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Third Review

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Third Review

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The United Nations issued the second Environmental Performance Review of Belarus (Environmental Performance Reviews Series No. 22) in 2005.

This volume is issued in English and in Russian.

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Foreword

It is essential to monitor progress towards environmental sustainability and to evaluate how countries reconcile environmental and economic targets and meet their international environmental commitments. Through regular monitoring and evaluation, countries may more effectively stay ahead of emerging environmental issues, improve their environmental performance and be accountable to their citizens. The ECE Environmental Performance Review Programme provides valuable assistance to member States by regularly assessing their environmental performance so that they can take steps to improve their environmental management, integrate environmental considerations into economic sectors, increase the availability of information to the public and promote information exchange with other countries on policies and experiences.

As we celebrate 20 years of ECE Environmental Performance Reviews, we are undertaking a process of reflection and evaluation of the review process itself. One thing is clear: it has been a valuable mechanism in evaluating the implementation of the extensive environmental legislation enacted and the numerous environment-related conventions ratified by ECE member States. All the countries of the region have further benefited from the discussions on the recommendations of the Environmental Performance Reviews, which entail the sharing of environmental data and knowledge and a frank exchange on best practices and lessons learned.

Recently, new instruments, such as the 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs) and the Paris Agreement on Climate Change, have been negotiated and adopted to address sustainable development challenges. ECE peer review mechanisms, including the Environmental Performance Reviews, play an important role in assessing how well countries are addressing such challenges and meeting their commitments, both old and new. These mechanisms will also continue to provide an opportunity to evaluate whether policies are achieving results, whether there might be better ways to do so, and how to address any shortcomings.

The third Environmental Performance Review of Belarus gathers together a wealth of information to build up a snapshot of the country's environmental governance and performance — both in terms of achievements and shortcomings. I trust that this third review will serve as a powerful tool to support policymakers and representatives of civil society in their efforts to improve environmental management and further promote sustainable development in Belarus. ECE wishes the Government of Belarus further success in carrying out the tasks involved in meeting its environmental objectives, including the implementation of the recommendations in the third review. I also hope that the lessons learned from the peer review process in Belarus will benefit other countries throughout the ECE region and facilitate the achievement and monitoring of the SDGs.

Christian Friis Bach

Executive Secretary
Economic Commission for Europe

Preface

This third Environmental Performance Review (EPR) of Belarus takes stock of progress made by Belarus in the management of its environment since it was peer reviewed for the second time in 2005 and assesses the implementation of the recommendations made in the second review. It covers issues of specific importance to the country related to legal and policy frameworks, the financing of environmental expenditures, greening the economy, air protection, water and waste management and biodiversity conservation. It also examines the efforts of Belarus to integrate environmental considerations in its policies in the energy, transport, forestry, tourism, human settlements and health sectors, and highlights the progress achieved in developing environmental education and education for sustainable development. The review further provides a substantive and policy analysis of the country's climate change adaptation and mitigation measures and its participation in international mechanisms.

The successes of Belarus in the achievement of most of the Millennium Development Goals are highlighted, as well as some remaining challenges. Governments are now discussing the implementation of the 2030 Agenda for Sustainable Development, as well as the follow-up and review of progress in the achievement of its Sustainable Development Goals. This third review, together with its recommendations, should assist all stakeholders in developing an aspirational national agenda for achieving these Goals.

The third EPR of Belarus began in January 2015 with a preparatory mission to agree on the structure of the report and the schedule for its completion. A team of international experts took part in the review mission from 17 to 25 March 2015. The draft report was submitted to Belarus for comment and to the ECE Expert Group on Environmental Performance Reviews for consideration in September 2015. During its meeting on 12 and 13 October 2015, the Expert Group discussed the draft report with expert representatives of the Government of Belarus, focusing on the conclusions and recommendations made by the international experts. The recommendations, with suggested amendments from the Expert Group, were then submitted for peer review to the Committee on Environmental Policy at its twenty-first session on 29 October 2015. A high-level delegation from Belarus participated in the peer review and the Committee adopted the recommendations in this report.

The Committee and the ECE secretariat are grateful to the Government of Belarus and its experts who worked with the international experts and contributed their knowledge and assistance. ECE would also like to express its appreciation to the German Federal Ministry for Environment, Nature Conservation, Building and Nuclear Safety and the German Federal Environment Agency for their support by providing funds through the Advisory Assistance Programme, and to Norway and Switzerland for their financial contribution. Sincere thanks also go to France and the United Nations Environment Programme for having provided their experts, and to the United Nations Development Programme for their support of this review.

ECE also takes the opportunity to thank Austria and the Netherlands for their general financial support to the EPR Programme and expresses its deep appreciation to Georgia, Estonia, Germany, Hungary, Sweden and Switzerland for having provided their experts for the ECE Expert Group on Environmental Performance Reviews, which undertook the expert review of this report.

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KEY ABBREVIATIONS

BAT	best available techniques
BREF	best available techniques reference document
CHP	combined heat and power
CIS	Commonwealth of Independent States
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CLRTAP	Convention on Long-range Transboundary Air Pollution
CPI	Consumer Price Index
EE	environmental education
EIA	environmental impact assessment
ELV	emission limit value
EMEP	Co-operative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe
ESCO	energy service company
ESD	education for sustainable development
EU	European Union
FIT	feed-in tariff
ForFITS	For Future Inland Transport Systems
GDP	gross domestic product
GHG	greenhouse gas
GMO	genetically modified organism
HCFC	hydrochlorofluorocarbon
HPP	hydropower plant
IAC	information and analysis centre
IBA	Important Bird Area
ILO	International Labour Organization
IPA	Important Plant Area
ITS	intelligent transportation system
LEAP	local environmental action plan
LPI	Logistics Performance Index
MAC	maximum allowable concentration
MDG	Millennium Development Goal
MIAC	Main Information and Analysis Centre
MSME	micro-, small and medium-sized enterprises
MSW	municipal solid waste
NGO	non-governmental organization
NEAP	National Environmental Action Plan
NEMS	National Environmental Monitoring System
NIP	National Implementation Plan
NPP	nuclear power plant
NSSD	National Strategy for Sustainable Socioeconomic Development
ODP	Ozone Depleting Potential
ODS	ozone-depleting substances
PCB	polychlorinated biphenyl
POP	persistent organic pollutant
PPP	public–private partnership
PRTR	pollutant release and transfer register
RBMP	river basin management plan
RES	renewable energy sources
RUE	Republican Unitary Enterprise
SEA	strategic environmental assessment
SEIS	Shared Environmental Information System
SDGs	Sustainable Development Goals
SEE	state ecological expertise
SOE	state-owned enterprise
SWC	State Water Cadastre

TCP	Technical Code of Practice
TPP	thermal power plant
UNDP	United Nations Development Programme
VOC	volatile organic compound
WPI	Water Pollution Index
WWTP	wastewater treatment plant

SIGNS AND MEASURES

..	not available
-	nil or negligible
.	decimal point
$	dollar
cap	capita
eq.	equivalent
g	gram
Gg	gigagram
GWh	gigawatt-hour
ha	hectare
kg	kilogram
km	kilometre
km^2	square kilometre
km^3	cubic kilometre
kt	kiloton
kV	kilovolt
kW	kilowatt
kWh	kilowatt-hour
l	litre
m	metre
m^2	square metre
m^3	cubic metre
Mg	Megagram
MW	megawatt
PJ	petajoule
ppm	parts per million
t	ton (1,000 kg)
toe	ton of oil equivalent
TWh	terawatt-hour

CURRENCY CONVERSION

Exchange rate (period average)
Monetary unit: 1 Belarusian rouble = 100 kopeks

Year	Roubles per Euro	Roubles per US$
2004	2 692.6	2 159.8
2005	2 667.6	2 153.0
2006	2 707.8	2 144.1
2007	2 961.4	2 146.3
2008	3 147.8	2 138.0
2009	3 920.6	2 808.5
2010	3 939.6	2 983.8
2011	7 306.4	5 261.1
2012	10 770.2	8 330.0
2013	11 878.8	8 921.7
2014	13 645.9	10 351.7

Source: ECE Database. Accessed on 15 August 2015.

Executive summary

The second Environmental Performance Review (EPR) of Belarus was carried out in 2005. This third review assesses the progress made by Belarus in managing its environment since the second EPR and in addressing new environmental challenges.

Environmental conditions and pressures

The economic system is characterized by central government planning and control of most of the domestic economic activity. Price controls exist for socially important goods and services. The economy is dominated by large, vertically integrated state owned enterprises, which currently account for about 75 to 80 per cent of the gross domestic product (GDP) output and provide a large share of the employment.

On average, GDP grew 5.6 per cent annually from 2005 to 2013. However, GDP growth was uneven over the review period. Until 2009, Belarus' economy had a strong 9.6 per cent annual average GDP growth. Since 2009, the annual average growth dropped to 3.2 per cent.

Sulphur dioxide (SO_2) emissions contracted over the review period, from 75,000 tons in 2005 to 51,000 tons in 2014 – a decrease of 32.0 per cent. The amount of SO_2 per capita in 2013 was 5.2 kg, which is less than half of the European Union (EU)'s 2010 average of 11.9 kg. Of the total SO_2 emissions in 2013, 7 per cent came from energy production and 88 per cent from industry.

Between 2005 and 2013 there was practically no change in the level of nitrogen oxide (NO_x) emissions. The three biggest sources of NO_x emissions in 2013 were road transport (14 per cent of the total), industry (42 per cent) and energy (38 per cent).

Ammonia (NH_3) emissions increased by 17.6 per cent, from 136,000 tons in 2005 to 160,000 tons in 2013. The agricultural sector was the source of 89 per cent of the NH_3 emissions in 2012.

All heavy metal emissions increased significantly from 2005 to 2012. Mercury emissions increased the most – by 50 per cent, whereas cadmium emissions increased by 38 per cent and lead emissions by 36 per cent.

From 2005 to 2013, the total greenhouse gas (GHG) emissions measured in CO_2 equivalent increased by 10.72 per cent, from 84,173.71 Gg to 93,200 Gg. The energy sector, which is the largest emitter, producing about 62.45 per cent of all GHGs, has not been able to reduce its emissions since 2005 – in 2013, they amounted to 58,200 Gg. However, the most significant percentage increase took place in the waste sector.

The total amount of abstracted water, which was 1,705.8 million m^3 in 2005, diminished by 191.6 million m^3 to 1,514.2 million m^3 in 2014. This 11.48 per cent drop in water abstraction was mainly caused by the 36.90 per cent decrease in the amount of water provided for drinking and domestic purposes. The per capita water use dropped from 210 litres per day in 2005 to 143 litres per day in 2010 and 137 litres per day in 2014.

The volume of total wastewater discharges diminished by 18.07 per cent between 2005 and 2014. In 2014, the total volume of discharged wastewater was 1,011 million m^3, of which 931 million m^3 went to surface water bodies while 80 million m^3 was disposed to the irrigated lands, infiltration fields and storage facilities. Of the wastewater discharged into surface waters, one third (31.47 per cent) required no treatment, about two thirds (68.21 per cent) was treated in compliance with appropriate regulations and norms, and a very small portion (0.32 per cent) was not adequately treated to the standards.

Surface water quality shows a steady, improving trend. In 2003, the Water Pollution Index showed that 41 per cent of surface waters were relatively clean, 58.4 per cent moderately polluted and 0.6 per cent extremely polluted. In 2013, the combined percentage of clean and relatively clean water had increased to 90.7 per cent, while the amount of moderately polluted water had decreased to 9.3 per cent and no surface water was classified as polluted or extremely polluted.

The forest area growth rate between 2006 and 2014 was 2.87 per cent. As of 1 January 2015, forest land covered 8.653 million ha, corresponding to 41.68 per cent of the country's territory.

The generation of municipal solid waste (MSW) increased by 38.23 per cent, from 2.8 million tons in 2005 to 3.9 million tons in 2013. The lack of accurate data and the change of calculation methods from cubic metres to tons might exaggerate the growth rate. Nonetheless, during the same period, per capita MSW grew even more, by 41.24 per cent, reaching 411 kg/capita in 2013.

Industrial waste generation increased by more than 51 per cent between 2005 and 2014. The generated amounts in 2005 and 2014 were 38,472 and 52.529 million tons, respectively.

The management of radioactive pollution from the 1986 Chernobyl NPP accident remains a specific issue. As of January 2012, as a result of natural radioactive decay, the area of contaminated lands with a Caesium-137 level of more than 1 Ci/km^2 (37 kBq/m^2) had decreased to 31,100 km^2 or 14.5 per cent of the land area of the country (from 47,600 km^2 – 23 per cent – of the country's land area in 1986).

Legal, policy and institutional framework

Progress has been achieved in the integration of environmental requirements into sectoral legislation and strategic documents. However the level of such integration differs across sectors and there is scope for stronger integration of environmental requirements in sectoral legislation and planning.

The country has a developed system of strategic planning, going beyond environmental issues and covering all planning areas, with the National Strategy for Sustainable Socioeconomic Development being at the core of the system. In the environmental field, strategic planning has been weakened with the discontinuation of national environmental action plans and the approval in 2011 of the Environmental Protection Strategy for the period until 2025 at the level of the Board of the Ministry of Natural Resources and Environmental Protection.

Green economy principles have been integrated in the National Strategy for Sustainable Socioeconomic Development for the period until 2030. Use of economic policies and instruments, introduction of green technologies, education for green economy, and science and innovation are among key measures. Practical steps are taken through international projects to raise capacity for implementation of a green economy approach.

Strategic Environmental Assessment (SEA) is not applied. At the same time, the prerequisites for introduction of SEA exist and SEA principles and procedures could be effectively integrated into the existing planning process. The country is not a Party to the Protocol on Strategic Environmental Assessment to the Espoo Convention.

The Millennium Development Goals (MDGs) have a prominent place on Belarus's agenda. MDG implementation reports have been prepared in 2005 and 2010, and an MDG statistical book was released in 2012. Belarus has been actively involved in the discussions on the post-2015 sustainable development goals (SDGs).

Although some reorganizations have taken place in the structure of the Ministry of Natural Resources and Environmental Protection, this body operated on a relatively stable basis in recent decades. Such stability of the national environmental authority, in particular its functioning at the ministerial level, resulted in consistent development and implementation of environmental policies, as well as facilitated the integration of environmental considerations into sectoral policies and legislation.

Since 2005, the Government has made progress in improving the legal framework for public participation in environmental decision-making. Public participation in the development of strategic documents and legislation relating to the environment, however, is still not provided for in the legislation.

The number of legal cases concerning citizens' environmental rights has increased. However, there are still difficulties with access to justice on environmental matters. Such difficulties include the limited standing of environmental non-governmental organizations (NGOs); high costs of litigation; poor awareness and capacity

of judges and prosecutors to handle environmental cases with participation of citizens and environmental NGOs; and other issues.

Although the requirements for registration of environmental public associations have been eased, the difficulties in their registration remain. The requirement for a public association to have an official seat in non-residential premises, the high number of founders needed and the requirements for territorial representation of founders continue to be obstacles for registration.

The procedures for approval and registration of international funding represent another difficulty for the operation of environmental NGOs, even though these procedures have been relaxed in the past years. There are cases when, due to delays or the impossibility of receiving governmental approval, NGOs had to return funding to the donor.

The situation regarding access to and availability of environmental information and data has improved. Still a large amount of environmental information is not available on the websites of relevant public authorities. Due to the definition of types of environmental information in the Law on Environmental Protection, some environmental information remains outside the scope of access-to-information provisions of this Law.

The National Environmental Monitoring System (NEMS) ensures the availability of environmental information to all governmental levels. Since 2014, the National Statistical Committee publishes on its webpage environmental indicators according to the Shared Environmental Information System (SEIS) principles. Despite the progress achieved, some issues remain if the country is to be able to fully comply with the principles of SEIS, namely, data flow and protocols for data flow between NEMS' environmental data systems are lacking.

Regulatory and compliance assurance mechanisms

The compliance assurance system has been strengthened over the last decade. Reforms have been initiated both inside the environmental sector as concerns integrated permitting and outside it as concerns inspection. Still, there is lack of capacity at the lowest level of governance – in rayon and town inspection units.

The mandate for carrying out state ecological expertise (SEE) was concentrated at the central and oblast levels in order to increase the quality of assessment. The scope of SEE as concerns industrial and infrastructure projects was harmonized with the scope of environmental impact assessment (EIA).

There have been improvements in the legal framework for public participation in EIA. However, in practice, major decisions are still taken without due consideration of public opinion. Post-EIA access to relevant information remains limited. There have been difficulties in the application of EIA in the transboundary context.

The introduction of integrated environmental permitting has been an achievement. Nevertheless, its scope does not follow international benchmarks, and resources are not used efficiently leaving potentially dangerous installations not covered by integrated permitting. Public participation is not well embedded within the integrated permitting procedure.

Discovery of and response to non-compliance have improved, from a procedural perspective. Self-monitoring was further improved. Strategic goals for compliance assurance, however, have not been established. There are no performance management indicators for the compliance assurance system. Information on environmental inspection, even in aggregated form, is not available to the public.

Building the legal and institutional framework for the introduction of a national Pollutant Release and Transfer Register (PRTR) is underway. The list of facilities for inclusion in a PRTR was determined. Belarus is not a Party to the 2003 Protocol on Pollutant Release and Transfer Registers to the Aarhus Convention.

Economic instruments, environmental expenditure and investments for greening the economy

A number of reforms of the system of environmental taxes that are imposed on polluting activities were undertaken. It has also introduced new product charges for dealing with products that are having

environmentally harmful effects at the post-consumption stage. In contrast, the changes made to the system of environmental taxes on emissions of air pollutants, discharge of industrial wastewater and the disposal or storage of industrial waste, have been piecemeal and not directed by a coherent concept designed to strengthen their impact on the behaviour of polluters.

The provision of communal utility services is, with a few minor exceptions, fully operated by state-owned companies. The role of the private sector is marginal and limited mainly to a single public-private partnership organizing the waste management in the City of Minsk. This points to a potentially large role for private sector participation as a mechanism for improving the provision of communal utility services.

The tariffs (prices) for the provision of communal utility services have been marked by the distinction between the official full cost recovery tariffs and the much lower tariffs that residential customers actually have to pay. The counterpart to this has been a combination of cross-subsidies from other customer groups (notably industry) that were significantly above the cost recovery level and/or considerable government subsidies to the utility companies. The Government has started to introduce tariff reforms that aim at gradually raising residential tariffs to cost recovery levels. The challenge is to ensure adequate access of lower income groups to communal utility services.

In the government sector, nature protection funds played a major role in the financing of environmental expenditure, but they were abolished in 2011. The large bulk of government budget expenditure is now financed from general revenue, with the exception of some budget organizations, mainly in the forest sector, that can also employ own revenue sources. Overall general government environmental expenditure has, however, been on a marked declining trend, both in real terms (i.e. when adjusted for inflation) and relative to GDP, in recent years.

Air protection

Air quality standards are close to EU standards. Air quality standards for specially protected natural areas were also developed and are, in some cases, more stringent than the EU standards.

Continuous efforts have been taken to gradually reduce consumption and phase out production of ozone depleting substances (ODS) such as hydrochlorofluorocarbons (HCFC) by 2020, to improve import and export licensing systems of ODS and to ban import and export of substances listed in the Montreal Protocol by the non-Parties. By 2010, the total HCFC consumption in Belarus was required to decrease to 12.7 metric tons (MT) of Ozone Depleting Potential (ODP). In 2010, 2011 and 2012 Belarus was in compliance with a consumption of 10, 9 and 8 MT ODP, respectively.

The country is not yet a Party to the amended Protocol to Abate Acidification, Eutrophication and Ground-level Ozone to the Convention on Long-range Transboundary Air Pollution. The Protocol provides emission limit values (ELVs) for stationary and mobile sources and requires implementation of best available techniques, also for ammonia (NH_3) control measures in the agricultural sector. Belarus is only partially complying with the ELVs, mostly for NMVOC and NH_3 emissions. Current SO_2 emissions meet the target for the Protocol by 2020, for which Belarus has announced its voluntary commitment. NH_3 emissions have increased in the last 10 years due to the growth of livestock husbandry.

Belarus is considering accession to the amended protocols on Heavy Metals and on POPs to the Convention on Long-range Transboundary Air Pollution. However some issues remain, e.g. achievement of the ELVs for lead in the glass industry and for dust in the cement industry.

There are very few people who use bicycles, although Minsk City is not very hilly and distances are not too great. The construction of safe paths for bicycles, and other promotion measures, could encourage more people to use this green and healthy form of transport.

Water management

The overall water supply and wastewater service coverage is high, and has shown steady growth over the last several years. In 2014, the coverage of the urban population served by a centralized water supply system

reached almost 98 per cent, while centralized sewerage coverage in urban areas was 92 per cent. In rural areas, 29 per cent of the population lack access to centralized water supply systems and 62 per cent are not connected to centralized sewerage. Services are more developed in larger settlements, the so-called "agro-towns", while in scattered villages and farms the population relies mostly on public or private shallow wells and individual sanitation facilities.

Pollution load from diffuse sources in residential and industrial areas and cultivated land is a major contributor to contamination of water bodies and shallow groundwater. Some measures have been taken to reduce diffuse pollution but so far not much progress has been made. Polluted runoff from cultivated land remains the main source of diffuse pollution of water bodies and groundwater with nitrogen and phosphorus. The methodology for assessing diffuse pollution has not been updated since 1999.

There is no regular monitoring of contaminated sediments, which are usually accumulated on the bottom of the river sections downstream of large cities and industrial complexes.

The 2014 Water Code places the river basin management approach at the core of water management policy. It provides for the preparation of river basin management plans (RBMPs) for the parts of the Dnieper, Pripyat, Neman, Western Dvina and Western Bug river basins located within the territory of Belarus. The draft of the Upper Dnieper RBMP has been prepared. The basin councils to be set up in compliance with the Code will provide an institutional framework for management of river basins with the participation of central, oblast and local authorities, water users and the public.

The State Water Cadastre (SWC) is an efficient and indispensable tool for managing the country's water resources. In 2015, its functions and scope were updated and expanded. Information about the ecological status of water bodies, inland waterways and hydrotechnical structures will be covered in SWC. However, with its current capacity, such as outdated information and communication technologies and limited human resources, SWC cannot face this challenge.

Waste management

MSW collection services are available to all citizens and organizations. While in 2005 only about 35 per cent of the urban population received regular waste collection services, 99 per cent of the urban population was serviced in 2014.

Separate collection of MSW, providing containers for dry (paper, plastics, glass) and for wet (biodegradable) waste, is available in the capital, oblast and rayon centres. The dry fraction is delivered for sorting and the wet fraction is sent for disposal. The number of containers for separate collection is not sufficient. The country has sufficient capacity to process recyclables separated from municipal waste, but it is reaching its capacity.

MSW is disposed to mini-dumpsites or to rayon dumpsites. Mini-dumpsites are used in remote countryside areas, but their number is decreasing: while in 2007 about 4,500 mini-dumpsites were registered, their number decreased to 2,351 in 2014. The rayon dumpsites, currently numbering to 170, are usually equipped with basic machinery, a weighbridge and bottom sealing. The transformation of disposal practice, from small disposal sites to oblast-controlled landfills, is a challenge.

The current legislation and practice of waste management assumes that the waste collector and operator of a disposal site is the same legal entity. One of the preconditions for successful modernization of waste management is the division of these two functions into different entities, which would create incentives to build modern landfills, install weighbridges, introduce gate fees and improve data on municipal waste.

Management of industrial waste is well organized at the level of generation and recovery, but disposal practice is behind international practice, especially for sites storing waste generated in large volumes in the past. The impact of these sites on the environment is known in the most outstanding cases, but methodology for comparable evaluation of risks is not in place. Rehabilitation of large industrial waste sites may be very costly.

The 2014 estimate shows that 10,632 tons of obsolete pesticides were identified in the country. The process started to transfer pesticides from underground sites to above-ground storage facilities and to the special facility

for storage, treatment and disposal of hazardous waste, including obsolete pesticide, in Chechersk. This is leading to the reduction of the volume of pesticides stored in unsafe conditions and the number of waste storage facilities. All identified storage facilities for obsolete pesticides are regularly monitored.

A roadmap towards ratification of the Minamata Convention on Mercury was drafted. No inventory of mercury and products containing mercury was carried out in the health and energy sectors.

Biodiversity and protected areas

The share of specially protected natural areas in total land area of the country increased from 7.7 per cent in 2009 to 8.7 per cent in 2015. There are four national parks, one nature reserve, 96 preserves of the national importance and 267 preserves of local significance. An integrated monitoring of ecosystems in specially protected natural areas is in place.

Since 2005, the country designated nine new Ramsar sites. National management plans were updated for three bird species (great spotted eagle, great snipe, and aquatic warbler) and developed for three new species (bittern, smew, and roller). Starting from 2015, the ban on spring hunting for waterfowl was introduced in 32 wetland areas.

Since 2009, the country participated in the programme to create the Emerald Network. In 2014, the nomination of 16 Belarusian specially protected natural areas for inclusion in the Emerald Network was approved. In 2015, Belarus submitted 64 additional territories for inclusion in the Emerald Network.

A national ecological network is not yet established. The draft scheme of the national ecological network was developed and the legal framework is in place. However some areas that are to become part of the national ecological network are not currently under the protected area system and do not yet have a special status of protection.

The draining of wetlands is among major anthropogenic factors affecting both the hydrology of water resources and biodiversity. As of 2014, the area of 2.9 million ha was drained for agricultural purposes.

One of the main pressures on biodiversity is climate change. A decrease in the number of areas for boreal species of wild plants has been registered in the northern and eastern regions of the country, while some new species typical of steppe and forest-stepped zones have appeared. The effects also include a decrease in population numbers of some species of wild plants and animals of inundated, riverside and wetland ecosystems.

In 2011, the country launched a system of monitoring alien and invasive plant species. As of early 2015, more than 70 permanent observation points have been set up; in addition, a specialized database on the location of the most harmful invasive species is maintained. Action plans to restrict the spreading of invasive Canadian goldenrod, wild cucumber (*Echinocystis lobate*), black locust (*Robinia pseudoacacia*) and American maple (*Acer negundo*) were approved.

Belarus became a Party to several biodiversity-related international agreements. In 2013, it acceded, with reservations, to the 1979 Bern Convention on the Conservation of European Wildlife and Natural Habitats. In 2014, it acceded to the 2010 Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization. In 2015, the country took a decision to accede to the 1995 Agreement on the Conservation of African-Eurasian Migratory Waterbirds (as of 29 October 2015, the instrument of accession is not yet deposited).

Energy and environment

Energy pricing remains inadequate to encourage efficient use of energy. Market mechanisms for setting energy tariffs are still absent. Electricity remains heavily subsidized for households. There is cross-subsidization between consumer groups (mainly between households and industry). Motivating households to save energy is an important issue to be addressed.

The first energy service company (ESCO) started operation in early 2005. However, there are barriers to ESCOs operations, in particular, the legislative basis for the development and operation of an ESCO is not sufficiently developed.

The 2,400 MW nuclear power plant (NPP) is under construction in Ostrovets, Grodno Oblast. The first reactor of 1,200 MW is planned to be in operation in 2019, and the second, of the same capacity, in late 2020. The NPP is expected to reduce gas imports by 5 billion m^3 annually. The construction and operation of any NPP can potentially have environmental impacts. It is therefore important to ensure compliance with the international standards of NPP construction and operation in order to reduce environmental and health risks.

The share of renewable energy in total energy consumption in the period 2005–2012 increased, with average annual growth of around 4 per cent. However, currently, only a small proportion of energy comes from renewable resources, as the legislation in this area has been developed only recently and the institutional and technical capacity to develop renewable energy sources is still to be built.

There is no legislation that supports further development of the national energy system according to market rules. No law on energy covers all aspects of the energy sector, including production, transport, distribution and consumption, to transform the sector into a competitive market. Government plans to reform the electricity sector by creating a wholesale market have been delayed.

Transport and environment

The impact of the transport sector on air pollution has stabilized and, in recent years, even reversed. Compared with 2009, emissions of air pollutants from transport in 2013 have declined by some 20 per cent, from 1.14 million tons to 0.93 million tons. As a percentage, their share in total air polluting emissions has declined, from 72 per cent in 2005 to 68 per cent in 2014. These developments are significant because they are occurring against the backdrop of a sharp increase in the vehicle fleet.

The country has invested in electrifying public transport in major cities. At the same time, greening urban transport in this way has not yet resulted in equivalent increases in passenger turnover, with the notable exception of metro passengers in Minsk. There has been a steep rise in the use of metro in Minsk – by more than 31.1 per cent, from around 250 million passengers in 2009 to 328 million passengers in 2013.

The quality of fuel remarkably improved. As of January 2015, Euro 5 standard for diesel is applied (sulphur 10 ppm), a quality level to be attained for petrol as of 2016. Currently, the Euro 4 standard for petrol is used (sulphur 50 ppm).

The urban traffic performance of Minsk is improving through the application of intelligent transportation system (ITS) solutions. However, the application of ITS solutions to improve the traffic situation and mitigate the negative environmental, health, economic and social impacts of motorized transport is not widely practised.

The country participates in several transport agreements which are important from an environmental point of view. However Belarus does not yet participate in the 1993 Protocol to the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) and the 2000 European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN).

Forestry and environment

Over recent decades, forest rehabilitation and restoration have been very successful in quantitative terms. But these practices created uneven age structure and species composition in re-established forests. As a result, Belarusian forests are relatively young and without the full genetic stock of old growth forest systems. Young, low diversity forests tend to be less resistant to pests and diseases as well as climate change.

The preparation of the second Forestry Development Strategic Plan (2015–2030) and the ongoing revision of the Forest Code were characterized by a wider consultation process than in the past. Still, the formulation of these key documents for the forestry sector mainly involved institutional actors, and professional forestry and academic communities, and lacked active participation of the private sector, local communities and civil society

organisations. Also, the consideration of cross-sectoral aspects such as biodiversity conservation and climate change was insufficient.

At present, the economic potential of forests is not fully exploited, and there is large scope for development in terms of increased harvesting on a sustainable basis and processing for export as well as for domestic consumption. Private sector engagement in timber and non-timber forest products harvesting and processing and other entrepreneurial activities related to reforestation and nurseries is still marginal.

The actual timber regulation system results in unequal access to forest resources and advantages forest enterprises over private sector wood processing companies. Such a form of subsidization may discourage the efficient utilization of forest resources, reduce the financial resources for forest management and cause the misallocation of investment funds.

Despite efforts in recent years, the enhancement of the forest road network remains a priority. Low forest road density can cause an overexploitation of forests close to existing roads, with associated negative environmental impacts. Current efforts to enhance the forest road networks are not based on multifunctional construction principles and do not give due consideration to soil erosion, habitat loss and natural landscape impacts.

Tourism and environment

Although the total number of collective accommodation facilities in Belarus increased by more than 60 per cent in the period 2005–2014, the number of organized Belarusian tourists travelling abroad still outstrips the number of visitors to Belarus. In 2014, five Belarusian citizens travelled abroad (six in 2005) for each visit of a foreign tourist to Belarus.

Agri-ecotourism has been actively developing in the country. The overall growth of agri-ecotourism entities has significantly escalated: from 34 entities in 2006 to 2,037 in 2014. The number of tourists who used agri-ecotourism services in 2014 was 318,842, 17.3 per cent more than in 2013. Residents of Belarus made up 86.9 per cent of total agri-ecotourists.

Since 2005, Belarus has become a destination for hunting enthusiasts from abroad. Hunting companies typically offer three days of hunting for around €1,000. Within the country, not all citizens are willing to pay these kinds of prices. Poaching remains a widespread activity, especially in rural areas.

Information is not available on the pressures that tourism puts on the environment. Neither data nor estimates are available of the pressures that tourism puts on water resources and air. Data on municipal waste generated by the tourism sector are hidden within the total data on municipal waste generated in the country.

Environmental education and education for sustainable development

Progress has been achieved in efforts to integrate environmental education (EE) and education for sustainable development (ESD) elements in formal, non-formal and informal education contexts. Belarus is also advancing in putting in place legal, policy and institutional frameworks that support EE and ESD. Research and methodological work on ESD is advanced in universities and education institutions, and educators are actively involved in discussions on improving teaching methodology. However, no evaluation of progress in development of EE and ESD, and no assessment of their effectiveness, has been undertaken.

Although an environmental component largely prevails, there is a noticeable move observed in shifting from environmental to sustainable development topics in the education system. This shift may be further strengthened to cover a broader spectrum of sustainable development topics (e.g., democracy and governance; peace and human security; sustainable consumption and production; and sustainable urbanization).

Current in-service training programmes on environmental and sustainable development issues are targeted at civil servants. There are no such training programmes tailored to private sector professionals.

The institutional framework that supports EE and ESD at the national level is weak. The Coordination Centre "Education for Sustainable Development" is not financed by the Government. The interministerial Coordination Council on ESD at the Ministry of Education, established in 2006, has met only two times.

Human settlements and environment

There is a strong tradition of territorial planning in the country and a comprehensive system of territorial plans for the national, oblast and local levels. The existing territorial planning approaches, however, do not sufficiently reflect modern, internationally accepted principles of urban planning as an integrative and strategic decision-making process.

The existing practice on energy saving in the housing sector has mainly focused on improving thermal resistance of walls and other structures. Extensive research conducted in the country over the last decade demonstrates the possibility of further reduction in thermal energy consumption through more comprehensive solutions. However, the practical implementation of such measures is constrained by a shortage of the technical norms and standards that would support optimization of integrated energy efficiency of dwellings.

The provision of green spaces in settlements is regulated by specific technical regulatory legal acts, yet, in practice, the availability of high quality green spaces differs significantly among the settlements. There are further possibilities for enhancing green spaces as part of settlements' development programmes, including improving the existing parks and underused/abandoned land, converting the curtilages of residential buildings into recreational green spaces, and road planting.

In the past decade, the rural settlement system was optimized through establishment of new rural centres – 1,500 agro-towns with improved social services and public amenities. At the same time, many other rural settlements have not yet managed to achieve positive changes. Some rural settlements have recently been engaged in the development of their integrated local sustainability plans.

Health and environment

Monitoring programmes exist for several environmental health factors such as air quality, food, drinking water and recreational water quality, as well as for radiation. This monitoring is performed by different ministries and all data collected are published in statistical yearbooks. Statistical analysis of the results are not performed to extract significant tendencies and cross-links between environmental and health results.

Various ministries take the environment and health into account in their areas of competence. However, there is no agency or department specifically dedicated to the coordination of health and the environment and to strategy development in this field. There is no national environmental health action plan and no strategic targets on environment and health are defined.

Indoor air quality is controlled by state sanitary supervision authorities before opening of a new school and after repair works in existing schools. However no data are available on indoor air pollution in houses, while several factors, such as asbestos, radon, carbon monoxide emission and mould, can be presumed to be present in buildings and have an impact on public health.

Two enterprises produce asbestos-containing materials but no data on asbestos concentrations in the environment of the surrounding areas are available. Asbestos is still used in building construction and no data on asbestos in houses are available. Specific diseases related to asbestos are not registered. A comprehensive approach to the reduction of the use of asbestos in the country is lacking.

With regard to construction of the Belarusian NPP, there is an understanding of the necessity to enhance radiation monitoring and to strengthen a new radiation monitoring programme dedicated to the NPP. The authorities have to bear the associated costs of the installation such as radiation monitoring, development of safety programmes and emergency action plans, and ensuring the availability of medication (iodine pills).

Major industries include mechanical and chemical manufacturing; they use hazardous chemicals. There is insufficient attention to the protection from exposure to hazardous chemicals of workers and of the population

living in the vicinity of industrial facilities. Information on the population's exposure to hazardous chemicals in industrial areas is not available. Biomonitoring is performed for workers but only occasionally for the population living in industrial areas.

Introduction

ENVIRONMENTAL CONDITIONS AND PRESSURES

I.1 Demographic and socioeconomic context

Geography

Belarus is a landlocked country in Eastern Europe. It is bordered by the Russian Federation to the east (border length 959 km), Ukraine to the south (891 km), Poland to the west (407 km), and Latvia (141 km) and Lithuania (502 km) to the north-west. Within its total land area of 207,600 km^2 Belarus has four distinctive geographic regions: the lakes and forested hills in the north; the elevated plain region in the east; the Polessye (Pripyat marsh) lowland area of rivers and swamps in the south; and an agricultural region with mixed conifer forests in the west.

The terrain is generally flat with forests, lakes and marshes, but a highland running from the north-east to the south-west divides the country into two water catchment areas; the northern one drains to the Baltic Sea and the southern one to the Black Sea.

The largest of the country's thousands of lakes is Lake Naroch (80 km^2) in the north-west. The Dnieper River (length within Belarus 700 km) is the longest river, flowing south almost the entire length of the country. It has two main tributaries, the Pripyat (length within Belarus 495 km) in the south and the Berezina (length within Belarus 613 km) in the country's central region.

The continental climate is influenced by the Baltic Sea and the Atlantic Ocean. The average annual precipitation ranges from 546 to 693 mm while the average temperature varies from 17.5°C in July to -7°C in January, although in the north of the country even -40°C temperatures have been recorded.

Population

The total population has been stable – it was 9,697,475 in the beginning of 2005 and then decreased by 2.36 per cent to 9,468,154 in the beginning of 2014. The other population indicators have changed somewhat. The life expectancies of the male and female populations increased between 2005 and 2013, by 4.4 and 2.8 years, to 67.3 and 77.9 years, respectively. During the same period, the total fertility rate increased by 33.2 per cent, from 1.225 to 1.668, while the infant mortality rate more than halved, from 7.1 per 1,000 births in 2005 to 3.5 in 2013 – a significant 50.7 per cent decrease to a very low absolute level. The average population density is 45.6 people/km^2. The main cities include the capital, Minsk (pop. 1,921,807 in the beginning of 2014), Gomel (pop. 521,965 in the beginning of 2014) and Mogilev (pop. 370,690 in the beginning of 2014).

Economic and social development

In 2001–2014, Belarus has participated in the Eurasian Economic Community (EurAsEC). Since 2015, it participates in the Eurasian Economic Union. The Treaty on the Eurasian Economic Union entered into force on 1 January 2015. It brings together Armenia, Belarus, Kazakhstan, Kyrgyzstan and the Russian Federation. The Eurasian Economic Union is currently only an economic union focusing on the free flow of capital, goods and services, and the workforce throughout a common market. For Belarus, the free flow of goods and easier trade with the Russian Federation is essential because more than 40 per cent of its exports and more than half of its imports are traded with the Russian Federation, the country's main trade partner.

The economic system is characterized by central government planning and control of most of the domestic economic activity. Price controls exist for socially important goods and services.

The transition process towards a more market-driven economy has been slow during the past decade and the economy is dominated by large, vertically integrated SOEs, which currently account for about 75 to 80 per cent of the gross domestic product (GDP) output and provide a large share of the employment. The private business sector is comprised of small and medium-sized enterprises.

On average, GDP grew 5.6 per cent annually from 2005 to 2013. However, GDP growth was uneven over the review period, which can be divided into two very different phases – before and after 2009. Until 2009, Belarus' economy had a strong 9.6 per cent annual average GDP growth – with which Belarus outperformed the also very respectable annual average GDP growth figures of both the Commonwealth of Independent States (CIS) (7.55 per cent) and the Russian Federation (7.05 per cent).

However, since 2009, the annual average growth dropped to 3.2 per cent (table I.1).

The robust economic growth before 2009 resulted from a combination of external factors. The strong export demand by the main trading partners – the CIS region in general and the Russian Federation in particular – was crucial to the growth. The economy was boosted by the availability of inexpensive energy imports from the Russian Federation and the profitable exports of oil products and fertilizers.

The Russian Federation's move to market-based pricing of its energy exports to Belarus in 2006, in combination with the 2008–2009 global economic and financial crises, which was transmitted to the Belarusian economy through lower export demand and reduced access to external borrowing, slowed the GDP growth down to 0.2 per cent in 2009. The Government responded to the worsening economic situation in 2009 with tightening of the macroeconomic policy and a one-off adjustment of the exchange rate, backed up by external financing.

The initial economic stabilization in 2009 was reversed by the expansionary fiscal and monetary policies, including a fast credit expansion under government-directed lending programmes that fuelled a rapid but short-lived economic recovery in 2010. GDP growth figures jumped to 7.7 per cent in 2010.

This recovery came at the expense of the current account deficit deteriorating to 15 per cent of GDP in 2010, and heightened pressure on the exchange rate and foreign exchange reserves.

After a period of multiple exchange rate changes, the Belarusian rouble lost close to 70 per cent of its value relative to the United States dollar (US$). The current account deficit decreased to 2.9 per cent in 2012 but then increased to 10.5 per cent in 2013. GDP growth remained at 5.5 per cent in 2011 but dropped to 1 per cent in 2013.

GDP per capita measured in 2005 US$ and purchasing power parity was US$15,200 in 2013 or 53.0 per cent of the EU-28 average. In comparison with its neighbours, Belarusian GDP per capita fared quite well – it was 81.3 per cent of the GDP of Poland (US$18,688) and 98.9 per cent of that of the Russian Federation (US$15,375).

Since 2005, annual inflation (December to December of the previous year), measured by Consumer Price Index (CPI), has never been below 6.6 per cent. The effect of the economic difficulties started to show in 2011 when the annual inflation rate jumped to 108.7 per cent. The following year, 2012, saw an inflation rate of 21.8 per cent. The inflation hike was finally brought under control in 2013 and 2014 when the CPI rate dropped to 16.5 per cent and 16.2 per cent respectively (table I.1).

The registered unemployment rate has been at a very low level and without fluctuation. Even the economic slowdown after 2008 did not increase the unemployment level. Before 2008, the registered unemployment rate was above 1.0 per cent of the workforce but in 2008 the rate dropped below 1.0 per cent and has stayed at that level ever since. This contradictory development quite likely happened because the big SOEs have been keeping their employees on the payroll even when production is decreasing.

The share of the Belarusian population living with income below the national poverty line has diminished over the review period. In 2005, this share was 12.7 per cent of population but it decreased gradually up to 2010, reaching a low of 5.2 per cent. In 2011, the trend reversed for a year, but positive development with decreasing poverty returned in 2012 and the indicator ended at 5.5 per cent in 2013 and 4.8 per cent in 2014.

Table I.1: Selected macroeconomic indicators, 2005–2014

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Unemployment rate	1.5	1.1	1.0	0.8	0.9	0.7	0.6	0.5	0.5	0.5
Consumer Price Index, growth rate	10.3	7.0	8.4	14.8	13.0	7.8	53.2	59.2	18.3	18.1
Consumer Price Index, growth rate (December in relation to December of the previous year)	8.0	6.6	12.1	13.3	10.1	9.9	108.7	21.8	16.5	16.2
GDP at 2005 prices, growth rate	9.4	10.0	8.6	10.2	0.2	7.7	5.5	1.7	0.9	..
GDP per capita at 2005 prices, growth rate	10.1	10.7	9.1	10.6	0.4	7.9	5.7	1.8	0.8	..
Current account balance (% of GDP) from WB databank	1.5	-3.8	-6.7	-8.2	-12.5	-15.0	-8.5	-2.9	-10.5	..

Source: ECE database, May 2015; World Bank databank, May 2015; National Statistical Committee, September 2015.

Measured by the United Nations Development Programme (UNDP)'s Human Development Index (HDI), Belarus belongs to the high human development country group. In 2005 it attained an HDI score of 0.725, while its 2013 HDI was slightly higher at 0.786, placing the country in 53rd place of the 187 countries compared.

Gender

The proportion of female legislators in the National Assembly has fluctuated around 30 per cent since 2005. As of 1 January 2014, 29.7 per cent of the parliamentarians were women. Only two of 24 ministries in 2015 were headed by women and among the seven chairpersons of oblast (and Minsk City) executive committees there were no women.

The gender imbalance is practically absent at the general secondary education level, where the male:female ratio of enrolment is close to 1.0. The tertiary education sector has much higher female than male enrolment levels. Belarus has one of the world's highest ratios of female enrolment in higher education. In 2012, the ratio of female to male enrolment was 1.4 women to 1.0 man.

The National Council on Gender Policy, which coordinates implementation of the state policy on gender, was established in 2000.

The National Plan of Actions to Ensure Gender Equality in the Republic of Belarus for 2011–2015, which is the main document to foster the equal participation of men and women in all spheres of life, was adopted by the 2011 Resolution of the Council of Ministers No. 1101.

The Convention on the Elimination of All Forms of Discrimination against Women (CEDAW) was in effect in the Belarusian Soviet Socialistic Republic from 1981 and remained in effect after Belarus gained its independence. Belarus ratified an Optional Protocol of the Convention in 2004. Belarus has regularly submitted periodic reports under the Convention.

The UNDP Gender Inequality Index placed Belarus, with a score of 0.152, in 28th place of the 187 countries compared in 2013, and the World Economic Forum's Gender Gap Report ranked Belarus 32nd of 142 countries, with a score of 0.730, in 2014.

I.2 Key environmental trends

Air and climate change

Air

Sulphur dioxide (SO_2) emissions contracted over the review period, from 75,000 tons in 2005 to 51,000 tons in 2014 – a decrease of 32.0 per cent. There was a sudden increase in SO_2 emissions from stationary sources in 2009, due to changes in quantity and type of fuel combusted (temporary switch from natural gas to fuel oil with sulphur content of 2.3 %). This did not impact the overall picture with implementation of country's obligations under the Convention on Long-range Transboundary Air Pollution. The amount of SO_2 per capita in 2013 was 5.2 kg, which is less than half of the European Union (EU)'s 2010 average of 11.9 kg (figure I.1).

Between 2005 and 2013 there was practically no change in the level of nitrogen oxide (NO_x) emissions, which grew over the comparison period only 0.7 per cent, from 153,000 tons in 2005 to 154,000 tons in 2014.

Ammonia (NH_3) emissions increased by 17.6 per cent, from 136,000 tons in 2005 to 160,000 tons in 2013.

Of the total SO_2 emissions in 2013, 7 per cent came from energy production and 88 per cent from industry.

The three biggest sources of NO_x emissions in 2013 were road transport (14 per cent of the total), industry (42 per cent) and energy (38 per cent).

The agricultural sector was the source of 89 per cent of the NH_3 emissions in 2012, while the chemicals industry and various smaller sources contributed the rest.

All heavy metal emissions increased drastically from 2005 to 2012. Mercury emissions increased the most – by 50 per cent, whereas cadmium emissions increased by 38 per cent and lead emissions by 36 per cent.

The emissions of fine particles ($PM_{2.5}$) increased by 13 per cent from 2005 to 2012. During the same period, PM_{10} emissions increased by 25.9 per cent.

Greenhouse gas emissions

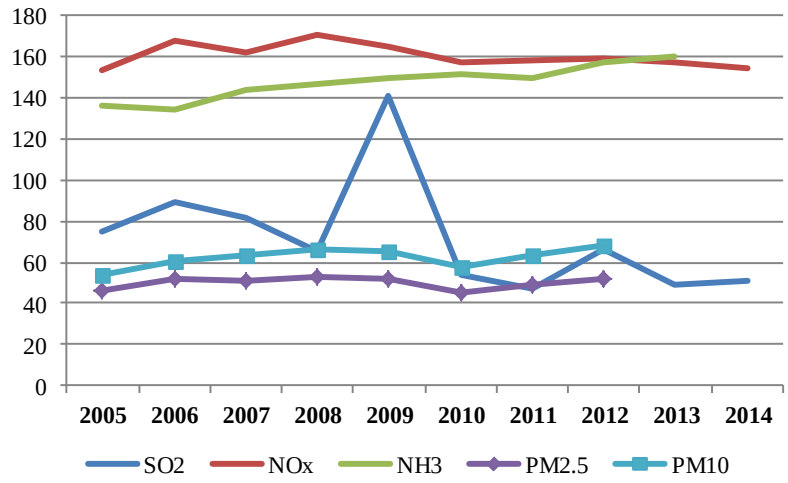
Compared with the UNFCCC's figures for the base year of 1990, Belarus has made noticeable positive progress in reducing greenhouse gas (GHG) emissions. In 2013, the country's emissions were only 56.92 per cent of the 1990 base year levels, but progress in reducing GHGs since 2005 has been reversed in all sectors except the solvents sector, which diminished by 6.8 per cent between 2005 and 2012.

From 2005 to 2013, the total GHG emissions measured in CO_2 equivalent increased by 10.72 per cent, from 84,173.71 Gg to 93,200 Gg. The energy sector, which is the biggest emitter, producing about 62.45 per cent of all GHGs, has not been able to reduce its emissions since 2005 – in 2013, they amounted to 58,200 Gg. However, the largest percentage increase took place in the waste sector, which, in 2013, was the source of 24.79 per cent of all GHG emissions (figure I.2).

Between 2005 and 2013, emissions from the waste sector increased by 60.16 per cent. Compared with the base year of 1990, the waste sector's growth in emissions was remarkable – 287.41 per cent. Industrial processes and agriculture have also had increasing emissions since 2005. In 2013, industrial processes emissions were 29.14 per cent higher than in 2005, and agricultural emissions 11.66 per cent higher.

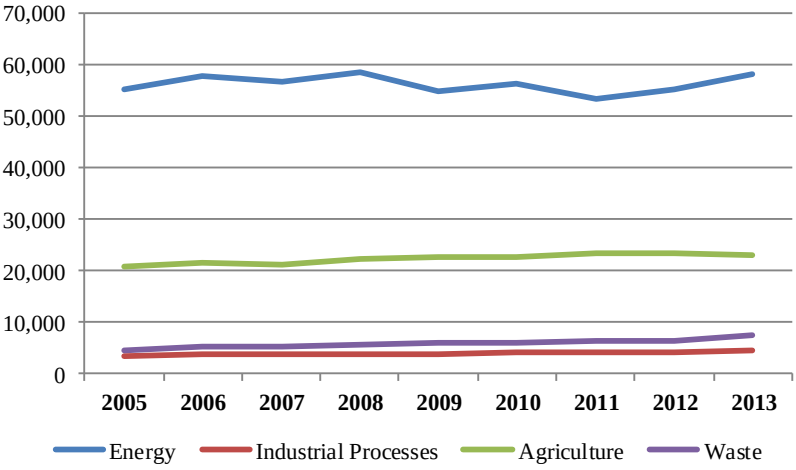
Energy intensity declined during the review period, from 0.29 kilotons of oil equivalent (ktoe)/ US$ million (measured in 2005 US$ prices and PPP), in 2005 to 0.20 ktoe/US$ million, in 2010 – a 30.22 per cent drop.

Figure I.1: Air emissions, 2005–2014, Gg



Source: Ministry of Natural Resources and Environmental Protection, 2015.

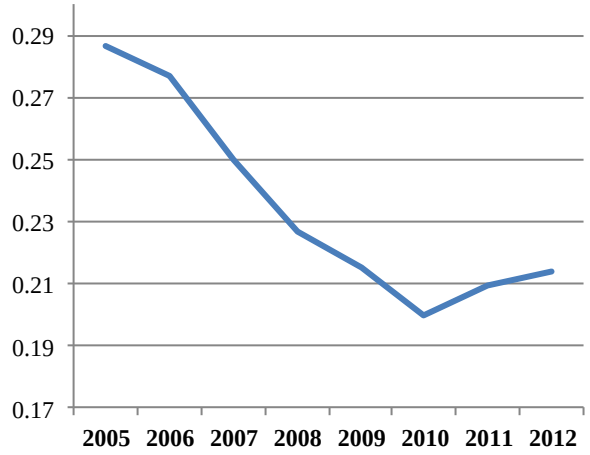
Figure I.2: Sectoral GHG emissions, 2005–2013, Gg of CO_2 equivalent



Source: Environmental Protection in the Republic of Belarus 2009–2013, Statistical book, National Statistical Committee, 2014.

This positive trend was reversed when energy intensity increased slightly to 0.21 ktoe/US$ million in 2012 (figure I.3).

Figure I.3: Energy intensity 2005–2012, total primary energy supply (TPES), ktoe/US$ million (measured in 2005 US$ prices and PPP)



Source: IEA database, 2013.

Surface water and groundwater

Water resources

The total annual mean runoff is 57.9 billion m^3, of which 58 per cent or 34.0 billion m^3 is formed within the country, while the rest, 23.9 billion m^3, is the inflow from the neighbouring Russian Federation and Ukraine.

The water availability per capita is 3,590 m^3/person/year, which is more than double the threshold of 1,700 m^3/person/year defining a water-stressed country. The estimated renewal groundwater resources are 15.9 billion m^3/year and the estimated total groundwater resources are 18.1 billion m^3/year.

The country has five river basins (Dnieper, Western Dvina, Western Bug, Neman and Pripyat). The Dnieper basin covers about 30.7 per cent of the area of the country and accounts for 55.2 per cent of its renewable surface water resources (RSWR). The second biggest river basin is the Western Dvina, which covers about 16 per cent and accounts for 24.7 per cent of its RSWR.

The Neman basin covers about 22 per cent and accounts for 16.2 per cent of its RSWR. The Western Bug basin covers about 5.8 per cent and accounts for 4 per cent of its RSWR. The Pripyat basin covers 12.2 per cent and accounts for 2.4 per cent of RSWR.

Belarus has over 10,800 freshwater lakes with a total capacity of 7.2 km^3 and combined area of 1,600 km^2, covering about 0.8 per cent of the total area of the country. There are also about 1,550 ponds and natural dugouts with a total capacity of 0.5 km^3 and combined area of 350 km^2.

In addition to the natural lakes, Belarus has 153 water reservoirs, of which 89 have been built for irrigation purposes; their total capacity is estimated at 3.08 km^3 and their total surface area about 880 km^2.

Water abstraction and use

The total amount of abstracted water, which was 1,705.8 million m^3 in 2005, diminished by 191.6 million m^3 to 1,510 million m^3 in 2014 (figure I.4). This 11.48 per cent drop in water abstraction was mainly caused by the 36.90 per cent decrease in the amount of water provided for drinking and domestic purposes. Most of this change in drinking water provision was due to the reduced use of groundwater as a source (figure I.4).

The supply of water for drinking and domestic needs accounts for the largest share of water use in Belarus. In 2014, water used for these purposes (473 million m^3) accounted for 34.50 per cent of the total water use of the country. There was a steep reduction in household water use between 2005 and 2010. After 2010, the reduction was much smaller. The per capita water use dropped from 210 litres per day in 2005 to 143 litres per day in 2010 and 137 litres per day in 2014.

Industrial water use diminished 8.27 per cent from 2005 to 2014. Irrigation and agriculture used 9.66 per cent less water in 2014 than in 2005. However, the starting level for this sector in 2005 was relatively low and this decrease did not have much effect on total water use.

Water losses in 2014 were 5.43 per cent of the total abstracted water – a very low figure. As a comparison, according to the Waterworld website, countries such as Switzerland and the United Kingdom have water losses of 12 and 25 per cent, respectively.

Water pollution

The industrial sector is among leading polluters of the water resources, by its discharges. Industrial water use decreased by 8 per cent, from 441 million m^3 in 2005 to 406 million m^3 in 2014. Government policies and regulatory as well as economic measures

have increased water reuse to a high level. In 2013, about 93 per cent of the total industrial water was reused, but the industrial sector still remains one of the major sources of water pollution in the country.

The energy sector accounts for about 21 per cent of the total industrial water use. In 2014, it used 86 million m^3 of water for electricity production. Water is used mostly for cooling at the thermal power stations, causing degraded water quality by thermal pollution. To prevent or minimize thermal pollution, recirculation and reuse of cooling water is widely applied.

Agricultural sector is the main source of diffuse pollution of surface water and groundwater. This is mostly due to the increasing use of inorganic nitrogen and phosphorus fertilizers, which has led to increased content of nitrates and phosphates in water that leads to a certain extent to eutrophication of the surface water bodies.

Nitrate pollution of surface water and groundwater is a serious issue for shallow wells in rural areas, a principal source of drinking water supply for the rural population.

In several areas near the fertilizer storage sites, groundwater pollution has been observed at a depth of 14–16 metres, and the zone of pollution extends up to 1.5 km from its source.

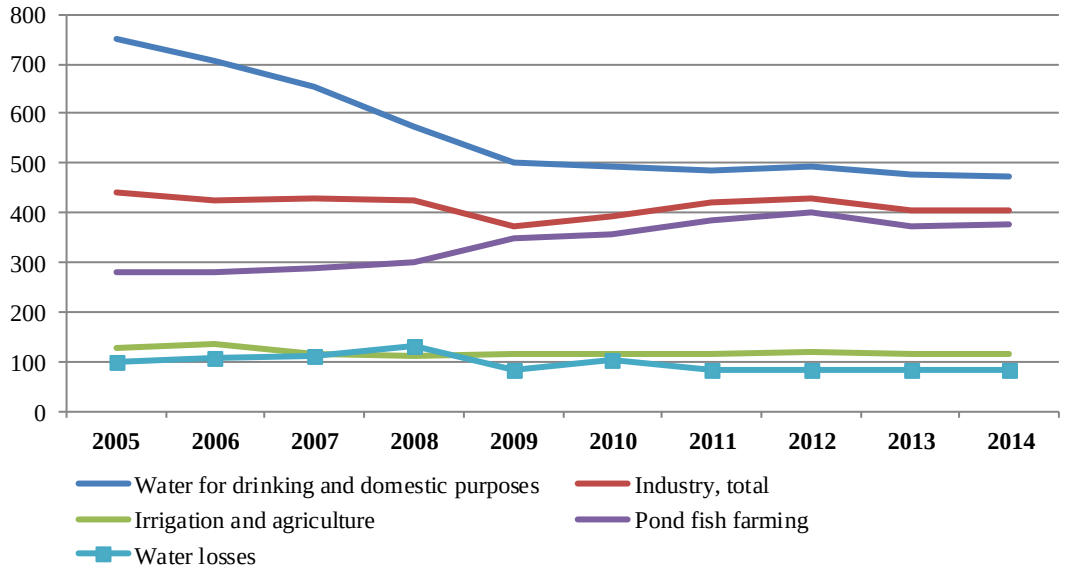
Wastewater discharges

The volume of total wastewater discharges diminished by 18.07 per cent between 2005 and 2014. In 2014, the total volume of discharged wastewater was 1,011.0 million m^3, of which 931.0 million m^3 went to surface water bodies while 80.0 million m^3 was disposed to the irrigated lands, infiltration fields and storage facilities.

Of the wastewater discharged into surface waters, one third (31.47 per cent) required no treatment, about two thirds (68.21 per cent) was treated in compliance with appropriate regulations and norms, and a very small portion, 3.0 million m^3 (0.32 per cent), was not adequately treated to the standards.

Urban wastewater, which is often a mix of sewage and industrial effluent, is a principal source of pollution of water bodies in the country. The volume of disposed wastewater decreased by 18.07 per cent from 2005 to 2014 and amounted to 1,011 million m^3. Since 2008, the annual volume of wastewater has remained more or less constant, slightly exceeding 1,000 million m^3. The pattern of wastewater disposal follows changes in water use.

Figure I.4: Water abstraction and use, 2005–2014, million m^3



Source: Environmental Protection in the Republic of Belarus 2010–2014, Statistical book, National Statistical Committee, 2015.
Note: Water loss during transport includes the volume of water lost as a result of filtration, evaporation, leakage and breakdowns in water delivery systems between a point of withdrawal (abstraction) and a point of use or transfer. Losses do not include water transferred to outside users.

Water quality

Surface water

Surface water quality, measured by the aggregated Water Pollution Index (WPI), shows a steady, improving trend. In 2003, the WPI showed that 41 per cent of surface waters were relatively clean, 58.4 per cent moderately polluted and 0.6 per cent extremely polluted. In 2013, the combined percentage of clean and relatively clean water had increased to 90.7 per cent, while the amount of moderately polluted water had decreased to 9.3 per cent and no surface water was classified as polluted or extremely polluted.

Bathing waters

The quality of bathing waters has slowly but steadily improved. In 2005, 9.02 per cent of microbiological tests of the selected bathing locations exceeded the norms, and this share decreased to 6.94 per cent in 2014. The share of the microbiological tests not meeting the sanitary and chemical requirements fell from 15.08 per cent in 2005 to 10.13 per cent in 2014.

Groundwater

In 2013, 74 per cent of the tested shallow groundwater was within the drinking water quality norms and standards, while 82.7 per cent of the tested water from deeper aquifers met the norms. In a few cases, the pollution of groundwater by harmful substances originating from anthropogenic activities was observed underneath urban areas or industrial zones.

Drinking water

Of total water samples tested on sanitary and chemical parameters, the proportion of samples that did not meet hygienic standards changed from 22.3 per cent to 21.7 per cent during the period 2010–2015. The proportion of total water samples tested on microbiological parameters that did not meet hygienic standards decreased from 2.5 per cent in 2010 to 1.9 per cent in 2014.

Water quality in river basins

In 2013, samples from almost all the major river basins of the country registered a decrease in excessive content of ammonium ion. The only exception was the Dnieper river basin, where samples indicated a slight increase in cases exceeding the maximum allowable concentrations (MAC), to 35.8 per cent of samples.

The highest occurrence of excessive concentration of nitrite ion was registered over the period 2009–2012 in the Western Bug river basin, where the number of water samples with its excessive content increased to 40.9 per cent in 2013. There was also an increase in the samples with high nitrite ion content up to 17.4 per cent in the Neman river basin in 2013, although there was a steady reduction in this indicator over several previous years.

Persistent pollution of surface waters by phosphate ions in 2009–2013 was observed in the basins of the Western Bug (61–74 per cent of water samples), the Dnieper (49–55 per cent of water samples) and the Pripyat (19–46 per cent of water samples) rivers, with maximum values of that substance in 2012.

In 2013, there was a slight increase in water samples with values exceeding its MAC in the basins of the Western Dvina River (from 6.8 per cent to 8.5 per cent) and the Neman River (from 12.7 per cent to 19.2 per cent).

A sharp increase in total phosphorus content was noted in water bodies in the Western Bug river basin in 2011 and 2012. However, in 2013, there was a reduction in the number of samples with excessive concentration of total phosphorus from the Western Bug, the Dnieper, the Pripyat and the Neman Rivers, by 1.7, 1.7, 1.8 and 2.6 times, respectively.

In 2013, the highest mean annual concentrations of total iron (2.29 mg/l) and manganese (0.163 mg/dm^3) were registered in the waters of the Pripyat river basin, while those of copper (0.013 mg/l) and zinc (0.029 mg/l) were registered in the basin of the Western Dvina River.

During a long observation period, the most frequent excesses of the MAC for oil products were registered in the water bodies of the Pripyat River basin (up to 9.8 per cent of water samples in 2012) although, in 2013, the percentage of such samples decreased to 5.1 per cent. However, in 2013, the number of samples from the Pripyat river basin with excessive content of synthetic surfactants increased by 2.4 times and reached 3.1 per cent.

Land

Land and soil cover

Around 27 per cent of Belarus is arable land. Forest

land and woodland cover 45 per cent of the land area. Meadows cover 14 per cent, while lands under marshes cover about 4 per cent of the total area (figure I.5).

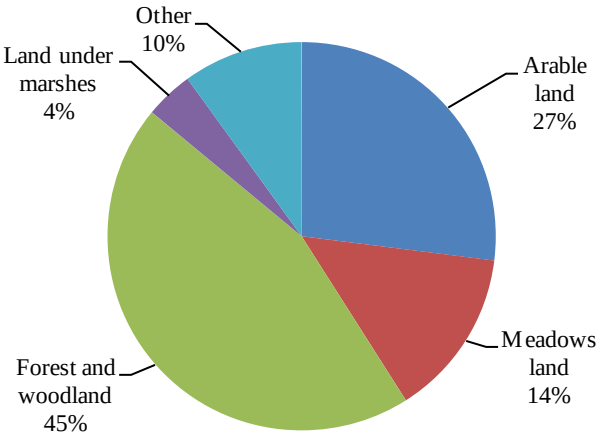
The country has three moisture-characterized soil types: normal moistening auto-amorphic soils, which are typically located at territories with hilly relief and are the main areas that are constantly cultivated by ploughing (52.3 per cent of land area); swampy, partly waterlogged semi-hydromorphic soils – typical lowlands that are wet in certain periods of the year, such as early spring, and after very heavy rainfall, and are mainly under forests (27 per cent); and peat-boggy, constantly waterlogged hydromorphic soils (20.1 per cent) (figure I.6).

Nearly 67 per cent of all soil types in Belarus are sward-podzolic soils. Sward-podzolic soils of normal moistening cover 33.0 per cent of agricultural lands, while sward-podzolic waterlogged soils cover 33.8 per cent of agricultural lands.

Land degradation

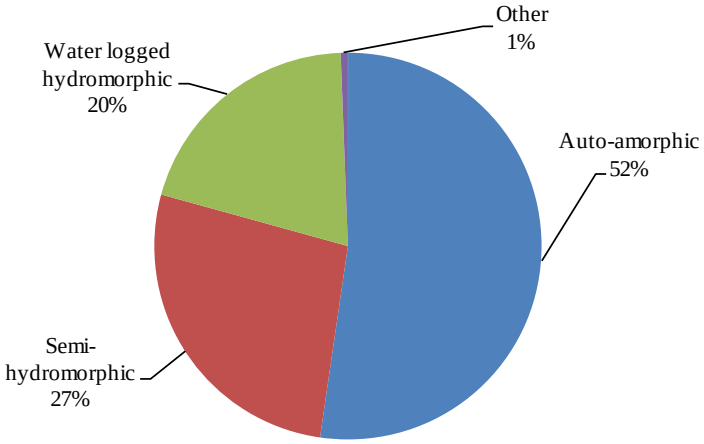
Erosion is the most important type of land degradation. According to the National Action Plan on Rational Use of Natural Resources and Environment for 2006–2010, the total area of eroded land and the areas in danger of erosion was more than four million ha (19.27 per cent of the territory), including about 2.6 million ha of arable land. There were 556,500 ha of eroded land, including 479,500 ha of arable land. Of total erosion, 84 per cent was caused by water erosion and 16 per cent by wind erosion.

Figure I.5: Land cover, per cent of total



Source: State Property Committee, 2015.

Figure I.6: Soil types, per cent of total



Source: FAO (http://www.fao.org/ag/agp/AGPC/doc/Counprof/belarus/belarus.htm). Accessed on 17 June 2015.

Soil pollution

Soil pollution with oil products is common and characteristic. In 50 per cent of settlements, maximum oil content in soil exceeds the MAC by a factor of 5 to 15.

According to the National Report of the Republic of Belarus on Implementation of the United Nations Convention to Combat Desertification (2006), soil pollution by cadmium is typical of 72 per cent of the surveyed cities, by zinc of 77 per cent, and by lead of 61 per cent. Exceedance of the permissible level of cadmium was recorded in eight cities, of zinc in 14 and of lead in nine cities. High copper concentrations were found in four cities.

Isolated cases of soil pollution with sulfates, at 1.0 to 1.5 times higher the permissible level, were reported in 39 per cent of the cities. Exceedance of permissible nitrate concentration was found only in three cities.

Biodiversity

Ecosystems and habitat threats

The natural threats to Belarusian biodiversity can be divided into three main sources. The first is the effects of climate change, which is reducing the size of the habitats of boreal plants and animal species, and also decreasing the size of populations of some species of wild plants and animals of wetland ecosystems. The second is the emergence of bird species with southern origins, aggravating inter-specific competition near water sources. The third is the competitive exclusion of Belarusian fauna species by the introduction of invasive species such as American mink, giant hogweed and Canadian goldenrod.

The threats from anthropogenic factors include: changes in land use patterns; pollution; habitat fragmentation and degradation from urbanization and the development of transport and communication systems; irrigation and drainage practices; replacement of complex forests with mono-dominant forest plantations; recreation and tourism; and fires in forests and from grassland vegetation.

The central and significant Belarusian landscape types, such as swamps, inundated territories and lake complexes, are important and precious ecosystems because they are so rare in Europe. In the twentieth century, wetlands were extensively drained but, recently, the area of wetlands has increased as a result of the natural reswamping of previously drained wetlands.

The conservation and sustainable use of the Belarus Polessye, one of Europe's most important inland water regions, located in the southern part of the country, is given a preservation priority.

The radioactive contamination from the accident at Chernobyl Nuclear Power Plant (NPP) is affecting some wild plant species with a low degree of ecological flexibility.

Forest area

Two geobotanical regions, the Eurasian taiga and European deciduous broad-leaved zone, meet in Belarus. Although the total forest cover has increased, there is a threat of decrease of boreal areas. This is due to the warming climate, and there are indications that steppe and forest-steppe species of grass plants penetrate the forest flora of Belarus.

As of 1 January 2015, forest land covered 8.653 million ha, corresponding to 41.68 per cent of the country's territory. Forest area has almost doubled over the past 60 years, though the growth rate has been moderate during past decade. The forest area growth rate between 2006 and 2014 was 2.87 per cent.

The most common species is pine, which covers about half the forest land (50.4 per cent). The rest of the forest is composed of spruce (9.4 per cent), oak (3.5 per cent), birch (23.1 per cent), alder (8.6 per cent), aspen (2.1 per cent) and other species (2.9 per cent).

Flora and fauna

Belarus has about 12,000 plant species. Of these, 7,000 species are fungi and 2,000 species are algae, together comprising 75 per cent of the total flora. There are 1,638 species of vascular plants, comprised of over 1,500 herbal species.

The bird fauna has 316 species, of which 227 are nestling. The terrestrial fauna has 472 species of vertebrates and more than 30,000 species of invertebrates. Of the 63 fish species, 46 are indigenous.

There are 47 species which are used as game species and 31 fish species used commercially. The number of invasive species within Belarus includes over 600 plant and 30 animal species. One of the major water corridors, through which invasive species from the

Black and Caspian Seas penetrate through to Central and Western Europe, passes through the territory of Belarus.

Threatened species

Critically endangered species comprise 54 flora and 16 fauna species. Some species, such as the mute swan and aquatic warbler, have been successfully protected and some even removed from the Red Data Book as the result of a number of conservation projects.

Specially protected natural areas

Belarus has four national parks, one nature reserve, 96 preserves of the national importance and 267 preserves of local significance (table I.2). Berezinsky biosphere reserve has a total surface of 85,200 ha. The fauna of the reserve numbers 56 species of mammals, 234 species of birds, 10 species of amphibians, 5 reptile species, and 34 species of fish. In the reserve there are more than 800 species of vascular plants, 45 of which are listed in the Red Data Book of Belarus.

The Belovezhskaya Pushcha National Park was established in 1939 and occupies an area of 150,069 ha. It is a part of the UNESCO World Heritage Site Białowieża Forest, Belarus, Poland, the last primeval forest fragment of Europe's woodlands, which once stretched across the European Plain. It is home to a large population of European bison, the continent's heaviest land animal.

Pripyatsky National Park was established in 1969. It is located between the Pripyat, Stviga and Ubort Rivers. A special protection area covers about 88,550 ha.

The Pripyat Polessye area is an entire system of protected territories, including the Pripyatsky National Park, 25 wildlife preserves of national and local importance and 24 natural monuments. Pripyatsky is home to pristine natural systems with a wide variety of flora and fauna – vast swamps, wide inundated lands, oak woods and broad-leaved forests.

Braslav Lakes National Park was set up in 1995. It is a unique ecosystem with 73 lakes and a large area of pine forests. It has a total area of about 64,490 ha.

Narochansky National Park is centred on and named after Lake Naroch. It was created in 1999 and covers an area of more than 87,130 ha.

In addition, Belarus has 16 Ramsar sites covering over 600,000 ha. The largest is Pripyatsky National Park; like Pripyatsky, Kozyansky and Vydritsa are designated as Important Bird Areas. These sites include bogs, peatlands, swamps and lakes, as well as rivers and their floodplains.

The share of the protected area of the total land area of the country has fluctuated somewhat over the past ten years. In 2014, about 8.2 per cent of the land area had the status of specially protected natural areas (table I.3). As of 1 September 2015, this figure reached 8.7 per cent.

Table I.2: Specially protected natural areas as of 1 September 2015

	Number of entities	Total area, thousand ha	per cent of total country land area
Specially protected natural areas – total	1 245	1 808.6	8.7
of which:			
nature reserves[1)], national parks	5	475.4	2.3
preserves	363	1 232.0	
of which, of:			
nationwide importance	96	940.5	4.5
local importance	267	377.3	1.8
natural monuments	886	15.4	
of which, of:			
nationwide importance	319		
local importance	567		

Source: Ministry of Natural Resources and Environmental Protection, 2015.
Note: [1)] Excluding Polessye State Radiation and Ecological Reserve.

Table I.3: Share of specially protected natural areas in total land area of the country, 2005, 2009–2015, per cent

	2005	2009	2010	2011	2012	2013	2014	2015
Protected area	8.0	7.7	7.7	7.7	7.6	7.8	8.2	8.7

Source: Ministry of Natural Resources and Environmental Protection, 2015.

Waste

Municipal waste

During the review period, the generation of municipal solid waste (MSW) increased by 38.23 per cent, from 2,812,000 tons in 2005 to 3,887,000 tons in 2013. The lack of accurate data and the change of calculation methods from cubic metres to tons might exaggerate the growth rate. Nonetheless, during the same period, per capita MSW grew even more, by 41.24 per cent, reaching 411 kg/capita in 2013. For 2014, figures are not available in thousand tons but, if 2014 MSW generation figures in m^3 are compared with 2005 figures in m^3, the growth rate was 42.03 per cent.

Waste collection with separate containers for dry (paper, plastics and glass) and wet (biodegradable) waste is available in the capital, oblast and rayon centres. Belarus has two types of disposal sites for MSW – the mini-dumpsites (minipoligoni) and the rayon dumpsites (poligoni).

The number of mini-dumpsites, which are usually in remote rural areas, has been decreasing; in 2014 there were 2,351. Currently, there are 170 organized rayon dumpsites, typically one per rayon, but larger rayons may have two or three dumpsites.

Industrial waste

Industrial waste generation increased by 51.02 per cent between 2005 and 2014. The generated amounts in 2005 and 2014 were 38,472 and 52.529 million tons, respectively.

There has been an enormous, increasing trend in the amount of generated hazardous waste. While in 2005 only 192,000 tons of hazardous waste was reported, the latest data show that 1.724 million tons of hazardous waste were generated in 2014. Rather than representing a real increase in hazardous waste generation, this almost ninefold increase is probably the result of improved and more comprehensive reporting from waste generators as well as from the implementation of new, stricter legislation.

Medical waste

Medical waste is separated into four groups in the health-care facilities, according to how hazardous it is. The least dangerous group is treated as municipal waste and disposed to a municipal disposal site.

The other three waste types, which either require special attention or are highly infectious or hazardous, are either sterilized and then disposed of or incinerated in hospital boilers. Data on health-care waste varies on a year-by-year basis, which may indicate incomplete reporting of data. Since 2014, there has been a medical waste incinerator with capacity of 370 tons per year in Minsk. Anatomical waste is burned in crematoria or buried in specially allocated sites in cemeteries.

Aftermath of the Chernobyl NPP accident

A specific issue for Belarus is the management of radioactive pollution from the 1986 Chernobyl NPP accident. The initial explosion and the ensuing fire carried radionuclides from Chernobyl in Ukraine over the border to Belarus, contaminating 47,600 km^2 (23 per cent) of the country's land area, where 20 per cent of its population lived.

In January 2012, as a result of natural radioactive decay, the area of contaminated lands with a Caesium-137 level of more than 1 Ci/km^2 (37 kBq/m^2) had decreased to 30,100 km^2 or 14.5 per cent of the land area of the country. The regional differences in contamination levels are huge. The worst-hit Gomel Oblast still had over 1 Ci/km^2 radiation on almost half of its land area in 2012 (table I.4).

In addition to the loss of life and the adverse impact of the accident on the health of the population (such as a significant increase in thyroid cancer), the accident has had heavy economic consequences for Belarus. Initially, there was an enormous loss of economic activity and infrastructure in the affected areas and around 135,000 persons were resettled from contaminated areas.

Approximately 21 per cent of the country's agricultural land, 23 per cent of its forested land and 132 deposits of mineral resources were contaminated, and the worst contaminated areas were removed from economic use. The total cost of the accident over 30 years is estimated at US$235 billion (in 2005 dollars).

The collection, transportation, storage and disposal of radioactive waste from decontamination of territories polluted by the accident are carried out by the Republican Specialized Unitary Enterprises "Polessye" (Gomel) and "Radon" (Mogilev). This waste is stored in three decontamination waste disposal facilities.

Belarus also has a fourth radioactive waste storage facility for the radioactive waste from the former installations of the USSR military forces.

Table I.4: Area contaminated with Caesium-137 as a result of Chernobyl nuclear accident, Ci/km^2, as of 1 January 2012

	Total area		of which, by contamination density			
	1 000 km^2	% of total area	1-5 Ci/km^2	5-15 Ci/km^2	15-40 Ci/km^2	>40 Ci/km^2
Republic of Belarus	30.1	14.5	20.9	6.6	2.2	0.4
Region:						
Brest	2.4	7.2	2.3	0.1	..	..
Vitebsk	0.01	0.03	0.0	..	..	..
Gomel	18.3	45.4	11.7	4.7	1.4	0.4
Grodno	0.6	2.4	0.6	< 0.01	..	..
Minsk	0.9	2.3	0.9	< 0.01	..	..
Mogilev	7.9	27.1	5.4	1.8	0.7	0.1

Source: Environmental Protection in the Republic of Belarus 2010–2014, Statistical book, National Statistical Committee, 2015.

Photo I: Berestovitsky rayon, Grodno Oblast

Map I.1: Map of Belarus

Source: United Nations Cartographic Section, 2014.

Note: The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.

PART I: ENVIRONMENTAL GOVERNANCE AND FINANCING

Chapter 1

LEGAL, POLICY AND INSTITUTIONAL FRAMEWORK

1.1 Legal framework

The hierarchy of legal acts in Belarus includes, from the top downward, the Constitution, legal acts of the President, laws, resolutions of the Council of Ministers, resolutions of ministries and technical regulatory legal acts. Codes have higher legal value than other laws. Rules of an international treaty have the value of a legal act through which Belarus consented to be bound by an international treaty. An achievement has been the requirement for mandatory publication, since 2007, of all technical regulatory legal acts.

Environment and sustainable development

The 1992 Law on Environmental Protection does not have the status of a code. Therefore the 2000 Forest Code, 2008 Land Code, 2008 Code on Subsoil Resources or 2014 Water Code have higher legal value than this Law.

In 2005, the Council of Ministers, through Resolution No. 1460, approved the concept of a draft environmental code. The development of an environmental code was envisaged by the National Action Plan on Rational Use of Natural Resources and Environmental Protection for 2006–2010 (also known as the National Environmental Action Plan (NEAP) 2006–2010); however, no draft was developed. The reason given in the NEAP implementation report is that finalization of work to strengthen legislation covering specific areas of environmental protection and use of natural resources should have preceded codification. Currently, there are no efforts in the direction of codification.

The 1992 Law on Environmental Protection was issued in new edition in 2002, and afterwards modified a number of times. In 2007, the concept of and procedures for access to environmental information, as well as the procedures for compensation for environmental damage were introduced. In 2010, the elements and procedures for development of the national ecological network and establishment and management of biosphere reserves were included. Since 2012, the operation of provisions on the Nature Protection Fund has been suspended (chapter 3). In 2013, the amendments referred to strengthening regulation of specially protected natural areas, typical and rare natural landscapes and biotopes, control activities on environmental protection, the decrease of administrative procedures in use of natural resources and introduction of the notion of “public ecologists” instead of “public inspectors”.

It is expected that, in 2015, new amendments will be introduced to cover public participation in environmental decision-making, in particular for drafts of concepts, programmes, plans, legal acts and environmental impact assessment (EIA) reports, as well as to introduce the requirement for all enterprises with adverse environmental impact to have a nature protection department and a nature protection expert among staff.

Several new laws have been adopted since 2005. The 2006 Law on Hydrometeorological Activities, adopted in place of the 1999 Law, regulates public administration on hydrometeorological activities, types of and procedures for hydrometeorological observations, conditions for access to hydrometeorological information and maintenance of the State Climate Cadastre.

The 2006 Law on the Safety of Genetic Engineering regulates the requirements for use of genetically modified organisms (GMOs) in closed systems; release of GMOs into the environment for experimental purposes; use of GMOs for economic purposes; transportation of GMOs; import, export and transit of GMOs; and disposal of GMOs. Since GMO-related activities fall into the domain of several bodies – the Ministry of Natural Resources and Environmental Protection, Ministry of Health, Ministry of Agriculture and Food and other public authorities – the Law delineates and describes their relevant competences.

The 2007 Law on Wildlife, adopted in place of the 1996 Law, is in many ways more comprehensive and detailed than its predecessor. It introduces new principles of wildlife protection, such as sustainable use of wildlife and conservation of biodiversity, the principle of restricting the economic activities that have a negative impact or threaten wildlife and habitats, and the principle of use of economic incentives for protection and sustainable use of wildlife.

The Law introduces the notion of habitats. Also, it differentiates between the general (for natural persons) and special (for legal persons) use of wildlife objects. The Law provides detailed rules on prohibitions and restrictions for use of wildlife. It regulates hunting, fishing, purchase of wild animals and protection of wild animals in captivity, including their mandatory registration, as well as requirements for construction and other activities that have an impact on wildlife and habitats.

The 2007 Law on Waste Management, adopted in place of the 1993 Law, introduces the principle of extended producer responsibility, regulates waste classification and provides for economic incentives in waste management. The Law describes the relevant competences of the Ministry of Natural Resources and Environmental Protection, Ministry of Health, Ministry of Housing and Public Utilities, Ministry of Emergency Situations, Ministry of Trade and other public administration bodies (chapter 6).

The 2008 Law on Atmospheric Air Protection, adopted in place of the 1997 Law, introduces classifications of facilities with impact on air, of emission sources and of polluting substances. It regulates emission limits and requirements for economic and other activities connected with emission of polluting substances, as well as the issuance of permits for emission of polluting substances into air. The Law stipulates that limits for emission of polluting substances into air can also be prescribed in integrated permits. The Law regulates the maintenance of the State Air Cadastre, as well as record-keeping and inventory of emissions by enterprises whose activities are connected with emissions into the air (chapter 4).

The 2008 Code on Subsoil Resources, adopted in place of the 1997 Code, for the first time provides for a classification of mineral resources. It delineates the competences of the Ministry of Natural Resources and Environmental Protection and the Ministry of Emergency Situations. It entrusts the President with the power to decide on mine allotments for exploitation of strategic mineral resources and mineral resources of limited availability. Decisions on mine allotment for commonly used mineral resources are made by local executive and administrative bodies with the agreement of the Ministry of Natural Resources and Environmental Protection.

The 2009 Law on State Ecological Expertise, adopted in place of the 1993 Law, entrusts the organization of SEE to responsible officials of the Ministry and oblast (and Minsk City) committees on natural resources and environmental protection (i.e. not the rayon and town inspection units as was previously the case). The Law includes the non-exhaustive list of the types of project documentation and other documents requiring SEE. The Law was followed by the 2010 Resolution of the Council of Ministers No. 755 which approved the Regulations on SEE and Regulations on EIA (chapter 2).

The 2010 Law on Renewable Energy Sources aims to ensure governmental support and incentives to the development of renewable energy sources (chapter 8). It provides for the guaranteed connection of renewable energy installations to state energy networks and guaranteed purchase by governmental energy supply organizations of all energy coming from renewable energy sources and supplied to state energy networks. The Law provides for tax and other privileges further described in the Tax Code and other legislation.

The 2012 Law on Legal Regime of Territories Exposed to Radioactive Contamination as a Result of the Chernobyl NPP Disaster, adopted in place of the 1991 Law, determines the legal regime of territories and zones of radioactive pollution, including the conditions for the use of natural resources and prohibitions and restrictions on agricultural production. Land users on the territories of radioactive pollution can be compensated for the costs of agrochemical, agrotechnical and other measures they take to ensure that radionuclides in agricultural production do not exceed the permitted levels. Among novelties of the 2012 Law is the regulation of the management of the State Radiation and Ecological Reserve (Polessye), which has functioned since 1988 in the zones of radioactive pollution (box 7.1).

The 2014 Water Code replaces the 1998 Code and introduces the basin management of water resources, including the development of river basin management plans (RBMPs) and establishment of river basin councils. For the first time, the approach to defining limits for wastewater discharges for municipal wastewater treatment plants (WWTPs) is based on population equivalent. Classification of surface water bodies is introduced. The Code prioritizes the use of groundwater for drinking before other uses (chapter 5).

In 2014, amendments dealing with ozone layer protection were introduced in several laws. In particular, the 2001 Law on the Protection of the Ozone Layer was issued in a new edition. The new edition clarified the economic incentives for enterprises introducing ozone-safe technologies,

introduced prohibition of production of ozone-depleting substances (ODS) and restrictions on the import and export of ODS and ODS-containing products, and included the requirement for training of workers on safe management of ODS and ODS-containing equipment.

Since 2005, the 1998 Law "On radiation safety of the population" was amended twice. In 2008, the amendments provided for more detailed description of the competences of various public authorities in this area and introduced a chapter on radiation safety in radioactive waste management. Amendments introduced in 2014 mostly referred to state surveillance and control.

In addition, from 2005, amendments were introduced a number of times into the 2003 Code on Misdemeanours to revise the content and sanctions for offences against ecological safety, the environment and the use of natural resources.

A key development for enforcement activities on environmental protection has been the adoption of the 2009 Decree of the President No. 510 "On enhancement of control (surveillance) activities in the Republic of Belarus" (chapter 2). The Decree introduced unified rules for all control (surveillance) activities and listed all bodies entitled to perform such activities, as well as their scopes of competence. The Decree differentiated two forms of control (surveillance) – checks (i.e. inspections) and monitoring (i.e. preventative on-site visits) – and described their procedures.

In 2011, the Decree of the President No. 528 "On integrated environmental permits" introduced integrated environmental permitting (chapter 2). Other landmark presidential decrees include the 2008 Decree No. 348 "On the rates to determine the amount of compensation for harm caused to the environment" and 2008 Decree No. 349 "On the criteria for classifying economic and other activities which have a detrimental effect on the environment as environmentally hazardous activities" (chapter 3).

Environment-related provisions in sectoral laws

There has been some progress achieved in integrating environmental considerations into sectoral legislation (chapters 8, 10, 12, 13, 14), though the level of such integration differs across sectors. A number of examples illustrate such integration. The 2015 Law on Energy Saving, adopted in place of the 1998 Law, improves target-setting on energy saving. The 2008 Law on Land Reclamation includes prohibitions on land reclamation in reserves and national parks, forests of the first group (with nature protection roles) and, in some cases, second group (for commercial exploitation), migration passes of wild animals and certain types of wetlands. It also provides that land reclamation can be prohibited in other protected areas when it goes against the legal regime of such areas. Remarkably, the Law on Land Reclamation gives priority to legislation on specially protected natural areas in the event that there are contradictions between legislation on specially protected natural areas and legislation on land reclamation. The 2005 Law on Plant Protection provides for various requirements (e.g. attestation of companies performing tests, requirements for transportation, storage and disposal) to ensure that plant protection products are safe for human health and the environment.

The legislation on urban planning has been better aligned with environmental considerations. The 2004 Law on Architectural, Urban Planning and Construction Activities in the Republic of Belarus regulates the right of participation of natural persons in urban planning, while procedures of public participation in decision-making on architectural, urban planning and construction activities are further detailed in the 2011 Resolution of the Council of Ministers No. 687 and instructions of local executive and administrative bodies of Minsk City, Minsk Oblast, Brest Oblast and the Luninetsky rayon of Brest Oblast. The 2012 Law on the Sanitary and Epidemiological Well-being of the Population provides for state sanitary and epidemiological expertise of draft documentation for sanitary protection zones of facilities having an impact on human health and the environment, and of drinking water supply sources and systems. The 2011 Code on Education declares ecological focus as a principle of state policy on education and includes ecological upbringing as a component of upbringing, but lacks detailed provisions in the field, whereas the Law on Environmental Protection includes a dedicated chapter on education, informal education and research on environmental protection.

In various fields, there are a number of joint resolutions of two or more ministries to address cross-sectoral issues (annex V). At the same time, both governmental officials and other stakeholders understand that much stronger "ecologization" of sectoral legislation is needed, not only in terms of integration of environmental protection requirements in sectoral laws but also in development of subsidiary legislation.

Trends and progress achieved

The quality of environmental legislation improved due to the reduction of reference norms, availability of clear rules on the planning of law-making activities and the approach of reducing the frequency and increasing substantiveness of changes to the legislation. Some environmental legislation (e.g. on ODS and hazardous waste) has been influenced by the participation of Belarus in the Eurasian Economic Community (until 1 January 2015) and, thereafter, in the Eurasian Economic Union (since 1 January 2015), and the related Customs Union. In the area of water, harmonization of Belarusian legislation with that of the EU is among the strategic goals. The law making process, in particular, the procedure of mandatory review and approval by all ministries concerned, including the Ministry of Natural Resources and Environmental Protection, of draft legislative acts, as well as the procedure of mandatory legal expertise of draft legislation have contributed to the integration of environmental requirements into sectoral legislation, even though such integration is not the purpose of these procedures. Yet there is need for stronger integration of environmental requirements in sectoral legislation.

1.2 Strategic documents

Strategic planning

Types of strategic planning documents

The 1998 Law "On the state forecasting and socioeconomic development programmes of the Republic of Belarus" describes the system of socioeconomic development forecasting, which includes:

- For a long-term perspective, the national strategy of sustainable socioeconomic development (adopted for 15 years) and main directions of socioeconomic development (adopted for 10 years);
- For a mid-term perspective, the programme of socioeconomic development (adopted for five years);
- For a short-term period, annual forecasting of socioeconomic development.

Although the 1998 Law speaks only about socioeconomic development planning, these rules apply, by analogy of law, to other areas of planning. Therefore, the strategic planning system includes concepts adopted as planning documents to cover a 15- to 20-year perspective, strategies adopted as planning documents to cover a 10-year perspective and programmes covering five-year periods. Programmes generally follow a five-year cycle approach. Currently, the 2011–2015 cycle programmes are active and the development of new ones for 2016–2020 is ongoing.

The 2009 Resolution of the Council of Ministers No. 404 "On approval of the Regulations on the procedure of development, financing and control over the implementation of state, regional and sectoral programmes and revocation of selected resolutions of the Council of Ministers of the Republic of Belarus" distinguishes the following types of programmes depending on level of endorsement and sources of financing:

- A *state* programme is approved by the President or the Council of Ministers and financed fully or partially at the costs of the republican budget or state non-budgetary funds;
- A *regional* programme is approved by the local councils of deputies and financed fully or partially at the costs of local budget;
- A *sectoral* programme is aimed at the implementation of tasks and functions assigned to the republican state authorities and is developed and adopted by them; it can be financed from the republican budget, local budget, state non-budgetary funds, loans, donor assistance and/or other sources.

The Resolution regulates the order for development and adoption of programmes. Where programme implementation is related to the use of natural resources and/or is likely to cause environmental impact, the concept note of such a state programme or sectoral programme shall be reviewed by the Ministry of Natural Resources and Environmental Protection, which decides on the expediency of programme development. When the draft programme is developed and its implementation is related to the use of natural resources and/or is likely to cause environmental impact, it is again sent to the Ministry of Natural Resources and Environmental Protection for SEE. These requirements serve to ensure the integration of environmental requirements in overall socioeconomic and sectoral policies.

There is no legal act which would regulate the elaboration and adoption of concepts and strategies and there are no clear rules as to who approves concepts and strategies. In practice, concepts are developed more rarely than strategies. The implementation of concepts and strategies takes place through the development and implementation of programmes at relevant levels. At the same time, not every programme is necessarily preceded by a

concept or a strategy, and every single issue/measure raised in a strategy does not necessarily find its way into a programme.

Financing and reporting

Resolution No. 404 clearly regulates the financing of programmes, linking financing procedures to the procedures for development of republican and local budgets. Usually, programmes state only the overall estimated amount of financing per programme activity, with details on the volumes and sources of financing for specific activities being settled in the process of budgetary planning for the upcoming year.

The Resolution provides clear rules on reporting on programmes' implementation. Reports on implementation of state and sectoral programmes are to be submitted annually to the Council of Ministers. Reports on implementation of regional programmes are to be submitted annually by local executive and administrative bodies to local councils of deputies. The reports on implementation of state, regional and sectoral programmes are not available on the websites of relevant institutions, although summary information on implementation is regularly covered by mass media and reflected in various bulletins and reports. The Resolution also describes the ways to amend or terminate programmes.

Strategies typically do not include provisions on financing. There are also no clear rules on reporting on strategies. However, when a strategy is approved by a resolution of the Council of Ministers, the resolution usually requests respective authorities to inform the Council of Ministers on implementation.

Specifics of urban planning

In the area of urban planning, the 2004 Law "On architectural, urban planning and construction activities in the Republic of Belarus" determines the basic requirements for forecasting and planning. General urban development plans are to be agreed upon with the Ministry of Natural Resources and Environmental Protection, Ministry of Emergency Situations, Ministry of Health, Ministry of Defence and Ministry of Internal Affairs, and the Committee of the State Security in cases determined by the legislation. The development of urban planning documentation and project documentation, and the construction of settlements and facilities, should be carried out in compliance with the requirements of the legislation on environmental protection and rational use of natural resources, as well as sanitary norms and hygienic standards.

Towards strategic environmental assessment

Strategic environmental assessment (SEA), as provided for in the ECE Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention) does not exist in Belarus. At the same time, the prerequisites for introduction of SEA exist, since the current strategic planning system already provides for consideration of environmental requirements through the consent to be given by the Ministry of Natural Resources and Environmental Protection at the stage of development of a concept note of a state programme or a sectoral programme, as well as through the SEE performed for draft concepts, forecasts, programmes and schemes of sectoral development, whose implementation is connected with use of natural resources and/or may have an impact on the environment. The country is not a Party to the Protocol on SEA.

The Review of legislation on strategic environmental assessment of Belarus with regard to implementation of the Protocol on SEA to the Espoo Convention, conducted in 2013 by ECE within the Greening Economies in the Eastern Neighbourhood (EaP GREEN) programme,[1] concluded that SEA principles and procedures could be effectively integrated into the existing planning process through revisions of the legislation in force and/or adoption of a new law on SEA. As of early 2015, amendments to the Law on State Ecological Expertise are being developed; SEA is expected to be integrated into the amended law by the end of 2015.

Green economy policy framework

The 2007 Presidential Directive No. 3 "Economy and prudence – main factors of national economic safety" largely inspired the development of legislation and state and sectoral programmes incorporating concrete activities in line with green economy principles.

In 2012 the System of Measures to Strengthen Technological Potential of the National Economy to Ensure its Functioning on Environmental (Green) Principles was approved by the Deputy Prime Minister as an organizational document entrusting

[1] The EaP GREEN programme is implemented by the Organisation for Economic Co-operation and Development (OECD), ECE, the United Nations Environment Programme (UNEP) and United Nations Industrial Development Organization (UNIDO) to assist the EU's Eastern Partnership (EaP) countries in their transition to green economies.

various governmental institutions with implementation of green economy measures. The document specified short-term (until 2015) and long-term (2015–2020) technological, institutional/legal and economic measures in electricity production, public utilities, oil and chemical products, industrial production, construction, agriculture, transport, forestry and setting of standards; envisaged the introduction of green public procurement; and provided for various incentives on introduction of new environmentally friendly technologies. Governmental authorities report annually to the Ministry of Natural Resources and Environmental Protection on implementation of the measures under their responsibility.

In 2012, ahead of Rio+20 Conference, the Ministry of Economy prepared a national report, "Sustainable development of the Republic of Belarus based on 'green' economy principles". The report summarizes the achievements of Belarus on the way to sustainable development and in the development of green economy, with particular emphasis on such sectors as energy and fuel resources, industry, transport, agriculture, forestry, construction, housing and utilities, and describes the direction of transition to green economy through use of economic policy and instruments, education for green economy, and science and innovation. The report largely served as a starting point for development of the National Strategy for Sustainable Socioeconomic Development until 2030 (NSSD-2030). The National Strategy includes explicit references to green economy principles.

In 2015, the project "Supporting the Transition to a Green Economy in the Republic of Belarus", financed by the EU (€5 million) as part of the EU Annual Action Programme 2012 for Belarus and implemented by UNDP, started in Belarus, focusing on further development and practical application of green economy principles in the country and to provide tangible support to the Government's efforts in the field.

Another project, "Technical Assistance to Support the Development of the Green Economy in Belarus", approved in February 2015 and financed by the EU (€1.6 million), is implemented by a consortium led by Hulla & Co. Human Dynamics. It aims to define the mechanisms and provide institutional and legal support for green economy development, increase the capacity of staff in public administration and develop a programme of action for the reduction of pollutants covered by the Gothenburg Protocol to Abate Acidification, Eutrophication and Ground-level Ozone to the Convention on Long-range Transboundary Air Pollution.

Strategic documents on sustainable development

National Strategy for Sustainable Socioeconomic Development until 2030

The National Strategy for Sustainable Socioeconomic Development until 2020 (NSSD-2020) – the second NSSD in Belarus – was approved by the National Commission on Sustainable Development and presidium of the Council of Ministers in 2004. No implementation report for NSSD-2020 was prepared, though some assessment of implementation is found in NSSD-2030.

The National Strategy for Sustainable Socioeconomic Development until 2030 (NSSD-2030) – the third NSSD – was approved by the presidium of the Council of Ministers in February 2015. The NSSD-2030 reflects the three pillars of sustainable development by emphasizing the triad "human being – economy – environment".

The strategic goal defined by NSSD-2030 is to ensure high living standards for the population and conditions for the harmonious development of human personality on the basis of transition to a highly efficient economy, based on knowledge and innovation, while preserving a healthy environment for future generations. This strategic goal is to be achieved in two phases:

- Phase I – 2016–2020, aiming to achieve qualitative and balanced economic growth on the basis of structural and institutional transformation of the economy according to green economy principles and priority development of high-tech production as a basis for raising the competitiveness of the country and quality of life for its population;
- Phase II – 2021–2030, aiming to support stable, sustainable growth grounded in the growth of high moral and spiritual values, high quality of human development, speedy development of knowledge-intensive production and services, and further development of green economy while preserving the natural capital.

The NSSD-2030 envisages the restoration of the nature protection fund; at the same time, the Ministry of Finances reports that as of late 2015 only few funds with large significance for the national economy have been kept in the republican budget and

that the restoration of the nature protection fund is not envisaged.

Unlike NSSD-2020, NSSD-2030 envisages a system of reporting on implementation. Monitoring of implementation is to be done annually, and a detailed analytical implementation report is to be prepared biannually. Monitoring results are to be reviewed by the to-be-revitalized National Commission on Sustainable Development. Monitoring results and the analytical report are to be published and accessible to the public.

Main areas of socioeconomic development

The Main Areas of Socioeconomic Development for 2006–2015 were approved in 2006 by the Council of Ministers Resolution No. 1475. They serve to guide the development of programmes and annual forecasts of socioeconomic development, as well as sectoral and regional programmes and forecasts.

Programme of Socioeconomic Development

Programmes of Socioeconomic Development for 2006–2010 and for 2011–2015 are the main programmes developed by the government in furtherance of the Law "On the state forecasting and socioeconomic development programmes of the Republic of Belarus" and in implementation of the NSSD. They are also considered to be the main mechanism for implementation of other strategies, including the Environmental Protection Strategy until 2025, and include sections on environmental policy and use of natural resources. Despite the economic crisis, most forecasted indicators of socioeconomic development of the 2006–2010 Programme were achieved.

The 2011–2015 Programme provides for a number of measures on environment, including construction of modern WWTPs, replacing surface water supply with groundwater supply in the city of Minsk, construction of new iron removal facilities at water intakes, increasing centralized water supply in rural areas, re-equipping large industrial facilities with modern gas-cleaning systems, increased use of environmentally friendly fuels and expanding reuse of packaging materials. Concrete activities and implementing institutions are indicated in the 2011 Resolution of the Council of Ministers No. 942 "On approval of activities on implementation of the Programme of Socioeconomic Development of the Republic of Belarus for 2011–2015". Examples of results of the Programme include the recent creation of a number of new republican preserves.

The oblasts, the city of Minsk, as well as rayons and towns also developed their own programmes of socioeconomic development for the respective periods.

There is annual reporting on implementation of programmes of socioeconomic development, which involves practically all public administration bodies.

Concept of National Security

The 2010 Concept of National Security approved by the President includes strategic directions for ensuring ecological safety, including continued rehabilitation of the territories damaged by the Chernobyl NPP disaster, improvement of the state system of prevention and response to emergency situations, and compliance with international rules and standards during the construction of the Belarusian NPP.

Strategic documents on environment

National Environmental Action Plan 2006–2010

The 2006 National Action Plan on Rational Use of Natural Resources and Environmental Protection (or NEAP) for 2006–2010, approved in 2006 by the Decree of the President No. 302, followed the previous plan for 2001–2005, approved by the 2001 Resolution of the Council of Ministers No. 912. The report on implementation of NEAP 2006–2010 shows impressive results, that is, implementation of nearly all (182 out of 195) activities planned, including both legal/institutional and technical (introduction of new equipment, installations, technologies) measures. No NEAP was developed for the period after 2010.

Environmental Protection Strategy for the period until 2025

The 2011 Environmental Protection Strategy for the period until 2025 was approved by the decision of the Board of the Ministry of Natural Resources and Environmental Protection, despite the original intention to have it approved by the Council of Ministers.

The Strategy is to be implemented through the development and implementation of state strategies, programmes and action plans on specific environmental components, programmes and action plans in economic sectors, regional programmes and local environmental action plans (LEAPs).

The Strategy includes a number of tasks, such as:

- Reduction of adverse environmental impacts and restoration of natural systems through improvement of ambient air quality, improvement of groundwater and surface water quality and rehabilitation of polluted and ecologically destabilized territories;
- Reduction of the generation of waste, increased use of waste as secondary raw material and prevention of negative impacts of waste on the environment;
- Sustainable territorial development, including strengthening the ecological safety of territories through optimization of placement of industrial facilities and preservation of natural systems and achieving better quality of environment in human settlements;
- Conservation of biological and landscape diversity through development of a national ecological network integrated into the Pan-European Ecological Network, as well as development of local ecological networks at oblast and rayon levels;
- Reducing impact on climate and ensuring adaptation to climate change in social and economic spheres.

A separate section deals with environmental governance, including scientific support, monitoring, education and staff development, access to information and public participation, and international cooperation.

The Strategy includes targeted values of the state of the environment to be achieved in 2015 and in 2025 with regard to the quality of air, land, waste, biodiversity and health. Progress towards the achievement of targeted values is regularly discussed by the Ministry's Board. Although, at the time of drafting, the Environmental Protection Strategy was agreed with other ministries, it is poorly known in sectoral ministries.

Strategic documents on specific environmental issues

There are a number of strategic documents covering specific environmental media or issues, such as air, water, waste and protected areas (chapters 4–7), chemicals management and radiation (annex V). There are no strategic documents on environmental noise and vibration – these issues are governed by sanitary regulations and standards. There are a number of strategic documents covering cross-cutting or horizontal issues, for example the State Programme of Measures to Mitigate the Effects of Climate Change for 2013–2020, Strategy for development of scientific, technical and innovation activities on environmental protection and rational use of natural resources for 2014–2015 and until 2025, or the regular five-year state programmes on the development of the National Environmental Monitoring System (NEMS).

Strategic documents on international cooperation

There are a number of strategic documents adopted specifically to facilitate implementation of commitments taken by Belarus under international environmental agreements, for example, the 2011 National Plan of Implementation of the Republic of Belarus under the Stockholm Convention on Persistent Organic Pollutants in 2011–2015, approved by the 2011 Decree of the President No. 271; the 2015 Strategy on Implementation of the United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa, approved by the 2015 Resolution of the Council of Ministers No. 361; and the 2009 Strategy on Implementation of the Convention on Wetlands of International Importance, especially as Waterfowl Habitat, approved by the 2009 Resolution of the Council of Ministers No. 177.

The 2012 National Programme of International Technical Cooperation for 2012–2016, approved by the 2012 Resolution of the Council of Ministers No. 411, is the main document describing to the donor community the needs and priorities of the country in international technical cooperation. The programme includes 114 project proposals clustered around four main directions, including environmental sustainability.

Strategic documents at local level

The Law on Environmental Protection requires the development of territorial integrated schemes for rational use of natural resources and environmental protection. The 2007 Resolution of the Council of Ministers No. 1436 detailed the procedure for development, adoption and financing of the schemes. The schemes were developed for concrete administrative-territorial units in order to identify environmental problems and substantiate respective activities, and were subject to SEE. The schemes existed until 2010. As of 2011, the local programmes on socioeconomic development had to be developed, and the territorial integrated schemes ceased to exist as the activities under the schemes would duplicate those under the programmes. In addition, there was

some duplication with the schemes of integrated territorial organization adopted at the oblast level as urban planning documents and covering some environmental issues, for example, waste disposal sites and wastewater treatment facilities.

Besides local programmes on socioeconomic development and schemes of integrated territorial organization, there are other strategic documents at local level, for example, programmes on energy saving and energy efficiency, on "Clean Water" and on treatment of secondary material resources.

The legislation does not require the development of LEAPs. However, in 2014, LEAPs were developed and endorsed in 10 rayons of Belarus with support of the project "Local Environmental Action Plans Component: Introducing New Visions for the Better Environment in Belarusian Districts" coordinated by the non-governmental organization (NGO) "Interakcia".

Sectoral development with a possible impact on environment

There has been progress achieved in integrating environmental considerations into sectoral planning in the energy (chapter 8), transport (chapter 9), forestry (chapter 10), spatial and urban planning (chapter 13) and health (chapter 14) sectors. A positive and unique example is the 2013 Strategy for Reduction of Adverse Impacts of Transport on Atmospheric Air for the Period until 2020, developed through joint efforts of the environment and transport sectors and approved by the Deputy Prime Minister.

The Strategy covers all types of transport and includes such strategic goals as: to decrease by 2020 the share of emissions from mobile sources in the total emissions, from 72 per cent to 65 per cent; increase by 2020 the share of public transport with improved environmental performance and electrical transport in settlements with a population over 100,000 inhabitants to 50 per cent; renovation of the air fleet; and increased electrification of railways with a corresponding decrease of emissions of polluting substances from mobile sources in railways by 20 per cent (chapter 9). The Strategy is accompanied by an action plan with over 70 activities by the Ministry of Natural Resources and Environmental Protection, Ministry of Transport and Communications, their subordinated organizations, scientific institutions and local executive and administrative bodies.

In the agricultural sector, the 2011 State Programme on Sustainable Rural Development for 2011–2015 provides for increased innovation, technical re-equipment of agricultural production by use of resource-efficient technologies, use of more efficient technologies of soil cultivation, increased use of environmentally sound mechanisms of plant protection and increased introduction of environmental management systems based on ISO 14001. The concept of the new State Programme on Sustainable Rural Development for 2016–2020 addresses organic agriculture and "ecologization" of agricultural production.

The Programme for Construction of Energy Generation Facilities Fuelled by Biogas for 2010–2015 provides for construction of 18 biogas systems in agricultural organizations dealing with cattle, pig and poultry breeding. Environmental protection issues are reflected in some way in the State Programme of Conservation and Use of Meliorated Lands for 2011–2015 (protection of lands and soils) and the State Programme on Development of Fisheries for 2011–2015 (rational use of fish resources in natural water bodies).

With regard to strategic planning in industry, the key sectoral strategic document – the 2012 Programme on Development of Industrial Sector until 2020 – provides for "ecologization" of the industrial sector. The main tasks include decreasing industrial waste generation, wastewater discharges and GHG emissions from stationary sources, reducing use of primary natural resources with increased use of secondary material resources, and minimization of environmental and health risks during the life cycle of industrial products, in particular in the chemical, oil, pharmaceutical and food industries.

The targeted indicators for the year 2020 include: increase by 2 per cent the use of water in systems of reverse water supply and water recycling systems; increase by 2 times the number of industrial organizations certified with ISO 14001; ensure that eco-labelled industrial products make up at least 2 per cent of all industrial products produced; and other indicators.

An Action Plan on Rational Use of Natural Resources and Environmental Protection of the Ministry of Industry for 2006–2010 was developed to streamline the activities of that Ministry with NEAP 2006–2010.

The mandatory SEE performed for draft concepts, forecasts, programmes and schemes of sectoral development, together with well-developed interministerial coordination, have contributed to the integration of environmental considerations into

strategic planning in various sectors. However, environmental protection is not yet considered to be on an equal footing with sectoral development.

Millennium Development Goals (MDGs)

Official reports on implementation of the MDGs were prepared in 2005 and 2010. In 2012, a statistical book was issued with MDG-related data. A new MDG implementation report is expected to be released by the government in late 2015. According to the Ministry of Foreign Affairs, as of early 2015, Belarus had achieved five of the eight MDGs; the yet-to-be achieved goals are Goal 6 (Combat HIV/AIDS, malaria and other diseases), Goal 7 (Ensure environmental sustainability) and Goal 8 (Develop a global partnership for development).

Information on MDG indicators available to the EPR team is found in annex IV. With regard to non-indicator assessment of progress in achieving Target 7.A: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources, Belarus has achieved such integration by placing the NSSDs (NSSD-2020 and NSSD-2030) at the core of the national planning system. The long-term NSSDs provide the roadmap for developing and implementing the mid-term programmes of socioeconomic development and other programmes and strategic documents in the country. At the same time, more effort could have been employed to monitor and report specifically on NSSD-2020 implementation.

Post-2015 development agenda

Belarus took an active part in the discussion on the post-2015 sustainable development goals (SDGs), including as a member of the Open Working Group on SDGs. National consultations on the post-2015 development agenda took place in April 2013.

On 29 January 2015, the international conference "Strengthening technical cooperation between Belarus and the United Nations: Results, New Prospects and Opportunities" (in Minsk) discussed the progress achieved in MDG implementation and the national perspective for future SDGs.

Trends and progress achieved

Belarus continued to rely on a developed system of strategic planning. No NEAP was developed after 2010 as approaches to planning changed: the Programme of Socioeconomic Development is seen as a key programme document, also in the environmental field. The 2011 Environmental Protection Strategy for the period until 2025 was approved at the level of the Ministry's Board. Due to mandatory SEE and strong interministerial coordination, progress has been achieved in integrating environmental protection in strategic planning in various sectors. Steps are being made to review the current legislation in order to introduce SEA. Green economy principles have been integrated in the recently approved NSSD-2030 and practical steps are taken through international projects to raise capacity for implementation of a green economy approach.

1.3 Institutional framework

President and the Council of Ministers

Defining consolidated state policy on environmental protection is the prerogative of the President. Among other matters, the President approves state programmes on the rational use of natural resources and environmental protection, determines how natural resources can be given for exploitation, takes decisions on proclamation of reserves and national parks, and approves the national ecological network scheme. The Council of Ministers has to ensure implementation of the state policy on environmental protection. Among other matters, it adopts legal acts on environmental protection, ensures the development and implementation of state programmes on the rational use of natural resources and environmental protection, and determines the lists of environmental protection measures financed from the republican and local budgets.

Ministry of Natural Resources and Environmental Protection

The Ministry of Natural Resources and Environmental Protection is in charge of implementation of consolidated state policy on environmental protection and rational use of natural resources. It is also responsible for implementation of state policy on the use and protection of subsoils and on hydrometeorological activity. As the key governmental body in the field, the Ministry coordinates the activities on environmental protection and rational use of natural resources of other republican authorities and local executive and administrative bodies.

The functions of the Ministry are specified in the Regulation approved by the 2013 Resolution of the Council of Ministers No. 503. Among other matters, the Ministry is responsible for the development of state programmes, action plans and other documents

on environmental protection and rational use of natural resources, setting norms, technical norms and standards, organizing the operation of the NEMS, maintenance of several cadastres, issuance of special permits (licences) for activities connected with environmental impacts, and implementation of SEE.

Structure and staff

Since 2005, some reorganizations have taken place in the structure of the Ministry, though, in general, this body has operated on a relatively stable basis. The most significant change in its organizational structure was the abolition, as of 1 January 2010, of such territorial bodies as interregional specialized inspectorates, which previously implemented tasks on the protection and control of environmental components (including ambient air, water, fauna and flora, as well as wastes), and performed monitoring, analytical control and SEE. The staff of interregional specialized inspectorates was transferred to the central apparatus of the Ministry where the Division of Biological and Landscape Diversity, Waste Management Division, Division of State Ecological Expertise and Division for Control of Impacts on Air and Water Resources were created.

As of 1 July 2013, separate departments on geology and on hydrometeorological activity were abolished and respective divisions were created in the structure of the Ministry.

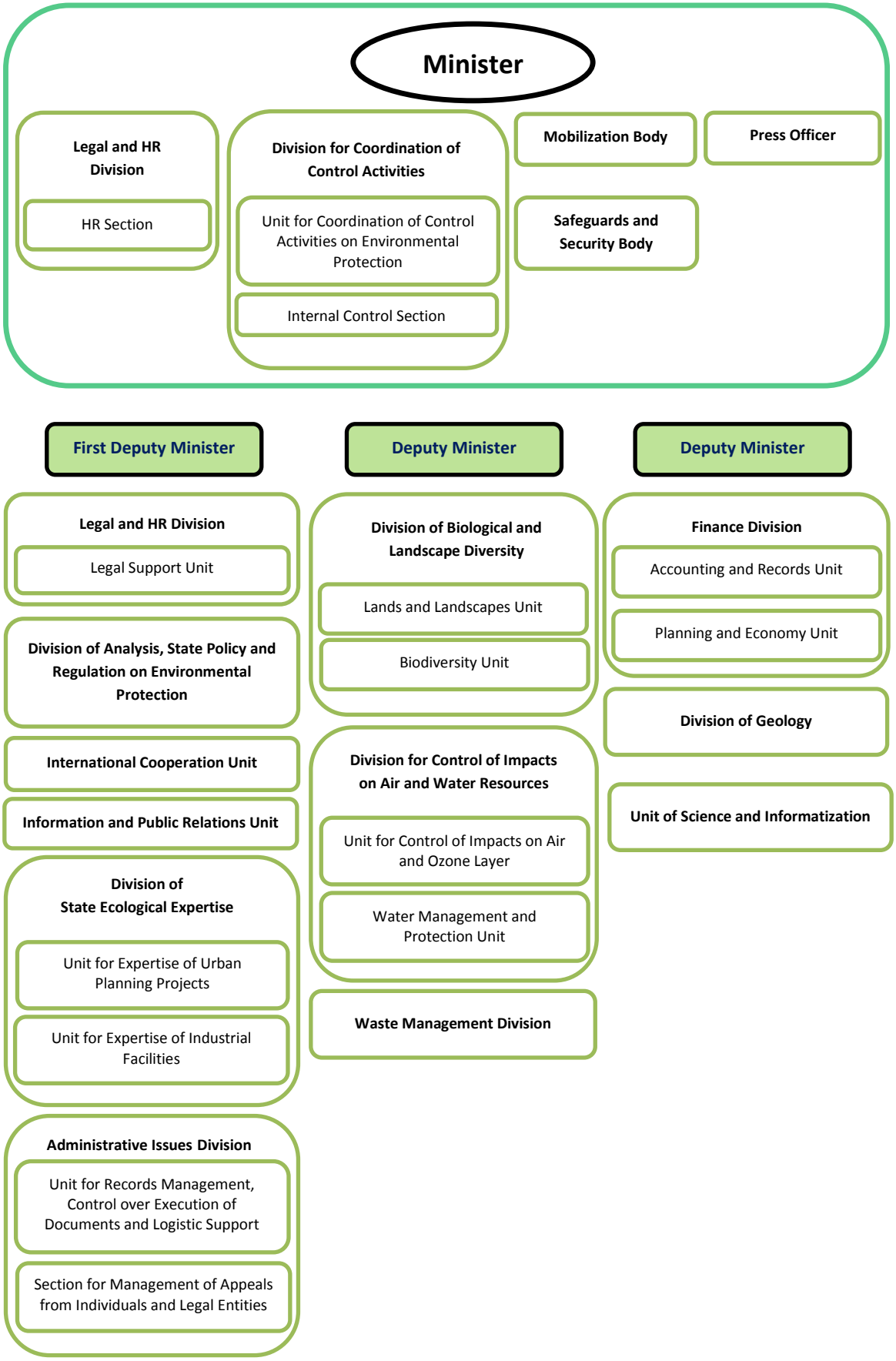
As of 1 January 2015, the Division on Hydrometeorological Activity was abolished. Coordination of hydrometeorological activities was entrusted to the State Institution "Republican Centre for Hydrometeorology, Radiation Control and Environmental Monitoring" formed by merging the Republican Centre of Radiation Control and Environmental Monitoring and the Republican Hydrometeorological Centre. Also, organizational changes included transformation of some divisions and units and reshuffling of functions between the structural units. The structure of the central apparatus of the Ministry, active as of 1 January 2015, is reflected in figure 1.1. Territorial bodies and subordinated organizations of the Ministry are shown in figure 1.2.

In 2004, 72 staff worked in the central apparatus of the Ministry. Following the inclusion of staff of the interregional specialized inspectorates into the central apparatus of the Ministry, the number of staff increased to 135 persons.

In accordance with 2013 Decree of the President No. 168, as of 1 July 2014, the staff of the central apparatus of the Ministry decreased by 30 per cent and constitutes 94 persons (figure 1.3). Turnover of staff in the central apparatus is an issue, though not of critical character.

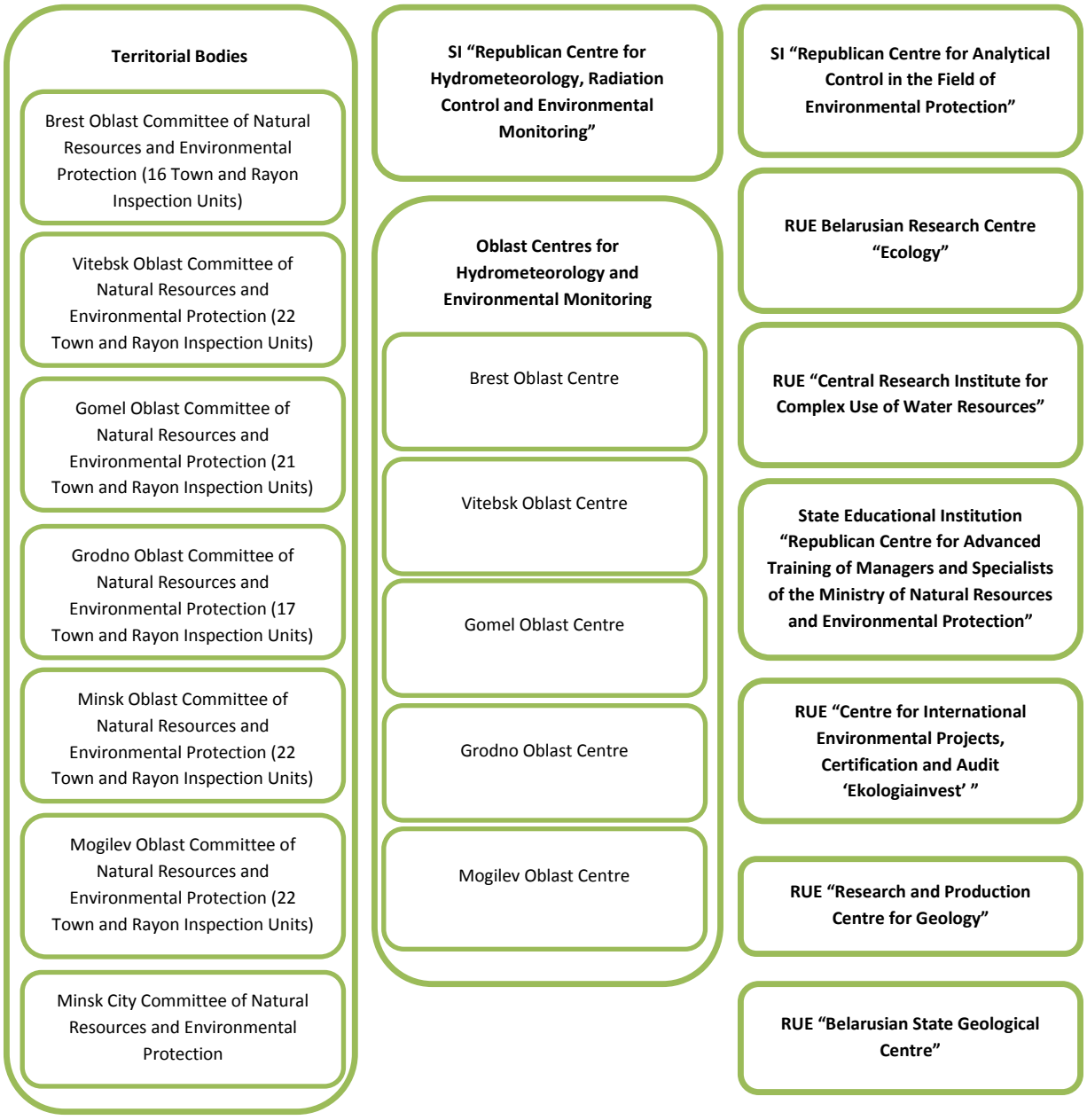
Photo 1: Ministry of Natural Resources and Environmental Protection, Minsk

Figure 1.1: Organizational chart of the central apparatus of the Ministry of Natural Resources and Environmental Protection



Source: Ministry of Natural Resources and Environmental Protection, 2015.

Figure 1.2: Territorial bodies and subordinated organizations of the Ministry of Natural Resources and Environmental Protection



Source: Ministry of Natural Resources and Environmental Protection, 2015.
Note: SI – State Institution. RUE – Republican Unitary Enterprise.

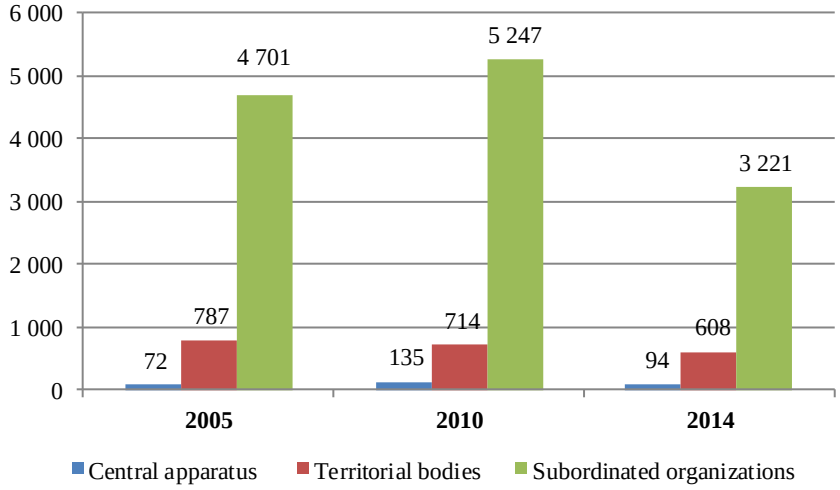
Territorial bodies

The territorial bodies of the Ministry are the Minsk City Committee of Natural Resources and Environmental Protection, six oblast committees of natural resources and environmental protection and 120 town and rayon inspection units (often joint town and rayon inspection units) of natural resources and environmental protection. The town and rayon inspection units do not have legal personality and, in practice, resemble structural units of respective oblast committees.

The oblast and Minsk City committees and inspection units are subordinated only to the Ministry, that is, they are not subordinated to local authorities in respective oblasts, rayons and towns.

In 2004, territorial bodies had 792 staff. In 2005, there were 787 staff. As of 1 January 2010, the staff of territorial bodies decreased to 714 persons due to dissolution of interregional specialized inspectorates. Following the 2013 Decree of the President No. 168, as of 1 July 2014, the staff of territorial bodies decreased by 15 per cent and stands at 608 persons (figure 1.3).

Figure 1.3: Number of staff in the system of the Ministry of Natural Resources and Environmental Protection, 2005, 2010, 2014



Source: Ministry of Natural Resources and Environmental Protection, 2015.
Note: High fluctuations in numbers of staff in subordinated organizations are connected with transfer of some organizations to/from the authority of the Ministry.

The status and powers of the Minsk City Committee are similar to the status and powers of oblast committees, except that the Minsk City Committee does not have the town and rayon inspection units, whereas the oblast committees do. Also, inspectors of the Minsk City Committee perform inspection control but do not issue permits, whereas inspectors of town and rayon inspection units issue permits in addition to performing inspection control. The functions of oblast committees and Minsk City Committee are stipulated in their regulations approved by the Ministry. Selected functions of these committees include issuing permits for emission of air pollutants, special water use, and storage and disposal of production waste, issuing integrated permits, organizing checks (inspections) of implementation of environmental legislation, organizing SEE and proposing to the local executive and administrative bodies the declaration of specially protected natural areas of local significance. Town and rayon inspection units have their own regulations developed on the basis of a model regulation.

Subordinated organizations

All subordinated organizations are state owned. The State Institution "Republican Centre for Analytical Control in the Field of Environmental Protection", the State Institution "Republican Centre on Hydrometeorology, Control of Radioactive Pollution and Environmental Monitoring", as well as five oblast centres on hydrometeorology and environmental monitoring, receive funding from the state budget for their core activities and also have the right to implement activities to earn extra funding.

Other subordinated organizations do not receive direct budgetary funding, but they can have contracts with the State and receive remuneration from the state budget for implementation of certain services.

Subordinated organizations implement a significant amount of work. They are often entrusted with the development of strategic and policy documents and national implementation reports. They perform some "administrative procedures". In the situation when there are restrictions on the number of staff in the central apparatus of the Ministry, subordinated organizations add to the capacity of the Ministry without being counted as Ministry staff. There are significant numbers of staff in the subordinated organizations: in 2005, 4,701 staff were employed; in 2010, 5,247 staff; and in 2014, 3,221 staff (figure 1.3). High fluctuations in numbers of staff are connected with the transfer of some subordinated organizations to/from the authority of the Ministry.

The State Institution "Republican Centre for Analytical Control in the Field of Environmental Protection" has functioned since 2010. It performs analytical (laboratory) control on environmental protection and organizes surface water monitoring on hydrochemical parameters. The Centre includes three republican, five oblast and 14 interregional laboratories.

The laboratories cover: water (wastewater, surface water and groundwater) – 179 indicators, bottled water – 158 indicators, air emissions from stationary sources – 122 indicators, air emissions from mobile sources – three indicators, land (including soil) – 138 indicators, and waste – 100 indicators.

The State Institution "Republican Centre for Hydrometeorology, Radiation Control and Environmental Monitoring" performs regular environmental observations and information analyses, prepares short-term and long-term weather forecasts and notices on extreme weather events, maintains the climate cadastre and develops research on climate, agrometeorological and hydrological conditions. The Centre does air and surface water monitoring, including radiation. Although it is responsible for surface water monitoring, this only means expert assessment of results, whereas the actual sampling and analyses of samples are done by the Republican Centre for Analytical Control in the Field of Environmental Protection. The five oblast centres for hydrometeorology and environmental monitoring (one per oblast, except Minsk Oblast) function as separate legal persons and are subordinated directly to the Ministry. The 2014 Strategy for Development of Hydrometeorological Activities and Environmental Monitoring Activities until 2030, approved by the Board of the Ministry, aims to raise the efficiency of these activities through use of new technologies and equipment.

The Republican Unitary Enterprise (RUE) Belarusian Research Centre "Ecology", created in 1991, maintains the State Waste Cadastre, register of facilities for use of waste, register of facilities for storage, disposal and decontamination of waste, State Air Cadastre and register of specially protected natural areas. Its other activities include development of normative technical and methodological documentation on the environment, development of analytical reports on the state of the environment, environmental certification and audit. The Centre implements the functions of the Main Information and Analysis Centre (MIAC) of the NEMS, as well as of NEMS' Information and Analysis Centres for local monitoring and for wildlife monitoring (table 1.1). Since 2004, it also hosts the Aarhus Centre. In 2010, the Centre on Environmental Conventions and Agreements was created within the RUE Belarusian Research Centre "Ecology".

The RUE "Central Research Institute for Complex Use of Water Resources", founded in 1961, is a scientific institution of the Ministry for research on water management and engineering. Among other matters, it participates in the planning, forecasting and setting of standards for the use and protection of water resources, develops new water management measures, maintains the State Water Cadastre, develops schemes and drafts documentation for water protection zones and sanitary zones, performs environmental audit in the field of hydroecology and participates in international cooperation on transboundary waters.

The RUE Centre for International Environmental Projects, Certification and Audit "Ekologiainvest", founded in 1996, deals with development and implementation of international technical assistance projects and performs ecological certification. The Centre on the Development of Technical Norms and Standards on Environment within "Ekologiainvest" works to develop and improve legislative requirements on environmental protection, including on ecological audit, attestation of ecological auditors and certification of services in environmental protection. It is accredited as a body for certification of such services. In 2009, "Ekologiainvest" established the Centre on Best Available Techniques (BAT) in order to collect and disseminate information on BAT as well as assist with identification of BAT during preparation of applications for integrated permits.

The RUE "Belarusian State Geological Centre" conducts geological expertise of project documentation on geological research of subsoils and maintains the state geological fund with geological information.

The RUE "Research and Production Centre for Geology" implements geological exploration activities and geological research.

The State Educational Institution "Republican Centre for Advanced Training of Managers and Specialists of the Ministry of Natural Resources and Environmental Protection" was established in 2004. The Centre organizes training for staff of the Ministry. Staff of other ministries and governmental organizations, as well as of the private sector and other actors can also enroll in the programmes of the Centre (chapter 12). New courses are regularly developed by the Centre.

Training

It is a legal requirement for staff to undertake in-service training every five years. The Ministry has annual plans for training of staff in the Republican Centre for Advanced Training of Managers and Specialists of the Ministry. In accordance with such plans, the Centre trained 160 staff in 2005, 182 staff

in 2006, 209 staff in 2007, 184 staff in 2008, 180 staff in 2010, 140 staff in 2012 and 93 staff in 2014. The staff of the Ministry, including its territorial bodies and subordinated organizations, regularly receive training in the Institute of Managerial Education of the Academy of Public Administration under the President (e.g. in 2012, 13 senior staff were trained). In 2014, 31 heads of territorial bodies of the Ministry received training in the Institute of Civil Service of the Academy of Public Administration under the President.

Sectoral ministries

The Ministry of Forestry continues to combine resource use functions and policymaking and control functions. Besides the implementation of state policy on rational use and protection of the forest fund and in the hunting sector, the Ministry is responsible for the protection of wildlife in forests under its competence.

The Ministry of Health is responsible, among other matters, for the sanitary and epidemiological situation in the country. It performs state sanitary control and control over drinking water quality, as well as over compliance with sanitary rules in human settlements. The system of the Ministry includes public health departments of oblast executive committees and oblast, town and rayon centres of hygiene, epidemiology and public health. The Ministry of Health has a number of subordinated organizations. The RUE "Scientific and Practical Centre of Hygiene" carries out applied and fundamental research (chapter 14).

The Ministry of Housing and Utilities is responsible for implementation of state policy in the housing and public utilities sector, including construction and maintenance of human settlements, conditions of the housing sector, provision of utilities and municipal waste management. It is also responsible for coordination of activities in field of secondary material resources.

The Ministry of Emergency Situations is responsible for prevention of and response to natural and man-made emergency situations, fire prevention, and industrial, nuclear and radiation safety, as well as addressing the consequences of the Chernobyl NPP disaster.

The Ministry of Agriculture and Food implements state policy in agriculture, fishing, food production and food quality, plant protection, preservation of soil fertility, veterinary issues and land reclamation. It has some competences on the safety of genetic engineering activities. The Ministry is responsible for performing control in fisheries, land reclamation and veterinary activities, among other fields.

The Ministry of Industry implements state policy on the development of industry, including the issues of rational use of raw materials and fuel energy resources, use of secondary raw materials and promotion of local raw materials.

The Ministry of Energy is responsible for implementation of energy policy, including environmental issues.

The Ministry of Architecture and Construction implements state policy in architectural, urban planning and construction activities, including on resource efficiency.

The Ministry of Transport and Communications implements state policy in the transport sector, including on the reduction of adverse impacts from transport on the environment.

The Ministry of Economy prepares forecasts and programmes of socioeconomic development which have a section on the environment and use of natural resources. It is also responsible for international technical cooperation, including on the environment.

The Ministry of Education implements the state policy on education, including coordination on education for sustainable development and environmental education.

Affairs Management Department of the President

The Affairs Management Department of the President is responsible for the management of four national parks and Berezinski Biosphere Reserve. In the territories under their jurisdiction, the nature protection organizations and forestry organizations of the Affairs Management Department of the President perform control of the hunting sector, hunting, fishing, use and protection of the forest fund, and other control functions with regard to protection of wildlife and plant resources. The Department of Humanitarian Activities of the Affairs Management Department of the President is responsible for approval of grant humanitarian aid, including on the environment.

State Inspectorate on Fauna and Flora Protection under the President

The State Inspectorate on Fauna and Flora Protection under the President is a specialized state body responsible for preventing poaching and illegal logging. It exercises control over the protection and use of wild animals which may be hunted or fished, wild plants, forest fund and lands covered by wild plants. It also exercises the control over the implementation by fishery organizations of fish preservation measures. It has six oblast branches and 47 interregional inspectorates.

Other actors

The Committee of State Control is a body empowered to control the use of the republican budget, use of state property, implementation of acts of governmental institutions referring to state property, economic, financial and tax relations, as well as other issues. In practice, the Committee looks at implementation of all kinds of legislation when doing checks (inspections). The Committee has its territorial bodies in oblasts.

The Department of Energy Efficiency of the State Committee on Standardization is responsible for implementation of state policy on efficient use of fuel-energy resources, development of norms and standards for energy-consuming equipment, participation in state energy efficiency expertise, control over the rational use of fuels, electricity and heat.

The National Statistical Committee (Belstat) compiles data on the basis of state statistical reporting (with 10 statistical forms on environment and forestry). It publishes statistical yearbooks, bulletins and the annual statistical edition "Environmental protection in the Republic of Belarus". Belstat also publishes on its webpage a set of core indicators of the Shared Environmental Information System (SEIS).

The State Committee on Property is responsible for keeping the record of lands, maintenance of the State Land Cadastre, control over the use and protection of land and the operation of the land use planning service.

The National Academy of Sciences of Belarus provides scientific advice on environmental issues. Its Institute of Genetics and Cytology serves as a National Coordination Biosafety Centre.

Vertical coordination

The territory of Belarus is divided for administrative purposes into six oblasts (Brest, Gomel, Grodno, Minsk, Mogilev and Vitebsk) and the capital city of Minsk, which has its own status. Oblasts are further divided into rayons and oblast-subordinated cities and towns. There is also a third layer: rayons in cities and towns, urban-type settlements, rayon-subordinated towns and rural localities. Local self-government is organized through local councils of deputies, local referenda and other forms.

In the area of environmental protection, the local executive and administrative bodies, or ispolkoms, have rather limited functions. These include the development (for approval by the councils of deputies) of programmes of socioeconomic development and programmes on the environment and rational use of natural resources for respective territories. They also organize, in their respective territories, electricity and other power supply, water supply to the population, sewerage services, and the collection, transportation and disposal of municipal waste. Local executive and administrative bodies take decisions on proclamation of protected areas of local importance and certain types of decisions on the use of land and natural resources. They also perform control over construction in the housing sector and implementation of housing legislation. In addition, they are entitled to make decisions on the use of natural resources in accordance with legislation on environmental protection and use of natural resources, as well as to take measures to ensure environmental protection and rational use of natural resources. There are no units on environmental protection and natural resources in the structure of local executive and administrative bodies.

In terms of division of responsibilities on the environment between central and local levels, the system is highly centralized. The territorial bodies of the Ministry of Natural Resources and Environmental Protection have a higher scope of environment-related powers and responsibilities than the local executive and administrative bodies. However, there is close cooperation between territorial bodies of the Ministry and local authorities. The heads of the oblast and Minsk City committees of natural resources and environmental protection are appointed by the Minister with prior agreement of the chairs of oblast executive committees and Minsk City Executive Committee, respectively. Officials of the territorial bodies attend the meetings of the local executive and administrative bodies and sessions of oblast and rayon councils of deputies when relevant

issues are on agenda. There are cases of joint checks (inspections) being organized, for example, with regard to construction in human settlements. There are joint activities on environmental awareness of the population. There is cooperation on the development of strategic documents, for example, schemes for the placement of specially protected natural areas – these are developed jointly by territorial bodies of the Ministry and local executive and administrative bodies for approval by councils of deputies. There are cases when inspectors of the territorial bodies of the Ministry are elected in the oblast and rayon councils of deputies.

High centralization is apparent also in other areas relevant for environmental protection. For example, the Department on Energy Efficiency of the State Committee on Standardization has its territorial offices for supervision over the rational use of fuel-energy resources. These offices are directly subordinated to the Department. In the area of housing, however, an office for housing and utilities of an oblast executive committee is a structural unit of an oblast executive committee, but is subordinated to both the oblast executive committee and the Ministry of Housing and Public Utilities (so-called double subordination).

Horizontal coordination

The National Commission on Sustainable Development, created in 1996, was dissolved in 2009. The NSSD-2030 envisages revitalization of the Commission.

The way of preparing issues for discussion at the Council of Ministers involves the process of thorough coordination among all ministries involved, with procedures described in the Regulation of the Council of Ministers approved by the 2009 Resolution of the Council of Ministers No. 193.

The competences of the Ministry of Natural Resources and Environmental Protection include coordination of activities of other republican state authorities on the issues of environmental protection and use of natural resources. In 2011, the Ministry's Board approved a document, "Set of additional measures on efficient use of natural resources and strengthening the role of the Ministry of Natural Resources and Environmental Protection in coordination of activities of the republican state authorities and local executive and administrative bodies", which describes concrete steps and activities for cooperation between the Ministry and other bodies and institutions.

Representatives of other governmental organizations are invited to take part in the meetings of the Board of the Ministry when relevant issues are discussed. Joint boards involving other ministries are sometimes organized.

Interministerial commissions or councils are often created to address the issues belonging to the competence of several ministries. For example, in 2006–2014, the State Commission on Climate Change Problems under the chairmanship of the Deputy Prime Minister and with participation of ministries and state organizations was in charge of coordinating the activities of all governmental bodies on implementation of the UNFCCC and the Kyoto Protocol. In 2010, through the Order of the Ministry of Health, a Council on implementation of the Protocol on Water and Health to the Convention on the Use and Protection of Transboundary Watercourses and International Lakes was established with participation of the Ministry of Health, Ministry of Natural Resources and Environmental Protection, Ministry of Housing and Public Utilities, Ministry of Emergencies and the National Academy of Sciences.

There are also a number of expert bodies with interministerial participation, for example, the Interministerial Expert Council on Application of Energy Efficient Technologies, Equipment, Appliances and Materials, established in 2008 to approve new energy efficiency technologies and equipment, or the Expert Council on Safety of Genetic-Engineering Organisms under the Ministry of Natural Resources and Environmental Protection, established to organize state expertise on the safety of genetically engineered organisms under the 2006 Law on the Safety of Genetic Engineering.

However, a few coordination bodies incorporate other stakeholders along with governmental bodies, organizations and institutions. An example is the Coordination Council on Education for Sustainable Development, established in 2006 under the Ministry of Education with participation of governmental bodies and institutions, academia, NGOs and mass media (chapter 12). Rather, Belarus seems to see the creation of interministerial coordination bodies and the establishment of public coordination councils as separate mechanisms. For example, along with revitalization of the National Commission for Sustainable Development, the NSSD-2030 provides for the establishment of public councils on sustainable development at republican, oblast, rayon and town levels.

Public participation and stakeholder involvement

Main developments

Since 2005, the Government has made progress in improving the legal framework for public participation in environmental decision-making. The Aarhus Centre opened in 2005 in Minsk. A regional Aarhus Centre opened in 2012 in Grodno. There are many examples of discussions organized with the public on draft legal and strategic documents, as well as of public participation as part of the EIA procedure (chapter 2). A public consultation process was organized to prepare the 2014 national implementation report to the fifth session of the Meeting of the Parties to the Aarhus Convention.

Since 2009, Belarus has been under the scrutiny of the Aarhus Convention Compliance Committee. In 2011 (decision IV/9b) and 2014 (decision V/9c), the Meeting of the Parties adopted decisions on compliance by Belarus, including recommendations to the country. In October 2014, the Deputy Prime Minister approved the Action Plan for Implementation of the Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters for the period 2014–2017 with a view to streamlining implementation of the Convention and of decision V/9c.

Environmental NGOs

In 2005, 47 environmental NGOs existed in the country. As of early 2015, there are no separate data on the number of environmental NGOs in the country. The 2014 data of the Ministry of Justice speak of a cumulative number of 73 registered public associations active in "nature conservation, protection of historic monuments and culture" (i.e. not only nature conservation NGOs but also NGOs dealing with the protection of historic monuments and culture). The Aarhus Centre and NGO representatives concur in the estimates that there are about 30 republican and not more than 10 local environmental NGOs registered in the country. This number is much lower than in other countries with a similar population (e.g. there are more than 2,000 environmental NGOs registered in Serbia).

The 2013 amendments to the 1994 Law on Public Associations eased the requirements for territorial representation of founders of republican and local public associations. At least 50 founders coming from the majority of oblasts (i.e. four oblasts) and the City of Minsk are now required for the registration of a republican public association, contrary to the pre-amendments requirement for 10 founders from each of the majority of oblasts (i.e. four oblasts) and the City of Minsk. At least 10 founders coming from two or more administrative and territorial units of the territory covered by the activities of the local public association are now required for the registration of a local public association, contrary to the pre-amendments requirement of having at least 10 founders from the majority of administrative territorial units of the territory covered by the activities of the local public association. The 2013 amendments also lifted the requirement to present in graphics the organizational structure of a public association.

However, the requirement for a public association to have an official seat in non-residential premises, the high number of founders needed (50 for a republican and 10 for a local public association), together with remaining requirements for territorial representation of founders, continue to be obstacles for registration of environmental public associations.

Although the legal requirements for registration of environmental public associations are the same as for other associations, environmental NGOs report that registering a public association in the area of environmental protection is more difficult than in some other areas (e.g. education). In this situation, there are environmental groups that operate unregistered, even though operation of an unregistered organization is a criminal law offence. Also, there are environmental groups which register in the form of an "institution" or in other forms, as this is easier than registration in the form of a public association. There are no official statistics on denials of registration of NGOs, including environmental NGOs.

Difficulties in access to financing remain another obstacle for the activities of environmental NGOs. The opportunities to receive national funding are limited. Assistance arriving from abroad (not only for NGOs but also for projects implemented by international organizations and governmental bodies) needs to go through procedures of governmental approval and registration.

There are two main procedures for approval of international funding: the procedure for "international technical assistance" and the procedure for "foreign grant aid". NGOs report the lack of clear criteria for differentiation between the two procedures. There are cases when, due to delays or the impossibility of receiving governmental approval, NGOs had to return funding to the donor.

The first procedure, for "international technical assistance", is through the Ministry of Economy and applies to assistance arriving from international organizations, foreign governments and their administrative and territorial units. This procedure culminates in the approval given through a resolution of the Council of Ministers or, in some cases, by the Commission on International Technical Assistance under the Council of Ministers. In 2010, this procedure was eased as the possibility of approval by the Commission on International Technical Assistance (instead of a resolution of the Council of Ministers) was introduced for two categories of projects: (i) national implementation projects where all funding is received by one national recipient; and (ii) mini-projects with overall funding of no more than 3,000 basic units and an implementation period not exceeding one year. Moreover, projects developed on the basis of the 2012 National Programme of International Technical Cooperation for 2012–2016 do not require the approval, but only registration. Despite these efforts to ease the procedure for "international technical assistance", environmental NGOs characterize it as difficult and lengthy, whereas governmental authorities stress the need to raise the quality of documentation submitted for approval. The average time to get approval differs in the estimates given by NGOs and by the governmental authorities.

In July 2015, the Resolution of the Council of Ministers No. 590 (enters into force in October 2015) introduced changes in the procedure for international technical assistance. In particular, the number of documents to be submitted for approval and registration of assistance was reduced. The Resolution provides for establishment of a Coordination Council on international technical cooperation with participation of governmental authorities, donors and NGOs under the Commission on International Technical Assistance.

The second procedure, for "foreign grant aid", is through the Department of Humanitarian Activity under the Affairs Management Department of the President. In this procedure, until 2015, NGOs were requested to present a letter of support from a governmental body as part of the procedure, contrary to the absence of such a requirement in the legislation. The Edict of the President No. 5 "On foreign grant aid" was adopted in August 2015 and comes into force in March 2016. The Edict widens the list of goals for which foreign grant aid can be used, including the goals of "development of specially protected natural areas, environmental protection and rational use of natural resources". For the first time ever, the Edict introduces the minimal amount of foreign grant aid that does not require registration; however this threshold applies only to goods (property) and does not apply to monetary contributions. The Edict introduces an obligation of recipients to report about use of foreign grant aid to the Department of Humanitarian Activity and in general tightens the control over use of foreign grant aid.

The reports of the Human Rights Centre "Vesna" and oral communication with environmental NGOs reveal cases of detention of environmental activists and activists standing against infill construction, formally for administrative offences (e.g. hooliganism, strong language in public places) but supposedly for their environmental activities. Environmental NGO activists also report being summoned to the Committee for State Security. However, there are no data to demonstrate whether these practices are of a systematic character. A new public communication on Belarus (2014) in the Aarhus Convention Compliance Committee alleges non-compliance with article 3(8) (persecution of environmental activists) with regard to the detention of Belarusian anti-nuclear activists.

Public participation in decisions on specific activities

Public discussions are required by the legislation on EIA (chapter 2) and the legislation on architectural, city planning and construction activities. Also, the legislation provides for public discussions in cases of planned cutting or replanting of plants (2011 Resolution of the Council of Ministers No. 1426). There are no statistics on public participation in decisions on specific activities; however, in general, the use of procedures for public discussions in EIA increased.

Environmental NGOs report difficulties with timely receipt of information on the beginning of public discussion since the mechanisms of dissemination of notices on upcoming public discussions vary. The Aarhus Centres publish some announcements on upcoming public discussions for EIA.

Public participation in integrated permitting

There are requirements on public participation in both the permit application and permit issuance stages of the integrated permitting procedure. For the eight integrated permits issued so far, no public reaction on the applications has been received (chapter 2).

Public participation in strategic planning and legislation

Although the principle of public participation in the development of programmes and policies relating to the environment is stated in some laws, there are no mechanisms in the legislation to transform this principle into reality. There are cases of public participation in the development of plans and programmes but the practice is not developed sufficiently. The operation of the Public Coordination Environmental Council of the Ministry of Natural Resources and Environmental Protection is among the ways for the public to comment on draft strategic documents.

There are no legal provisions on public participation in the preparation of legally binding instruments that may have a significant effect on the environment. The practice of public participation in this area is not systemic and varies depending on the governmental authority involved. The Ministry of Natural Resources and Environmental Protection regularly publishes draft legal acts on its website. The Public Coordination Environmental Council of the Ministry discussed a number of draft laws (e.g. the new Water Code in September 2012).

The 2010 Presidential Directive No. 4 "On the Development of Entrepreneurial Initiative and Stimulating Business Activities" requested that all republican authorities, and oblast and Minsk City executive authorities organize public discussions of draft legal acts that may have a significant impact on conditions for entrepreneurship. This is to be done by the creation of public consultative and/or expert councils with participation of businesses and associations of businesses and through placing the drafts on the websites of respective bodies and/or mass media. As a follow-up to the Directive and in accordance with the 2012 Resolution No. 247 of the Council of Ministers, many draft legal acts on environmental issues are available on official websites.

The draft amendments to the Law on Environmental Protection and to several other laws, currently in the parliamentary procedure, are expected to ensure public participation in the development of concepts, programmes, plans and schemes which have an impact on the environment and/or are connected with use of natural resources and public participation in the preparation of legal acts on the environment and use of natural resources, as well as legal acts on activities which require EIA according to Belarusian legislation.

Public Coordination Environmental Council

Since 2001, the Public Coordination Environmental Council of the Ministry of Natural Resources and Environmental Protection has provided the public and the Ministry with an important platform for dialogue. The Council brings together about 20 representatives of public associations and meets on a quarterly basis. Since July 2015, the First Deputy Minister (the Minister before that time) presides over the Council. The Council takes decisions of a recommendatory character. Among recent successes is the Council's consideration of the expediency for Belarus of signing the Minamata Convention on Mercury, followed by the Government becoming a signatory to the Convention in September 2014.

Environmental NGOs put forward proposals to raise the efficiency of the Council by stipulating in the legislation the mechanisms for development of its agenda and by offering membership to organizations rather than individuals. There are also calls for entrusting the Council with monitoring of the implementation of large international projects on environmental protection. The regulation of the Council approved by the 2007 Resolution No. 2 of the Ministry is currently under revision.

Public Coordination Environmental Councils were also created in 2003–2004 in the oblast and Minsk City committees of natural resources and environmental protection. Within a few years, with the exception of Vitebsk Oblast, these councils ceased their activities. In early 2015, the Ministry's Board suggested to the oblast and Minsk City committees to revitalize the councils.

Access to justice

The 2014 National Implementation Report of Belarus to the fifth session of the Meeting of the Parties to the Aarhus Convention recognizes the lack of clarity with regard to the jurisdiction of courts in relation to environmental cases. From time to time, courts of general jurisdiction decline to accept cases initiated by environmental public associations and redirect them to economic courts which, in their turn, refuse to take a case, referring to its non-economic character. Another issue highlighted by the Report is the poor preparedness of judges and prosecutors on environmental law and citizens' environmental rights.

According to two studies conducted under the auspices of the Aarhus Convention's Task Force on Access to Justice, in 2012 and 2014, difficulties with access to justice in Belarus also include: the limited

standing of environmental NGOs (public associations, institutions and other organizations); high costs of litigation (including court fees, payments to experts and lawyers, and the requirement that the losing party recovers the costs of the winning party); lack of opportunities to receive qualified legal aid; restricted opportunities of citizens and environmental public associations with regard to the right to challenge acts and omissions by private persons and public authorities that contravene national environmental legislation (article 9, paragraph 3 of the Aarhus Convention); the refusal of courts to accept environmental cases on the basis of lack of jurisdiction; and poor awareness and capacity of judges and prosecutors to handle environmental cases initiated by citizens and environmental public associations. NGOs also report that courts tend to avoid cases when governmental bodies are involved.

According to the report "Judicial protection of citizens' environmental rights in Belarus" (Ecohome, Green Network, 2014), there were 20 cases on citizens' environmental rights in 2010–2014, compared with very few prior to 2010.

Participation of the business sector, women and youth

Following the 2010 Presidential Directive No. 4 requiring the establishment of public consultative and/or expert councils with participation of businesses and associations of businesses, 32 such councils were created in the republican state authorities. Another 32 public consultative/coordination councils or working groups with participation of public associations and the business sector existed in republican authorities before the Directive. In 2014, the councils created in the framework of Directive No. 4 held 93 meetings, while other councils held 59 meetings.

Women and youth have opportunities to participate in the development and implementation of environmental policies through the general frameworks for public participation, including by creating public associations.

At subnational level, since 2005, oblast and rayon public councils on agroecotourism promote the development of such tourism through partnerships between governmental authorities, agrofarm owners, tourism companies, NGOs, businesses, science and mass media (chapter 11).

Trends and progress achieved

Although some reorganization has taken place in the structure of the Ministry of Natural Resources and Environmental Protection, it has operated on a relatively stable basis throughout recent decades. Its central apparatus is relatively well staffed and the system of staff training is well established. Such stability of the national environmental authority, in particular its functioning at the ministerial level and its operation on an equal footing with sectoral ministries, resulted in consistent and well-balanced development and implementation of environmental policies and legislation, and facilitated the integration of environmental considerations into sectoral policies and legislation. At the same time, there are concerns about plans for possible changes in the structure of the Government which could result in the subordination of the national environmental authority to one of the sectoral ministries.

The 2009 Decree of the President No. 510 "On enhancement of control (surveillance) activities in the Republic of Belarus" was a step forward to set uniform rules for enforcement activities. However, it did not eliminate the overlaps in the control functions on environmental protection of the Ministry of Forestry ("control over the state, use and protection of forest fund" and "over the hunting sector and hunting"), Ministry of Natural Resources and Environmental Protection ("control in the area of environmental protection and rational use of natural resources"), State Inspectorate on Fauna and Flora Protection under the President of the Republic of Belarus ("control over the protection and use of wild animals which may be hunted or fished, … forest fund") and the Affairs Management Department of the President (which performs, in the territories under its jurisdiction, "control of the hunting sector, hunting, fishing, use and protection of forest fund, and other control functions with regard to protection of wildlife and plant resources"). At the same time, in practice, these institutions seem to have found ways to run their respective enforcement activities in a complementary manner.

In terms of division of responsibilities on the environment between the central and local levels, the system is highly centralized. Interministerial coordination is well developed. Multi-stakeholder coordination bodies are rare; instead, public coordination councils are formed within public authorities. The Public Coordination Environmental Council of the Ministry of Natural Resources and

Environmental Protection became an important platform for dialogue with NGOs but there is room for raising the efficiency of this body and of the oblast public coordination environmental councils.

Since 2005, the Government has made progress in improving the legal framework for public participation in decision-making and access to justice in environmental matters. Yet this area remains a weak link in environmental policy development and implementation.

1.4 Environmental information and data

National Environmental Monitoring System (NEMS)

The NEMS (http://www.nsmos.by), established in 1993, aims to ensure the availability of environmental information to all levels of government as well as in support of implementation of international agreements. The operation of the NEMS is regulated by the 2003 Resolution of the Council of Ministers No. 949 "On the National Environmental Monitoring System in the Republic of Belarus" and many other resolutions referring to the specific types of monitoring (annex V).

There are 11 types of monitoring in the NEMS, performed by various institutions (table 1.1). There is an information and analysis centre (IAC) for each type of monitoring. The RUE Belarusian Research Centre "Ecology" hosts the Main Information and Analysis Centre (MIAC) for the NEMS. The Interagency Coordinating Council oversees the functioning of the NEMS and may request additional data or analytical information from institutions performing monitoring.

IACs maintain primary, aggregated and analytical information and data while the MIAC keeps aggregated, analytical and complex information and data. However, exchange of information and data is basic and done through files sent by email. No protocols of data flow are in place between IACs and the MIAC. Data in most of the cases are replicated between IACs and the MIAC. Modern technologies, such as geographical information systems (GIS), are not fully used. For example, the register of NEMS observation points was developed using GIS technologies but, since the links to the various databases are not in place, an update of the register is followed by manual actions to the IACs' and MIAC's databases, and vice versa. Tools, such as forecasting systems on the environmental situation, which could help decision makers, are not developed. The lack of appropriate tools delays assessment of the health of ecosystems.

The State Programme for Development of the NEMS for 2006–2010 allowed for improving the legal and organizational framework for NEMS operation. The State Programme for Support and Development of the NEMS for 2011–2015 includes measures aimed to raise the quality and reliability of data, including through modernization of equipment and use of satellite observation methods. There are annual reports on implementation of both programmes.

In 2005, the Ministry of Natural Resources and Environmental Protection, Ministry of Health and Ministry of Emergency Situations agreed to exchange, regularly and free of charge, environmental information between the NEMS, the system of socio-hygienic monitoring and the system of monitoring and forecasting of natural and man-made disasters. Some information is exchanged on a monthly basis, while other information is on a quarterly or annual basis. Exchange of information among the three systems functions also at local level, for example, there are agreements on exchange of information between oblast centres for hydrometeorology and environmental monitoring and oblast centres for hygiene, epidemiology and public health.

Socio-hygienic monitoring is implemented by the Ministry of Health in cooperation with other ministries and bodies; it is not part of the NEMS.

Use of environmental indicators

In 2010, in accordance with the Guidelines for the Application of Environmental Indicators in Eastern Europe, Caucasus and Central Asia (now referred to as Online Guidelines for the Application of Environmental Indicators, ECE), Belstat, together with the Ministry of Natural Resources and Environmental Protection, Ministry of Housing and Utilities and State Committee on Property, developed and approved the "System of core environmental indicators of the Republic of Belarus". For each indicator, the system includes information on the unit and methodology of measurement, source of information and importance of the indicator for environmental policy. The system is available on the Belstat webpage.

Table 1.1: National Environmental Monitoring System

Ministry of Natural Resources and Environmental Protection				
Interagency Coordinating Council				
Main Information and Analysis Centre (MIAC) (hosted by RUE Belarusian Research Centre "Ecology")				
Ministry of Natural Resources and Environmental Protection	Ministry of Education	Ministry of Forestry	National Academy of Sciences of Belarus (NASB)	State Property Committee
Air monitoring IAC – SI "Republican Centre for Hydrometeorology, Radiation Control and Environmental Monitoring" [1)]	**Ozone layer monitoring** IAC – National Research Centre for Ozonosphere Monitoring of the Belarusian State University [6)]	**Forest monitoring** IAC – Republican Forest Management Unitary Enterprise "Belgosles") [7)]	**Flora monitoring** IAC – State Research Institution "Institute of Experimental Botany" [8)]	**Land monitoring** IAC – UE "Design Institute Belgiprozem" [11)]
Surface water monitoring IAC – SI "Republican Centre for Hydrometeorology, Radiation Control and Environmental Monitoring" [2)]			**Fauna monitoring** IAC – State Research and Production Association "NASB Scientific and Practical Centre for Bioresources" [9)]	
Radiation monitoring IAC – SI "Republican Centre for Hydrometeorology, Radiation Control and Environmental Monitoring" [3)]			**Geophysical monitoring** IAC – SI "Geophysical Monitoring Centre/ NASB" [10)]	
Groundwater monitoring IAC – RUE "Research and Production Centre for Geology" [4)]				
Local monitoring IAC – RUE Belarusian Research Centre "Ecology" [5)]				

Source: RUE Belarusian Research Centre "Ecology", 2015.

Notes: IAC = Information and Analysis Centre; SI = State Institution; UE = Unitary Enterprise; RUE = Republican Unitary Enterprise

Soil monitoring is done as part of land monitoring, local monitoring (at 45 enterprises) and radiation monitoring.

1) Samples are collected and measurements are performed independently by the Republican Centre together with oblast centres for hydrometeorology and environmental monitoring.
2) Samples are collected and measurements are performed by laboratories of SI "Republican Centre for Analytical Control in the Area of Environmental Protection".
3) Samples are collected and measurements are performed independently by the Republican Centre together with oblast centres for hydrometeorology and environmental monitoring.
4) Samples are collected and measurements are performed independently.
5) Local monitoring is conducted by users of natural resources.
6) Works are carried out independently.
7) Samples are collected and measurements are performed independently.
8) Research is also conducted by: Lake Hydrology Laboratory/Educational Institution "Belarusian State University"; Educational Institution "A.S. Pushkin Brest State University"; Educational Institution "Ya. Kupala Grodno State University".
9) Research is also conducted by: RUE "BelGosOkhota" (hunting); Ministry of Agriculture and Food (fish).
10) Works are carried out independently.
11) Research is conducted by: RUE "Institute of Soil Science and Agrochemistry"; Landscape Ecology Laboratory/Educational Institution "Belarusian State University"; SI "Republican Centre for Hydrometeorology, Radiation Control and Environmental Monitoring".

In 2014, in the framework of Belarus's participation in the ECE Joint Task Force on Environmental Indicators, a set of core indicators of the Shared Environmental Information System (SEIS) was developed and published on Belstat's webpage. The indicators allow for comparisons at international level, are available in English and Russian, and cover statistics on air pollution and ozone depletion, climate change, water resources, biodiversity, waste, application of fertilizers, passenger turnover and energy. It is a positive development that not only data are available at the website but also their interpretation, as well as the methodologies by which data were produced, and that links from Belstat's SEIS webpage to other data websites are provided.

National State of Environment Report

According to the 2008 Resolution of the Council of Ministers No. 734, a national State of Environment (SoE) Report is to be published every four years.

The 2010 SoE report for the period 2005–2009 was prepared using the Guidelines for the Preparation of Indicator-Based Environment Assessment Reports in Eastern Europe, Caucasus and Central Asia (ECE). The report links the trends in the state of environment with policy measures undertaken. The report does not include comparisons of national values vis-à-vis those of comparable countries. Furthermore, its conclusions and recommendations section lacks clear policy recommendations for the future on how to solve urgent environmental problems.

As of early 2015, a working group under the Ministry of Natural Resources and Environmental Protection is working to develop a new SoE report covering the period 2010–2013.

Use of environmental information for decision-making

Data from environmental monitoring are regularly reported during the meetings of the Ministry's Board. This triggers response measures and allows for the allocation of priorities to the most pressing environmental issues.

The system of strategic planning in Belarus is linked to environmental information and data. At the stage of preparation of state, regional or sectoral programmes, the concepts of such programmes are to be reviewed and approved by the Ministry of Natural Resources and Environmental Protection. Such review allows for the available environmental information to be taken into account. Performance indicators, included in strategic documents, are formulated on the basis of data from environmental monitoring.

Data from environmental monitoring are used in project design, in the permitting process and for the assessment of environmental damage.

Availability of environmental information

Environmental information and data are available on the websites of the Ministry of Natural Resources and Environmental Protection, Belstat, the NEMS, the Republican Centre for Hydrometeorology, Control of Radioactive Pollution and Environmental Monitoring and other websites. Belstat compiles information from statistical reporting in statistical yearbooks and bulletins. The publication "National Environmental Monitoring System: Results of observations" is produced annually by the Ministry of Natural Resources and Environmental Protection and RUE Belarusian Research Centre "Ecology". Since 1991, the Ministry of Natural Resources and Environmental Protection and the Institute of Nature Use of the National Academy of Sciences of Belarus publish annual Environmental Bulletins "State of environment in Belarus" with detailed information on environmental conditions and use of natural resources (water, land and biological resources). The bulletins cover, in a large number of cases, five-year data series. The Ministry of Health publishes annually the State Report on Sanitary and Epidemiological Situation.

Environmental information is also available in a number of state cadastres and registers: the cadastre of anthropogenic emissions from sources and GHG absorption; cadastre of renewable energy sources; climate cadastre; water cadastre; atmospheric air cadastre; cadastre of wildlife; cadastre of subsoils; cadastre of plants; register of specially protected natural areas; cadastre of wastes; register of NEMS observation points; register of facilities using wastes; register of facilities for storage, disposal and decontamination of wastes; unified database of persistent organic pollutants (POPs); and several others. Some are accessible online.

The 2008 Resolution of the Council of Ministers No. 734 requires the holders of environmental information, such as the Ministry of Natural Resources and Environmental Protection, Ministry of Forestry, Ministry of Agriculture and Food, Ministry of Emergency Situations, Ministry of Education, State Committee on Property, State Inspectorate of Wildlife and Plants, National Academy of Sciences, local executive and administrative bodies, and other governmental organizations, to maintain registers of

the environmental information they possess. Such registers should include information about environmental information obtained as a result of environmental monitoring, issuing permits, organization of EIA and ecological expertise, environmental audit and certification, development of norms on environmental protection, and development and implementation of territorial integrated schemes and programmes on the rational use of natural resources and environmental protection. The Resolution also envisages the creation by the Ministry of Natural Resources and Environmental Protection of a consolidated register of environmental information which would include the list of environmental information available in the registers of holders of environmental information. In late 2014, the Ministry had requested other state authorities to provide information for inclusion in the consolidated register. As of early 2015, no consolidated register has been developed.

Access to information

Since 2005, the situation regarding active dissemination of information by public authorities has improved. The Ministry of Natural Resources and Environmental Protection undertook significant steps towards increasing the transparency of its decisions and accountability towards the general public. The Ministry's website is updated weekly and contains various and detailed information, including on events and planned activities. Telephone hotlines were established at both the central and oblast levels. Environmental forums, media and other events are organized. Still, a greater amount of environmental information (e.g. draft and adopted legal and strategic documents, reports on implementation of strategic documents, information on issued permits, decisions of SEE, all cadastres and registers, etc.) could be made available on the websites of relevant public authorities. Also, documents are often not displayed directly on public authorities' websites but through links to password-protected databases.

In 2007, the amendments to the Law on Environmental Protection introduced the notion, types and sources of environmental information, as well as conditions for access to environmental information. The 2008 Law on Information, Informatization and Protection of Information regulates general conditions for dissemination of information and access to information. The 2011 Law on the Requests from Citizens and Legal Persons regulates general conditions and procedures for requests for information. The limitations on access to environmental information are provided by the Law on Environmental Protection, 2013 Law on Commercial Secrets, 2010 Law on State Secrets, 2011 Law on Copyright and Related Rights and other acts. The Law on Commercial Secrets excludes from the notion of "commercial secret" data on the state of the environment, or on factors which might affect the safety of the operation of industrial facilities or the safety of the population.

The Law on Environmental Protection divides environmental information into two groups: (i) environmental information to be accessed and disseminated in accordance with the Law on Environmental Protection, and (ii) environmental information to be accessed and disseminated in accordance with legislation on the financial and credit system, national statistics, public health, safety of genetic engineering activities, hydrometeorological activities, national system of prevention and response in case of emergency situations, historic and cultural heritage, information and informatization and other legal acts. The environmental information from the second group falls outside the requirements for access to information of the Law on Environmental Protection.

According to the Law on Environmental Protection, a request for environmental information can be submitted without an interest having to be stated, whereas the Law on Information, Informatization and Protection of Information provides that, in some cases, information may be withheld if it has no direct relation to the protection of rights and lawful interests of the person requesting the information. This issue has been highlighted, among others, by decision V/9c of the Meeting of the Parties to the Aarhus Convention, and is expected to be addressed by Belarus through the adoption of amendments to the Law on Environmental Protection and several other laws, currently in the parliamentary procedure. There are other differences in conditions for access to information between the two laws.

In practice, the number of requests for environmental information has considerably increased over the past few years. However, NGO representatives inform of cases in which the form, volume or content of provided environmental information did not correspond to the request. They also report denials of the provision of requested information on the ground that the information is not environmental information, as well as denials of the provision of environmental information with reference to the 2013 Law on Commercial Secrets, in spite of the fact that no commercial-secrecy regime was introduced for the requested information. There are also cases of labelling environmental information as "service information for restricted use". The 2014 Council of

Ministers Resolution No. 783 makes this possible for any information the dissemination of which could harm: national security; public order; the morals, rights, freedoms and lawful interests of individuals, their honour and dignity, personal and private life; and the rights and lawful interests of legal entities and organizations without legal personality.

The public interest test is not applied in Belarus.

Trends and progress achieved

The NEMS remains a strong foundation for environmental monitoring activities. The system of core environmental indicators was developed and approved, and a set of SEIS core indicators was developed and is publicly accessible. The 2007 amendments to the Law on Environmental Protection introduced the conditions for access to environmental information, but a part of environmental information remains outside the scope of this Law.

1.5 Conclusions and recommendations

Belarus has a developed system of strategic planning, going beyond environmental issues and covering all planning areas, with the National Strategy for Sustainable Socioeconomic Development being at the core of the system. Clear regulation exists with regard to types, reporting and financing of state, regional and sectoral programmes but is missing with regard to elaboration and adoption of concepts and strategies. In practice, strategies are approved at different levels (Council of Ministers, Deputy Prime Minister, Ministry's Board, etc.).

Implementation of strategies takes place through development and implementation of programmes; however, not every strategy is necessarily followed by a programme and therefore not every issue raised in a strategy finds its way into a programme. In general, implementation of and reporting on strategies are organized in a more systemic way for strategies approved at a higher level. In the environmental field, strategic planning has been weakened with the discontinuation of NEAPs and the approval of the 2011 Environmental Protection Strategy until 2025 at the Ministry's Board level.

Recommendation 1.1:
The Government should further improve the system of strategic planning on environment and sustainable development by:

(a) Adopting clear rules on the development, adoption and implementation of concepts and strategies, as well as reporting on their implementation;
(b) Strengthening strategic planning in the environmental field by raising the level of the key strategic documents on environmental protection, in addition to covering environmental protection in the programmes of socioeconomic development.

Strategic Environmental Assessment (SEA) is not applied in Belarus. At the same time, the prerequisites for introduction of SEA exist and SEA principles and procedures could be effectively integrated into the existing planning process. The country is not a Party to the Protocol on Strategic Environmental Assessment to the Espoo Convention.

Recommendation 1.2:
The Ministry of Natural Resources and Environmental Protection should:

(a) Introduce strategic environmental assessment into national legislation;
(b) Initiate accession to the Protocol on Strategic Environmental Assessment to the Convention on Environmental Impact Assessment in a Transboundary Context.

The MDGs have a prominent place on Belarus's agenda. MDG implementation reports have been prepared in 2005 and 2010, and an MDG statistical book was released in 2012. Belarus was actively involved in the discussions on the post-2015 sustainable development goals (SDGs).

Recommendation 1.3:
The Government should launch an inclusive process, with the participation of all relevant stakeholders, to identify lessons learned from the implementation of the Millennium Development Goals and set up an ambitious national agenda on the basis of the globally agreed Sustainable Development Goals.

Although some reorganizations have taken place in the structure of the Ministry of Natural Resources and Environmental Protection, this body operated on a relatively stable basis in recent decades. Such stability of the national environmental authority, in particular its functioning at the ministerial level and its operation on an equal footing with sectoral ministries, resulted in consistent and well-balanced development and implementation of environmental policies and legislation, as well as facilitated the integration of environmental considerations into sectoral policies and legislation.

Recommendation 1.4:
The Government should preserve the national environmental authority at the ministerial level to ensure its operation on an equal footing with sectoral ministries.

Although the requirements for registration of environmental public associations have been eased, the difficulties in their registration remain. The procedures for approval and registration of international funding represent another difficulty for the operation of environmental NGOs, despite that these procedures have been softened in the past years.

Public participation in the development of strategic documents and legislation relating to the environment is still not provided for in the legislation. The draft amendments to the Law on Environmental Protection and several other laws, currently in the parliamentary procedure, are expected to address this issue. It is important that, following the adoption of the amendments, respective procedures for public participation be adopted.

Although the number of cases on citizens' environmental rights has increased, there are still difficulties with access to justice on environmental matters. These are highlighted by the two studies conducted under the auspices of the Aarhus Convention's Task Force on Access to Justice in 2012 and 2014, and refer both to the need to make the legislation consistent with the Aarhus Convention and the need to raise the awareness and capacity of judges and prosecutors to handle environmental cases initiated by citizens and environmental public associations.

Recommendation 1.5:
In line with its obligations under the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention), the Government should:

(a) Further improve the conditions related to the establishment and operation of environmental non-governmental organizations;
(b) Introduce in the legislation procedures for public participation in the development of strategic documents (at least plans and programmes) and of legislation relating to the environment;
(c) Bring the legislation into line with the Convention regarding access to justice;
(d) As part of training programmes for judges and prosecutors, raise their awareness and capacity to deal with cases initiated by citizens and public associations on the basis of environmental legislation and the Convention.

The Public Coordination Environmental Council of the Ministry of Natural Resources and Environmental Protection has provided the public and the Ministry with an important platform for dialogue but there is room for increased efficiency, including by amending the 2007 Resolution the Ministry of Natural Resources and Environmental Protection No. 2, in order to stipulate mechanisms for development of agenda and offer membership to organizations rather than individuals. The revitalization of public coordination environmental councils at oblast level represents an opportunity to improve the functioning of these bodies.

Recommendation 1.6:
The Ministry of Natural Resources and Environmental Protection should increase the efficiency of public coordination environmental councils at various levels.

Overall, the situation regarding access to and availability of environmental information and data has improved. Still, a greater amount of environmental information (draft and adopted legal and strategic documents, reports on implementation of strategic documents, information on issued permits, decisions of SEE, all cadastres and registers, etc.) could be made available on the websites of relevant public authorities. Relevant documents are often not displayed directly on public authorities' websites but provided through links to password-protected databases. A consolidated register of environmental information is not yet in place.

Due to the definition of types of environmental information in the Law on Environmental Protection, some environmental information remains outside the scope of access-to-information provisions of this Law. There are a number of denials of requests for access to environmental information; however, the public interest test which would prevent excessive use of the limitations to access to information is not applied.

Recommendation 1.7:
The Government should:

(a) Improve the online accessibility of environmental information and data;

(b) Establish a "one stop shop" portal for environmental information in line with Shared Environmental Information System (SEIS) principles and using geographic information system technologies;

(c) Align the scope of environmental information with the requirements of the Aarhus Convention and ensure access to all environmental information in accordance with the Convention's provisions.

Since 1993, the National Environmental Monitoring System (NEMS) ensures the availability of environmental information to all governmental levels. Information and analysis centres (IACs) keep the environmental monitoring data for their respective type of monitoring while the Main Information and Analysis Centre (MIAC) keeps all environmental monitoring data.

Since 2010, Belarus uses a system of core environmental indicators. Since 2014, the National Statistical Committee publishes on its webpage environmental indicators according to the Shared Environmental Information System (SEIS) principles. Despite the progress achieved, some issues remain if Belarus is to be able to fully comply with the principles of SEIS, namely, the lack of data flow and of protocols for data flow between NEMS' environmental data systems.

Since 2005, the Ministry of Natural Resources and Environmental Protection, Ministry of Health and Ministry of Emergency Situations exchange, on a regular basis, environmental information between the NEMS, the system of socio-hygienic monitoring and the system of monitoring and forecasting of natural and man-made disasters. The exchange of information also functions at local level.

<u>Recommendation 1.8:</u>
The Ministry of Natural Resources and Environmental Protection should:

(a) Continue working towards the establishment of a shared environmental information system that provides relevant, comprehensive, accurate and publicly accessible data and information on the state of the environment, by:

(i) Strengthening the capacities of the Information and Analysis Centres and the Main Information and Analysis Centre with the means for enhancing environmental data systems, applying geographic information system technologies and developing forecasts of the environmental situation for decision makers;

(ii) Establishing protocols for data flows, including workflow definitions (precisely defining who reports what, when and to whom,) and protocols on higher levels of information subsystems to avoid segregation of the whole system;

(b) Extend, in cooperation with the National Statistical Committee, the Ministry of Health, the Ministry of Emergency Situations and other relevant public authorities, the application of SEIS principles to environmental information and data pertaining to the system of socio-hygienic monitoring and the system of monitoring and forecasting of natural and man-made disasters.

Chapter 2

REGULATORY AND COMPLIANCE ASSURANCE MECHANISMS

2.1 Institutional framework

The main actors in environmental compliance assurance in Belarus are the territorial bodies of the Ministry of Natural Resources and Environmental Protection. Its Division for Coordination of Control Activity oversees and coordinates their work. The territorial bodies include six oblast and Minsk City committees on natural resources and environmental protection, and 120 rayon, town, and joint rayon and town inspection units (chapter 1). The latter do not have independent legal status: they are subdivisions of the oblast committees. In this sense, environmental management in Belarus exhibits a two-tier organization.

The inspection units are poorly resourced: they have three to four staff members on average and, quite often, only one to two staff members per rayon.

The oblast committees assess and authorize project and facility-level activities, and establish – through the state environmental expertise and permitting procedures – specific conditions that enterprises, including communal enterprises, must follow. The rayon and town inspection units monitor compliance and provide non-compliance response through the administrative path of enforcement. Upstream, the Ministry is responsible for policy design and law-making, and environmental standard setting. The Ministry is also the main actor in horizontal coordination with other governmental authorities.

The broad delegation of environmental compliance assurance duties to the territorial bodies is a recent development. Until 2010, when the compliance assurance system was changed, specialized inspectorates working at the national level were at the core of this system.

The reform was conducted to consolidate resources and promote coordination across substantive areas of compliance assurance. However, the system remains centralized and the Ministry of Natural Resources and Environmental Protection is, despite this deconcentration of powers, vested with ultimate responsibility for the system's performance.

Resources available to the Ministry and its territorial bodies have gradually decreased. Since July 2013, the Ministry's personnel number was cut by 30 per cent while its territorial subdivisions suffered a 15 per cent staff reduction. In 2015, the number of civil servants employed by the Ministry is 94. The number of staff working at the oblast and rayon level is 608: some 85 per cent of them are involved in inspection and permitting activities. Since 2015, the Section for Management of Appeals from Individuals and Legal Entities was established in the Ministry's structure.

There are several subordinated organizations, which report to the Ministry (chapter 1), dealing with monitoring, analytical control, information management, environmental certification and staff training.

The Belarusian Research Centre "Ecology" plays a role in validating and assessing data received through the system of enterprises self-reporting. It acts as the MIAC of the NEMS. The Centre for International Environmental Projects, Certification and Audit "Ekologiainvest" consults enterprises on the ISO 14000 series certification and acts as the national BAT centre. The Republican Centre for Analytical Control in the Field of Environmental Protection plays a major role as the analytical arm of environmental enforcement agencies through its network of 22 accredited laboratories covering the entire country.

The nature protection legislation is also enforced by the State Inspectorate on Fauna and Flora Protection under the President. The State Inspectorate has wide control prerogatives, notably over observance of hunting and fishing rules as well as protection of the forest fund and land. In comparison with Ministry inspectors, this competent authority's staff enjoy much more extensive enforcement powers. They have the right to carry service guns and combine regular checks with rapid response actions. The State Inspectorate has six oblast branches and 47 inter-rayon inspectorates. This type of organization offers the benefit of a lesser dispersion of resources within the lower-level tier of organization.

Photo 2: Wetland, Yelnya preserve

The Affairs Management Department of the President has prerogatives on the management of the country's four national parks and the Berezinsky Biosphere Reserve. Its role mostly refers to the supervision of the protected areas regime; it also has limited regulatory functions related to issuing woodcutting permits (tickets and orders) in areas that are not part of the forest fund.

A certain duplication of functions between the Ministry's territorial bodies, on one side, and the State Inspectorate on Fauna and Flora Protection and the Affairs Management Department of the President, on the other, exists in accordance with the legislation, but is compensated for by good interaction between those institutions on the ground, sometimes backed by formal cooperation agreements/plans.

Special competences on environmental compliance assurance are assigned to other bodies of state administration and organizations:

- The Ministry of Forestry is responsible for the state of forests and hunting regulation. The functions of State Forest Guard in the Ministry and its subordinated organizations are implemented by about 13,500 people who enforce the forest management legislation and ensure fire protection.
- The Ministry of Emergency Situations is in charge of fire, industrial and radiation safety. Its Department for Industrial Safety Supervision employs 230 industrial safety inspectors distributed throughout six control areas. It also issues licences for the operation of dangerous facilities and licences for industrial safety activities.
- The Ministry of Health's competences include: the State Sanitary Supervision, assessment of the quality of drinking water and food products, and enforcement of sanitary rules. It approves outdoor air quality standards for residential areas and sets the hazard category of different pollutants. For water, it sets sanitary standards for surface waters used for drinking and recreation purposes. It also set standards for soil quality and noise.
- The State Customs Committee plays a role in preventing the smuggling of endangered species of wild fauna and flora and in control of transboundary shipments of hazardous materials.

In total, there are some 40 bodies mandated to oversee regulatory compliance and carry out monitoring functions. To make them work in a coherent and coordinated way, the Government put in place specific legislation and organizational arrangements. The country's supreme audit institution – the Committee of State Control – requests all bodies with oversight functions to establish a single coordinated plan of inspection. The Committee verifies compliance by competent

authorities of national inspection procedures. It actively participates in international cooperation through the International Organisation of Supreme Audit Institutions (INTOSAI). Besides the Committee of State Control, the General Prosecutor's Office has oversight rights over the work of compliance assurance authorities.

Except for land management control, local executive authorities have almost no role in compliance assurance and no structural units dedicated to environmental protection. Their main function is asset management (e.g. of mineral resources) and delivery of environmental services, such as household waste management. Local executive authorities have a central role in land-use and urban planning.

The cooperation of the local executive authorities with the territorial bodies of the Ministry of Natural Resources and Environmental Protection is quite intense. However, the right balance between the prerogatives of the two is still to be found. Since the local executive authorities lack resources for their day-to-day activity, there is a tendency to use the rayon and town inspection units for local issues more or less related to the environment. Sometimes this is to the detriment of the statutory functions of the environmental enforcement bodies. For example, until recently, the annual "good land-keeping" campaign, implemented jointly by different state services and the local authorities, used to absorb a lot of environmental territorial bodies' time, as they coordinated this campaign. A positive development is that coordination of "good land-keeping" activities has been entrusted to local executive and administrative authorities in accordance with the 2015 Resolution of the Council of Ministers No. 428.

2.2 Legal and policy framework

In 2007, the notion of environmental liability and environmental damage, as well as the definition of mechanisms to ensure access to environmental information and public participation in environmental decision-making, were introduced in the 1992 Law on Environmental Protection. This Law also established the public's right to environmental oversight through involvement in EIA procedures and in other ways, as well as public access to environmental justice. Further amendments introduced the BAT concept, streamlined compliance monitoring activity and eased some administrative procedures on natural resources use.

The 2008 Law on Atmospheric Air Protection sets air protection requirements during the design, construction and operation of stationary and mobile pollution sources. It introduces a classification of pollution sources and pollutants and establishes permitting, monitoring and pollution control requirements.

The 2014 Water Code introduced new mechanisms of water use and protection, including the integrated management of water resources, the concept of river basin management and the goal of improvement of the ecological status of surface water bodies.

The 2009 Law on State Ecological Expertise streamlined the procedure of environmental assessment of projects. The competences for SEE are now concentrated at the national and oblast levels. The number of development projects subject to SEE by the environmental authorities has decreased drastically. For smaller scale projects, the environmental assessment was built into the construction assessment procedure. The assessment of sectoral development programmes and technical regulations concerning the environment was introduced. The duration of SEE was limited to one month (except for projects with transboundary impact). The place of EIA in the assessment procedure was clarified.

In addition to laws, presidential decrees are used to promote some of the key changes in environmental legislation. Thus, the transition towards an integrated system of environmental permitting was launched through the 2011 Decree of the President No. 528. Presidential decrees were used to introduce criteria of environmental risk in enterprises (2008 Decree No. 349) or to determine the size of compensations for environmental damage (2008 Decree No. 348).

Legislation enacted in other sectors complements environment-related legislation. For example, the 2012 Law on the Sanitary and Epidemiological Well-being of the Population sets standards of drinking water quality and monitoring requirements and complements the provisions of water quality protection set out in the Water Code and the Law on Environmental Protection.

Belarus developed legislation that specifically addresses inspection procedures. The 2009 Decree of the President No. 510 "On enhancement of control (surveillance) activities in the Republic of Belarus" describes in detail how inspection should be planned and executed, and delineates the mandate of various compliance assurance authorities.

Policy and strategic planning documents on compliance assurance are scarce. The National

Strategy of Integrated Environmental Permitting Implementation for the period 2009–2020, laying out the vision of the gradual adoption of integrated permitting, comes as an exception. Conversely, there are neither defined strategic priorities on enforcement of environmental legislation nor targets on using different compliance assurance instruments to address those priorities at the national and subnational levels.

2.3 Environmental standards

Ambient quality standards

Belarus conserved most of the ambient quality standards inherited in great numbers from the Soviet period. Those standards, expressed in terms of maximum allowable concentrations (MACs), have traditionally been set based on the "zero risk" concept, which continues to be followed by the authorities in Belarus. It may be questioned whether the number and stringency of standards reflects the current capacity to monitor and ensure their compliance. When new chemicals are being introduced by the enterprise sector, the responsibility to develop and suggest ambient quality standards for those new substances lies with the enterprise.

The current system of ambient quality standards contains a substantially larger number of parameters expected to be regulated (including monitoring and assessment) than, for example, the equivalent EU directives.

For air, 654 MAC standards and 1,429 temporary MACs are set for settlements. Besides, the Ministry of Natural Resources and Environmental Protection, upon coordination with the Ministry of Health, approves environmental standards in atmospheric air for specially protected natural areas.

For water, there are 1,434 sanitary MACs (and 402 temporary standards) applied for water bodies used for drinking water supply and recreation purposes. Related to the Water Code enactment, in March 2015, the Ministry of Natural Resources and Environmental Protection introduced significant changes in surface water quality standards.

In May 2015, the list of fishery MACs was reduced from 672 to 458 parameters and modernized, notably by including most hazardous substances from the EU priority list. It is important to underline that specific requirements were set up for the surface water bodies that are used for breeding, feeding, wintering, migration of fish species of Salmoniformes and Acipenseriformes. These water bodies are clearly marked on the list.

The lists of MACs are enacted as technical normative acts and are regularly updated. For most comparable parameters, Belarus standards are close to the international benchmarks, particularly EU ones (table 4.12). However, EU air quality standards are much stricter for arsenic, cadmium and nickel. The Ministry of Natural Resources and Environmental Protection and the Ministry of Health enact ambient quality standards. They ensure that regular revision of ambient quality standards is conducted. Thus, a review of ambient air quality standards in residential areas was conducted in 2010 and revised standards approved by a resolution of the Ministry of Health.

Emission standards

MACs are translated into enterprise-specific emission and effluent limit values, which are part of permits authorizing a certain level of environmental impact. These limit values are complemented by technological standards, for example, emission standards for large combustion plants, which are close to those established in EU Directive 2001/80/EC on the limitation of emissions of certain pollutants into the air from large combustion plants. Sectoral emission limit values (ELVs) exist in the cement industry, energy generation sector, and different types of waste incineration. Development of technological standards for emissions in selected industries and for selected process equipment is among the country's priorities related to air quality regulation.

The Ministry of Natural Resources and Environmental Protection establishes the pollutants and types of installations that are subject to ELV setting. In total, 242 air pollutants are subject to mandatory ELV setting and criteria are established for extending this list with new substances. The ELVs are prepared by the industrial operators and approved by the territorial bodies as part of a permit.

A special regulation regime of pollutant emissions is applied during unfavourable meteorological conditions. Each enterprise has an emission reduction plan which includes three levels of activities, up to suspension of operation. These activities are to be implemented following in accordance with notices on unfavourable meteorological conditions issued by hydrometeorological authorities.

The Water Code regulates discharge of sewage waters into water. Discharge of substances for which a MAC has not been established into water bodies is

prohibited. New elements of discharge regulation were introduced in 2013 by the Technical Code of Practice (TCP 17.06-08-2012) on setting ELVs in wastewater (table 2.1). The TCP sets a number of mandatory ELVs for users discharging their wastewater directly into receiving water bodies. For communal (mixed) wastewater, several parameters are regulated, based on the EU Urban Wastewater Directive (91/271/EC).

These standards do not depend on the quality of the water being treated and are defined for the entire country. For industrial wastewater, 39 sectoral ELVs are established. Apart from mandatory ELVs, the TCP sets recommended (guideline) ELVs for 22 industrial sectors discharging their wastewater into the municipal sewer systems. Pollutants for which general ELVs were not established are to be further regulated, based on calculated individual limit values while taking account of MACs, background level of the substance in the water body and the assimilation capacity of the receiving waters.

The ELVs are set by the oblast and Minsk City committees for natural resources and environmental protection and are part of the water use permits or the integrated permits. They are accompanied by self-monitoring requirements. In 2014, the document was modified and a list of 18 specific micropollutants (mostly POPs) were banned from discharge to water bodies, while the discharge of 22 micropollutants (from the list of priority substances according to EU Directive 2008/105/EC on environmental quality standards in the field of water policy) is to be strictly controlled.

Individual and sectoral industrial waste generation norms are drafted by waste generators and line ministries, respectively. Those norms form the basis for setting waste storage and waste disposal limit values, which are specified in waste storage and disposal permits issued by the environmental authorities.

According to the sanitary norms, rules and hygienic standards "Hygienic requirements to design and operation of nuclear power stations", approved by 2010 Resolution of the Ministry of Health No. 39, limits for population exposure to radiation as well as limit values for emissions and discharges by NPPs with pressurized water reactor were set. Criteria for classifying wastewater as radioactive waste and rules for treatment of radioactive waste are set in the sanitary rules for radioactive waste treatment (SPORO-2005) approved by the 2005 Resolution of the Chief State Sanitary Officer No. 45.

Product standards

The quality of automobile fuels produced and marketed in Belarus has been subject to systematic improvement during recent years. As of January 2015, Euro 5 standard for diesel is applied (sulphur 10 ppm), a quality level to be attained by the petrol as of 2016. Currently, the Euro 4 standard for petrol is used (sulphur 50 ppm), however in 2014 Belarusian refineries produced for domestic market only the petrol of Euro-5 standard. Leaded petrol has been banned since 1998.

The quality of the fuel is checked during production and storage and before commercialization. The list of parameters to be checked is prescribed by technical regulations (TCP 17.13-14-2014).

In the period 2009–2012, new national standards for exhaust gases of vehicles were enacted, which were largely harmonized with European and international requirements (State Standards STB 1848-2009 "Road Transport. Ecological Classes", STB 2169-2011 "Motor vehicles equipped with compression-ignition engines. Opacity of exhaust fumes. Limits and methods of measurement" and STB 2170-2011 "Motor vehicles equipped with positive-ignition engines. Emissions of pollutants in exhaust gases. Limits and methods of measurement").

Table 2.1: Selected standards for effluent quality (municipal wastewater), mg/l

Population Equivalent	COD	BOD5	Suspended solids	Ammonium	N-total	P-total
<= 500	125	35	40			
501 – 2 000	120	30	35	20		
2 001 – 10 000	100	25	30	15		
10 001 – 100 000	80	20	25		20	4.5
> 100 000	70	15	20		15	2.0

Source: TCP 17.06-08-2012, 2012.

On energy efficiency, 129 technical standards and regulations were developed to ensure a comprehensive approach to establishing requirements for energy-consuming products, insulation of buildings, control and metering equipment, production waste reuse and renewable energy sources. Currently, the Programme of Development of Technical Regulation, Standardization and Conformity Assessment for Energy Saving for 2011–2015 is implemented by the State Committee for Standardization.

2.4 Regulated community

The regulated community is well identified as there are multiple possibilities to receive relevant information from and about an enterprise. Environmental enforcement agencies have access to the state register of legal persons and individual entrepreneurs and to the lists of economic entities maintained by the local executive authorities. All enforcement agencies have access to unified information database of enforcement agencies which includes data on regulated entities and their risk level group (2013 Resolution of the Council of Ministers No. 74). This database is maintained by the Ministry of Taxes and Duties.

Besides the economic/business activity databases, the enforcement agencies have more specialized sources of information for identifying and profiling the regulated community. Environmental authorities collect such information mainly during the process of land allotment and as part of SEE and permitting/licensing procedures. The holders of a permit or licence for activities related to some form of environmental impact implicitly become subject to control by environmental inspectors. Information from the databases of other agencies (e.g. the Department for Industrial Safety Supervision of the Ministry of Emergency Situations) is also used to identify the objects of control.

At the beginning of 2014, the National Statistical Committee reported 13,360 enterprises in the manufacturing industry, 50 in mining, 205 in the energy, gas and water sector and over 7,600 in the building sector. The classification of industrial enterprises by type of economic activity shows the following groups that are particularly relevant for environmental protection: chemicals (408 entities), pulp and paper (1,054), metal production (1,669), cement and asphalt (979), machinery (1,073), electrical and electronic equipment (1,102) and coke production, refineries and nuclear materials (24). The distribution of business entities by size revealed the presence of 1,900 large and medium-sized enterprises (with over 100 employees).

As of April 2014, the list of facilities subject to integrated permitting according to the 2011 Decree of the President No. 528 included 298 units. This list is regularly revised by the oblast committees for natural resources and environmental protection, based on information received from environmental inspectors and operators. A register of dangerous production facilities is maintained by the Department for Industrial Safety Supervision of the Ministry of Emergency Situations. Among them, there are some 800 installations using or storing dangerous chemicals.

Several approaches of enterprise classification according to various environmental risks exist, without these approaches being sufficiently integrated. For example, the 2008 Decree of the President No. 349 “On the criteria for classifying economic and other activities which have a detrimental effect on the environment as environmentally hazardous activities” introduced a list of types of activities presenting particular environmental risks for inspection purposes. Different risk classifications are established by other legal acts, for example, for the purposes of determining the facilities subject to EIA or to integrated permitting or to analytical control by the environmental authorities. An integrated risk assessment approach is lacking.

There are multiple databases that contain relevant enterprise-level information. Sector-specific databases exist in all ministries. The territorial bodies of the Ministry of Natural Resources and Environmental Protection keep a state register of legal entities whose activity has an adverse impact on the environment. At registration, each legal entity is assigned a nature user number according to the place of economic or other activity, which records their environmental impact.

An information system ensuring the interconnection of databases and registers on environmental permits, and inspection activity among them and with external partners (tax authorities, real estate register, Ministry of the Interior), is under development.

2.5 State Ecological Expertise and Environmental Impact Assessment

Domestic context

The existing system of project-level environmental assessment of economic initiatives comprises two

distinct but closely linked processes: EIA and SEE. EIA is developed by the proponent in the pre-design phase when feasibility of the project is assessed; further, the EIA report becomes part of the design documentation. SEE is used by the competent environmental authorities to review the full project design documentation including EIA report in order to check whether proposed technical solutions comply with environmental laws and regulations. The scope of SEE is broader than projects, since it also includes, for example, the assessment of forest management, hunting and fishery projects as well as technical regulations or strategic documents.

Traditionally, the regulatory framework gives more prominence to the SEE procedure. The EIA procedure itself is not of a permitting nature; rather, EIA and SEE are considered as parts of a decision-making process jointly constituting an environmental assessment procedure finalized with the conclusions of the SEE. The decision-making procedure involves the development of the EIA study, carrying out the public participation process, then submitting the entire design documentation (including the EIA report) to SEE and ending with the issuance of the SEE conclusions by the competent environmental authorities. The positive SEE conclusion is a formal recognition of compliance of the design documentation with environmental law. It is then followed by a building permit granted by the construction supervision authorities upon the agreement of the local executive authorities. Land allotment for projects receives temporary endorsement at the early stages and is then confirmed by the local executive and administrative authorities after the SEE procedure. Overall, environmental assessments are well articulated with the urban planning procedures.

The 2009 Law on State Ecological Expertise amended the scope of SEE as concerns industrial and infrastructure projects, reducing it to facilities that have a significant impact on the environment. In fact, now, the environmental authorities review only the design documentation of development projects requiring an EIA.

The mandate for SEE was limited to the central and oblast-level environmental authorities (previously, the rayon inspection units were involved in reviewing small facilities design). Now, the Ministry is dealing with the most dangerous newly built facilities (i.e. those having a sanitary protection zone of 500–1,000 m), while the oblast committees review the newly built facilities presenting less environmental risk and all reconstructed facilities from the EIA list. The environmental assessment of smaller scale projects is done now by the construction expertise authorities (Gosstroiexpertiza).

Since the enactment of the Law, about 1,000 SEE conclusions have been issued annually by the competent environmental authorities at the central and oblast levels. Around 20 per cent of these concerned project documentation containing an EIA report, that is, large projects. One important characteristic of the environmental assessment functioning in Belarus is the relatively large number of rejected project dossiers (generally 7–17 per cent for SEEs at the central and oblast levels); whether this speaks for the particularly critical review by the authorities or, rather, for the inadequate quality of the prepared project documentation remains unclear.

The Law had an impact on the workload of oblast committees of natural resources and environmental protection. It decreased the number of applications for SEE, while, at the same time, mandating oblast committees to review large projects, which are subject to EIA. The Brest Oblast Committee started such reviews in 2012 with 15 EIA reports and reviewed 21 reports per year in 2013 and 2014 (table 2.2). Previously, the distribution of assessment prerogatives between central-level and oblast-level authorities was based on the project cost; now, it is more risk based.

Table 2.2: Projects reviewed by the Brest Oblast Committee of Natural Resources and Environmental Protection, 2006–2014

	2006	2007	2008	2009	2010	2011	2012	2013	2014
Projects reviewed, number	2 724	3 079	3 129	1 695	376	97	144	123	128
including projects with EIA	0	0	0	0	0	0	15	21	21
of which:									
Approved	2 490	2 759	2 721	1 485	246	37	71	57	53
Approved with conditions	167	272	353	154	95	43	40	45	52
Rejected	67	55	55	62	35	17	8	9	9
Rejected projects, per cent	2.46	1.79	1.76	3.66	9.31	17.53	5.56	7.32	7.03

Source: Brest Oblast Committee of Natural Resources and Environmental Protection, 2015.
Note: Data for 2006–2010 include the assessments done by the rayon and town inspection units.

The SEE is undertaken by dedicated units within the Ministry of Natural Resources and Environmental Protection or the oblast committees, consisting of professionals mostly educated as engineers. The statutory duration of the SEE administrative procedure is limited to one month (two months for projects having transboundary impact). Besides considering the SEE documentation, staff experts also have other duties to perform, such as participation in law-making and resolving complaints. With the 2009 Law, the complexity of considered dossiers increased.

The Law foresees the possibility for the competent authorities to set ad hoc expert committees for particularly complex projects, involving external experts who have specific knowledge and experience. In accordance with the 2012 Resolution of the Ministry of Natural Resources and Environmental Protection No. 45, external experts are to be paid by the competent authority (i.e. the Ministry or the oblast committee) based on individual contracts. However, this legal possibility is extremely rarely used by the authorities (if at all); using it more often might prove beneficial for both the quality of assessment and the staff experts themselves, in terms of experience gained.

The uniform deadline applied to all reviewed projects (1 month) does not allow talking into account project complexity. Currently, the legislation does not include clauses on increased duration of the procedure for special cases that would allow addressing the increased complexity of projects subject to SEE.

The current assessment system envisages neither screening nor scoping as specific procedural steps of EIA. The Law on State Ecological Expertise clearly specifies the type of projects subject to EIA, leaving no room for case-by-case examination. There are quite detailed general requirements as to the content of the EIA documentation included in legal acts regulating the procedure, without regard to the particular features of the project in question, in particular the size and location of the project. There is no formal requirement for dialogue between the proponent and the public authorities during the scoping stage. Thus, scoping is totally within the responsibility of the project proponent. Besides, EIA development is not a licensed activity – no legal requirement exists for EIA study developers to have a qualification and/or experience in particular fields.

The list of installations for which EIA is required reflects the structure of the economy in Belarus and the capacity thresholds applied to projects are similar with, or close to, international practice. A detailed technical code of practice on EIA (TCP 17.02-08-2012) was approved in 2012.

Public participation

Public participation as a mandatory element of the procedure is envisaged only at the EIA stage. At the SEE stage, the only real possibility for public participation is provided through so-called public ecological expertise. The latter is not a mandatory element of the assessment procedure and, in practice, is only rarely conducted and even more rarely taken into account by the competent authorities.

The 2011 Resolution of the Council of Ministers No. 687 "On public consultations in architectural, urban planning and construction activities" was updated in 2014, offering terms similar to those under the EIA procedure. Those public consultations are to be undertaken before the SEE.

The public participation element of EIA has been strengthened over the last decade. The EIA reports, for example, have to contain a non-technical summary. These reports are available for review by the local population, who may be affected by the project. The minimum duration of public consultation was set at 30 days from its announcement by the local executive authorities. Concerned citizens can request public hearings of a specific EIA report. Public hearings are organized by the project developer in cooperation with local executive authorities. Environmental authorities are not necessarily involved at the stage of public consultation, including notifying the public, making available the relevant information, conducting public hearings and collecting the comments. A record of public hearing or public consultation containing the answers of the project proponent to questions raised by the public is attached to the EIA study presented to the SEE.

NGOs invoke the lack of a clear and transparent mechanism for assessing proposals from the public and integrating them, when relevant, into final documents. Usually, the competent authorities request that proposals be formulated in very technical language. Most of the proposals received are rejected without explanation of the reasons for rejection. Consequently, public opinion does not have an impact on the final decision. Very often, according to NGOs, the public concerned does not have access to the final conclusions of the SEE.

One of the problems is that often the public has no opportunity to provide input on the decision at the

early stage of the development process when siting and other alternatives are still open. In such cases, the public's input is reduced, at best, to only commenting on how the environmental impact of an already selected development option could be mitigated. The limits of public participation in decision-making have been manifest in relation to the Ostrovets NPP project, where the major decisions (including on the project site) were taken without due consideration of public opinion. The Meeting of Parties to the Aarhus Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters has issued two decisions in this regard, in June 2011 and July 2014, stating that Belarus is in non-compliance with the Convention.

Transboundary context

Over the last decade, practical experience has been gained the application of EIA in the transboundary context. Belarus has been a Party to the Espoo Convention on Environmental Impact Assessment in a Transboundary Context since 2006. Belarus is a Party, since 2011, to the first amendment but not a Party to the second amendment to the Espoo Convention. The transboundary element of the EIA procedure was strengthened by the 2010 Council of Ministers Resolution No. 755 that translated part of the Convention's requirements into the national legislation.

The transboundary EIA procedure has been applied in several cases. Belarus has experience both as Party of origin (e.g. construction of the Nemnovskaya hydropower plant (HPP) on the Neman River; and development of the chalky deposit "Khotislavskoye" – with Lithuania and Ukraine, respectively) and affected Party (e.g. decommissioning of Ignalina NPP and construction of the new Visaginas NPP, and building a storage facility for spent nuclear fuel in the area of the Chernobyl NPP – with Lithuania and Ukraine, respectively).

The deadline for SEE of projects which are likely to have transboundary effect is two months. This timing is based on the assumption that the entire transboundary procedure, including participation of the public from affected Party, is conducted at the previous stage and completed in the final EIA report submitted by the developer. Belarus piloted the post-project analysis process in cooperation with Ukraine and with support from the ECE, UNEP and UNDP Belarus in the framework of the Environment and Security Initiative and EaP GREEN programme. The pilot project, implemented in 2011–2014, allowed the verification of the quality of the transboundary EIA procedure, and contributed to building further trust with the neighbouring Ukraine. Given the relatively little experience and detailed guidance that exist so far on post project analysis in a transboundary context in the ECE region, this project can serve as an example also for other countries of the region (box 2.1).

Box 2.1: Transboundary EIA procedure on the development of the chalky deposit "Khotislavskoye" and its follow-up within a bilateral Belarus–Ukraine post-project analysis process

The transboundary EIA procedure on the development of the chalky deposit "Khotislavskoye" (second phase) was initiated in 2009, when Belarus sent a notification to Ukraine. Ukraine provided comments on the EIA documentation and consultations were held according to the Espoo Convention in 2010. The EIA procedure was officially completed in June 2011, when Belarus sent the final decision to Ukraine.

To address the concerns raised by Ukraine on the transboundary environmental impacts of the project, the parties agreed to continue cooperation during the implementation of the activity. In this context, a pilot project was initiated by the two countries in cooperation with ECE, UNEP and UNDP Belarus in order to apply post-project analysis in accordance with the Espoo Convention. To support this process institutionally, a standing bilateral working group and a task-force on post-project analysis was established.

The working group carried out field works on monitoring in the territory of both countries. The working group also collected and analysed all the information available from the period 2011–2013 on the environmental monitoring in the vicinity of the project area. No adverse environmental impacts from the activities at the chalky deposit were detected as far as was measured (up to 10 metres' depth) and the implemented environmental measures were considered to be efficient. The experts of the bilateral working group also pointed out that, when the exploitation of chalky deposits reaches 25 metres' depth, there might be need to assess whether the mitigation measures currently in place are sufficient for preventing adverse transboundary impacts.

Through the pilot project, the two countries established a basis for long-term environmental monitoring and an information exchange programme to support joint decision-making regarding prevention and mitigation measures during further exploitation of the "Khotislavskoye" quarry, including the incorporation of provisions on post-project analyses into the draft bilateral agreement on EIA between Belarus and Ukraine.

Source: Espoo Convention (http://www.unece.org/env/eia/meetings/subregional2014.html#/).

In 2011, Lithuania made a submission to the Espoo Convention's Implementation Committee raising concerns about Belarus's compliance with the Convention in relation to the decision-making for the construction of the Ostrovets NPP.

The Committee considered the case and adopted its findings and recommendations in March 2013 finding that Belarus was not in compliance with the Convention. On the basis of further information provided by Belarus and Lithuania in the period between the adoption of the findings and recommendations by the Committee and the MOP (June 2014), the Committee revised its recommendations to the MOP as included in Decision VI/2. Following the revised Committee recommendations, the MOP at its sixth session held in June 2014 considered the Committee proposals and in principle endorsed the Committee findings that Belarus was not in compliance with several provisions of the Convention relating to notification, public participation, consultations, and the final decision. The MOP further welcomed the steps undertaken by both Belarus and Lithuania, expressed its regret that the two Parties were not in agreement about the procedure and invited them to improve their communication and cooperation for the implementation of the Convention. Further to the MOP mandate, the Implementation Committee is currently following up to the issue, so that to report on the matter to the MOP at its seventh session in 2017 (ECE/MP.EIA/20.Add.1 – ECE/MP.EIA/SEA/4.Add.1).

In 2015, Lithuania made a submission to the Aarhus Convention Compliance Committee requesting to investigate the compliance by Belarus with the Convention in relation to the Ostrovets NPP project.

2.6 Environmental permits and licences

Belarus has a system of environmental permits and licences granted by different authorities, at three decision levels (national, oblast and rayon/town). Permits are issued on air emissions, water use and wastewater discharge, storage and disposal of production waste, integrated pollution prevention and control, nature protection, and natural resources use and protection. Licences are provided for special activities on environment, namely for the handling of ODS and the handling of waste (use, neutralization and disposal of waste).

Integrated permitting

Since 2005, the environmental authorities in Belarus have invested particularly important efforts into enabling the integrated permitting of large enterprises and have started, though timidly, the practical use of this system. As of early 2015, there were eight (seven existing and one new) large installations that have already prepared fully fledged applications and obtained their integrated permits.

The integrated permit is to establish environmental requirements for large enterprises, based on BAT. The integrated permit is to replace the current single-media permits on air emissions, special water use and waste disposal for certain categories of industrial installations specified by the 2011 Decree of the President No. 528. The rationale behind the move towards integrated permitting was to limit the administrative burden on operators and to harmonize the national approach on permitting with the EU one.

The adoption of integrated permitting is based on a clear roadmap provided by the National Strategy of Integrated Environmental Permitting Implementation for the period 2009–2020. The legal basis for integrated permitting was set in 2011–2012, including institutional, procedural and technical guidance. During the next phase (2012–2015) the development of pilot projects on introduction of integrated permits in priority sectors was foreseen – a measure that has not been implemented. Installations regulated by the Decree No. 528 were welcome to apply for integrated permits, but very few took up this possibility. As of 2016, integrated permits will become mandatory for all other enterprises subject to this regulatory regime. In total, there are up to 300 identified installations that may need integrated permits. Though lists of such installations have been established in all oblasts, they continue to be clarified and thus the number of relevant installations may change.

The scope of integrated permitting is adapted to the structure of Belarusian industry and is less complex and sometimes less constraining as compared with EU Directive 2008/1/EC, which inspired it. For example, thresholds for combustion installations and, particularly, poultry and pig farms are much higher in Belarus, while some industrial processes are not subject to integrated permitting at all (e.g. municipal waste incineration, tanning of hides and skins, slaughterhouses, electrolytic or chemical surface treatment of metals, manufacture of ceramic products by firing or production of explosives). At the same time, Belarus included on the list the communal WWTPs, which are not part of integrated permit regulation in the EU. It also applied a lower threshold for landfills. As a result of these decisions, over one fifth of the identified installations subject to integrated permitting are WWTPs and landfills,

which is unusual compared with other countries applying integrated permits. This is distracting administrative resources from the regulation of more complex facilities.

The competent authorities for issuing integrated permits are the oblast committees of natural resources and environmental protection. The central environmental authority offers methodological support to the oblast committees, deals with complaints and organizes training activities. Within the committees, these tasks are assigned to two or three civil servants from different units, usually coordinated by the Division of State Ecological Expertise; none of them is solely responsible for integrated permits because they also have other tasks. This situation does not seem adequate, especially against the tight deadline for considering some 300 applications by the end of 2015. The possibility for external experts to participate in the consideration of integrated permit applications is currently not foreseen in the legislation.

In terms of procedural requirements, public participation is reflected at both the permit application and permit issuance stages. Decisions on awarding an integrated permit, as well as notification of the application for one, are made publicly known. However, neither the integrated permit itself nor the application is available to the public. The notification of the application (in a prescribed format) informs the public on the main measures foreseen for avoiding and mitigating environmental risks from the installation. Based on this, the public is invited to submit comments to the applicant who, in turn, must submit to the competent authority a record of resolving the issues noted by the public. No public hearings are envisaged. In the case of the eight integrated permits issued so far, no public reaction on the application has been recorded.

It is worth noting the similarity of criteria applied to identify the installations subject to EIA and integrated permitting. This means that, for new facilities, most of the installations applying for an integrated permit must have gone through an EIA procedure. This provides the opportunity to take into due consideration the issue of BAT early in the assessment procedure and in the design documentation. Otherwise, there is a risk of building installations non-compliant with BAT that may then need difficult and costly retrofitting in line with BAT requirements. The Law on Environmental Protection, other legal acts and technical regulations contain requirements on BATs use during a facility's lifetime, including the siting, design and construction phase. The extent to which BATs are used as criteria for selection of adequate technical measures at the early stages of new developments is difficult to judge.

During the preparatory phase in the introduction of integrated permitting, many capacity-building events were organized. They covered governmental authorities and the industrial sector alike. In 2014, the large enterprises were invited to submit any questions for clarification and comments on the design of the integrated permitting system. They showed that demand for training and expert advice remains high in this area. Some of the questions were answered through information letters. Feedback from the industries was reflected in the prepared updates of the first wave of legal acts adopted in 2011 (e.g. clearer delimitation of installations subject to integrated permitting is deemed necessary). In 2015, the Ministry of Natural Resources and Environmental Protection planned trainings in several oblasts. The Republican Centre for Advanced Training of Managers and Specialists of the Ministry has included integrated permitting in its curricula. Electronic application to apply for an integrated permit is foreseen for the future: so far, the system that would enable it is under construction.

Three best available techniques reference documents (BREFs) have been translated and adapted to the national context. They are not particularly easy to use because of wide gaps between recommended technologies and techniques and the actual state of installations in Belarus. Enterprises are often overwhelmed by the large number of technological processes they need to accommodate to BREFs. In this regard, the Ministry of Natural Resources and Environmental Protection provided guidance that only core processes may be adjusted to BREF recommendations. Original and adapted BREFs are posted on the website of the BAT national centre, hosted by the Centre for International Environmental Projects, Certification and Audit "Ekologiainvest" – a subordinated organization of the Ministry.

The integrated permits cover only air, water and waste issues. Other issues such as energy efficiency, noise or soil protection can be included into the permit but are not mandatory. They continue to be regulated by legal acts and technical regulations on environment, health and energy. Integrated permits are issued for a period between five and 10 years, which can be twice as long as currently issued single-media permits.

It is foreseen to monitor implementation of the system of integrated permitting with consequent introduction of necessary improvements, including

by provision of additional training to the relevant institutions and introduction of BAT.

Single-media permits

Single-media permits exist for air emissions, water use and wastewater discharge, and industrial waste disposal.

Water permits cover both abstraction and wastewater discharge and concern only those entities that are not connected to the municipal sewerage system. Where enterprises are connected to municipal WWTPs, the quality of their effluent is stipulated on a contractual basis. Since 2008, water permits have been issued free of charge.

Almost all industrial enterprises have to prepare draft limit values for air emissions and wastewater discharges as well as ensure the determination of limit values for storage and disposal of production waste, taking into account the standards for generation of production waste, capacities of storage and disposal facilities, time limits for their use and the quantities of stored waste. These values become part of permits. The enterprises undertake periodical inventories of all pollution sources, which serve for updating the limit values and applying for new permits. For new installations, an inventory is due two years after they became operational; for existing installations, once in four to 10 years, depending on the risk category. If an instrumental check of emissions is not possible, they are calculated based on technological parameters and production volume.

Emission dispersion modeling is used to predict the concentration level at the limit of the impact zone of the enterprise. The results are compared with the sanitary standards of ecologically safe concentration of pollutants in the ambient air of specially protected natural areas and areas under special protection and biosphere reserves. The legislation defines a list of the main pollutants that are subject to emission standards. Emission standards are also set up for substances that are not included in the list, but meeting the criteria set out in the law (one of the criteria is a modelling result).

Single-media permitting has seen little change since 2005. Some procedural elements have been modified to slightly ease the administrative burden for the smallest installations. Clear thresholds are established for units that require a permit. For example, since 2009, air emissions permits are introduced only for stationary sources that emit > 100 kg of pollutants or > 0.1 kg for substances classified by the Ministry of Health in the first hazard group – this is a step forward from when almost all production units were required to have one.

Clarifications have been added as concerns delimitation of requirements for production waste disposal, that is, in some cases, permits are no longer required, having been replaced by a simple contract with the communal waste management enterprise. The procedure for obtaining permits for special water use was eased by limiting the number of authorities involved.

However, in total, the scope of single-media permitting is wide and the number of issued permits remains high (table 2.3). This is a particular issue for the waste sector, where signs of over-regulation are visible; currently, disposal of any production waste with an assigned hazard class needs a permit (except municipal waste from production), irrespective of the waste amount.

Notwithstanding the waste disposal permits being issued for a five-year term, they are subject to frequent updates (sometimes every year), for example, due to changes in the amount of waste to be disposed of, new types of waste produced due to technological modifications, and changes in the legislation. In every case, the documentation to be submitted to the regulator is to be renewed.

Table 2.3: Valid single-media permits as of early 2015, number

Oblast	Air emission	Water use and discharge	Waste
Brest	1 191	814	22 273
Vitebsk	1 232	533	3 920
Gomel	1 270	402	4 589
Grodno	1 714	451	3 771
Minsk	2 218	1 241	10 227
Minsk City	1 003	51	5 420
Mogilev	1 454	382	3 799
Total	**10 082**	**3 874**	**53 999**

Source: Ministry of Natural Resources and Environmental Protection, 2015.

Competent authorities for single-media permitting are the oblast committees; however, several tasks on issuing air emission permits and waste disposal permits are devolved to rayon/town inspection units. At the moment, there is no clear separation between permitting and inspection activity at the level of oblast committees and rayon/town inspection units, so there are situations in which the same people can issue and enforce permits.

The compliance monitoring results are taken into account in the permitting process, for example, by setting additional requirements in permits.

Current legislation does not foresee any participation of the public in the single-media permitting process.

Permits for clearing trees and bushes in urban areas are issued by the local authorities. The procedure of issuing permits for the removal and replanting of plants provides for public discussions.

The breach of permit requirements is considered an environmental offence. Notably, exceeding the ELVs established in permits for air/water and the amount of production waste disposed of is considered environmental damage and is subject to a damage compensation claim by the environmental enforcement authority. Permits can be temporarily suspended or withdrawn by decision of the issuing authority or by the court.

Nature protection permits

Biodiversity-related permitting is handled by central government. The Division of Biological and Landscape Diversity of the Ministry of Natural Resources and Environmental Protection issues CITES permits and authorizations for removing wild animals and plants from their habitats. In the period 2010–2014, 66 CITES permits were granted, including 26 for import and 40 for export operations. Forty-eight permits for the removal of wild animals and plants listed in the national Red Book were issued, mostly for scientific purposes. At the same time, 151 permits for the removal of wild animals from their habitat were granted.

Natural resources use permits

Natural resources use is also subject to authorization by environmental or/and other authorities. Limits for extraction of natural resources need to be approved and special permits issued. The oblast committees for natural resources and environmental protection coordinate the bioeconomic assessments of hunting areas and fisheries.

In mid-2014, there were 251 users of hunting areas and 142 users of fishing areas in Belarus. Prior to 2005 Decree of the President No. 580, the Ministry of Natural Resources and Environmental Protection approved quotas for hunting of regulated game species. Following the adoption of the Decree, since 2006, the quotas for hunting of game species were replaced by the procedure of development by the users of hunting areas of plans for hunting of regulated game species which are to be agreed with the Ministry of Natural Resources and Environmental Protection, Ministry of Forestry and local executive and administrative bodies.

The forest management organizations issue woodcutting permits (tickets and orders). Mining allotment is dealt with by the local executive authorities.

Data on resource characteristics, abstraction limits and actual use are consolidated in resource-specific cadastres (chapter 1).

Licences for special activities on environment

Two types of licences are in use, for handling of ODS and for handling of waste. The former started to be issued in 2008. The procedural aspects of licensing were clarified through a regulation approved by the 2010 Decree of the President No. 450 “On licensing of certain types of activities”. Licences for special activities on environment are issued by the Ministry of Natural Resources and Environmental Protection. Licensing fees apply and the period of licence validity is limited to five years. The registers of issued licences are publicly open and are used by other government authorities (for example, the State Customs Committee) as well as by economic entities interested in services in those two licensed areas. Temporary suspension or revocation of licences by the licensing authority is rarely used as an enforcement tool (e.g. no such cases were recorded in 2014).

2.7 Compliance promotion and voluntary schemes

Environmental compliance promotion activities in Belarus continue to be rather punctual. The business sector is invited to participate in the meetings of the Public Coordination Environmental Council at the Ministry of Natural Resources and Environmental Protection (chapter 1). It can also participate in the public consultative and expert councils established in accordance with 2010 Presidential Directive No. 4 (chapter 1).

BAT reference documents (BREFs) are being translated from English. Three magazines are specifically dedicated to environmental matters, notably in industry. At the same time, there is no structured process of compliance promotion within the Ministry of Natural Resources and Environmental Protection.

Voluntary approaches towards environmental management are emerging, especially among enterprises that work on markets where environmental management systems are well known and widely applied. There are a few large enterprises that have adopted the ISO 14000 series, such as Belaruneft, Belshina, Naftan, Atlant, MTZ and Grodno Azot. Some enterprises, such as Gefest, put an emphasis on the environmental quality of their products, improving them in order to be more energy efficient. The economic and financial crises have reduced the number of ISO 14001-certified enterprises, although, lately, the process of certification has become more intensive. In 2015, there were 69 enterprises in Belarus covered by ISO 14001 certificates, according to an ISO survey.

In parallel, the national system of environmental management certification, STB ISO 14001, has seen wider use, most likely because of the ISO 14001 system coming at a higher price and due to government financial incentives (figure 2.1). As of late April 2015, there were 343 enterprises certified according to the national environmental management system of certification. Tax abatements are foreseen for enterprises implementing the ISO 14001 system (10 per cent environmental tax relief for the first three years), but only for those certified in the national system. The extent to which the two systems of certification (ISO 14001:2004 and STB ISO 14001-2005) communicate with each other remains unclear.

Eco-labelling is at an initial stage. A few standards have been established so far for non-food products, for example, refrigerators, wooden furniture and synthetic detergents, in accordance with EU benchmarks. A technical code, TCP 126-2008, was introduced to certify conformity of food products with production standards, including the absence of genetic engineering and artificial food additives. At the beginning of 2015, 47 local food producers were given the right to use that label for 263 of their products.

Eco-labelling is applied based on a certificate of conformity issued for a term of three years by the State Committee for Standardization. It can annul the certificate based on inspection results; however, there are no sanctions for the wrong use of eco-labelling.

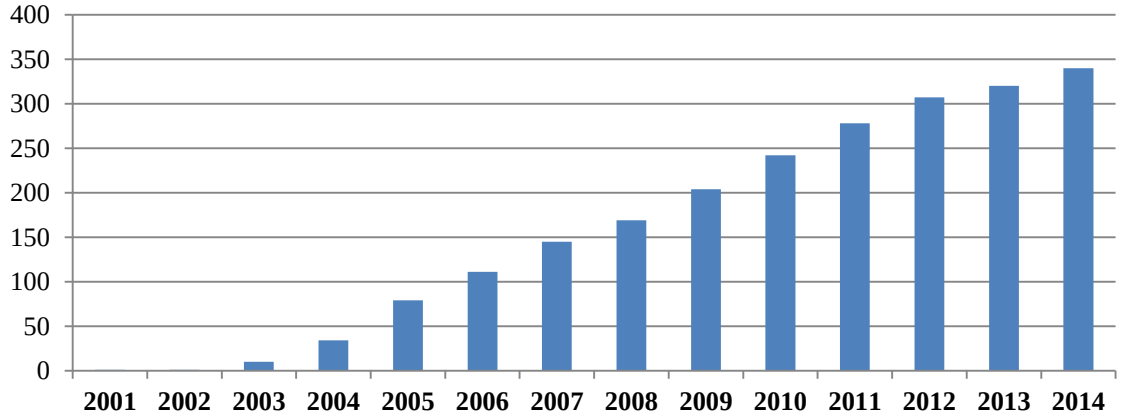
Overall, incentives are lacking for more active engagement of enterprises in voluntary activities.

The extended producer responsibility system was introduced in Belarus in 2012 and covers 17 product categories (chapters 3 and 6).

2.8 Identification of non-compliance

Since the last decade, the compliance monitoring system is Belarus has further evolved and increasingly offers the benefit of discovery of non-compliance in a timely and effective manner. This system now combines extensive self-monitoring by enterprises with risk-based inspections conducted by government officials.

Figure 2.1: Cumulated number of Belarus enterprises having received STB ISO 14001 certificate, 2001–2014



Source: Register of the National System of Conformity, State Committee for Standardization (https://tsouz.belgiss.by/).

Self-monitoring

The Law on Environmental Protection establishes the legal basis for self-monitoring. Belarus combines two systems of self-monitoring by enterprises: (i) a system of environmental self-control to be undertaken by all legal entities that perform activities having an adverse impact on the environment; and (ii) so-called "local environmental monitoring", which is a system of assessment of environmental impacts caused by major pollution sources. Both are the obligation of the facility operators.

Environmental self-control is focused on checking compliance with permit requirements, keeping environment-related documentation, maintaining preparedness for emergency situations, etc.; in fact, it serves as an environmental management system at the facility level. It may include sampling and analyses, if required. There is no legal obligation for operators to regularly report on the acquired data to the authorities. They would submit information by request or, otherwise, the environmental authorities would check on the results of self-control by enterprises during regular or unplanned inspections.

The purpose of local monitoring is to estimate changes in areas where there are major sources of environmental pollution. Local monitoring is part of the NEMS (chapter 1). Its scope is strictly delineated: it involves the largest environmental polluters included in a list approved by the Ministry of Natural Resources and Environmental Protection and periodically updated at the initiative of its territorial bodies (last update in 2012).

There are 394 enterprises that are subject to this requirement, though not every enterprise is obliged to report data across all environmental media (table 2.4). Soil quality monitoring was added to this system in 2007. Due to this system, for example, authorities are systematically informed about emissions and the ambient impact of enterprises, totaling 75 per cent of total air emissions (2011 data).

Detailed instructions on performing local environmental monitoring have been issued, specifying the criteria for installations subject to monitoring of different environmental media, parameters to be monitored and procedures to be followed under different circumstances. For example, 47 types of facilities are subject to mandatory monitoring of air emissions.

Sampling and laboratory analysis within the enterprise self-monitoring system must be done by accredited laboratories. Methodological guidance for measurements, as well as the state analytical control for compliance with the emission standards, is assigned to the Ministry's Republican Centre for Analytical Control in the Field of Environmental Protection. Sometimes, the same state-owned laboratories could conduct laboratory analysis for inspection authorities and under subcontracts with enterprises.

The frequency of self-monitoring is risk based and gradually evolves towards a continuous automated monitoring. Adoption of such type of monitoring of air emissions by large combustion plants is foreseen in the State Programme for Support and Development of the National Environmental Monitoring System (NEMS) for 2011–2015. Systems of continuous automated monitoring are already functioning at 14 enterprises.

Assessment and self-reporting

Self-control and local monitoring are often mixed up, in spite of having different purposes. This may be the consequence of the fact that, often, the operators use data supplied into the local monitoring system for self-control purposes. Data resulting from local environmental monitoring are integrated into the enterprises' own systems of decision-making. They are usually combined with data gathered through the operational monitoring of production processes and compared with requirements established through the permitting system.

Table 2.4: Network of local environmental monitoring, as of 1 January 2015, number

	Local environmental monitoring points					
Oblast	**Air**	**Surface water**	**Groundwater**	**Soil**	**Total**	**Enterprises**
Brest	22	19	39	2	82	60
Vitebsk	16	41	48	2	106	69
Gomel	29	23	41	9	102	64
Grodno	21	24	29	5	80	49
Minsk City	17	5	4	8	34	22
Minsk	22	26	37	7	93	58
Mogilev	33	25	33	12	102	72
Total	**160**	**163**	**231**	**45**	**599**	**394**

Source: Belarusian Research Centre "Ecology", 2015.

As opposed to self-control, the enterprises that are subject to local monitoring have clear self-reporting obligations. The results of the local monitoring programme are reported to oblast committees of natural resources and environmental protection every 15 days and further transmitted to the IAC-Local Monitoring of the NEMS for validation and analysis. The quality of data supplied under the local monitoring is regularly checked by governmental inspectors through sampling and laboratory analysis.

Another self-reporting channel for emission data gathered by enterprises is via the statistical forms for air emissions, water use and discharge, and industrial waste management. Data of state statistical reporting are used in aggregated form in the development of statistical books, reports and other publications. Facility operators are obliged to store such data, together with other operational, management and environmental information, in the so-called "environmental passport" of the enterprise.

The passport should be updated regularly and is subject to control by the environmental authorities during inspections. Both competent authorities and the regulated community find the passport to be a useful management tool.

Over the last decade, the Government has systematically updated the regulatory basis for self-monitoring and environmental reporting in order to ensure its quality. There are several instructions and guidance documents that complement regulations.

Pollutant release and transfer register

Belarus does not have a fully-fledged pollutant release and transfer register (PRTR). A draft PRTR database was developed and several methodological guidance documents have been elaborated. In 2015, 224 enterprises were identified for inclusion in the PRTR. As of early 2015, the database is fed, on a pilot basis, with 2011 data on some enterprises from Grodno Oblast.

The country is not party to the PRTR Protocol to the Aarhus Convention; however, it has been leading the activities on the promotion of the Protocol in Eastern Europe, the Caucasus and Central Asia in the framework of the Meeting of the Parties to the Protocol. In 2014, the second session of the Meeting of the Parties endorsed the document prepared by Armenia and Belarus describing various activities and steps needed to advance the ratification and implementation of the Protocol in the region.

Inspection on environmental protection and natural resources use

Inspection system

The system of inspection has seen improvements. The 2009 Decree of the President No. 510 created a unified legal framework for enforcement agencies' activity. Due to changes in the legal basis, the inspections have become more coordinated across various competent authorities, within and beyond the environmental sector. To this end, a consolidated ("coordinated") inspection plan is maintained by the Committee of State Control with regular input from all competent authorities. Inspection planning evolved towards risk analysis. The mandates of various inspection authorities are now better differentiated, and the powers of inspectors clearer.

The intensity of inspection has been fluctuating over the last few years (table 2.5). In 2014, the competent environmental authorities conducted 2,645 planned and 1,163 unplanned inspections, of which the largest number – 1,115 visits – were follow-up checks aimed to verify compliance with recommendations provided during planned inspections. Unplanned inspections and preventative on-site visits steadily increased (in absolute and relative terms). Some 90 per cent of planned inspections result in the discovery of non-compliance.

The planned inspection activity is subject to mandatory coordination with other enforcement agencies. It has to be specified that "coordinated" inspections are not necessarily integrated/joint inspections in character, since every involved agency follows its own interest during the check and prepares a separate report at the end of it. Coordinated plans are set for every six months and are posted on the Committee of State Control's website, indicating the month when the planned inspection of the given facility will commence. The enterprises subject to inspection are informed of an inspection in writing, 10 days before it commences.

The frequency of planned inspection is also strictly framed and is risk based. Three categories of risk are introduced for planning purposes. Installations performing environmentally hazardous activities or economic activities within specially protected natural areas are considered high risk and can be inspected annually. Medium-risk activities can be checked once in three years, while lower-risk facilities can be inspected every five years. The legislation introduces a moratorium on inspections for operators who have a good history of compliance and regularly pay their taxes.

Table 2.5: Inspections on environmental protection and natural resources use, 2011–2014, number

	2011	2012	2013	2014
Planned inspections [1]	2 088	3 818	2 994	2 645
Unplanned inspections [2]	309	755	697	1 163
of which:				
Follow-up inspections	187	566	578	1 115
Thematic/operative	72	80	36	8
Unplanned inspections*	43	108	82	39
Additional inspections**	7	1	1	1
Total inspections [1]+[2]	**2 397**	**4 573**	**3 691**	**3 808**
Monitoring***	..	2 199	6 753	6 883

Source: Ministry of Natural Resources and Environmental Protection, 2015.
Notes:
* Inspections which are prescribed by (paragraph 9.1 of Decree No. 510):
- Orders of the President of the Republic of Belarus and Prime-Minister of the Republic of Belarus;
- Chair of the Committee of State Control and its deputies, chairs of Oblast Committees of State Control, heads of sections of the Department of Financial Investigations of the Committee of State Control in oblasts, Minsk oblast and Minsk City within the limits of their powers;
- General Prosecutor and its deputies, prosecutors of oblasts and Minsk City and other prosecutors within the limits of their powers;
- Heads of other enforcement authorities (except territorial bodies, structural units and subordinated organizations) and their deputies within the limits of powers of such enforcement authorities.

** Unplanned inspections following an appeal on the act on inspection or the decision of the enforcement authority, for further investigation of cases received by the prosecuting authorities or the courts, or by reason of breach of the established inspection procedure by the enforcement authority.
*** Monitoring according to Decree No. 510 (in fact, preventative on-site visits).

The Committee of State Control is given the right to exclude from the coordinated plan all inspections that do not comply with the requirements.

Mandatory checklists were introduced for preparation of the planned inspection but also as a measure for strictly framing the inspection; thus, inspectors cannot exceed the prerogatives they are given. The checklists are quite detailed and used by those under regulation to prepare for the coming inspection; in this sense, they also have a preventative role. The duration of a planned inspection is limited to 30 working days, which normally provides sufficient time for a detailed inspection.

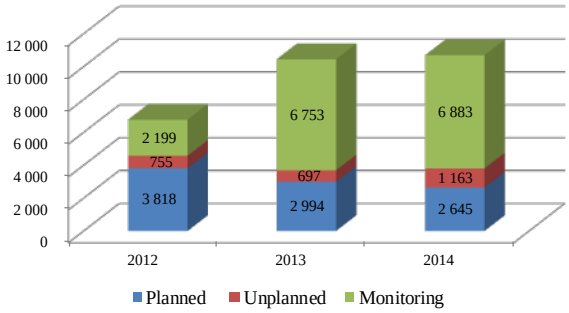
Notable exceptions from Decree No. 510 are, for example, the field checks to provide rapid response on combating illegal hunting or fishing (mostly undertaken by the State Inspectorate for Flora and Fauna Protection), the site visits related to sampling and measurements as part of the state analytical control, and complaint-driven site visits.

Unplanned inspections can be decided by the heads of enforcement agencies in special cases indicated by the law, such as follow-up visits, thematic/operative checks, incidents, or on receipt of reliable information concerning a breach of law. During unplanned inspections, the general inspection principles and rules apply. The derogations from the planned framework maintain a necessary level of flexibility in inspection activity.

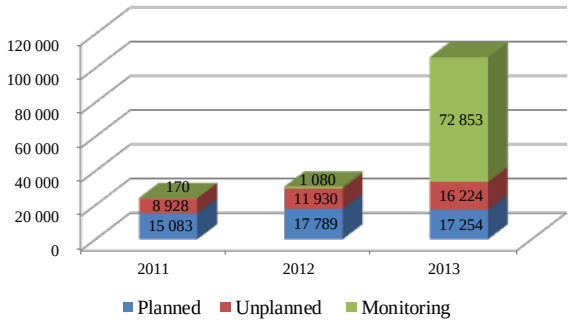
A new form of enforcement activity is increasingly in use: it is called “monitoring” in the Decree No. 510 and in fact means preventative on-site visits. To conduct this kind of on-site visit can be decided by the head of the enforcement agency (including heads of territorial bodies, structural units and subordinated organizations) or its deputy. Such a visit consists of visiting the installation in order to identify the potential for non-compliance and to prevent it; it is important to note that, during such a visit, the inspector cannot use sanctions; rather, he or she would issue recommendations for corrective measures. However, if problems are not resolved, an unplanned inspection could be decided upon, followed by sanctions.

Information on such preventative on-site visits by both environmental and sanitary authorities shows that their number has exploded across these enforcement areas (figure 2.2). It is most likely that this is a way of compensating for the imposed maximum frequency of inspection. The opinion of those under regulation on this new method of control is mixed – they suspect there may be an increase in control burden and possible abuses.

Figure 2.2: On-site visits, 2011–2014, number



Source: Ministry of Natural Resources and Environmental Protection, 2015.



Source: Ministry of Health, 2015.

The inspection is finalized either by an inspection record (meaning that no breach of law was established) or an act on inspection. The latter document is subject to administrative appeal by a higher level authority (within 30 days), with possible subsequent judicial recourse or initiation of a legal action in the economic court (within one year of the inspection decision). The appeal procedure does not prevent the execution of the decision. An eventual administrative sanction can also be appealed within 10 days. The number of appeals is very low.

Information on the inspection results is introduced in the integrated automatic database of enforcement activities run by the Committee of State Control. The information on environmental violations can thus be used by other enforcement authorities.

Environmental inspectors have sufficient powers to perform their duties. The distribution of inspectors at the rayon level, with a low number of inspectors covering small territories, is an impediment in further capacity strengthening among environmental inspectors, since one or two inspectors per rayon cannot cover the whole range of environmental issues. There are prerequisites for avoiding fragmentation, as inspectors' powers are extraterritorial. This could be used for building specialized teams of inspectors who could work, where necessary, outside their usual administrative units. This may prove useful for strengthening inspection capacity in view of checking large facilities that have received integrated permits.

Neither the central authorities nor the general public have sufficient information to assess the performance of the environmental compliance assurance system. There are no performance management indicators that would enable "input–output–outcome" analysis of the compliance assurance system. Each territorial body discloses data at its own discretion, with varying frequency and in various formats.

Sampling and analytical control system

Environmental enforcement authorities can use a wide range of tools for discovering non-compliance, including sampling and analytical control. Compliance monitoring activity of environmental authorities is supported by a network of 22 dedicated laboratories of the Republican Centre for Analytical Control in the Field of Environmental Protection, covering the entire country's territory.

Clear procedures are available for state analytical control. Annual plans and a mandatory list of facilities to be checked is prepared, based on criteria such as newly constructed installations, facilities subject to planned inspections in the next six months, a history of non-compliance, installations with new permits or permits in their terminal phase, and installations included in the local monitoring scheme. These annual plans are updated on a monthly basis, taking stock of the unveiled cases of non-compliance and public complaints. The currently available (non-exhaustive) list of objects to mandatory analytical control includes 416 facilities. A similar instruction prescribes the analytical control procedure in the event of accidents/incidents resulting in environmental pollution.

Every year, the Republican Centre checks compliance with permit requirements on air for 1,500–1,700 installations and on water for 650–800 facilities (i.e. 15–20 per cent of permit holders). Information gathered through the system of state analytical control is published in a summarized form every quarter. Information bulletins present data on enterprises exceeding the prescribed emission/ discharge limit values of pollutants. The information is available on the website of the MIAC of the NEMS. The presentation of information in the bulletins is overly technical and comes post-factum to the pollution events. On the other hand, inspectors find out about non-compliance events via the official

channel of the Republican Centre and do not need the bulletins for information.

Public inspectors

Finally, the abrogation of the institution of "public inspectors", which have existed for years in Belarus, must be noted. This move was probably made to avoid any confusion with the statutory inspectors in the wake of the regularization of enforcement activity under the 2009 Decree No. 510. A new provision was introduced into the Law on Environmental Protection in 2013 (article 15–1 "Public ecologists"). As of May 2015, there were 462 public ecologists registered as working under the auspices of the oblast committees for natural resources and environmental protection. They should support the environmental inspectors on some thematic checks and resolving citizens' complaints but mostly focus on public information and education activities. Surprisingly, a corpus of "public inspectors" under the State Inspectorate on Fauna and Flora Protection under the President was created in 2009, which is creating confusion and unnecessary fragmentation of the public movement in support of environmental enforcement authorities.

2.9 Non-compliance response

Little change occurred in the system of environmental enforcement, which was already sufficiently advanced a decade ago. Since 2011, the enforcement pyramid has remained largely identical, with prescriptions for corrective action (injunctions) at the base, followed by a substantial number of monetary fines and a relatively smaller number of damage compensation claims (table 2.6). Compliance with issued prescriptions is checked regularly as part of unplanned follow-up inspections.

On average, enterprises receive some 11 prescriptions per year for corrective action, though in 2012 their number jumped exceptionally to 18 prescriptions per year per enterprise. One inspection results in five fines applied, on average. These exceptionally high figures can be explained by a number of factors, including: (i) the decrease in the general number of inspections compensated by the increase in their duration and thoroughness; and (ii) the mandatory use of checklists, which can involve checking 100–150 requirements, with potential prescriptions issued for every position.

The number of other non-compliance responses, such as installation shutdown or permit revocation, is very low, according to competent authorities. More often, in cases of serious law violations, inspectors order the suspension of the installation's activity. After remediation of non-compliance, the ban on activity is lifted. Temporary suspension or withdrawal of permits has practically not been used in the case of air emission permits and water permits.

The practice of starting a compliance dialogue with the enterprise with non-punitive measures is a positive development. Environmental authorities, for example, the Minsk City Committee of Natural Resources and Environmental Protection, also use the "name and shame" approach by publishing the names of non-compliant enterprises on their websites.

The level of fines established by the 2003 Code on Misdemeanours looks relatively high, ranging up to 50 "basic units" (about US$600) for physical persons and 1,000 "basic units" (US$12,000) for legal persons. However, the level of applied fines is not high and fails to provide a deterrent effect: for example, in 2014, the average level of fine applied was about 5 "basic units" (approximately US$60).

Sanctions can be softened where the offender pleads guilty and agrees to pay the fine through a simplified procedure. This often results in applying the lowest limit of fine, or a symbolic 0.5 "basic units" fine when such a lower limit is not established in the law. The average level of a damage compensation claim during recent years is approaching 100 "basic units" (about US$1,200), which is relatively low (table 2.7).

Table 2.6: Key types of non-compliance responses, 2011–2014, number

	2011	2012	2013	2014
Inspected entities	2 397	4 573	3 691	3 808
Injunctions	26 585	86 107	43 535	40 816
Fines	14 287	21 204	20 470	19 619
Damage claims	827	1 178	1 192	1 260
Suspension of activity	243	129	26	41

Source: Ministry of Natural Resources and Environmental Protection, 2015.

Table 2.7: Selected inspection indicators, 2011–2014

	2011	2012	2013	2014
Number of inspected entities	2 397	4 573	3 691	3 808
Number of injunctions	26 585	86 107	43 535	40 816
Number of fines	14 287	21 204	20 470	19 619
Amount of fines, billion roubles	4.2	7.3	9.8	14.4
Average fine in basic units	8.4	6.0	3.9	5.1
Number of damage compensation claims	827	1 178	1 192	1 260
Amount of damage compensation claims, billion roubles	3.7	4.5	15.5	16.5
Average damage compensation claim in basic units	128.0	67.0	106.0	90.0

Source: Ministry of Natural Resources and Environmental Protection, 2015.

Both legal persons and physical persons can be sanctioned according to the Code of Administrative Offences. However, legal entities are rarely fined. Administrative sanctions to responsible persons (e.g. the manager) are applied more often than administrative sanctions to legal persons.

The amount of monetary penalties has increased sharply in absolute terms since 2011. Average amounts per case also increased – by some 2.5 times in the case of administrative fines and almost threefold in the case of damage compensation claims. However, taking inflation into account, these numbers have not grown. The collection rates are close to 100 per cent; effective mechanisms for enforced collection are in place.

Besides environmental damage claimed by the competent environmental authorities, damage incurred by individuals as a result of environmental pollution and degradation can also be claimed. In such cases, a civil judicial enforcement path is applied.

The number of environmental criminal cases is quite limited for non-compliance related to pollution or infringements of overall rules of environmental management (table 2.8). The most frequently committed environmental crimes are, by far, poaching, illegal fishing and illegal logging.

Criminal cases can be initiated by either environmental inspectors or other enforcement agencies, or by the General Prosecutor's Office. The investigative committee of the General Prosecutor's Office conducts inquiries and then the prosecutors decide whether to press charges in court, suspend the case for lack of evidence or order further investigation.

Most often, the criminal cases result in condemnatory judgments, although the courts tend to "modulate" their final decision using mitigating circumstances. Prison convictions are almost exclusively pronounced in cases of poaching involving the use of guns and disobedience towards officials. Criminal proceedings are often dismissed if the defendant agrees to compensate for damage.

Table 2.8: Environmental criminal cases per specific article of the Criminal Code, 2010–2014, number

Articles of the Criminal Code	2010	2011	2012	2013	2014
Art.263 Deliberate destruction or damage to natural complexes and specially protected natural areas	-	1	-	-	-
Art.265 Environmental safety rules infringement	-	-	-	-	1
Art.269 Land degradation	-	-	1	-	2
Art.271 Mineral resources depletion	1	-	-	-	-
Art.272 Water pollution	1	2	-	1	1
Art.274 Air pollution	-	-	-	1	-
Art.275 Forest pollution	-	-	-	-	3
Art.276 Unintended forest damage	1	3	1	-	-
Art.277 Illegal logging	19	17	25	20	22
Art.281 Illegal fishing	326	250	215	211	292
Art.282 Illegal hunting	342	270	261	247	184
Art.284 Veterinary rules infringement	1	-	-	7	23
Total	**691**	**543**	**503**	**487**	**528**

Source: General Prosecutor's Office, 2015.

2.10 Conclusions and recommendations

Belarus strengthened its compliance assurance system over the last decade. Reforms have been initiated both from inside the environmental sector, for example, as concerns integrated permitting, and outside it, for example, as concerns inspection. Although the balance sheet of changes is positive, the changes require further fine-tuning with good international practice.

In order to improve the institutional framework for compliance assurance, the specialized inspectorates of the Ministry of Natural Resources and Environmental Protection were dissolved and mandates were redistributed. Many compliance assurance duties were transferred to the territorial bodies of the Ministry. Through this, policymaking was separated from environmental assessments, permitting and enforcement. This structural change also helped reduce fragmentation at the central level and bring regulatory activities closer to the ground.

However, it did not address the lack of capacity at the lowest level of governance – in rayon and town inspection units. Limited human resources at the rayon level are often dispersed on multiple tasks, sometimes not directly related to environmental enforcement. One of the possible approaches to strengthening them is to merge several rayon inspection units into an inter-rayon inspection units. However, washing out of the system the proximity of inspection units to local executive authorities and stakeholders may jeopardize the existing close interaction with local actors.

Recommendation 2.1:
The Ministry of Natural Resources and Environmental Protection should further strengthen its institutional framework for environmental compliance assurance by making rayon and town inspection units more effective through:

(a) Focusing their work on the core tasks of compliance monitoring and non-compliance response;
(b) Providing training;
(c) Enabling to form inter-rayon inspection units of natural resources and environmental protection;
(d) Further promoting the in-depth specialization of each inspector, taking into account areas in which specialist knowledge is required.

The system of project-specific assessments has seen several changes. The mandate for carrying out SEE was concentrated at the central and oblast levels in order to increase the quality of assessment. The scope of SEE as concerns industrial and infrastructure projects was harmonized with the scope of EIA, thus ensuring coherence across different stages of project review. The complexity of assessed projects, coupled with limited personnel and rarely used external expert support, impose a burden on the staff experts. SEE/EIA is not yet well aligned with integrated permitting, especially as concerns the use of BAT during the siting, design and construction stages. Despite improvements in the legal framework for public participation in EIA, in practice, major decisions are still taken without due consideration of public opinion. Post-EIA access to relevant information remains limited.

There have been difficulties in the application of EIA in the transboundary context. The country is not yet a Party to the second amendment to the Espoo Convention.

Recommendation 2.2:
The Ministry of Natural Resources and Environmental Protection should:

(a) Further strengthen the environmental impact assessment/state ecological expertise (EIA/SEE) procedures by introducing amendments to the legislation in order to:
  (i) Provide more flexibility in EIA/SEE procedure in response to the increased complexity of projects by involving external experts;
  (ii) Systematically use the best available techniques as criteria for the selection of adequate technical measures at early stages;
  (iii) Publish the SEE conclusions and the EIA reports online, except for information of a commercial nature;
  (iv) Ensure public participation in line with the Convention on Environmental Impact Assessment in a Transboundary Context (Espoo Convention) and the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention);
(b) Initiate the process for the acceptance of the second amendment to the Espoo Convention.

Environmental permitting has been a priority area of reform since 2005. Despite concrete achievements, such as the launch of an integrated permitting system, this area has room for improvement. The scope of integrated permitting is not following international

benchmarks, which distracts resources from regulation of environmentally more risky facilities while leaving uncovered potentially dangerous installations. Enterprises are not yet convinced of the advantages of integrated permitting, and capacity to implement this regime still requires the substantial investment of expert knowledge and resources.

Public participation is not well embedded within the integrated permitting procedure, for instance, the public does not have access to permit applications. The electronic application system for integrated permitting is not in place. Information on single-media permitting is not readily available. Existing databases are used mostly for storing data rather than as modern tools of data processing and analysis.

Recommendation 2.3:
The Ministry of Natural Resources and Environmental Protection should further improve the design, implementation capacity and arrangements related to environmental permitting by:

(a) Updating the scope for integrated permitting by revising the types of installations subject to integrated permitting and their production capacity or output thresholds;
(b) Providing training to industrial operators and competent authorities concerning the way applications for integrated permits should be made and considered;
(c) Speeding up the adaptation of best available techniques reference documents (BREFs) to the national context and enabling effective use of BREFs by the regulated community;
(d) Improving public participation in the integrated permitting procedure by making applications for integrated permits available to the public and by providing for public hearings;
(e) Speeding up the development of the electronic application system for integrated permitting and an information system for single-media permits.

Discovery of and response to non-compliance have improved, from a procedural perspective. Decree of the President No. 510 has played a decisive role in making inspection activities clear, risk based and backed by adequate powers. It also improved coordination and coherence among various inspection bodies.

To complement discovery of non-compliance by government inspectors with activities conducted by the enterprise sector, self-monitoring was further improved. When unveiled, non-compliance is addressed rigorously and sharply.

Capacity for inspection of installations that have an integrated permit is yet to be built. The current inspections are coordinated in terms of timing but not in terms of tasks followed by different controlling bodies. Suspension of installations and permit withdrawal are rarely used as enforcement tools.

Strategic goals for compliance assurance have not been established. This results in a system of performance management that focuses on counting activities rather than obtaining compliance results. There are no performance management indicators for the compliance assurance system.

Information on environmental inspection, even in aggregated form, is not available to the public.

Recommendation 2.4:
The Ministry of Natural Resources and Environmental Protection should strengthen the specific instruments of environmental compliance monitoring and non-compliance response and improve analysis of their use and impact by:

(a) Building capacity on and strengthening the practice of integrated inspections and joint inspections, especially for installations that have an integrated permit;
(b) Improving the balance of enforcement tools, that is, more actively using permit withdrawal and suspension of installations as instruments for non-compliance response;
(c) Defining a national set of performance management indicators that would enable an "input–output–outcome" analysis of the compliance assurance system;
(d) Establishing strategic goals and priorities in terms of compliance and aligning the performance management system with them;
(e) Ensuring regular publication of compliance and enforcement data.

Belarus is not a Party to the 2003 Protocol on Pollutant Release and Transfer Registers (PRTR) to the Aarhus Convention, although it is active in the promotion of the Protocol. The country is progressing towards building the necessary legal and institutional framework that would enable the introduction and adequate functioning of a national PRTR. The list of facilities for inclusion in a PRTR was determined. A draft PRTR database was developed and is fed, on a pilot basis, with data on some enterprises from Grodno Oblast.

<u>Recommendation 2.5:</u>
The Government should:

(a) Continue taking appropriate legislative, institutional and technical measures in order to establish a national pollutant release and transfer register system in accordance with the requirements of the Protocol on Pollutant Release and Transfer Registers (Protocol on PRTRs) to the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters;

(b) As soon as appropriate capacities for implementation are in place, consider accession to the Protocol on PRTRs.

Chapter 3

ECONOMIC INSTRUMENTS, ENVIRONMENTAL EXPENDITURE AND INVESTMENTS FOR GREENING THE ECONOMY

3.1 Environmental taxes

Belarus applies a range of economic instruments that are intended to create incentives for improved environmental performance in industry and other sectors of the economy. These include *inter alia* environmental taxes, charges for use of natural resources, compensation for damage caused to the environment, charges for utility services (waste, water supply and sewerage, and energy supply) and charges on products (such as motor fuels) that are related to polluting activities. There are, moreover, also financial incentives for investments in environmentally friendly technologies and the adoption of environmental management practices.

Until 2009, the term "environmental tax" (or "ecological tax") was synonymous with the term "tax for use of natural resources" in Belarus's environmental legislation. All these charges were governed at that time by the 1991 Law "On the tax for the use of natural resources (environmental tax)" and the 2007 Decree of the President No. 215 "On the rates of tax for use of natural resources (environmental tax) and some issues of its collection". As of 2010, all these taxes have been consolidated into the Tax Code, which distinguishes between the environmental tax and the tax for mining and extraction of natural resources.

Effective from the beginning of 2011, the Tax Code distinguishes among four types of environmental taxes:

- Emissions of pollutants into the atmospheric air;
- Discharge of wastewater into the environment;
- Storage and disposal of production waste;
- Imports of ODS, including those contained in products.

A number of environmental taxes were abolished in 2010–2011, with the general intention to simplify the tax system for enterprises. These taxes were levied on:

- Processing of oil and oil products (by petroleum refineries);
- Transportation of oil and mineral oils through the long-haul pipelines;
- Production and/or import of goods containing 50 per cent or more of volatile organic compounds (VOCs);
- Production and/or import of plastic and glass containers and cardboard and paper packaging, as well as on the volume of imported goods packed in plastic and glass containers and cardboard and paper packaging;
- Emissions of pollutants from mobile sources (motor vehicles).

The tax on products containing VOCs was introduced in 2009, and there is no official information on why it was abolished in 2010.

The calculation of the environmental tax and the rules of payment are governed by the Tax Code. The tax base is the actual volume of the corresponding polluting indicator, such as emissions of air pollutants. The volume of emissions of pollutants, wastewater discharge (including pollutant content), and generated waste subject to disposal and storage, are reported in special state statistical forms, which are the basis for the environmental tax declarations. The application of environmental taxes is integrated with a system of annual emission limits, which are specified in corresponding environmental permits. Until the end of 2010, exceeding these limits led to the application of a coefficient, which was 15 times the corresponding standard tax rates. As of the beginning of 2011, this coefficient has been abolished. It was replaced by a system of payments of compensation for environmental damage in combination with administrative fines.

The standard tax rates specified in the Tax Code can be modified by the application of so-called "coefficients", which can either increase or reduce the effective tax burden per unit of the tax base, such

as a ton of air pollutants emitted into the atmosphere, depending on the type of economic activity or other factors. A general provision is that enterprises that have been certified to meet environmental management standards (in line with ISO 14000 standards) benefit from a coefficient of 0.9, that is, a reduction of the tax rate by 10 per cent, for a period of three years after having been awarded such a certificate. In March 2015, there were some 350 enterprises that had obtained such a certificate.

The amount of environmental tax due during a given tax period can, moreover, be reduced (to a minimum of zero tax payments) by pollution abatement expenditures made by enterprises during the corresponding tax period. But there is no information on the extent to which companies have made use of this possibility.

Under the simplified tax system, small and medium-sized enterprises, which dominate the private sector of the economy, can replace a large number of taxes by a single tax with a simplified calculation procedure. This is subject to the condition of satisfying certain activity criteria such as annual turnover and number of employees.

The list of taxes that can be replaced includes the environmental taxes. There is no assessment of the contribution that these enterprises make to environmental pollution in Belarus. In contrast, the relatively small number of large, vertically integrated SOEs, which dominate the economic structure in terms of output and employment, are, in principle, fully subject to payment of environmental taxes.

Air pollution taxes

Emission limits for air pollutants are fixed for 242 substances. Not all of these substances, however, have been subject to payment of environmental tax in recent years. Since June 2008, the number of substances subject to air pollution tax was reduced to 53. However since January 2014, again, 242 substances of hazard classes 2–4 are subject to the tax provided that they are mentioned in the air pollution permit; the tax base is set for hazard classes, i.e. not per substance.

The number of pollutants subject to tax is still very large compared with international practice, the feature of which is emission taxes limited to only a few major pollutants. These substances are allocated to one of four hazard classes, which are based on health and safety indicators regarding their content in the ambient air. Tax rates differ, depending on the hazard class.

The Government has been indexing the annual tax rates to inflation to prevent its revenue collected per unit of the tax base from losing value. The latest adjustment at the beginning of 2015 entailed tax rates in real terms being somewhat higher than in 2010 (table 3.1). But this assessment could well be different when made at the end of 2015, depending on inflation developments. Nominal tax rates have also declined in euro terms, on account of the strong depreciation of the national currency.

For each stationary emission source, the Government sets a maximum allowed volume of emissions for each hazard class. These limits are calculated based on the expected utilization rate of existing production capacity during the following year, that is, under normal operating conditions; companies hardly risk exceeding emission limits.

Since 2013, allowable annual emission volumes of air pollutants are determined in corresponding air emission permits or integrated environmental permits. This is based on an amended Law on Atmospheric Air Protection. As of the beginning of 2014, emission taxes have only to be paid for substances that are listed in the environmental permit.

Previously, all stationary emission sources for which there are official rules or procedures for calculating the volume and type of pollutants were subject to environmental tax. The tax, moreover, has only to be paid if total emissions for the aggregate of all hazard categories amount to at least three tons per annum.

At the same time, the tax on emissions of substances falling into the first (most dangerous) hazard category was abolished. There is no official information on the reason for these measures, but, in a more general way, this is supposed to simplify the tax system.

A coefficient of 0.27 (i.e. a reduction by 73 per cent) has been applied to the tax rate for emissions of pollutants associated with the combustion of fuels for ensuring electricity, heat and hot water supply to the population. The coefficient applies also to the corresponding supplies to facilities in sectors such as health care, tourism, social security, education, and art and culture. The coefficient does not apply to emissions of pollutants associated with energy consumption for companies' own production purposes.

Effective 1 January 2011, a coefficient of 0.5 applied to emissions of carbon disulfide and hydrogen sulfide produced during the processing of cellulose was abolished.

Table 3.1: Tax on emissions of air pollutants from stationary sources, 2010, 2015

Hazard class	Substances (selected)	Rouble/ton		Ratio 2015/2010		Memo item €/ton	
		2010	2015	Nominal	Real	2010	2015
First	Cadmium, Mercury	54 623 520	0	..	..	13 829.1	0.0
Second	NO_2, H_2S	1 635 215	5 941 040	3.63	1.07	414.0	364.0
Third	SO_2, solid particles	540 580	1 964 020	3.63	1.07	136.9	120.3
Fourth	CO, Methane	268 610	975 910	3.63	1.07	68.0	59.8

Source: Tax Code (Special Part), annex 6; ECE Secretariat calculations.
Notes: Tax rates for 2015 are those effective from 1 January 2015. The tax on emissions of first hazard class substances was abolished from 2014.
The real ratio is the nominal ratio deflated with the ratio of the average annual CPI in 2014 compared with 2010.
Figures in € were calculated using the official average monthly exchange rate for March 2015: €1 = 16,164.5 roubles.

Table 3.2: Tax on discharge of wastewater from economic activity, 2010, 2015

Recipient	Rouble/m^3		Ratio 2015/2010		Memo item €/m^3	
	2010	2015	Nominal	Real	2010	2015
Waterways	166	610	3.67	1.08	0.04	0.04
Ponds	247	810	3.28	0.96	0.06	0.05
Groundwater	247	810	3.28	0.96	0.06	0.05
Subsoil	12 990	47 110	3.63	1.06	3.29	2.89

Source: Tax Code (Special Part), annex 7; ECE Secretariat calculations.
Notes: Tax rates for 2015 are those effective from January 1 2015. Until 2014, a coefficient of 1.5 was applied to tax rates for discharge of unmetered wastewater. The real ratio is the nominal ratio deflated with the ratio of the average annual CPI in 2014 compared with 2010. Tax rates in € for 2010 were calculated using the average annual exchange rate for 2010 (€1 = 3,949.9 roubles), and for 2015 using the average monthly exchange rate for January–May 2015 (€1 = 16,323.7 roubles).

Tax on discharge of wastewater

Effluent charges are based only on the volume of wastewater discharged into the environment. The quantity and type of pollutants is not taken into account. The tax rate is differentiated according to the type of object that is the recipient of the wastewater. These comprise watercourses, reservoirs, unconfined aquifers into which water seeps from the ground surface, and the subsoil. The 2014 Water Code prohibits the discharge of wastewater into natural lakes by new and modernized enterprises. With the exception of discharge of wastewater into the subsoil, tax rates are quite low; but they have remained broadly stable in real terms compared with 2010 (table 3.2).

A coefficient of 0.006 is applied to discharge of wastewater resulting from municipal sewerage services for the population and institutions, in areas such as health care, sports and education. Thus, the tax rate applied to municipal wastewater discharge amounts to only 0.6 per cent of the standard tax rate per m^3. This coefficient is also applied to wastewater discharged by fish farming entities and pond farms. The tax rate on wastewater discharged from power plants depends on the applied technology for energy production. In the case of traditional fossil fuels, the coefficient is 0.5; in the case of use of renewable energy sources, it is 0.2.

Industrial companies that discharge wastewater into water objects are, in principle, obliged to ensure adequate wastewater treatment to meet the established water pollution standards. But it appears that not all enterprises have the corresponding wastewater treatment installations (chapter 5). Enterprises connected to municipal sewerage systems can discharge their wastewater against a corresponding service fee into public sewer networks. In this case, the tax on wastewater discharge is paid by the vodokanal. A coefficient of 1.5 that was applied to discharge of industrial wastewater in the absence of metering devices was abolished as of 1 January 2011. More than 98 per cent of industries have meters installed for gauging the volume of wastewater discharge.

Tax on production waste

Waste generated during the process of economic production, which has to be stored and disposed, is subject to tax. The environmental tax does not apply to storing the production waste meant for further disposal, neutralization or use, until there is a sufficient amount of waste accumulated in order to be

transported to disposal, neutralization and waste use facilities.

The tax has to be paid by legal entities that have generated the waste or by legal entities that have acquired ownership rights to production waste generated by other legal entities. The 2007 Law on Waste Management requires to maximize the reuse and recycling of production and other wastes. The Law also introduced the concept of "secondary raw materials", which waste generators have an obligation to collect for further processing and reuse (chapter 6).

Tax rates on production wastes depend on the type of waste handling and the waste category. The disposal of waste containing secondary raw materials is subject to punitive taxation, with a tax rate of some €1,370 per ton in 2015. Annual increases in tax rates have fully offset cumulative inflation during the period 2010–2014, with the exception of the tax rates applied to storage of large volume mine wastes (table 3.3). Hazardous waste is allocated to one of four hazard classes, ranging from highly dangerous waste (first class) to low hazard waste (fourth class). The extent of danger and the hazard class of wastes generated are based on the 2007 Resolution of the Ministry of Natural Resources and Environmental Protection No. 85. The disposal, but not the storage, of waste belonging to the highest two hazard classes has been prohibited as of 2014. Storage of waste allocated to the lowest hazard class is not subject to taxation, with the exception of large volume mine wastes (halite, phosphogypsum and sludge).

In addition to the environmental tax, waste disposal and storage is subject to a waste-handling fee to be paid to the operators of the landfill or storage sites. Production waste that is similar to household waste is exempt from the disposal tax for annual volumes amounting to less than 50 tons. There is, moreover, a tax exemption for production waste containing polychlorinated biphenyls (PCBs).

Tax on ozone-depleting substances

The import of ozone-depleting substances (ODS), including those contained in products, has been subject to an environmental tax since the beginning of 2011. The tax rate amounts to 76,930 roubles (€4.8) per kg as of the beginning of 2015, compared with 23,000 roubles per kg in 2011. Taking inflation into account, the tax rate rose in real terms by some 50 per cent over this period. There are no domestic production capacities for these substances. Until 2006, a charge for the permit for one-time import in Belarus of ODS and ODS-containing products was applied on the basis of the 1997 Resolution of the Council of Ministers No. 1038. A republican fee on import of ODS was introduced in 2006, based on the 2006 Decree of the President No. 261.

Table 3.3: Tax on disposal and storage of industrial waste, 2010, 2015

	Rouble/ton		Ratio 2015/2010		Memo item €/ton	
	2010	**2015**	Nominal	Real	**2010**	**2015**
Waste disposal						
Non-hazardous waste	9 576	34 920	3.65	1.07	2.42	2.14
Hazardous waste by class of toxicity						
Third class	243 596	888 140	3.65	1.07	61.67	54.41
Fourth class	121 451	442 800	3.65	1.07	30.75	27.13
Waste containing secondary material resources	6 072 192	22 138 980	3.65	1.07	1 537.30	1 356.25
Waste storage						
Non-hazardous waste	2 104	7 670	3.65	1.07	0.53	0.47
Hazardous waste by class of toxicity						
First class	212 612	775 180	3.60	1.07	53.83	47.49
Second class	62 357	227 350	3.65	1.07	15.79	13.93
Third class	20 740	75 610	3.65	1.07	5.25	4.63
Fourth class	0	0	..	..	..	..
except:						
Solid halite waste; phosphogypsum	1 310	3 325	2.54	0.74	0.33	0.20
Active sludge treatment facilities	630	810	1.29	0.38	0.16	0.05
Other wastes	10 357	3 770	0.13	0.04	2.62	0.23

Source: Tax Code (Special Part), annex 8; ECE Secretariat calculations.
Notes: Tax rates for 2015 are those effective from 1 January 2015.
The tax on disposal of the first and second hazard class was abolished as of 2014. Disposal of this waste is prohibited.
The real ratio is the nominal ratio deflated with the ratio of the average annual CPI in 2014 compared with 2010.
Figures in € were calculated using the official average monthly exchange rate for March 2015: €1 = 16,164.5 roubles.

There is a tax exemption for ODS that are an integral part of the equipment of imported passenger motor vehicles or cargo transport vehicles. The same holds for the transit via the territory of Belarus of ODS and those contained in products.

Government revenue from environmental taxes

The changes in revenue collected from environmental taxes has been influenced by the annual changes in tax rates and the evolution of the various tax bases, that is, the volumes of emissions of air pollutants, and waste generated. Total revenues collected amounted to some 984.7 billion roubles (€60.9 million) in 2014, up from 325.6 billion roubles in 2010 – an increase by a factor of three. Taking inflation into account, however, the aggregate revenues declined in real terms by some 11 per cent over this period (table 3.4).

The bulk of the revenue in 2014 was generated from air pollution taxes (45.1 per cent) and the tax on waste disposal and storage (40.3 per cent); the share of effluent charges was 14.5 per cent. These revenues were fully earmarked for the republican and local nature protection funds, until their abolition at the end of 2011. Since 2011, 40 per cent of the revenues are allocated to the republican budget and 60 per cent to the budgets of the territorial units. The exception is the tax on ODS, which is fully allocated to the republican budget. Aggregate revenues corresponded to 0.3 per cent of general government revenue during the period 2011–2014.

3.2 Product charges

Charges for the management of special waste streams

Belarus has started to implement the principle of extended producer responsibility by obliging producers and importers of certain products to assume the responsibility for collecting, neutralizing and/or reusing them once they have entered the post-consumption stage of their life cycle. The legal basis for this was established in the 2012 Decree of the President No. 313 “On selected issues related to management of consumption waste”. The range of products covered includes inter alia plastic, glass, paper and cardboard packaging, tyres, waste oil, refrigerators, TV sets, and PCs. The companies concerned can meet their obligation by either applying their own system of waste collection or paying a waste management fee to a state-owned waste operator, which has been established under the auspices of the Ministry of Housing and Public Utilities. The state-owned waste operator, in turn, uses the revenues collected from the waste management fees to finance the collection of these wastes by municipal and private waste companies.

The charge rates for each of the products concerned are established by the Council of Ministers, for example, in the 2014 Resolution No. 135.

There has been no assessment so far concerning issues of financial viability of this new waste management system in Belarus. This system has replaced the environmental tax on production and/or import of plastic, glass, paper and cardboard and other goods, which was abolished as of 2011. The new approach, which is used in different forms across European countries, is, if appropriately designed, a more effective way of dealing with these special waste streams, because it shifts the responsibility, at least partly, of dealing with them away from municipalities to producers; and it also creates incentives for producers to already take environmental considerations into account at the design stage of products.

Vehicle recycling fee

Effective 1 March 2014, Belarus introduced a vehicle recycling fee, which is designed to finance the costs of managing the waste generated by end-of-life vehicles. The fee is based on the 2014 Decree of the President No. 64 “On the utilization fee for vehicles”. The amounts of the fee were established in a separate 2014 Resolution of the Council of Ministers No. 172.

The amount of the fee depends on the vehicle category (passenger cars, carriage of goods) and vehicle characteristics (age, engine size and type, permitted gross weight). For each vehicle category there is a base fee rate to which special coefficients are applied related to the vehicle characteristics. The base rates are specified in Russian roubles; payments due will be converted into national currency using the corresponding official exchange rate of Belarusian rouble to Russian rouble fixed by the National Bank of the Republic of Belarus at the date of the transaction. To illustrate, for vehicle category M1 (passenger cars with up to eight seats) the base rate is 20,000 Russian roubles (some €269). The special coefficients for this category range from 0.1 to 35,01, depending on age and engine size. The base rate for vehicles in category N_1, N_2, N_3 (carriage of goods) is 150,000 Russian roubles (€2,014) with a maximum applicable coefficient of 11.8 for vehicles not classified as special vehicles.

Table 3.4: Revenues from payment of environmental taxes, 2010–2014

	Million roubles					Ratio 2014/2010	
Tax object	**2010**	**2011**	**2012**	**2013**	**2014**	**Nominal**	**Real**
Emissions of air pollutants	190 686.6	159 356.7	336 214.2	428 762.2	444 257.4	2.33	0.68
Wastewater discharge by economic entities	46 878.2	78 250.2	94 398.1	119 001.4	143 276.0	3.06	0.90
Industrial waste storage and disposal	88 055.9	111 203.9	210 391.1	290 668.8	396 872.8	4.51	1.32
Ozone-depleting substances	..	535.8	875.3	0.0	275.8		
Total revenues above	**325 620.7**	**349 346.6**	**641 878.7**	**838 432.4**	**984 682.0**	**3.02**	**0.89**
Total revenues in € million	**22.29**	**17.29**	**19.64**	**24.67**	**29.12**	**1.31**	
Total as percent of total general Government revenue	**0.48**	**0.30**	**0.30**	**0.31**	**0.31**		

Sources: Ministry of Taxes and Duties, 2014; General government revenue: IMF World Economic Outlook Database April 2015; ECE Secretariat calculations.
Notes: The real ratio is the nominal ratio deflated with the ratio of the average annual CPI in 2014 compared with 2010. Figures in € were calculated using the official average monthly exchange rate for March 2015: €1 = 16,164.5 roubles.

The fee is collected from legal entities that produce vehicles in Belarus or import them; but it also covers natural persons who import vehicles for their personal use.

There is a tax exemption for vehicles produced in Belarus by legal entities that have committed themselves to ensure the safe handling of end-of-life vehicles. Vehicles exported by Belarusian vehicle manufacturers are not subject to the fee.

The fee is applied retroactively to vehicles that were imported before 1 March 2014. It is noteworthy that the revenues collected from this fee are not earmarked for the management of end-of-life vehicles. There is no information on whether the fee is, or will be, combined with quantified targets for reuse, recycling and recovery of end-of-life vehicles and their components. There is no published information on revenue streams generated by the vehicle recycling fee since its introduction, since it falls under the environmental tax according to classification of budget revenues.

3.3 Taxes for the mining (extraction) of natural resources

The Tax Code determines the list of mineral and non-mineral natural resources whose exploitation is subject to payment of a tax. The important mineral resources of Belarus include potassium (potash) salts, rock salts, oil, peat, construction materials, and underground fresh water and mineral water. The tax base for all these resources is the actual volume (in terms of tons or m^3) of natural resources extracted, with the exception of potassium salt and crude oil. It should be noted that the system of taxes on use of natural resources covered by the Tax Code does not include timber resources and charges for hunting and fishing.

Potassium salt

Potassium salt, which is processed into high-quality mineral fertilizers, is one of the most important natural resources of Belarus in terms of reserves and production. Belarus is the third largest potassium (potash) producer in the world after Canada and the Russian Federation and the large bulk of its production is exported. In the event, potassium salt is a major source of foreign exchange earnings for Belarus. The tax on potassium production was introduced only in 2011 on a simple per ton basis, but, since 2012, it has two components. The first is a specific tax per ton, which, as of the beginning of 2015, amounts to 36,940 (Belarusian) roubles (some €2.3) per ton. The second component is an *ad valorem* tax with a rate of 12 per cent, which is applied to the weighted average price of potassium sold in domestic and export markets. Since April 2014, this price has to be calculated by the legal entity that has to pay the tax. Previously, the average price was calculated, on a monthly basis, by the Ministry of Taxes and Duties. In March 2015, this price was announced to be some 2.26 million roubles (some €140).

Crude oil

Belarus is a small oil producer, with an average production of some 30,000 barrels per day in recent years. The extraction of crude oil is subject to a tax that is specified in terms of US$. The tax rate per ton of crude oil is linked to the monthly world market price per ton of crude oil using Urals oil as a benchmark. Urals is a brand for pricing crude oil exported from the Russian Federation. In the 2015 Tax Code, the potential tax rates range from US$9 per ton to US$103.5 per ton, depending on the price of Urals oil in world markets.

Other taxes

Whereas the tax rates for potassium and crude oil have, at least in part, a relation with the economic value of the resource, it is not clear on what basis the tax rates for the other natural resources were set. Tax rates are in general very low and do not appear to have been set having in mind the need to ensure the rational use of these resources and/or nature conservation objectives. This pertains also to water abstraction charges for purposes other than production of beverages (table 3.5). It is noteworthy in this context that, besides the minor fee for water abstraction for use in agriculture, there is no separate charge for use of irrigation water in Belarus. Tax rates in real terms at the beginning of 2015 were somewhat higher, compared with levels in 2010.

Tax revenues from extraction/removal of natural resources

Tax revenues collected from legal entities engaged in the extraction of natural resources amounted to some 3.4 billion roubles (€209 million) in 2014, corresponding to 1.1 per cent of total general government revenue, up from only 0.1 per cent in 2010 (table 3.6).

The large bulk of this revenue (82 per cent) was accounted for by potassium salt; revenue from oil extraction had a share of 11.4 per cent. All the other fees for use of natural resources (but excluding timber, hunting and fishing) had a share of only 6.6 per cent in total revenue. Overall, the increase in aggregate revenue in real terms – after subtracting inflation – has been considerable since 2010. Revenues had a share of 1.1 per cent in total general government revenue in 2014, up from 0.1 per cent in 2010.

These revenues are not earmarked for any specific purposes; they are distributed between central government and local governments according to a key established in the 2008 Budget Code. The large bulk of revenues (85 per cent from oil extraction, 85 per cent from the specific tax on potassium salt and 100 per cent from the corresponding ad valorem tax) are allocated to the central government budget. The remaining revenues are allocated to local government budgets, depending on the location of the tax objects.

3.4 Other economic instruments

Stumpage fees (fees for timber)

Stumpage fees are based on species, quality and distance to the point of transportation. In principle, stumpage prices are set to recover the costs of resources used for timber production. In 2014, stumpage fees rose within a range of 11.5–28.8 per cent compared with fees for 2013.

Table 3.5: Selected fees for use of natural resources, 2010, 2015

		Roubles		Ratio tax rates 2015/2010		€	
Resource	**Unit**	**2010**	**2015**	**Nominal**	**Real**	**2010**	**2015**
Moulding sands, glass	ton	330	1 200	3.64	1.07	0.084	0.074
Dolomite	ton	180	650	3.61	1.06	0.046	0.040
Sapropel (60% moisture)	ton	33	110	3.33	0.98	0.008	0.007
Peat (40% moisture)	ton	81	300	3.70	1.09	0.021	0.018
Rock salt	ton	1 600	5 840	3.65	1.07	0.405	0.358
Clay and tripoli	m^3	195	710	3.64	1.07	0.049	0.043
Construction stones	m^3	1 336	4 860	3.64	1.07	0.338	0.298
Facing stones	m^3	3 377	12 320	3.65	1.07	0.855	0.755
Water abstraction							
Residential water supply	m^3	18	70	3.89	1.14	0.005	0.004
Agriculture	m^3	1	6	6.00	1.76	0.000	0.000
Production of beverages	m^3	6 300	22 970	3.65	1.07	1.595	1.407
Other uses	m^3	60	220	3.67	1.08	0.015	0.013

Source: Tax Code (Special Part), annex 10; ECE Secretariat calculations.
Notes: Water abstraction fee rates for 2010 are for underground fresh water; fee rates for 2015 are for both underground and surface water.
The real ratio is the nominal ratio deflated with the ratio of the average annual CPI in 2014 compared with 2010.
Tax rates in euros for 2010 were calculated using the average annual exchange rate for 2010 (1 € = 3,949.9 roubles), and for 2015 using the average monthly exchange rate for January–May 2015 (1 euro = 16,323.7 roubles).

Table 3.6: Revenues from extraction/removal of natural resources, 2010–2014

	Billion roubles				
Type of activity	**2010**	**2011**	**2012**	**2013**	**2014**
Potassium extraction	..	14.3	1 354.7	1 432.5	2 774.5
Oil extraction	..	119.2	421.4	424.1	386.2
Other natural resource extraction	..	82.3	144.0	194.0	223.1
Total	**71.9**	**215.8**	**1 920.1**	**2 050.6**	3 383.8
Total revenue in € million	**18.2**	**33.6**	**179.2**	**174.0**	**248.3**
Total as per cent of total general government revenues	**0.1**	**0.2**	**0.9**	**0.8**	**1.1**

Sources: Ministry of Taxes and Duties; General government revenue: IMF World Economic Outlook Database, April 2015; ECE secretariat calculations.
Notes: Excluding revenues from timber harvesting, hunting and fishing. Revenues in € were calculated using the official average annual exchange rate for the corresponding year.

The highest stumpage fee per m^3 for 2014 was set for curly birch (4.111 million roubles, or some €250); oak, ash and maple trees were priced at 685,220 roubles (€42.40); pine and larch trees were available for 198,210 roubles (€12.30). Fees have also been raised to compensate for the depreciation of the national currency in the foreign exchange markets.

Land tax

Legal entities and individuals who own or use land in Belarus are subject to land tax. Tax rates are established in the Tax Code. The tax base is the cadastral value of the land, which is determined by the authorities. The cadastral value depends on the type of land use (agricultural, residential, commercial) and the location of the land plot. Tax rates for agricultural land are established per ha of the plot. In early 2015, they ranged from 320 roubles (€0.02) to 88,850 roubles (€5.50). Tax rates on land plots located in towns and rural areas are set as a percentage of the cadastral value. They ranged from 0.1 per cent to 3.0 per cent of the cadastral value in early 2015. Local councils of deputies have the right to increase (or decrease) the rate of land tax for certain categories of taxpayers but not more than by 2.5 times compared to the amount established in the Tax Code.

Among the major tax exemptions are lands of the forest fund, lands of the water fund and lands of common use of settlements. Since the beginning of 2014, the unauthorized use of land is subject to payment of a land tax that is 10 times the standard tax rate. The land tax is mainly used as an instrument for raising general budget revenue.

Environmental damage compensation

The legal base for payment of compensation for environmental damage caused by economic and other activities is provided in articles 101–103 of the 1992 Law on Environmental Protection. The rules for determining the amount of the compensation are determined in the 2008 Decree of the President No. 348 "On the rates to determine the amount of compensation for harm caused to the environment". It was supplemented by the 2008 Resolution of the Council of Ministers No. 1042 detailing the procedure for calculating the amount of compensation and establishing the fact of harm caused to the environment.

Since the beginning of 2011, moreover, payment of environmental damage compensation is also applied in cases where the existing annual limits to emissions of air pollutants from stationary sources, storage and disposal of production waste, and discharge of wastewater are exceeded. Prior to 1 January 2012, such cases led to the application of a tax rate that was 15 times the corresponding standard environmental tax rate stipulated in the Tax Code. In a similar vein, environmental damage compensation now also applies when the established limits for natural resource extraction are exceeded. Prior to 2011, a tenfold tax rate was applied in these cases. The corresponding amendments to Decree No. 348 and Resolution No. 1042 were introduced by the 2010 Decree of the President No. 618.

Environmental damage compensation is calculated as the multiple of a "base amount", which has been frequently revised upwards to take into account cumulative inflation. In January 2015, the base amount was set at 180,000 roubles (some €11). There is a long and detailed list of possible infringements of environmental norms and standards, each associated with a specific coefficient to be applied to the base amount for calculating the total compensation that has to be paid. Annual payments of environmental damage compensation amounted to 9,245 million roubles (some €1.4 million) in 2011, a level broadly

unchanged from 9,362 million roubles in 2008. These revenues, together with the fines collected for infringements of environmental norms and standards, were allocated to the nature protection fund until 2011 (table 3.7). No information on these revenues for the years 2012–2014 is available.

Special financial incentives

The Law on Environmental Protection provides for the possibility of state economic incentives for investments in green technologies that improve environmental performance in terms of, for example, pollution, energy and material resource savings, recycling and reuse of waste. The only instrument mentioned in the Law is accelerated depreciation schemes for such "green" investments. The Tax Code, moreover, provides for the possibility of enterprises reducing the amount of annual environmental tax by green investment expenditures. The maximum benefit for the company therefore amounts to the total annual tax that would be due in the absence of such investments. The Law identifies the type of investments that are eligible for this provision. To illustrate, as regards air pollution, expenditures have to be made on the construction or rehabilitation of gas-cleaning units or the installation of automated emission control systems. According to the Ministry of Taxes and Duties, 38 companies benefited from this provision in 2013. Companies can also reduce the applicable environmental tax rate for a period of three years after having been certified that they meet environmental management standards (ISO 14001).

Environmental insurance

The establishment of environmental insurance is foreseen in article 85 of the Law on Environmental Protection. Compulsory environmental insurance for enterprises does not exist in Belarus. But the leading domestic insurance organizations offer voluntary liability insurance for companies that are engaged in activities that can have harmful effects on the health and property of third parties, as well as on the environment.

There is no published information on the extent to which companies have made use of this option.

Excise duties on motor fuels

As of the beginning of 2014, excise tax rates on petrol (gasoline) and diesel are differentiated based on the fuel quality in terms of sulphur content limits. In previous years, excise rates on petrol were differentiated based on the Research Octane Number (RON). Accordingly, there was only a single tax rate for diesel fuel. The new approach distinguishes four fuel quality classes (K2 to K5), which are based on annex 2 to the Technical Regulations "On the requirements for automobile and aviation gasoline, diesel and marine fuels, fuel for jet engines and oil". This Regulation, which was established within the framework of the Customs Union, entered into force on 31 December 2012. Fuel quality classes K3 to K5 correspond to the Euro 3 to Euro 5 standards. Class K2 sets the sulphur emission limits at 500 ppm, which is equivalent to the EU standard that was applied (without a name) before Euro 3 was implemented.

Whereas in 2014 different excise tax rates were applied for each of the fuel quality classes, in 2015, uniform rates have been set for all fuel quality classes other than class K5 (sulphur limit 10 ppm) for petrol and diesel fuel (table 3.8). For K5 petrol, the tax rate applied in 2015 is some 40 per cent lower than the tax rate applied to the other petrol types. For diesel, the corresponding figure is 26 per cent. Diesel of class K5 has been available in Belarus since March 2012.

Table 3.7: Revenues from fines and environmental damage compensation, 2008–2011, million roubles

	2008	2009	2010	2011	2012	2013	2014
Fines	4 728.8	3 735.2	4 872.5	5 572.1	..	..	..
Environmental damage compensation	4 611.1	1 450.7	2 858.8	3 668.1	..	..	..
Sale of confiscated hunting and fishing tools	22.5	41.9	42.9	5.1	..	..	..
Total	**9 362.4**	**5 227.8**	**7 774.2**	**9 245.3**	**..**	**..**	**..**
Total in € million	**3.0**	**1.3**	**2.0**	**1.4**	**..**	**..**	**..**
Total as % of general government revenue	**0.0**	**0.0**	**0.0**	**0.0**	**..**	**..**	**..**

Sources: Ministry of Natural Resources and Environmental Protection; General government revenue: IMF World Economic Outlook Database April 2015; ECE Secretariat calculations.
Notes: Revenues were earmarked for the nature protection fund until 2011. Figures in € were calculated using the official average annual exchange rate for the corresponding year.

Table 3.8: Excise duty rates on motor fuels, 2014–2015

Product/Maximum sulphur content	Tax base	Roubles 2014	Roubles 2015	€ 2015
Gasoline (petrol)				
Other than K3-K5: 500 ppm	ton	3 962 600	3 515 800	215.4
K3: 150 ppm	ton	3 825 300	3 515 800	215.4
K4: 50 ppm	ton	3 536 700	3 515 800	215.4
K5: 10 ppm	ton	2 300 500	2 041 100	125.0
Diesel fuel				
Other than K4 and K5: 350/500 ppm	ton	2 293 100	1 511 500	92.6
K4: 50 ppm	ton	1 930 600	1 511 500	92.6
K5: 10 ppm	ton	1 695 800	1 117 800	68.5
Biodiesel	ton	350 900	368 500	22.6
Liquid petroleum gas				
Category PBA and PA	1 000 litres	198 400	208 300	12.8
Category PT, BT and other	1 000 litres	374 400	393 100	24.1
Compressed natural gas used as motor fuel	1 000 cbm	374 400	393 100	24.1

Source: Tax Code (Special Part), annex 1; ECE Secretariat calculations.
Note: Tax rates in € were calculated using the official average monthly exchange rate for March 2015: €1 = 16,164.5 roubles.

Excise duty rates on motor fuels are quite low in Belarus compared with EU minimum rates. To illustrate, the excise duty rate on petrol (K5) amounts to €97.2 per 1,000 litres, which corresponds to some 27 per cent of the EU minimum rate of €359. The tax rate on K5 diesel is €57.7 per 1,000 litres, which corresponds to only 17.5 per cent of the EU minimum rate of €330 per 1,000 litres.[2]

Road user charges for motor vehicles

The application of road user charges has changed significantly in recent years, reflecting efforts by the Government to find additional financial resources for the extension and rehabilitation of the road transport infrastructure. This involved a partial reversal of earlier policy decisions, namely, the cancellation of road user fees in 2008 and the abolition of a Road Fund in 2009. These user charges are not directly targeted at environmental issues, but can help to address them indirectly.

Toll for using motorways

Toll rates are specified in the 2013 Resolution of the Ministry of Transport and Communications No. 21 (amended by 2014 Resolution No. 32). Toll rates per km depend on the permitted technical weight of the vehicle and the number of axles, and they range from €0.04/km to €0.145/km (March 2015). Vehicles with a permitted weight of up to 3.5 tons (such as passenger motor cars) that are registered in Belarus and other member countries of the Customs Union are exempted from the road toll. This exemption is based on the 2012 Decree of the President No. 426 "On certain aspects of the system of electronic toll collection of vehicles on certain roads in the Republic of Belarus".

Fee for permit of vehicles to participate in road traffic

This fee was introduced in the Tax Code as of 1 January 2014. Taxpayers are legal and natural persons who own road motor vehicles. The tax has to be paid in connection with the mandatory annual or biannual technical vehicle inspections that are operated by the Unitary Enterprise (UE) "Beltehosmotr", which is subordinated to the Ministry of Transport and Communications. The fee depends on the type of owner (companies, individual entrepreneurs and natural persons) and the permitted maximum vehicle weight. The applicable fee is expressed in terms of number of base units, which range from 2 to 25. The monetary value of one base unit was set at 180,000 roubles (some €11) for 2015.

Road tax on foreign vehicles

Belarus levies a road tax (chapter 22 of the Tax Code) on foreign-registered trucks (including trailers) and buses, which has to be paid at the border crossing. The tax depends on the type and permitted total weight of the vehicle. The tax, which is specified in euros, amounts to €30 for trucks with a maximum weight up to 12 tons and €55 for other trucks.

[2] Calculations are based on conversion factors used by Belneftekhim: gasoline: 1 ton = 1,300 litres; diesel: 1 ton = 1,200 litres.

Photo 3: Toll road

The tax is €30 for buses with a permitted weight up to five tons, and €45 for buses with a higher permitted weight. Revenues collected are allocated to the general state budget.

Fare for large vehicles that exceed the permitted weight and dimensions

This fee was introduced as of the beginning of 2014, in accordance with the 2013 Decree of the President No. 589. It stipulates that bulky and/or heavy vehicles that enter the country and use the public roads network are subject to a special fare in cases where the vehicle exceeds the permissible total weight and dimensions. The fee is established by customs authorities at the border-crossing station and depends on the amount of excess weight and vehicle dimensions as well as the distance travelled inside the country. The original legal base was the 2010 Decree of the President No. 613 "On the passage of heavy and (or) large vehicles on the roads".

Municipal utility services

The provision of communal utility services (water supply and sewerage, waste collection and disposal, supply of electricity, gas and heat) is strictly regulated by the central government, which also designs sector development strategies and controls their implementation. The Ministry of Housing and Public Utilities coordinates activities in the sector.

The utility sector is clearly dominated by state-owned companies. The role of the private sector is marginal and limited mainly to a public–private partnership (PPP) organizing waste management in the City of Minsk. In the district heating sector, moreover, a number of small private companies account for about 1 per cent of the national heat supply. The development of a legal framework for PPPs is ongoing; a draft law on PPPs developed by the Ministry of Economy in 2012 only partly meets international standards. Private sector participation would require the gradual withdrawal of the state from the role of being a service provider. There are plans for launching a number of infrastructure projects involving PPPs. In any case, to date, the Government has not yet fully explored the potential of PPPs as a mechanism to improve the provision of municipal utility services by helping to overcome capacity constraints, for leveraging private finance and for achieving efficiency of operations.

Tariffs (prices) for municipal utility services are set in accordance with the 2011 Decree of the President No. 72 "On some issues of regulation of prices (tariffs)". In accordance with the Decree, residential tariffs for electricity, gas and district heating services are regulated by the Council of Ministers. The Ministry of Economy establishes the corresponding tariffs for other consumer groups (legal entities). The Decree transfers the authority for tariff regulation for other utility services (water supply and sanitation,

waste collection) from the central Government to local governments, namely, the oblast executive committees and the Minsk City Executive Committee. But these bodies have to coordinate their tariff-setting with the Ministry of Economy, partly also to avoid too large a differentiation of tariffs among the oblasts. Water supply and waste tariffs are uniform within each oblast.

When setting residential tariffs for utility services, the Government distinguishes between tariffs that ensure recovery of actual costs of service provision (so-called "economically justified costs") and the subsidized rate to be paid by the population. The methodology for the calculation of cost-recovery tariffs, however, has not been published. In any case, the level of residential tariffs for utility services has been significantly below cost recovery levels during the past decade. In 2013, average residential tariffs for utility services corresponded to only some 30 per cent of actual costs. There have been significant increases in tariffs since early 2013, but the gap between actual and cost-reflective tariffs is still substantial. In 2014, expenditures on housing and utility services accounted for only 4.4 per cent of household expenditures in Belarus; this compares with a share of about 11 per cent in neighbouring countries (Lithuania, the Russian Federation and Ukraine).

The fiscal and quasi-fiscal costs of low residential tariffs have been considerable; the World Bank has estimated that they corresponded to some 2.5 per cent of GDP in 2013. Low tariffs also create little incentive for households to economize on the use of energy and water resources. The subsidized tariffs, moreover, are benefiting the affluent households more than low-income families. Utility companies have been compensating for the operating losses associated with low residential tariffs by obliging non-residential customers to pay tariffs significantly above the cost recovery level. This system of cross-subsidies, in turn, has adverse effects on the international price competitiveness of industry. To the extent that cross-subsidies were not sufficient for offsetting the losses from residential tariffs, local governments have been providing direct subsidies to their municipal utility companies. This has been the case, notably, in the district heating sector.

Against this background, the Government has launched measures designed to reduce the costs of supporting the provision of residential utility services, based on tariff reforms (2013 Resolution of the Council of Ministers No. 97 "On the Programme for Development of the Housing and Utility Sector of the Republic of Belarus until 2015") and improvements in the efficiency of operations of utility companies. But the objective to raise residential tariffs to cost recovery levels by 2015 has proven to be too ambitious. Further tariff reforms were launched in late 2013 (2013 Decree of the President No. 550), which involve, notably, the indexation of residential tariffs to quarterly changes in average nominal wages. It was also decided to introduce increasing block tariffs for water supply and sewerage services as well as for electricity and gas supply (2014 Resolution of the Council of Ministers No. 571). In such a tariff system, the tariff rate per unit of consumption (water, gas, electricity) increases once a certain threshold value is exceeded. For consumption levels in the highest consumption block, the full cost recovery tariff is now applied.

The challenge for the Government is to combine the planned further increases in utility tariffs to cost recovery levels with a reform of the social protection mechanism, in order to ensure adequate access of low-income families, notably the poor, to utility services. There is also large scope for supply-side measures to improve the efficiency of operations of utility companies, including measures to improve energy efficiency, which would lead to reductions in unit production costs. And the demand of households for energy and heat can be reduced by measures designed to improve the energy efficiency of buildings. In a similar vein, there is also ample scope for improving energy efficiency in industry (chapter 8).

Tariffs for water supply and sewerage services

Water supply and sewerage services are operated in big cities by water companies (vodokanals). In smaller towns and rural areas, these services are provided by multi-service municipal utility companies, which, in general, are also in charge of waste collection, heat supply and other activities such as maintenance of green spaces. But all these companies are not subordinated to local governments; rather, they are accountable to the Ministry of Housing and Public Utilities. Average residential tariffs covered only 34.5 per cent of actual costs of water supply (32.5 per cent for sewerage) in early 2014. In Minsk City, the corresponding proportion was only 26.6 per cent at the beginning of 2015.

The two-block residential tariff system established in 2014 charges the full cost recovery tariff for monthly water consumption that exceeds 140 litres per capita per day (lcd). This corresponds to an annual water consumption of some 51 m^3 per capita per annum and is broadly the same as the average national water use

for domestic and drinking purposes of 138 lcd in 2013. The total annual water use for domestic and drinking purposes was 477 million m^3 in 2013. The upshot is that the heavily subsidized tariff is still being applied to the large bulk of residential water consumption. Moreover, residential consumers who do not have individual meters installed (unless this is technically impossible) have to pay the full cost recovery tariff for all water consumption. But more than 98 per cent of households have individual meters installed. Bill collection rates are close to 100 per cent. The operational efficiency of water companies is, in general, low. Expenditures on repair and maintenance and the rehabilitation of the water sector infrastructure are almost fully dependent on financial transfers from local and central government. Because of the strained public finances in recent years, this has led to a progressive deterioration in the technical and economic efficiency of operations. The high cross-subsidization of residential tariffs is creating incentives for water-intensive industries (such as beverage production) to develop their own water supply systems.

Charges for municipal waste collection and disposal

Charges for the collection, transport and disposal of household waste are established per m^3 per person, based on national waste norms. The rate of cost recovery for residential tariffs has increased in recent years and was some 80 per cent and more across all oblasts in late 2014. In some oblasts, such as Gomel, Mogilev and Vitebsk, separate waste tariffs are established for the major city, which in some cases are even higher than the cost recovery tariff. This is an interesting case of intra-regional cross-subsidization among residential customers. Tariffs paid by legal entities for the collection of household-type waste depend on the type of economic activity; they are, in general, much higher than tariffs that households have to pay. No information on the share of waste collection expenditures in household budgets is published, but it can be assumed to be very small.

Electricity tariffs

The electricity market is a vertically integrated monopoly that is operated by the State Production Association, Belenergo. Belenergo submits annual tariff proposals based on the methodology established by the Ministry of Energy and Ministry of Economy. There are uniform tariffs for the residential sector across the country. Tariffs for legal entities and individual entrepreneurs depend on the type of economic or social activity, and, since 2011, they are linked to changes in the Belarusian rouble against the US$. Tariffs for industrial consumers depend on the installed capacity in kilovolt-ampere (kVA) and distinguish two consumer groups, namely, up to 750 kVA, and 750 kVA and higher.

The subsidized residential tariffs have, for many years, been a source of significant operating losses for Belenergo, which, however, were not offset by government subsidies but, rather, by cross-subsidies from industrial consumers. In 2014, the average tariff per kWh paid by legal entities was 45 per cent above the cost recovery tariff and 75 per cent above the average residential tariff. The level of the subsidized residential tariffs has been significantly increased in recent years and this, in combination with the introduction of an increasing block tariff system, has pushed up the cost recovery ratio for the average residential tariff from 32.4 per cent in 2012 to 82.2 per cent in 2014. All final electricity consumers are equipped with meters. The bill collection rate is close to 100 per cent.

Gas tariffs

Gas supply is essentially provided by the state-owned company, Beltopgas. The Government establishes gas prices to be paid by residential consumers; all other gas prices, including those to be paid by Beltopgas to JSC “Gazprom transgaz Belarus”, are regulated by the Ministry of Economy.

Subsidized tariffs for residential consumers applied during the winter heating season, when demand is high, are much lower than tariffs during the summer months. For tariffs effective at the beginning of 2015, winter tariffs were some 75 per cent lower than summer tariffs. The new block tariff system introduced in 2014 charges residential consumers the full cost tariff rate for monthly consumption above 5,500 m^3 per year. At the beginning of 2015, the subsidized tariffs during the heating season corresponded to some 24 per cent (for monthly consumption up to 3,000 m^3) and 31 per cent (for monthly consumption between 3,000 and 5,500 m^3). Summer tariffs corresponded to 90 per cent of the cost recovery level, but this is not the peak consumption period. All industrial consumers and the large majority of households have individual gas meters. Residential consumers without individual metering pay a flat tariff per person per month.

District heating tariffs

Somewhat more than 60 per cent of the population of Belarus is connected to district heating systems for heat supply. In major cities, heat supply is provided

by Belenergo, the national electricity company, from combined heat and power (CHP). In smaller towns and in rural areas, heat supply is provided by multi-service municipal utility companies. Belenergo covers about half of the total heating demand. Most of the district heat generation is based on the use of natural gas as the energy source; in fact, district heating accounts for some 40 per cent of the total domestic gas consumption. Since 2005, increases in gas prices, combined with the depreciation of the national currency, have led to significant increases in the costs of heat generation. But these increased costs have not been passed on in higher tariffs to the population. In the event, the rate of cost recovery from residential district heating tariffs declined significantly during the past decade.

To compensate for the resulting operating losses, Belenergo and multi-service municipal utility companies have been using cross-subsidies from electricity sales to non-residential customers, notably industry. The multi-service municipal utility companies also used tariffs for other services they provide for cross-subsidization of heat supply, and they also benefited from direct subsidies from local governments.

The fiscal and quasi-fiscal costs of this tariff policy have been considerable, corresponding to some 1.5 per cent of GDP in 2013. Residential heat tariffs have been raised in 2014 and at the beginning of 2015, but they are still significantly below the full cost recovery tariff. Tariffs for thermal energy applied from 1 January 2015 corresponded to only 20.4 per cent of the full cost recovery tariff (Resolution of the Council of Ministers No. 1269 of 30 December 2014 that referred to the tariffs for heat and electricity for the population).

Renewable energy tariffs

The 2011 Law on Renewable Energy Sources (RES) established feed-in-tariffs (FITs) for electricity generated from RES, which are regulated by the 2015 Resolution of the Ministry of Economy No. 45 “On the tariffs for electric energy produced from renewables in the territory of the Republic of Belarus by individual entrepreneurs and legal entities which are not part of the State Energy Production Association “Belenergo” for the energy supplied to energy supply organizations of this Association”. FIT rates to be paid by electricity suppliers (Belenergo) to RES plants are set at the level of electricity tariffs for industrial and similar consumers with connected power up to 750 kVA, multiplied by a specific coefficient, which depends on the timeframe and the type of technology employed by the RES plant. Only companies that are not subordinated to the management of the state-owned energy company (Belenergo) are eligible for FITs.

For the first 10 years from the date of commissioning of electricity generation from RES, coefficients are larger than one, that is, the revenue per kWh of electricity produced by RES installations is higher than the tariff paid by industrial consumers to Belenergo. These coefficients and the corresponding FIT rates applicable on 1 January 2015 areas are as follows:

- Wind, wood, biogas and geothermal installations: 1.3 / US$0.174/kWh;
- Hydro installations: 1.1 / US$0.147/kWh;
- Solar installations: 2.7 / US$0.362/kWh.

The FIT for the following 10 years of operation is calculated for all types of RES by applying a uniform coefficient of 0.85. This entails that FIT rates will decline significantly relative to standard industry tariffs. In a more general way, this is designed to create incentives for renewable energy plants to increase the efficiency of their operations. The coefficients applied to the industry tariff are expected to be stable over the longer term; but the Government can modify the industrial tariffs to which these coefficients are applied on an annual or more frequent basis. This will then directly alter the FIT rates. The future size of the preferential tariffs for RES also depends significantly on the extent to which industrial electricity tariffs continue to be used for cross-subsidizing lower residential tariffs and on the development of the exchange rate against the US$.

The Law provides for a guaranteed connection of certified RES plants to the grid, as well as for a purchase guarantee by the state-owned electricity company (Belenergo) of all electricity produced by these plants. The Ministry of Natural Resources and Environmental Protection is administering the certification of RES plants; the issued certificates are valid for a period of 10 years. The Tax Code provides some tax incentives designed to support the development of RES. Imports of equipment used for the production, transfer and reception of RES energy are exempt from VAT. Land used by RES plants is, moreover, exempt from land tax. There is a reduction coefficient applied to the environmental tax for wastewater discharged by RES plants.

Public procurement

The 2012 Law on Public Procurement of Goods (Works and Services) consolidated the fragmented

legal framework for public procurement, which was based on the 2008 Decree of the President No. 618 "On public procurement in the Republic of Belarus" and the 2008 Resolution of the Council of Ministers No. 1987 "On some issues of conducting public procurement".

The 2012 Law constitutes an improvement compared with the previous legal provisions, but there is scope for further improvements designed to ensure competitiveness, transparency and complaints procedures. There is no information on the extent to which procurement that takes into account environmental ("green") criteria has been applied in Belarus. However, environmental certification of enterprises is integrated into procurement rules.

3.5 Expenditures on environmental protection

Environmental protection expenditures

Environmental protection expenditures are defined as expenditures that are directly related to achieving an environmental objective, for example, the prevention, reduction and elimination of pollution or any other degradation of the environment. Expenditure data for the total economy are based on annual surveys conducted by the National Statistical Committee. These data are published in the yearly publication "Environmental Protection in the Republic of Belarus". Data published include, notably, a breakdown by type of expenditure (current and investment expenditures) and expenditure by major environmental domain.

Total economy expenditures on environmental protection have varied within a narrow range corresponding to 1.1 to 1.3 per cent of GDP during the period 2006–2013 (table 3.9). Current expenditures accounted, on average, for some 86 per cent of the total expenditures during 2012–2013. During the period 2006–2011, this share was within a range of some 74–80 per cent. Investment expenditures on environmental protection accounted for only about 0.5 per cent of total economy investments in 2012–2013.

Looking at expenditures by major environmental domain, the largest share (some 55 per cent) was accounted for by the area of water protection and water use during the period 2009–2013 (table 3.10). In real terms, that is, adjusted for inflation, total economy environmental expenditures rose by some 34 per cent in 2013 compared with 2006, which corresponds to an average annual growth rate of 4.3 per cent. But this strong growth largely reflects an exceptional surge in real expenditures by 16 per cent in 2007.

Table 3.9: Environmental protection expenditures, 2006–2014, billion roubles

	2006	2007	2008	2009	2010	2011	2012	2013	2014
Total expenditures at current prices	914.0	1 253.5	1 519.0	1 744.2	2 001.8	3 467.3	6 117.1	7 077.2	7 559.7
Current expenditures	734.6	971.2	1 178.3	1 296.1	1 586.9	2 719.7	5 233.8	6 113.7	6 298.3
Investment expenditures	179.4	282.3	340.7	448.1	414.9	747.9	883.3	963.5	1 261.4
Total expenditures at constant prices (2006=100)	**100.0**	**116.1**	**122.0**	**124.6**	**126.6**	**132.3**	**132.3**	**131.7**	**..**
Memorandum items									
Total expenditures at current prices as per cent of GDP	1.2	1.3	1.2	1.3	1.2	1.2	1.2	1.1	1.0
Investment expenditures as per cent of total GFCF	0.8	0.9	0.8	0.9	0.6	0.7	0.5	0.4	..

Sources: Environmental Protection in the Republic of Belarus 2010–2014, Statistical book, National Statistical Committee, 2015; ECE Secretariat calculations.
Note: GFCF = gross fixed capital formation in the total economy.

Table 3.10: Environmental expenditures by major domain, 2006–2013, percentage of total

Domain	2006	2007	2008	2009	2010	2011	2012	2013
Protection and rational use of water resources	52.52	50.17	49.91	51.34	55.41	53.30	58.60	58.10
Air protection	13.98	18.40	18.22	20.22	15.61	16.33	15.08	16.49
Environmental protection against industrial pollution	10.10	10.63	10.70	11.07	10.85	10.30	10.04	11.11
Nature protection	3.77	4.91	4.80	3.37	4.76	4.04	4.42	4.03
Protection and rational use of land	8.99	5.99	6.64	4.64	4.15	3.01	3.93	2.08
Other	10.63	9.90	9.74	9.37	9.23	13.02	7.92	8.20
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

Source: Environmental Protection in the Republic of Belarus 2009–2013, Statistical book, National Statistical Committee, 2014, table 2.1.; ECE Secretariat calculations.
Note: The item "other" contains *inter alia* expenditures on capital repairs of fixed assets for environmental protection, research on environmental protection and functioning of national government environmental authorities.

For comparison, real expenditures rose at an average annual rate of 1.9 per cent during the period 2008–2013. However, growth rates have levelled off after 2011.

Government expenditures on environmental protection

Whereas the expenditure surveys conducted by the National Statistical Committee do not publish information on spending by major providers of environmental services, notably the public sector, data on government expenditure on environmental protection are provided in the annual government budgets based on the classification of functions of government. A major change concerning the financing of government environmental expenditures occurred at the end of 2011, when the system of nature protection funds, which operated at the central and local government levels, was abolished with the 2012 Law on the Republican Budget.

The financial resources of the nature protection funds originated from a number of earmarked revenue sources, mainly environmental taxes, fines for non-compliance with environmental norms and standards, and payments of environmental damage compensation. The funds had been an integral part of the central and local government budgets since 2005. Before that, they had the status of extra-budgetary funds. The funds were a major source of domestic spending on environmental protection and helped inter alia to extend and improve the municipal infrastructure for wastewater treatment and waste disposal and recycling activities, as well as the treatment and disposal of toxic industrial waste. The allocation of funds for various purposes, notably investment projects, at all levels, was subject to approval and control by the Council of Ministers. The disbursement of these financial resources was the responsibility of the Ministry of Natural Resources and Environmental Protection and its territorial bodies at the local level.

The rationale for abolishing the nature protection funds was to increase flexibility concerning the allocation of increasingly scarce government budget resources to the large array of competing government expenditure domains. The corresponding revenues, however, continue to be shared between the central Government (40 per cent) and local governments (60 per cent), but they are no longer earmarked for financing of environmental protection purposes. Since 2012, government environmental protection expenditures have been fully funded from general budget revenue.

The main share of total general budget expenditures since 2005 has been financed from the central government budget. Local governments started to get involved in financing of environmental expenditures only from 2008. Intergovernmental transfers from the central to local level for financing environmental protection projects have been the exception rather than the rule. The share of environmental protection expenditures in total general government expenditure peaked at 1.2 per cent in 2006–2007 and since then has declined more or less steadily to 0.3 per cent in 2013. A declining trend is also visible when relating general government environmental expenditures to total GDP; this ratio fell to 0.1 per cent in 2013, down from 0.6 per cent in 2006–2007 (table 3.11).

The broader context for this development has been the macroeconomic instability in the wake of the global financial crisis in 2008–2009.

Table 3.11: Government budget environmental expenditures, 2005–2014, billion roubles

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Central government	220.0	460.0	538.0	555.0	403.0	243.0	346.0	546.0	536.0	..
Local goverments	0.0	0.1	0.1	63.0	136.0	267.0	211.0	317.0	194.0	..
General government	220.0	460.0	538.0	537.0	397.0	496.0	557.0	862.0	730.0	..
Memorandum items										
Intergovernmental transfers	0.0	0.1	0.1	81.0	142.0	14.0	0.0	1.0	0.0	..
Environmental expenditures as per cent of general government expenditures	0.7	1.2	1.2	0.8	0.6	0.7	0.5	0.4	0.3	..
General government environmental expenditures as per cent of GDP	0.3	0.6	0.6	0.4	0.3	0.3	0.2	0.2	0.1	..
Total general government expenditure as per cent of GDP	45.5	47.9	47.9	48.8	46.2	42.1	34.5	38.9	42.1	40.2
Inflation-adjusted general government environmental expenditures (2005=100)	100.0	195.4	210.8	183.3	119.9	139.1	101.9	99.1	70.9	..

Sources: National Statistical Committee (http://belstat.gov.by/en/); Statistical Yearbook, 2014; General government revenue: IMF World Economic Outlook Database, April 2015.

This led to a marked contraction of overall general government expenditure, which fell from 48.8 per cent of GDP in 2008 to 34.5 per cent in 2011; but this ratio has since increased again to 42.1 per cent in 2013 (40.2 per cent in 2014), reflecting a shift to a more expansionary fiscal policy stance.

Data suggest, however, that the area of environmental protection has not benefited from this. Taken at face value, general government environmental expenditures accounted for 0.3 per cent of total economy expenditures (table 3.11) in 2013.

It is interesting in this context to also look at changes in government environmental expenditures that are adjusted for inflation (using the average annual changes in the CPI) during the past decade. Whereas, in nominal terms, general government environmental expenditures rose by some 230 per cent in 2013 compared with 2005, in real terms, there was actually a decline of 29 per cent. Compared with 2010, real expenditures fell by 49 per cent in 2013 (table 3.11).

Many government entities in Belarus have extra-budgetary resources at their disposal, which originate mainly from the earnings from revenue-generating activities. Thus, in the area of forest management, the more limited access to government budget resources has been offset by higher extra-budgetary income from forest management, use of forest lands and revenue from the sale of timber, seeds and planting materials.

Some 70 per cent of forest management costs are now self-financed by revenues of forest enterprises from sales of timber and other forest trade and services. This compares with a share 30 per cent around 2005. In a similar vein, forest hunting ranges have achieved self-sufficiency by raising revenues from hunting permits and licences and fees for accommodation of hunters that has more than covered the costs of game husbandry maintenance in recent years. In contrast, the nature reserves and national parks are largely financed from the state budget (82.5 per cent in 2014); these funds were supplemented by own income from tourism and other activities and donor funds.

Road Fund

It is expected to establish a new republican road fund designed to finance the extension, modernization and maintenance of the motorway infrastructure network as of 2015. An earlier road fund was abolished in 2009.

The new fund will receive the total revenues collected from the above-mentioned road tolls and fees. Previously, they were allocated to the general state budget, partly with revenue sharing between central Government and local government budgets, but without any earmarking. Total planned revenues from the above payments amount to 2,979 billion roubles (€185 million) in 2015. The large bulk of these revenues (some 65 per cent) is expected to originate from the charges for obtaining a permit for a vehicle to participate in traffic. Revenues collected from the toll for using the motorways are expected to account for about one quarter of total revenues.

3.6 Legal, policy and institutional framework

Legal framework

The main laws governing public sector financing are the 2008 Budget Code and the Tax Code (2002 – General Part, 2009 – Special Part). The Budget Code, which entered into force at the beginning of 2009, provides a comprehensive framework for the budget process, including the establishment of the roles, functions and responsibilities of the Republican (national) Government and the various levels of subnational government.

Budgets of subnational governments are drafted by centrally appointed executive committees but adopted by locally elected councils of deputies. As regards environmental protection and the provision of communal services, responsibilities are spread between central and local governments. Although local governments are responsible for funding the costs of provision of communal utility services by public entities and associated subsidies to the population, these resources are ultimately dependent on adequate transfers from the central government budget. The Budget Code does not provide any information on which level of government is actually responsible for regulating and delivering these services. In fact, although municipalities own the assets of the public waste and water companies, these are effectively subordinated to the Ministry of Housing and Public Utilities.

The administration of taxes is regulated by the General Part of the Tax Code. The Special Part of the Tax Code establishes the regulations, including tax rates, for most of the specific taxes. All significant tax bases are controlled by the central Government. These so-called national taxes include, notably, VAT, personal and corporate income tax, and the property tax. Local governments have direct control over only a limited number of tax bases that generate only small revenues.

The main revenue sources of local governments are shared revenues from the collection of national taxes, which account for some 60 per cent of total local government revenues. There is, moreover, a system of intergovernmental transfers designed to compensate for the gap between estimated expenditure needs and the fiscal revenue capacity of subnational governments. On average, these account for about 35 per cent of total revenues. Only some 5 per cent of total local government revenue comes from local taxes and fees.

Policy framework

The Ministry of Finance prepares a medium-term financial programme within the framework of the annual budget process, which, on the basis of macroeconomic forecasts, contains projections of aggregate revenue, expenditure and budget deficits for a three-year period following the corresponding current budget year. One of the main objectives is to gauge the fiscal impact of changes in government policies and programmes.

But the programme is not systematically linked to annual budget allocations. The current procedure does not allow for strengthening the link between policy, planning and budgeting. The funds and own revenues of budget organizations, moreover, complicate the setting of priorities for resource allocations. The Government has, however, committed itself to further reforms in the management of public finances in its five-year economic and social development programme for 2011–2015, but progress has been slow.

Policy action plans for specific sectors, such as environmental protection, are developed within the framework of multi-year state programmes, which identify main priority areas and specific targets, typically for five-year periods. These programmes also indicate the medium-term cost estimates for investment projects and their financing sources. These financing sources mainly include the annual central and local government budgets, investments of SOEs and loans from domestic banks, as well as loans and grants from international donors. A good example is the State Programme on Water Supply and Sanitation "Clean Water" for 2011–2015; there are similar state programmes developed for many other areas, such as energy savings, forest development, development of specially protected natural areas and renewable energy. The 2006 National Action Plan on Rational Use of Natural Resources and Environmental Protection for 2006–2010, however, has not been followed by a similar action plan for 2011–2015 (chapter 1).

In 2011, the Ministry of Natural Resources and Environmental Protection has approved the Environmental Protection Strategy for the period until 2025, although without cost estimates for achieving the identified priorities, as strategic documents are supposed to be implemented through subsequent adoption of state, regional and sectoral programmes.

A strict mechanism for the development, financing, monitoring and updating of state, regional and sectoral programmes is in place (2009 Resolution of the Council of Ministers No. 404 as amended by the 2013 Resolution of the Council of Ministers No. 152). However, the budgeting and expenditure control system is burdensome and lacks focus on efficiency and effectiveness of public service delivery. There are no incentives that encourage the more intensive use of existing resources.

Institutional framework

The Ministry of Finance is responsible for budgetary, financial and fiscal policy. The Ministry of Taxes and Duties is in charge of administering and collecting most of the taxes. Customs duties and fees are administered and collected by the State Customs Committee.

3.7 Green economy initiatives

In recent years, Belarus has been implementing a range of policies and projects that are relevant for the development of a green economy. These include inter alia efforts to promote renewable energy sources and improve energy and material efficiency, but also to gradually phase out massive subsidies from state and local budgets to the population for the provision of municipal utility services.

Energy efficiency investments

The main strategic objective of the 2010 National Energy Saving Programme for 2011–2015 approved by the 2010 Resolution of the Council of Ministers No. 1882 is to reduce the energy intensity of GDP in 2015 by half, and to raise the share of local fuel resources by 28 per cent, taking into account environmental requirements, social standards and provisions of energy security indicators.

Total funding needed for achieving the established targets (energy savings and increasing the share of local fuels) was estimated at some US$8.7 billion. Funding sources are the own funds of SOEs, state budget funds (including sectoral innovation funds) and loans from domestic and foreign sources.

Renewable energy investments

The 2011 National Programme for Development of Local and Renewable Energy Sources for the period 2011–2015 (2011 Resolution of the Council of Ministers No. 586) has the goal to increase the use of domestic energy sources compared with imported energy (gas). The target is to raise the share of local energy sources in the country's energy balance to at least 30 per cent by 2015. The target is to be attained by increased use of peat, wood, straw and municipal waste, and the construction of biogas, wind and solar installations and heat pumps, as well as the construction and rehabilitation of HPPs. Planned investment funds amount to US$3.5 billion.

Research and development

Research and development (R&D) expenditures are one of the drivers of eco-innovations, that is, the development and diffusion of new products and production technologies that result in reduced harmful environmental impacts compared with relevant alternatives. The overarching objectives of R&D activities in Belarus are established in the State Programme of Innovation Development for 2011–2015. The involvement of business companies in R&D activities is low. The rules for state support, moreover, discourage taking risks associated with the commercialization of innovative technologies. A venture capital market is only slowly emerging.

The 2010 Decree of the President No. 378 "On approval of the priority directions of scientific and technological activities in the Republic of Belarus for 2011–2015" identifies the major thematic priorities, which include *inter alia* the areas of alternative fuels and energy efficiency, agrotechnology, building technology, biotechnology, environmental management and resource conservation. The funds allocated to the various R&D activities are established in the 2011 Resolution of the Council of Ministers No. 116, approving the list of scientific and technical programmes for 2011–2015. Altogether, 3,279 billion roubles were allocated for the state scientific and technical programmes for 2011–2015. This corresponded to €510 million at the average annual exchange rate for 2011, but to only some €240 million at the average annual exchange for 2014. The following state comprehensive targeted scientific and technical programmes are part of the overall list:

- Natural resources and the ecology (183.5 billion roubles; 5.6 per cent of the total);
- Biotechnologies (158.8 billion roubles; 4.8 per cent);
- Energy and energy efficiency (107.8 billion roubles; 3.3 per cent).

Projects financed cover *inter alia* the R&D of innovative technologies for the efficient use of natural resources and secondary material resources; tools and technologies for sustainable forest management; new technologies for water supply and wastewater treatment and processing of secondary municipal waste, and improvements in energy efficiency.

Besides the National Academy of Sciences, most ministries and state committees are supported by affiliated state scientific and research institutes. In the case of the Ministry of Natural Resources and Environmental Protection, they are notably the RUE "Scientific Production Centre for Geology", the RUE "Central Research Institute for Complex Use of Water Resources" and the RUE Belarusian Research Centre "Ecology". In late 2014, the Ministry of Natural Resources and Environmental Protection adopted a "Strategy for the development of scientific, technical and innovative activity on environmental protection and rational use of natural resources in 2014–2015 and for the period until 2025" (2014 Decision of the Ministry's Board No. 112P). The main priority areas in scientific activities include resources and energy saving, public health and environmental protection.

Eco-labelling

The process of introducing eco-labelling started in 2013, and it is therefore still at an initial stage. Few standards have been established so far for non-food products, such as refrigerators and synthetic detergents, in accordance with EU benchmarks. A label for "natural products" was introduced to certify the conformity of food products with production standards, including the absence of genetic engineering and artificial food additives. At the beginning of 2015, 47 local food producers were given the right to use that label for some 263 of their products.

In the forest sector, forest certification in accordance with the requirements of the Forest Stewardship Council (FSC) has been applied. The legal framework for this is the Forest Certification System of the National Compliance Verification System, which is recognized by the pan-European Forest Certification Council. As of late 2015, 78 of the 97 state forestry enterprises subordinated to the Ministry of Forestry had been certified to meet FSC standards.

3.8 Foreign direct investment

Attracting foreign direct investment (FDI) has become an increasingly important factor in improving the overall competitiveness of the Belarus economy and, associated with that, promoting output and employment growth. FDI, moreover, can also be a source of technology transfer, including the diffusion of innovative green technologies.

Annual inflows of FDI to Belarus corresponded, on average, to some 3 per cent of GDP and some 9 per cent of total gross fixed capital formation during the period 2005–2013. The main sectors that attracted FDI during the past decade were transportation (notably the national gas pipeline), communications, and trade and manufacturing of food beverages. Total manufacturing industry accounted for only some 9.5 per cent of total FDI inflows during the period 2008–2013, which reflects, notably, the slow pace of privatization of state-owned companies. The size of positive spillover effects in terms of green technology transfer has been relatively modest. But FDI in other important sectors (agriculture, forestry, energy) has also remained relatively modest. No information on the size of environmental investments that were associated with FDI inflows is available. Future FDI will depend on a range of general factors such as improvements in the business environment and the strengthening of integration processes in the region.

3.9 Official development assistance

Donor financing is not a significant source of financing of development projects in Belarus. Total net Official Development Assistance (ODA) flows across all sectors amounted to US$128 million in 2011 (the last year for which data are available), which corresponded to 0.2 per cent of gross national income (GNI) and 0.5 per cent of general government revenue.[3]

The Ministry of Economy is responsible for the management and monitoring of donor financed projects. The ODA is not included in government budget, except for loans given to the Government or supported by guarantees of the Government. Environment-related projects have been supported during the period 2010–2015 by loans from foreign donors (the World Bank, European Bank for Reconstruction and Development [EBRD] and Nordic Investment Bank), with a total project value of US$366 million.

These projects aim at the development of:

- Water supply and wastewater systems (US$150 million);
- Solid waste management in the city of Grodno (US$42 million);
- Use of biomass for district heating (US$90 million);
- Forest sector (US$41 million);
- Municipal environmental infrastructure (US$43 million).

In addition to these loans, key donors (the European Commission and EU Member States) provided grants for various purposes. Also, grant aid was mobilized from the United Nations in 2011–2015 (over 100 million US$, of which 30 per cent in environmental area).

3.10 Conclusions and recommendations

Compared with the situation prevailing in 2004, Belarus has undertaken a number of reforms of the system of environmental taxes that are imposed on polluting activities. It has also introduced new product charges for dealing with products that are having environmentally harmful effects at the post-consumption stage. More recently, a separate fee for the management of end-of-life vehicles has also been introduced. These new product charges are an important step towards more effective environmental management of these special waste streams. In contrast, the changes made to the system of environmental taxes on emissions of air pollutants, discharge of industrial wastewater and the disposal or storage of industrial waste have been piecemeal and not directed by a coherent concept designed to strengthen their impact on the environmental behaviour of polluters. These taxes continue to have the primary purpose to generate revenue for the government budget. Until the end of 2011, this revenue was used to fund environmental protection activities; since then, it is part of the general revenue collected by the Treasury. The motive of generating revenue has also been the major rationale for indexing the corresponding tax rates to the high inflation in Belarus.

In principle, the economic rationale behind such taxes should be that polluters should pay the costs of damage done to the environment as well as the administrative costs incurred by the Government in regulating polluters. There is no supportive evidence concerning this matter for Belarus. The methodology for establishing these tax rates has not been published and the incentive effects of these taxes on the behaviour of polluters have not been studied. Since

[3] Using the official average annual exchange rate of the rouble against the US$ for 2011.

June 2008, the number of substances subject to tax was reduced from 242 to 53. However since January 2014, again, 242 substances of hazard classes 2–4 are subject to the tax provided that they are mentioned in the air pollution permit. Therefore, the number of pollutants subject to tax remains very large and can only be explained by the goal to ensure a steady stream of government revenue. The size of the revenue relative to the control and reporting costs for enterprises and verification costs for the Government is not known. The rationale for the recent cancellation of the tax on those air pollutants in the highest hazard class is unclear.

The tax on the generation of enterprise waste distinguishes between non-hazardous and hazardous waste; the tax base for the latter also distinguishes among different classes of toxicity. It has not been established to what extent the various tax rates reflect the environmental and other social costs of waste generation and management. These costs, in turn, are also dependent on factors – besides the type of waste – such as available disposal and storage methods and geographic location.

Moreover, in Belarus, for a given waste category, tax rates on waste storage are significantly lower than the corresponding rates on waste disposal. The upshot is that enterprises have no incentive to look out for adequate waste use and waste disposal methods and facilities for waste that is currently being stored mainly on enterprise premises. In other words, what should be a temporary feature has, in general, become the long-term "solution". As is the case with the taxes on emissions of air pollutants and the discharge of industrial wastewater, the Government has not examined the impact of the tax levied on the generation of hazardous and other wastes. In a way, there would be no environmental justification for the waste tax, if enterprises were charged the full cost recovery tariffs for all types of waste generated.

Recommendation 3.1:
The Government should:

(a) Ensure that the system of environmental taxes creates effective incentives for reducing or preventing pollution by adjusting tax rates accordingly, if necessary in a gradual manner within a specified time frame;
(b) Apply the air pollution tax only to the priority pollutants;
(c) Reform the tax on wastewater discharges by taking into account the pollution load by main pollution indicators of wastewater in addition to the volume;
(d) Develop and implement financial incentives for enterprises in favour of waste use, and remove the financial incentives in favour of waste storage and disposal.

The provision of communal utility services is, with a few minor exceptions, fully operated by state-owned companies. The role of the private sector is marginal and limited mainly to a single PPP organizing the waste management in the City of Minsk. This points to a potentially large role for private sector participation as a mechanism for improving the provision of communal utility services. The tariffs (prices) for the provision of communal utility services have been marked by the distinction between the official full cost recovery tariffs and the much lower tariffs that residential customers actually have to pay.

The counterpart to this has been a combination of cross-subsidies from other customer groups (notably industry) that were significantly above the cost recovery level and/or considerable government subsidies to the utility companies. There is evidence that this system of subsidized residential tariffs has mainly benefited the more well-off households. In the face of distorted incentives for rational use of water and energy, adverse consequences for enterprise price competitiveness and strained fiscal resources, the Government has started to introduce tariff reforms that aim at gradually raising residential tariffs to cost recovery levels. The challenge is to combine this with the reform of social assistance programmes that ensures adequate access of lower income groups to communal utility services.

Recommendation 3.2:
The Government should:

(a) Continue gradually raising tariffs for communal utility services to cost recovery levels, while at the same time phasing out cross-subsidies and budget subsidies;
(b) Develop adequate social support policies to ensure the affordability of communal utility services for low-income households;
(c) Explore the potentially large scope for public–private partnership as a mechanism for improving the provision of utility services.

Total economy environmental expenditure was within a range that corresponded to 1.1 to 1.3 per cent of GDP over the past decade. Most of these expenditures were made by SOEs, though neither an official estimate nor a breakdown by major economic sector has been published. No information concerning possible government budget contributions

to SOEs for the financing of environmental expenditures is published. In any case, the large bulk of expenditures were accounted for by current (operating) costs.

In the government sector, the nature protection funds played a major role in the financing of environmental expenditure, but they were abolished in 2011. The large bulk of government budget expenditure is now financed from general revenue, with the exception of some budget organizations, mainly in the forest sector, that can also employ own revenue sources. Overall general government environmental expenditure has, however, been on a marked declining trend, both in real terms (i.e. when adjusted for inflation) and relative to GDP, in recent years.

Although this reflected, at least partly, the need for consolidation of overall government budgets, it also raises the issues of allocative efficiency and the cost effectiveness of public expenditure management when establishing priorities for competing claims for different social objectives. Once this has been done in a transparent and objective manner, it is up to the corresponding line ministries to ensure the effective management of allocated financial resources.

Recommendation 3.3:
The Government should:

(a) Ensure allocative efficiency in the sectoral distribution of scarce public resources based on the National Strategy for Sustainable Socioeconomic Development until 2030;

(b) Monitor that the allocated budget funds for environmental protection are used in a cost-effective manner;

(c) Recommend to the National Statistical Committee and concerned public authorities that they regularly conduct statistical analyses concerning environmental expenditures in the main economic sectors, notably industry.

PART II: MEDIA AND POLLUTION MANAGEMENT

Chapter 4

AIR PROTECTION

4.1 Trends in emission levels

Air emissions

In the last 10 years, SO_2 emissions have been decreasing slightly, with sometimes sharp fluctuations (notably, in 2009) due to the temporarily increased use of oil, instead of natural gas, as fuel. For NO_x emissions, the situation compared with 2005 is more or less stable, with some increase until 2009 and decrease in the years to 2012.

An important factor is the growth of car traffic, which neutralizes the effect of cleaner engines. For NH_3 emissions, the trend is ascending due to the growth of activities in the livestock sector. Non-methane VOC (NMVOC) emissions are more or less stable compared with 2005, after a rise until 2008–2009. CO emissions have decreased since 2005 after an initial rise until 2008. PM emissions have also been increasing since 2005, slightly more for $PM_{2.5}$ than for PM_{10} (table 4.1).

Distribution of emissions per sector

The distribution of the emissions of the most important air pollutants per sector (in percentage terms) in 2013 is shown in table 4.2.

Heavy metals

An inventory of heavy metals emissions was carried out in the period 2009–2011. The most important emission sources of heavy metals are the manufacturing industries and construction (54 per cent), metallurgy (30 per cent) and energy use and heat production (11 per cent).

Emission trends are characterized and additional research is carried out, including contribution to the EMEP Programme, expert assessments and the assessment of critical loads. Trends of lead, cadmium and mercury emissions are similar. An increase in the emissions from 2005 until 2009–2010 was followed by stabilization of the mercury emissions and a slight decrease in cadmium and lead emissions (table 4.3).

Persistent organic pollutants (POPs)

The greatest emission sources of POPs to air in Belarus are metallurgical processes and waste incineration. About 6.6 kt of obsolete pesticides are stored in warehouses and specialized landfills.

The total emission of polychlorinated dibenzodioxines/dibenzofuranes (PCDD/Fs) was estimated at 38 g total dioxin toxic equivalence (g TEQ)/y in 2005 and 34 g in 2012. In this period, emissions of polycyclic aromatic hydrocarbons (PAH) had risen from 41 to 49 Mg/y. Emissions of the fungicide hexachlorobenzene (HCB) have risen from 2007 (table 4.4). Emissions of polychlorinated biphenyles were reduced by 75 per cent from 64 to 16 kg/y (expert estimates).

Greenhouse gas emissions

In 2011, CO_2 accounted for 63.4 per cent of GHG emissions, followed by dinitrogen oxide (N_2O, 19.1 per cent), methane (CH_4, 17.5 per cent) and sulphurhexafluoride (SF_6, 0.003 per cent). In 2013, the energy sector is the largest contributor of GHG emissions (62.4 per cent), followed by agriculture (24.8 per cent) and waste (7.9 per cent) (table 4.5).

Millennium Development Goals (MDGs)

For the MDG indicator 7.2: CO_2 emissions (total, per capita and per US$1 GDP (purchasing power parity)), Belarus adopted the following strategic documents for the reduction of CO_2 emissions: the National Programme of Measures to Mitigate the Effects of Climate Change for 2008–2012 and the State Programme of Measures to Mitigate the Effects of Climate Change for 2013–2020. In the period 2000–2011, CO_2 emissions per US$1 GDP declined, from 0.9 to 0.4 (table 4.6).

For the MDG indicator 7.3 on consumption of ODS, since 2004 the consumption of chlorofluorocarbons (CFCs) in Belarus has been phased out completely. The consumption of hydrochlorofluorocarbons (HCFCs) since 2000 is shown in table 4.7.

Table 4.1: Emission trends, 2005–2014, 2020, Gg/y

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2020*
SO_2	75	89	82	65	141	54	47	66	49	51	63
NO_x	153	168	162	171	165	157	158	159	157	149	128
NH_3	136	134	144	147	150	151	150	157	160	..	127
NMVOC	349	358	367	387	362	308	346	331	380	..	297
CO	803	888	861	902	852	694	687	697	686	657	..
$PM_{2.5}$	46	52	51	53	52	45	49	52	..	..	41
PM_{10}	54	61	63	66	65	58	63	68	..	..	49

Source: Data are derived from the National Statistical Committee publications and information from the Ministry of Natural Resources and Environmental Protection submitted to the Co-operative Programme for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe (EMEP) of the ECE Convention on Long-Range Transboundary Air Pollution (CLRTAP).
Note: * (Voluntary) emission commitments for 2020.

Table 4.2: Distribution of emissions by sector, 2013, percentage

	TSP	CO	SO_2	NO_x	Hydrocarbons (without NMVOC)	NMVOC	Other	Total
Industry	47.92	32.72	88.42	42.28	4.60	87.19	15.05	45.38
Energy	19.12	13.20	7.20	38.00	10.55	1.81	4.01	16.35
Agriculture. hunting and forestry	12.49	1.90	1.44	1.38	73.67	2.30	79.60	28.57
Transport	7.47	42.43	0.06	14.05	0.00	0.00	0.00	0.00
Other	13.00	9.76	2.88	4.28	11.18	8.70	1.34	9.71

Source: Ministry of Natural Resources and Environmental Protection, Ecological bulletin, 2013.

Table 4.3: Emission trends of lead, cadmium and mercury, 2005–2012, Gg/y

	2005	2006	2007	2008	2009	2010	2011	2012
Lead	50.0	57.0	59.0	63.0	66.0	70.0	69.0	68.0
Cadmium	2.1	2.5	2.6	2.8	3.0	3.2	3.0	2.9
Mercury	0.6	0.7	0.7	0.8	0.9	0.9	0.9	0.9

Source: Emission reports submitted by Belarus to EMEP (http://www.ceip.at/ms/ceip_home1/ceip_home/status_reporting/20../submissions/).

Table 4.4: Emission trends of persistent organic pollutants, 2005–2012

	Unit	2005	2006	2007	2008	2009	2010	2011	2012
PCDD/F	g TEQ/y	38.0	27.0	27.0	34.0	37.0	36.0	36.0	34.0
PAH	Mg/y	41.0	46.0	44.0	43.0	41.0	42.0	49.0	49.0
HCB	kg/y	0.8	0.6	0.6	0.8	0.9	0.9	0.9	0.9

Source: Emission reports submitted by Belarus to EMEP (http://www.ceip.at/ms/ceip_home1/ceip_home/status_reporting/20../submissions/).

Table 4.5: GHG emissions per year per sector, 2005–2013, million tons of CO_2 equivalent/y

Sector	2005	2006	2007	2008	2009	2010	2011	2012	2013
Energy	55.3	57.7	56.8	58.7	54.8	56.4	53.4	55.3	58.2
Industry	3.5	3.7	3.9	4.0	4.0	4.2	4.2	4.3	4.5
Agriculture	20.7	21.5	21.2	22.3	22.8	22.6	23.4	23.4	23.1
Land use, Land use change									
Forestry (LULUCF)*	-26.2	-28.4	-27.6	-27.1	-29.9	-30.2	-29.2	-25.5	-28.9
Waste	4.5	5.1	5.3	5.6	6.2	6.2	6.5	6.3	7.4
Total excl. LULUCF	**84.2**	**88.0**	**87.3**	**90.6**	**87.9**	**89.4**	**87.5**	**89.3**	**93.2**
Total incl. LULUCF	58.0	59.6	59.8	63.5	57.9	59.2	58.3	63.8	64.3
Per resident (tons/year)**	6.0	6.2	6.2	6.7	6.1	6.2	6.2	6.7	6.8

Source: Environmental Protection in the Republic of Belarus 2010–2014, Statistical book, National Statistical Committee, 2015.
Notes: *Absorption of GHG.
** In comparison: Croatia 5.2, Bulgaria 5.9, France 6, Slovakia 6.3, Poland 7.9, USA 17.5 (2010).

Table 4.6: CO_2 emissions total, per capita and per US$1 GDP

	2000	2005	2008	2011
CO_2 emissions x 10 metric tons	53 319	56 670	60 329	55 401
CO_2 emissions metric tons per capita	5.3	5.8	6.2	5.9
CO_2 emissions per US$1 GDP	0.9	0.7	0.5	0.4

Source: United Nations Framework Convention on Climate Change, 2014.

Table 4.7: HCFC consumption trends, 2000–2013, tons ODP

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
Ozone depletion potential	16.2	9.3	2.7	4.5	3.1	0.6	1.3	0.8	0.4	10.4	12.5	9.0	8.1	7.0

Source: http://ozone.unep.org/en/data_reporting.php.

4.2 Pressures

Agriculture

The agricultural sector is the largest national source of the emissions of NH_3 (accounting for 89 per cent) and PM (32 per cent). Animal husbandry (72 per cent) and mineral fertilizers (17 per cent) are the main contributors to ammonia emissions. The emission of ammonia is calculated by applying emission factors taking into account the different ways of breeding and manure storage, treatment and application.

In the period 2005–2013, there has been an overall growth in livestock numbers, especially of pigs and poultry (table 4.8). The number of pigs decreased by 23 per cent from 1 January 2013 to 1 January 2014. NH_3 emissions have grown in the period 2005–2012 with a mean trend value of 4.1 kt/year (3.1 per cent/year), due to the growth in the number of pigs and poultry. The effect of the drop in the number of pigs in 2014 is not yet known.

According to experts of the National Academy of Sciences, the overall accuracy of the emission inventory for NH_3 is lower than the average accuracy for the emissions of pollutants such as SO_2, NO_x and PM. Emissions of NH_3 are calculated by using emission factors that need to be improved.

Additional efforts to improve accuracy are therefore necessary. According to projections that were made in the framework of the state scientific programmes commissioned by the Ministry of Natural Resources and Environmental Protection, under a business as usual (BAU) scenario, NH_3 emissions should grow to more than 160 kt/y in 2020. The estimated maximum technically feasible ammonia emission reduction in livestock husbandry amounts to about 20 per cent of current emissions.

Technically (and in theory) economically feasible measures could lead to ammonia emissions in 2020 of around 127 kt/y. Extensive assessment of the ammonia emission reduction potential in livestock husbandry shows abatement costs of about €100

million/year, which is twice the current annual air protection cost.

Based on recent studies of the Institute of Nature Management of the National Academy of Sciences, the gap between emissions in the national baseline scenario and the target emissions value for 2020 is less than 1 kt/y. Additional costs to bridge this gap are around €2.5 million/year. The most common measures for the abatement of NH_3 emissions are scrubbers used at stables and different emission reducing techniques for manure application.

Table 4.8: Number of cows, pigs and poultry and NH_3 emissions, 2005–2014

Year	Cows x 10^3	Pigs x 10^3	Poultry x 10^6	NH_3 emission kt/y
2005	1 613	3 407	25.1	135
2006	1 565	3 545	28.5	134
2007	1 506	3 642	28.7	144
2008	1 459	3 598	29.4	147
2009	1 452	3 704	31.2	150
2010	1 445	3 782	34.1	151
2011	1 478	3 887	37.5	154
2012	1 477	3 989	39.9	157
2013	1 519	4 243	42.4	160
2014	1 525	3 267	45.7	..

Sources: National Statistical Committee, 2015; S. Kakareka et al. Towards assessment of the emission abatement potential in Belarus against emission targets for 2020, National Academy of Sciences, Minsk, Belarus, 2014.
Note: The data are provided for the beginning of the year.

Energy

Electric power is mainly produced in heat and power plants fired with natural gas. Belarus has an industrialized economy in which it is still a great challenge to improve energy efficiency. Incentives for enhanced energy efficiency are the pricing of fuels and the establishment of an operational framework for renewable energy. The pricing of natural gas might be an obstacle for higher energy efficiency.

The emission trends in the energy sector are shown in table 4.9. Emissions of SO_2 from the energy sector can fluctuate in some years due to the use of residual oil if not enough imported natural gas is available, as was happening in 2009 when the total SO_2 emissions were twice as high as the years before (table 4.1). The energy sector (heat and power plants) contributes 15 per cent of the actual total NO_x emissions, while stationary fuel combustion in refineries and other industry has an almost equal share (14 per cent) in the emissions.

Industry

The emission trends in the industrial sector are shown in table 4.10. The biggest industrial emissions are from the metallurgical and mechanical engineering sectors, (tractors, trucks, earth movers and mining equipment), oil refineries and chemical plants (e.g. fertilizer plants), glass and cement production. Oil refineries, the chemical industry and manufacturing industries contribute to almost 40 per cent of SO_2 emissions.

Transport

The emission trends for mobile sources are shown in table 4.11. The transport sector causes 40 per cent of the NO_x and 15 per cent of the PM emissions. With regard to the NO_x emissions, the transport sector is by far the largest contributing party (power plants and industry follow, with a joint contribution of 30 per cent). The growing fleet of automobiles therefore necessitates additional measures in order to ensure that the emission targets for NO_x and $PM_{2.5}$ in 2020 stay within reach.

Table 4.9: Emission trends in the production and distribution of electricity, gas and water, 2009–2013, Gg/y

	2009	2010	2011	2012	2013
SO_2	87.0	9.6	5.6	11.6	3.5
NOx	25.0	28.0	27.0	27.0	28.0
NMVOC	0.2	0.1	0.6	1.3	1.1
CO	9.0	7.4	18.4	20.7	18.8
TSP	0.9	0.3	7.0	7.5	7.5

Source: Ministry of Natural Resources and Environmental Protection, Ecological bulletins 2009–2013.

Table 4.10: Emission trends in industry, 2009–2013, Gg/y

	2009	2010	2011	2012	2013
TSP	24.2	23.0	20.7	19.6	18.9
CO	36.6	40.2	43.6	46.3	46.6
SO_2	46.3	37.2	36.4	49.9	43.0
NOx	26.7	26.8	27.9	28.7	30.5
Hydrocarbons excluding NMVOC	4.8	6.7	2.5	3.1	5.8
NMVOC	63.8	56.4	60.1	62.4	53.1
Other	5.4	5.2	4.1	3.8	4.6
Total	**207.8**	**195.5**	**195.3**	**213.8**	**202.5**

Source: Ministry of Natural Resources and Environmental Protection, Ecological bulletins 2009–2013.

Table 4.11: Emission trends for mobile sources, 2009–2013, Gg/y

	2009	2010	2011	2012	2013
SO_2	1.4	2.6	2.7	2.7	0.3
NOx	110	100	105	106	102
CxHy	214	191	193	198	192
CO	778	619	613	618	604
TSP	34	30	31	31	29

Source: Ministry of Natural Resources and Environmental Protection, Ecological bulletins 2009–2013.
Note: CxHy is the general chemical formula of a hydrocarbon. This is an organic compound consisting entirely of hydrogen and carbon.

Housing

Residential, commercial and district heating systems contribute to 6 per cent of the NO_x and 8 per cent of the PM emissions, on average 10 kt/y and 5 kt/y, respectively. Due to low emission heights, residential and district heating systems make a relatively high contribution to bad air quality during periods of cold in the winter. This is mainly related to the type of fuel used and the efficiency of the heating installations.

In many cases, district heating is used with natural gas as the main fuel. Some projects have been set up in the past to enhance the efficiency of older district heating systems and to study the possibility of using renewables (wood-based products or wood waste) as fuel to reduce GHG emissions. In these cases, extra attention must be given to the prevention of additional air polluting emissions, especially of particulate matter (PM), black smoke and odour emissions. The emissions of combustion installations > 0.1 MWe using biomass as fuel have been regulated since 2006.

4.3 Urban air quality

Belarus has developed air quality standards (table 4.12) that are close to EU standards. Standards for specially protected natural areas were developed and are, in some cases, more stringent than the EU standards.

Average annual concentration standards for total suspended particulates (TSP) are exceeded in Vitebsk (in 2010–2013, 20 per cent exceedance). Maximum single and average daily allowable concentrations (mostly for PM_{10}) are, in some years in the period 2010–2013, exceeded in Vitebsk, Mogilev, Grodno, Gomel and Minsk City (residential and industrial areas).

In five cities (Mogilev, Novopolotsk, Pinsk, Polotsk and Svetlogorsk), there is exceedance of the average annual air quality standard for NO_2 reported in residential districts: 25–30 per cent exceedance of the annual concentration standard for NO_2. The standard of the daily average concentration of NO_2 has also been exceeded in the last four years in Mogilev, Novopolotsk, Polotsk and Minsk City (table 4.13).

In the period 2009–2013, there was exceedance of the average annual concentration standard for formaldehyde in Bobruisk, Brest, Vitebsk, Gomel, Grodno, Minsk, Mogilev, Orsha, Pinsk, Polotsk and Svetlogorsk. In addition, maximum single and average daily allowable concentrations were often exceeded.

Table 4.12: Air quality standards, µg/m³

	Belarus			Belarus spec.prot.	EU				WHO	
Pollutant µg/m³	**Maximum**	**Annual average**	**24-h average**	**24-h average**	**Annual average**	**24-h average**	**1-h average**	**Maximum daily 8-h mean**	**Annual average**	**24-h average**
Sulphur dioxide	500	50	200	70		125	350			20
Nitrogen dioxide	250	40	100	75	40		200		40	
Ammonia	200			100						
TSP	300	100	150	50						
PM_{10}	150	40	50		40	50			20	50
$PM_{2.5}$	65	15	25		25				10	25
Carbon monoxide	5 000	500	3 000	3 000				10 000		
Benzene	100	10	40	40	5					
Ozone	160		90	90				120		100
Lead	1	0.10	0.30	0.30	1					
Arsenic	8	1	3	3	0.006					
Cadmium	3	0.30	1	1	0.005					
Nickel	10	1	4	4	0.020					
Formaldehyde	30	3	12	12						
Benzo(a) pyrene		0.00	0.01	0.01	0.001					

Sources: Ministry of Natural Resources and Environmental Protection, 2014;
EU (http://ec.europa.eu/environment/air/quality/standards.htm); WHO Air quality guidelines (updated 2014).

Table 4.13 Number of days exceeding the daily average concentration standard for NO_2, 2010–2013

Year	Mogilev	Polotsk	Novopolotsk	Minsk City
2010	6	4	1	0
2011	12	0	10	0
2012	10	40	9	1
2013	11	0	21	30

Source: Ministry of Natural Resources and Environmental Protection, Ecological bulletins 2009–2013.

The monitoring of PM_{10} in the ambient air indicates, however, that average levels of this pollution in residential areas are generally relatively low in Belarusian cities as compared with most cities in Europe.

The WHO air quality guideline level of 20 µg/m³ is, as in most European cities, mostly exceeded, but the Belarusian daily air quality guideline level (50 µg/m³) is in most cities exceeded on only a few days per year. Due to the use of natural gas for combustion and heating, the ambient air concentration of sulphur dioxide is very low, < 1µg/m³ for most stations.

Improvement of the road traffic system in the cities (especially in Minsk) can contribute to better air quality. The Concept of Establishing the Cycling System in Minsk for 2012–2015, approved in 2011 by the Minsk City Council of Deputies, is a good step in this direction.

Minsk has mostly wide avenues and there are also public gardens and large parks. There are hardly any narrow streets so street canyon effects with hotspots of air pollution do not exist. Nevertheless, in colder periods under certain atmospheric circumstances with lack of dispersion due to atmospheric inversions and low wind speeds, higher concentrations of air pollution can occur. The traffic emissions combined with emissions from industries and smoke from peat fires from surrounding rural areas can lead to levels that demand emergency measures. Under these circumstances, the Ministry of Emergency Situations acts by identifying sources of peat fire, whereas the Ministry of Natural Resources and Environmental Protection on the basis of the weather forecasts and air monitoring data requests large industrial and motor transportation enterprises in the city to lower their air emissions.

The sharp growth in the number of private cars over the last decade and a considerable older fleet problem prompt additional measures in the future in order to prevent the exceeding of maximum air quality limits. Measures to control the air pollution problem from road traffic are the regular and incidental vehicle inspections (including emission measurement),

prevention of congestion and traffic jams and further improvement of public transport.

There are very few people who use bicycles, although the city is not very hilly and distances are not too great. The construction of safe paths for bicycles, and other promotion measures, could encourage more people to use this environmental friendly form of transport. According to the estimates in the framework of THE PEP (2014), potentially 2,215 additional jobs might be created in Minsk by increasing cycling to the level it is practised in Copenhagen.

4.4 Atmospheric air pollution monitoring and monitoring networks

Air pollution monitoring

The system of air monitoring comprises observations of the concentration of pollutants in atmospheric air, precipitations and snow cover. The monitoring is organized and conducted by the SI "Republican Centre for Hydrometeorology, Radiation Control and Environmental Monitoring", a subordinated organization of the Ministry of Natural Resources and Environmental Protection, as part of the NEMS (chapter 1).

In 2013, monitoring of the ambient air quality was conducted in 20 cities, including all oblast centres and the cities of Baranovichi, Bobruisk, Borisov, Lida, Mozyr, Novopolotsk, Novogrudok, Orsha, Pinsk, Polotsk, Rechitza, Soligorsk, Svetlogorsk and Zhlobin. Within the boundaries of these cities lives 87 per cent of the population of Belarus. In the state monitoring network there is one station (Mogilev) where the Ministry of Health performs the measurements. In the above-mentioned settlements, observation posts for air quality measurements are located in industrial, recreational, public and residential areas, as well as in road-adjacent zones.

The monitoring network includes 66 stations: 11 in Minsk, six in Mogilev, five in Gomel, five in Vitebsk, four in Brest, four in Grodno and one to three in each of the other cities. Fourteen automated stations are operational in Brest, Gomel, Grodno, Minsk, Mogilev, Novopolotsk, Polotsk, Soligorsk and Vitebsk, and in the business area of Mozyr. These stations provide information on the concentration of priority pollutants in real-time mode.

Concentrations of the main pollutants are measured in all cities: solid particles in total (undifferentiated dust composition/aerosol), sulphur dioxide, carbon monoxide and nitrogen dioxide. Concentrations of priority pollutants are also measured: formaldehyde, ammonia, phenol, cadmium and lead in all industrial centres, benzo(a)pyrene in 16 cities, and VOCs in 10 cities. Hydrogen sulphide and carbon bisulphide concentrations are measured in the cities where industries with high emissions of these substances are located. The concentrations of ground level ozone and PM_{10} are regularly monitored at all automated stations and in Zhlobin according to the World Meteorological Organization (WMO) standards. Monthly monitoring of atmospheric precipitation is performed at 19 points in the country (22 in periods of snow). Parameters such as acidity and concentration of components of salts and of heavy metals are measured in the collected samples.

Contamination caused by pollutants transfer (as part of EMEP) is analysed on the basis of results received from the specialized transboundary station Vysokoye on the western border of the country.

The station of integrated background monitoring close to the Berezinsky Biosphere Reserve controls the state of the air and atmospheric precipitation according to the Global Atmosphere Watch Programme.

The state of atmospheric air is evaluated in relation to the average daily and the maximum allowable concentration (MAC) of pollutants. The average daily concentrations of PM_{10} and pollutants measured at automatic stations are compared with the average annual MAC.

In the years 2007–2013 the number of "problematic" areas in which air quality standards were not met has been decreased substantially (from 30 to 12).

Ozone layer monitoring

The National Research Centre for Ozonosphere Monitoring of the Belarus State University (Minsk) is monitoring the state and dynamics of the ozonosphere over Belarus. Regular measurements of the total ozone column (TOC), aerosol optical depth (AOD) of the atmosphere in the UV spectrum, tropospheric ozone (ground level concentrations) and UV irradiation levels at the Earth's surface are performed. Data on TOC, UV index and ozone ground level concentration are available online.

Since 2006, column ozone values have been retrieved using the Stamnes procedure from spectral irradiance measurements made with the spectro radiometer PION UV.

The network of total ozone measurement sites has been enlarging since 2011. In 2013, the general situation of the ozone layer was monitored in the Minsk ozonometric station and also at the Gomel State University and the biological station at Lake Naroch.

The National Research Centre for Ozonosphere Monitoring of the Belarus State University has a full database on total ozone monitoring in the atmosphere over the territory of the country for the period 1998–2014.

Measurements of the surface ozone concentration have been carried out since 2004 at the Minsk ozone station and the EMEP station close to Berezinsky Biosphere Reserve employing Differential Optical Absorption Spectroscopy (DOAS) instrument TrIO–1.

The Republican Centre for Hydrometeorology, Radiation Control and Environmental Monitoring has created a network of atmospheric air quality stations in which ozone, some of its precursors as well as aerosol particles are among the atmospheric pollutants controlled. Minsk has four such stations located in city areas differing in air pollution levels.

4.5 Reporting and emission inventories

Reporting

Stationary sources

Emissions from stationary sources are counted as the total amount of pollutants emitted into the air from all organized and non-organized stationary sources. Emissions of pollutants are determined on the basis of forms that are sent by the enterprises that have stationary sources of emissions to the National Statistical Committee.

The form 1-env (air) "Report on the Emissions of Polluting Substances and Carbon Dioxide into Atmospheric Air from Stationary Sources" records the emissions of pollutants in the atmosphere. The reporting is provided by legal entities (except small business enterprises) with facilities that have an adverse impact on atmospheric air.

The form includes sections in which the air emissions, availability of abatement techniques, CO_2 emissions from boilers or furnaces and the implementation of measures to reduce the emission of the pollutants in the atmospheric air are recorded. Data are used for statistical reports, national reports and bulletins on the state of the environment, and for reporting on international agreements.

Mobile sources

The calculation of emissions to the air from mobile sources is based on the amount of fuel consumed and data on the composition of the transport fleet operating on the territory of the country by ecological classes of engines in per cent in relation to the total number of vehicles. This is based on reports provided by the Ministry of Transport and Communication.

Inventories

Inventory of emissions of air pollutants is conducted for new and operational stationary sources with frequencies that are dependent on the category in which a facility is classified. There are five categories, depending on the impact of the facility on atmospheric air. The classification of the facilities is established in the Instruction on classification of facilities with an impact on atmospheric air approved by 2009 Resolution of the Ministry of Natural Resources and Environmental Protection No. 30.

4.6 Legal, policy and institutional framework

Legal framework

The 2008 Law on Atmospheric Air Protection, adopted in place of the 1997 Law, introduces the use of ELVs for the emission of air polluting substances. ELVs are binding in non-attainment areas where the air quality standards are not reached and also in specially protected natural areas. ELVs are based on technical annexes of the Protocols to the ECE Convention on Long-range Transboundary Air Pollution (CLRTAP) and also on the EU BREFs. ELVs used in Belarus are not yet always equal with the BREF ELVs that are based on the 2010 EU Industrial Emissions Directive.

In 2014, the 2001 Law on the Protection of the Ozone Layer was issued in a new edition. In the new edition, norms and standards comply with international legal acts. The Law includes the provisions on the account of ODS, the inventory of equipment and technical equipment containing ODS and the monitoring of the ozone layer. Measures are aimed at maximum protection and prevention of harmful impact of the ozone layer. The efforts are supported by UNDP in Belarus. There are some restrictions related to the Customs Union that impede effective control over HCFC imports and movement of equipment, for which special control provisions are now set up in the country.

Another development is the introduction in 2011 of integrated environmental permitting by Decree of the President No. 528 (chapter 2). Other laws that influence the reduction of GHG emissions are the 2010 Law on Renewable Energy Sources and the 2015 Law on Energy Saving, adopted in place of 1998 law (chapter 8).

The legal basis of air pollution monitoring is provided by the 2004 Resolution of the Council of Ministers No. 482 "On approval of the Regulations on the procedure for conducting monitoring of surface waters, groundwaters, atmospheric air and local environmental monitoring as part of the National Environmental Monitoring System, and using their data", 2004 Resolution of the Council of Ministers No. 161 "On approval of the Regulations on the procedure for conducting ozone layer monitoring as part of the National Environmental Monitoring System, and using its data" and other legal acts.

Policy framework

The priorities of Belarus related to air quality governance include:

- Ratification of some protocols to CLRTAP;
- Development of an action plan on heavy metals reduction;
- Further development of ELV standards and adapting existing BAT in selected sectors;[4]
- Development of technological standards for emissions in selected industries and for selected process equipment;
- Emission measurements in waste gases from large combustion installations;
- Training of specialists in monitoring, especially in quality assurance of measurements;
- Assessment of the transport situation in Minsk in relation to the automated traffic control system.

National strategies for sustainable socioeconomic development

The National Strategy for Sustainable Socioeconomic Development for the period until 2020 described the following priorities for air protection: reduction of harmful environmental impacts such as air polluting emissions, attainment and maintenance of a good air quality and minimizing the impacts of climate change.

The National Strategy for Sustainable Socioeconomic Development until 2030 envisages to decrease by 2030 the emissions of GHGs by at least 15 per cent compared to the 1990 baseline year, as well as to bring the emissions of air pollutants in 2030 to 96.4 per cent of those in 2010.

National Action Plan on Rational Use of Natural Resources and Environmental Protection for 2006–2010

The National Action Plan on the Rational Use of Natural Resources and Environmental Protection for 2006–2010 (NEAP) had identified the protection of atmospheric air, the ozone layer and the climate as one of the main priorities. Overall, NEAP had set out to achieve a reduction of anthropogenic impacts on the environment, rational and economic use of resources, industrial modernization and low waste technologies, reuse and recycling.

Results of the National Action Plan on air protection in the period 2006–2010 are the adoption of the 2008 Law on Atmospheric Air Protection, technical improvements in the oil and gas industries to prevent air pollution, qualitative improvement of diesel and gasoline fuels, ecological classification of car traffic, national communications to the UNFCCC, plans to decrease the use of ODS and fulfilment of the obligations of the Montreal Protocol, improvements in the monitoring of atmospheric air pollutants, reduction of emissions in the ceramics industry and in power plants, reduction of VOCs contents in paint, enhancing of the share of electrification in public transport, the transition of fuel for state-owned cars from liquid fuels to gas, traffic measures in cities to reduce air pollution, and reduction of ammonia emissions in the agricultural sector.

Environmental Protection Strategy until 2025

The 2011 Environmental Protection Strategy until 2025 defines the main principles and directions of environmental policy implementation in the country (chapter 1). The prognosis of the air emissions data in 2025 for sulphur dioxide and ammonia seems realistic, but for nitrogen dioxide and non-methane VOCs it is challenging and will demand considerable expenditure.

Dust emissions should be reduced by the use of less heavy liquid fuel and the construction of cleaner burners and combustion installations (emission concentrations of more than 50 mg/Nm^3 must be prohibited). Dust and NOx emissions from traffic can be reduced by adapting the new EU standards in good time. In residential areas where the concentrations of formaldehyde and/or phenol are too high, the air quality must be improved.

[4] The cement industry was the first pilot project.

In order to fulfil international obligations, by 2025 the use of ODS must be reduced by 96 per cent. In order to keep the emission of GHGs under control and within limits (< 110 million tons/y) the transition to a low carbon economy should be promoted by introducing new energy sources such as biofuels, hydrogen, hydropower, wind and solar energy.

State Programme of Measures to Mitigate the Effects of Climate Change for 2013–2020

The State Programme of Measures to Mitigate the Effects of Climate Change for 2013–2020 (2013 Resolution of the Council of Ministers No. 510) succeeds the National Programme of Measures to Mitigate the Effects of Climate Change for 2008–2012. Main directions of the State Programme include:

- Measures for saving on fuel use and energy in energy sector,
- Stabilizing GHG emissions by using resource saving techniques in energy-intensive sectors of economy;
- Optimizing waste management;
- Enhancing the absorption of GHGs.

In 2020, GHG emissions must be 8 per cent lower than the level in 1990. The Programme emphasizes improvement of the monitoring of climate change, scientific research on adaptation to climate change and international cooperation in the field of mitigation and adaptation. Annual reviews about the condition of the climate in Belarus are expected to be prepared.

The heat and power sectors have the highest potential for emissions reduction. Modernization of older facilities in these sectors and growth in the use of RES can deliver an important part of the necessary reductions in GHG emissions. The use of domestic energy resources for boilers and stoves should be 32–34 per cent in 2020 and the efficiency of electricity production should be 15 per cent in 2020 (for heat production, 5 per cent). In 2020, 2 million tons of biodiesel and bioethanol should be used in the transport sector and 7 million m^3 of wood for heating.

The amount of the financial means that is necessary for all measures to be taken under the State Programme is estimated at about 90 billion roubles. According to the Programme, the final result of implementation should be the reduction of GHG emissions by not less than 10 million tons of CO_2 equivalents.

Programme for Development of the Industrial Complex for the Period until 2020

The aims of the 2012 Programme for Development of the Industrial Complex for the Period until 2020 are the reduction of waste generation, reduction of wastewater volumes, reduction of pollutants and reduction of GHGs. High-tech and scientific production, the use of atomic energy, modern waste gas treatment systems, water saving processes and techniques will be supported. Economic instruments for the reduction of GHGs will be further developed. Innovative technology for the use of methane and biogas will be applied and the work processes in agriculture and forestry will be optimized.

Strategy for Reduction of Adverse Impacts of Transport on Atmospheric Air until 2020

The Strategy for Reduction of Adverse Impacts of Transport on Atmospheric Air until 2020 was developed by the environment and transport sectors and approved by the Deputy Prime Minister in 2013 (chapter 9). As of January 2015, Euro 5 standard for diesel is applied (sulphur 10 ppm), a quality level to be attained by the petrol as of 2016. Currently, the Euro 4 standard for petrol is used (sulphur 50 ppm), however in 2014 Belarusian refineries produced for domestic market only the petrol of Euro-5 standard.

Strategy on the Phase-out of Hydrochlorofluorocarbons (HCFCs) for the Period up to 2020

Belarus successfully phased out the use of annexes A and B ODS (CFCs) in 2000. In conformity with the Montreal Protocol, continuous efforts have been taken by Belarus to gradually reduce consumption and phase out production of ODS as hydrochlorofluorocarbons (HCFC-22, HCFC-142b, HCFC-21, HCFC 141-b) by 2020, to improve import and export licensing systems of ODS and to ban import and export of substances listed in the Protocol by the non-Party countries.

The goal of the Strategy on the Phase-out of Hydrochlorofluorocarbons (HCFCs) for the Period up to 2020, approved by the Deputy Prime Minister in 2013, is to end HCFC consumption and ensure Belarus's commitments to the Montreal Protocol.

To be in compliance with the Montreal Protocol, Belarus is obliged to reduce its HCFC consumption within different time periods from 2004, with certain percentages compared with the baseline consumption

level that was calculated for each Montreal Protocol signatory. By 2010, for example, the total HCFC consumption should have dropped by 75 per cent compared with the baseline of 51 metric tons (MT) Ozone Depleting Potential (ODP), which means a consumption limit of 12.7 MT ODP. In 2010, 2011 and 2012 Belarus was in compliance with a consumption of 10, 9 and 8 MT ODP, respectively. From 2015 until 2020, the limit for Belarus will be 5 MT ODP and, from 2020 on, it will be 0.005 MT ODP (only essential equipment maintenance).

To meet the targets specified in the Strategy and fulfil the commitments, Belarus lacks a comprehensive approach to the solution of organizational, legal, financial and economic problems. Replacing HCFCs with alternatives, introducing equipment for disposal, recycling and recovery of ODS, and updating legislative and reporting capacity for accurate monitoring and reporting are necessary. The Ministry of Natural Resources and Environmental Protection has developed a statistical reporting form 2-env titled: "Report on production processes and equipment involving ozone-depleting substances and (or) their substitutes". In the context of the Customs Union, a common policy for the monitoring of cross-border movements and the reporting of consumption data of ODS is lacking. This might be a challenge, as participating countries might follow different phase-out time schedules.

National implementation plans on persistent organic pollutants (POPs)

The first National Implementation Plan (NIP) under the Stockholm Convention on Persistent Organic Pollutants for the period 2007–2010 and for the period until 2028 was approved in 2007 by Decree of the President No. 271. For air protection, the development of NEMS and public health monitoring in connection with POPs in the environment, reduction and phase-out of unintentional releases of POPs, and research on POPs were the main issues in the NIP.

Best environmental practices and BAT to eliminate emissions of POPs into the air were to be developed and applied in the first NIP period. In the course of the NIP elaboration, a more detailed plan of inventory of unintentional POP releases to the air aimed at the requirements of the emission reporting system for CLRTAP under EMEP has been developed with the help of the Standardized United Nations Environment Programme (UNEP) Tool Kit. This method makes use of specified emission factors. As the enterprises' statistical records did not contain information, a special inquiry form was elaborated. To specify the emission factors, enterprises in the waste incineration, ferrous and non-ferrous metal production, minerals, pulp and paper, and chemical industry sectors were investigated. The release of PCDD/F in Belarus in 2004 was calculated in this way to be 36.5 g TEQ/y with a relatively high uncertainty (factor 4), mainly due to the emission factors.

The second NIP for the period 2011–2015 was approved by 2011 Decree of the President No 271. In 2009, a number of chemicals were included in the Convention list. The activities of the second NIP are based on an analysis of the situation and with regard to accomplished activities of the 2007–2010 NIP. The Ministry of Natural Resources and Environmental Protection, in cooperation with the State Committee for Standardization, developed the national standard, Emissions from stationary sources. The Ministry developed an estimation of the mass concentration of PCDDs/PCDPs and dioxin-like PCBs, and technical rules on emission assessments of POPs to air, in cooperation with the National Academy of Sciences. Key areas of activity on the implementation of the second NIP for air protection are the development of the National Environment and Public Health Monitoring System with regard to the impact of POPs, and the reduction and discontinuation of POP emissions resulting from their unintended production.

Although Belarus is not yet a Party to the CLRTAP Protocol on POPs, the reporting to EMEP already covers more than 90 per cent of the emissions.

Other strategic documents

Other related strategies and programmes are:

- The 2010 Strategy for Development of the Energy Potential;
- The National Energy Saving Programme for 2011–2015 (chapter 8);
- The 2010 State Programme on Hydropower Development in 2011–2015;
- The 2010 State Programme for the Construction of Energy Sources based on Local Fuels for 2010–2015;
- The 2010 Programme on Development of Biogas Energy Sources for 2010–2015;
- The 2011 National Programme for Development of Local and Renewable Energy Sources for the period 2011–2015.

National goals are the reduction of the energy intensity of GDP by 50 per cent in the period 2016–

2020 from the level of 2005, and energy savings of not less than 5.2 million tons/y of coal equivalent in the period 2016–2020. Although the plans and programmes are present, there are still some barriers to be overcome for the mitigation policy, such as low financial incentives for the public and business sectors, lack of regulations, lack of diversification of fuel supplies (peat and coal instead of natural gas) and lack of financial resources (Kyoto 1 mechanism is not available).

It is expected that a new national strategy will be elaborated with a roadmap up to 2050. There are thoughts about a national emissions trading scheme and drafting a climate protection law. The latter would allow the mitigation of climate change by the better control and accounting of GHG emissions, introduction of economic incentives for GHG emission reductions and investment in low carbon technologies, regulation of issues of ownership and rights with regard to carbon credits and the setting up of a legal framework for emission rights trading.

Institutional framework

The Ministry of Natural Resources and Environmental Protection is responsible for the national air protection policy, regulation and coordination of activities of other governmental agencies on air protection, hydrometeorological activities, the NEMS, information on air pollution and protection, GHGs reduction policy, and policy for the protection of the ozone layer and international cooperation. Territorial bodies of the Ministry issue permits for air emissions and integrated permits (chapter 2).

The Republican Centre for Hydrometeorology, Radiation Control and Environmental Monitoring, subordinated to the Ministry of Natural Resources and Environmental Protection, does air quality monitoring (including radiation) and prepares short-term and long-term weather forecasts and notices on extreme weather events (chapter 1).

Photo 4: Republican Centre for Hydrometeorology, Radiation Control and Environmental Monitoring

Table 4.14: Information resources on air protection

Resource	Information	Organization	Period	Update	Availability on website
State cadastre of atmospheric air	Air quality	Belarusian Research Center "Ecology" http://www.ecoinfo.by/	1990–2014	Annually	
Cadastre of anthropogenic emissions and sources of greenhouse gases	Air polluting emissions and greenhouse gas emissions		1990–2014	Annually, with 2 year delay	www.unfccc.int.by
State cadastre of renewable energy sources	Data on operational RES installations, possible placement areas for installations, as well as on reduction of GHG emissions		2012–2014	Annually	www.minpriroda.gov.by/
State climatic cadastre	Climate	SI "Republican Centre for Hydrometeorology, Radiation Control and Environmental Monitoring" http://hmc.by/	1881–2014	Annually	www.pogoda.by
Database of air pollution observations at the background monitoring station "Berezinsky reserve"	State of atmospheric air		1980–2014	Continuous – hourly; one off – annually	www.rad.org.by
Database "Pavetra"	State of atmospheric air		1996–2014	In Minsk – daily; in other towns – quarterly	www.rad.org.by
Database "ASPavetra"	State of atmospheric air		2007–2014	In Minsk – every 20 minutes; in other towns – hourly	www.rad.org.by
Database "Apadki"	Chemical composition of atmospheric precipitation and snow cover		2001–2014	Information on precipitation pH – weekly; on chemical composition – annually	www.rad.org.by
Database of radioactive contamination of the bottom layer of the atmosphere at the observation points of the monitoring of radiation in air of the Republic of Belarus	Data on measurements of radioactive fallout and concentrations of radioactive aerosols including ^{137}Cs, ^{90}Sr, ^{131}I, ^{7}Be		2001–2014	Daily	

Sources: RUE Belarusian Research Centre "Ecology" and SI "Republican Centre for Hydrometeorology, Radiation Control and Environmental Monitoring", 2015.

The Ministry of Health is responsible for public health factors that are associated with air pollution and air quality, in particular, particulate matter with an aerodynamic diameter smaller than 10 microns (PM_{10}).

The Ministry of Transport and Communications has the main responsibility for the development of environmentally friendly and safe transport. The annual or (for private vehicles less than 10 years old) biannual car inspections, in which air emissions are also measured, are performed in certified workshops under the control of this Ministry.

The traffic police of the Ministry of the Interior supervise this process.

The National Statistical Committee collects and publishes the air quality information.

Scientific support for the implementation of the air pollution policy is given by the Institute for Nature Management of the National Academy of Sciences.

4.7 Regulatory, economic and information measures

Permits for air emissions are granted to enterprises by territorial bodies of the Ministry of Natural Resources and Environmental Protection. Permits are to be obtained by enterprises whose emissions make more than 0.1 tons/y irrespectively of the content of emissions, or those whose emissions make less than 0.1 tons/y when such emissions include more than 0.0001 tons/y of first hazard class pollutants. The 2008 Law on the Protection of Atmospheric Air has introduced the use of ELVs for the emission of air polluting substances. In the permits, measures to reduce air emissions are prescribed.

In section 5 of the form 1-env (air), the enterprises report on the implementation of these measures. The measures should apply BAT at enterprises such as heat and power plants, ferrous and non-ferrous metal plants, chemicals plants, cement and lime plants, oil refineries, construction materials plants, fertilizer plants and wood processing plants.

For the abatement of air pollution, Belarus also uses an air pollution tax (chapter 3).

More than 30 information resources (excluding websites and portals) for ecology and environmental protection exist. Table 4.14 outlines information resources for air protection.

4.8 Air-related global and regional agreements

United Nations Framework Convention on Climate Change and Kyoto Protocol

Belarus has been a Party to the UNFCCC since 2000. In 2014, a review report about the GHG inventory for the 2012 annual submission was published (National Report on State Cadastre of Anthropogenic Emissions by Sources and Removals by Sinks of Greenhouse Gases not Regulated by Montreal Protocol for 1990–2012). Between 1990 and 2010, the total GHG emissions (excluding land use, land use change and forestry) in Belarus decreased by 35.7 per cent. The trend in GHG emissions is typical for countries with economies in transition, with a rapid decline in 1990 followed by a slow increase from 2000–2010. The expert review team concluded that the inventory submission was prepared in accordance with the UNFCCC guidelines, but was not yet complete in terms of categories and gases, as some categories were not estimated. The sixth National Communication was submitted by Belarus in 2013 and revised in 2015.

Belarus acceded to the Kyoto Protocol in 2005. Current emissions are 37 per cent lower than the 1990 emissions, which allows Belarus a substantial increase in emissions while still remaining within its target. Belarus has not yet formulated long-term reduction targets. Belarus cannot participate in the Kyoto Protocol flexible emissions trading scheme unless it has a quantified emissions target. The Doha amendment of the Kyoto Protocol limits targets for the second commitment period to the average historic emissions in the period 2008–2010. This affects Belarus and makes ratification of the amendment difficult, because the lack of access to the Kyoto flexible economic mechanisms. Conditions for a higher pledge level for Belarus, besides access to the Kyoto flexible mechanisms, are intensification of capacity building and enhancement of experience. According to the fifth National Communication of 2009, Belarus had implemented all available relatively low cost measures for the reduction of GHG emissions at that time.

Vienna Convention for the Protection of the Ozone Layer and Montreal Protocol

Belarus has been a Party to the Vienna Convention for the Protection of the Ozone Layer since 1986 and to the Montreal Protocol on Substances that Deplete the Ozone Layer since 1988. As a Party to the Convention and the Protocol, Belarus phased out the use of CFCs by 2000 and is still in full compliance with the control measures under the Montreal

Protocol. The phasing out of HCFCs is ongoing. Belarus agrees with recently proposed amendments to the Protocol regarding restrictions on the use of hydrofluorocarbons with no ozone-depleting but higher potential global warming characteristics, and replacing these by other substances, such as propane, butane, ammonia and pentane. This involves measures in the production sector where HCFC is used as a cleaning fluid and blowing agent and in refrigerants.

Stockholm Convention on Persistent Organic Pollutants

Belarus acceded to the Stockholm Convention on Persistent Organic Pollutants in 2004. Two national implementation plans were adopted: for 2007–2010 and 2011–2015. The Ministry of Natural Resources and Environmental Protection is the national coordination centre for information exchange and the public authority in charge of fulfilment of the obligations under the Convention.

Convention on Long-range Transboundary Air Pollution (CLRTAP) and protocols

Belarus has been a Party to CLRTAP since 1980. In the 1980s, it also became a Party to three protocols (EMEP Protocol, in 1985; SO_2 Protocol, in 1986; and NOx Protocol, in 1989). Belarus has already implemented large parts of the process of developing air quality policies and targets in compliance with the Convention's methodology. The National Academy of Sciences has carried out assessments of the emission abatement potential in Belarus against emission targets in 2020, and has provided insight into the expected costs that would be considerable for NOx and, to a lesser extent, PM and NH_3.

At present, three amended protocols to the Convention, namely, the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (Gothenburg Protocol), the Protocol on POPs and the Protocol on Heavy Metals, are considered to be important to the overall aim of the Convention. The amended Gothenburg Protocol has introduced flexibility measures to facilitate the accession of parties from Eastern Europe, the Caucasus and Central Asia. The Protocol provides ELVs for stationary and mobile sources and requires implementation of BAT (also for ammonia (NH_3) control measures in the agricultural sector). Belarus is only partially complying with the ELVs, mostly for NMVOC and NH_3 emissions.

The current SO_2 emissions are in line with the target for the Protocol by 2020, for which Belarus has voluntarily announced its commitments. If natural gas (and eventually low sulphur residual oil) for energy production stays available in sufficient quantities, this target can be met also with economic growth. NOx emissions from industrial sources (around 50-60 kt/y in the period 2009–2013) must be reduced in the next five years by more than 20 per cent to reach the Gothenburg emissions target for 2020. This means a reduction of around 10 kt/y. Recent assessments show that the technical potential for this reduction exists, such as installation of low NOx burners or selective catalytic reduction, but that the costs of implementation are high.

Belarus is considering accession to the amended protocols on Heavy Metals and on POPs. However some issues remain, e.g. achievement of the ELVs for lead in the glass industry and for dust in the cement industry. By reducing dust emissions, most heavy metal emissions will be reduced too. The same reasoning holds for the emission of particulate matter (PM_{10}, $PM_{2.5}$). In order to close the gap with the target emission for 2020, operators will have to invest in dust abating equipment such as electrostatic precipitators and fabric filters. These techniques will also lead to a decrease in the emissions of heavy metals and POPs.

Capacity building and support to the introduction of BAT was provided to Belarus in the framework of the EU air quality project (box 4.1).

Transport, Health and Environment Pan-European Programme (THE PEP)

Belarus regularly participates in the meetings, activities and monitoring of implementation under THE PEP.

4.9 Conclusions and recommendations

With regard to ELVs that are established in the amended Protocol to Abate Acidification, Eutrophication and Ground-level Ozone, and with regard to a few ELVs established in the amended protocols on Heavy Metals and on Persistent Organic Pollutants, Belarus is partially in line with the requirements on application of BAT to the specific stationary emission sources. ELVs are generally accepted and in existing international documents such as the EU BREFs. ELVs used in Belarus are not yet in line with the BREF ELVs that are set in the EU Industrial Emissions Directive. Heat and power plants, oil refineries, the chemical industry and manufacturing industries contribute to almost 90 per cent of the SO_2 emissions.

Box 4.1: Air Quality Governance Project

In the framework of the European Neighbourhood and Partnership Instrument (ENPI), the project "Air Quality Governance in the ENPI East Countries" was implemented from January 2011 to December 2014. The project supported Armenia, Azerbaijan, Belarus, Georgia, Republic of Moldova, the Russian Federation and Ukraine in reinforcing the legal framework and human capacity on air quality management. The project had a total budget of €7 million.

The project offered a wide range of activities in the framework of three main components. The first component (common activities) included technical assistance for gap analysis of existing national policies and legislation, institutions and capacity, as well as assistance in drafting policy papers and regulations. The second component was dedicated to the introduction of an integrated pollution prevention and control approach in the industrial sector and implementation of BAT. The third component addressed the transport sector, focusing on the introduction of transport-related emission standards and the development of mechanisms to encourage the use of public transport.

Belarus took part in the gap assessments, different interregional workshops, study visits and regional pilot projects supported in the framework of the Air Quality Governance Project. Support was provided towards the implementation of integrated permitting. The National Pilot Project "Development of technology-based ELVs and a self-monitoring system in the cement industry" was implemented.

Source: http://capacity4dev.ec.europa.eu/airqualitygovernanceintheenpieastcountries/

Current SO_2 emissions meet the target for the Gothenburg Protocol by 2020, for which Belarus has announced its voluntary commitment. Should natural gas (and eventually low sulphur residual oil) for energy production be available in sufficient quantities, this target can be met also with economic growth.

Recommendation 4.1:
The Government should develop a programme for emissions reduction based on the application of the best available techniques (BATs) and related reference documents, especially for the reduction of emissions of heavy metals, NO_x, NH_3, NMVOCs, PM and SO_2, in order to achieve the emission limit values established in the amended protocols to the Convention on Long-range Transboundary Air Pollution — i.e., the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (Gothenburg Protocol), the Protocol on Heavy Metals and the Protocol on Persistent Organic Pollutants.

In cities such as Minsk, the rapid growth in the number of private cars may cause problems with the air quality in certain places, in spite of the fact that individual new cars comply with more stringent standards and there is a good system of public transport. Very few people use bicycles although the terrain is appropriate (with no great elevations).

Recommendation 4.2:
The Ministry of National Resources and Environmental Protection, in cooperation with the local executive authorities, should investigate how the use of bicycles for shorter distances can be promoted, for example, by the construction of proper and safe infrastructure and a bicycle-sharing system.

NH_3 emissions have increased in the last 10 years due to the growth of livestock husbandry. Belarus has made assessments of the emission abatement potential against the targets for 2020. The baseline scenario approaches the emission target for 2020 but, as the research states, uncertainties in the emissions inventory lead to the limited accuracy of emissions modelling.

Recommendation 4.3:
The Ministry of Natural Resources and Environmental Protection should carry out an emissions data inventory of NH_3 and scenario projections for the NH_3 emission trends to reduce uncertainties, in order to prevent possible problems in reaching the necessary emission reductions in the framework of the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (Gothenburg Protocol).

Belarus is considering accession to the amended protocols on Heavy Metals and POPs and the amended Gothenburg Protocol to the Convention on Long-range Transboundary Air Pollution. It has now voluntarily included national emission reduction commitments in the amended Gothenburg Protocol for 2020 and beyond. ELVs for emissions of acidifying substances, heavy metals and POPs will be applied in permits.

Recommendation 4.4:
As soon as appropriate capacities for implementation are available, the Government should accede to the amended protocols to the Convention on Long-range Transboundary Air Pollution — i.e., the Protocol to Abate Acidification, Eutrophication and Ground-level Ozone (Gothenburg Protocol), the Protocol on Heavy Metals and the Protocol on Persistent Organic Pollutants.

Chapter 5

WATER MANAGEMENT

5.1 Water supply and demand

Available renewable water resources, comprised of the river runoff and groundwater, are sufficient to meet the current demand for water by all water users. Total annual mean runoff is estimated at 57,900 million m^3, of which 34,000 million m^3 are formed by precipitation within the country, while the rest, 23,900 million m^3, is the inflow from the neighbouring countries, the Russian Federation and Ukraine. The water availability to the country's population per capita, derived as the ratio of the internal annual mean runoff, is 3,590 m^3/capita/y, which is much higher than the threshold of water stress defined at 1,700 m^3/capita/y. Estimates for renewable and prognostic groundwater resources, which are widely available in the country, are 15,900 million m^3/y and 18,100 million m^3/y, respectively. In total, there are 323 explored groundwater deposits with exploitable resources of 2,600 million m^3/y. However, the assessment of groundwater resources was made more than 30 years ago and has not been updated since.

There are five major transboundary river basins: the Dnieper; the Pripyat – a tributary of the Dnieper River, which joins the Dnieper River after leaving the territory of the country in Ukraine; the Western Dvina; the Neman; and the Western Bug river basins. On the south slope of the Black Sea–Baltic Sea watershed divide, the Dnieper river basin, along with the Pripyat river basin, covers about 56 per cent of the country. Belarus's other transboundary rivers on the northern watershed slope eventually carry their waters to the Baltic Sea through the neighbouring countries of Estonia, Latvia, Lithuania, Poland and the Russian Federation.

Over the second half of the 2000s, water demand continued to decline due to the decrease in economic activities and the spread of water metering. Consequently, water abstraction decreased by 12 per cent from 2005 to 2009, when 1,507 million m^3 was withdrawn for all the users. Since then, there has been a temporary increase in water intake from all the sources, likely caused by variations in the climatic conditions and increased economic activities. In 2014, the total water abstraction for all uses was estimated at 1,510 million m^3, of which 667 million m^3 were withdrawn from the surface water sources and 843 million m^3 from the groundwater resources (table 5.1).

On average, since 2005, around 1 per cent of the total surface renewable water resources has been withdrawn annually for various uses, while about one third of the proven exploitable groundwater resources is abstracted annually, mainly for water supply to the population, domestic needs and industrial purposes. However, about five sixths of the country's groundwater resources are not yet explored for their potential utilization. Pursuing its policy of groundwater conservation, the Government set the target of reducing groundwater abstraction to 800 million m^3 by the end of 2015. However, insufficient progress was made to this end.

The largest demand for water is observed in Minsk City and Minsk Oblast, where a third of the country's population and a predominant part of Belarus' industrial capacities are concentrated. In 2013, about 37 per cent of the water abstracted from all the sources in the country was withdrawn there. Consequently, the bulk of the country's wastewater, 36 per cent in 2013, was discharged in that region. To supplement the region's available water resources, which are insufficient for meeting the demand there, some 137 million m^3 of water is transferred annually from the Neman river basin to the Svisloch river basin, where Minsk is located, by a system of canals and reservoirs.

Although no threat is expected to the sustainability of water resources development in Belarus due to climate change, recent research indicates that there is likely to be reduction in the runoff, particularly during summer, with some implications for water management.

5.2 Management of water use and prevention of pollution

In Belarus, total water use decreased drastically from 1,600 million m^3 in 2005 to 1,337 million m^3 in 2009 (table 5.1). Since 2010, there has been a modest increase in total water use, with 1,371 million m^3 of water used in 2014.

Table 5.1: Water abstraction, use and losses, 2005–2014, million m^3

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Abstraction										
Groundwater abstraction	1 011.6	986.9	937.6	896.3	834.8	854.3	870.1	875.0	851.0	843.0
Surface water withdrawal	694.2	687.1	680.3	669.2	672.4	693.9	721.6	717.7	663.2	667.0
Total abstraction	**1 705.8**	**1 674.0**	**1 617.9**	**1 565.5**	**1 507.2**	**1 548.2**	**1 591.7**	**1 592.7**	**1 514.2**	**1 510.0**
Water use										
Water supply for drinking and domestic purposes, total	749.6	707.7	653.2	573.5	500.8	494.8	486.2	492.3	477.1	473.0
of which:										
Groundwater	660.2	624.8	577.8	515.5	448.1	442.8	447.9	452.1	440.5	..
Industry, total	441.5	423.2	427.7	423.5	371.0	393.3	422.7	429.4	406.8	405.0
of which:										
Drinking quality	138.4	136.4	136.6	139.7	130.1	154.0	154.0	169.0	171.0	165.0
Water from public water supply systems	13.1	12.5	13.2	14.7	13.9	16.9	17.4	11.9	11.5	..
Irrigation and agriculture	127.3	133.9	116.1	113.2	115.8	114.6	114.0	120.0	117.3	115.0
Pond fish farming	281.9	281.4	287.7	299.6	350.0	356.8	383.4	400.8	371.9	378.0
Total water use	**1 600.3**	**1 546.2**	**1 484.7**	**1 409.8**	**1 337.6**	**1 359.5**	**1 406.3**	**1 442.5**	**1 373.1**	**1 371.0**
Water losses	**101.0**	**108.0**	**110.0**	**131.0**	**84.0**	**102.0**	**84.0**	**84.0**	**83.0**	**82.0**

Source: National Statistical Committee, 2015.
Notes: Wells serving local water supply systems are covered, but wells serving individual houses are not.
Water loss during transport includes the volume of water lost as a result of filtration, evaporation, leakage and breakdowns in water delivery systems between a point of abstraction and a point of use or transfer. Losses do not include water transferred to outside users.

Industry

Industrial water use decreased by 8 per cent from 441 million m^3 in 2005 to 405 million m^3 in 2014, almost the same amount used in 2013, when its share in the total water use reached 30 per cent. However, the target of lowering water use by industries to 370 million m^3 in 2015 will not be achieved. The share of drinking quality water used for industrial purposes in the total industrial water use is quite large and tends to increase, despite the efforts by the Government to bring it down.

In 2013, the industry used 171 million m^3 of drinking quality water, or 42 per cent of the total industrial water use. Around 93 per cent of this amount was abstracted from groundwater and the rest was taken from municipal water supply systems. Some industries, such as soft drinks and food processing, which are obliged to use potable water for their technological processes, used 66 million m^3 of such water in 2013. The remaining 105 million m^3 could have been replaced with lower quality water.

The industrial sector is also a leading polluter of the water resources by discharging its wastewater loaded with harmful substances. The Government has adopted comprehensive policies and taken regulatory and economic measures to reduce pollution load on the environment by industries. For instance, vigorously promoted water reuse and recycling has resulted in increasing the amount of reused water to 93 per cent of the total industrial water use in 2013. Nevertheless, the industries remain major sources of water pollution in the country.

Energy

The energy sector is a major industrial water user: in 2014, 86 million m^3 was used for the production of electricity, which accounted for 21 per cent of the total industrial water use. Water is used mostly for cooling at the thermal power stations that produce almost all the energy in Belarus, and for other technological purposes. Degradation of water quality caused by thermal pollution is the principal adverse effect of power generation plants on water resources. To prevent or minimize thermal pollution, recirculation and reuse of cooling water is widely applied.

Water is also used, but non-consumptively, for hydropower generation. As Belarus is a country of plains, the hydropower potential of rivers is very limited. The gross theoretical hydropower potential is estimated at 850 MW, of which 520 MW are technically available and 250 MW economically viable. The rivers in the northern and central parts of the country are most suitable for small low-head hydropower installations. Over the last five years, Belarus has been intensifying its efforts to develop its hydropower potential, along with other renewable energy sources, in order to diversify its power

generation base and reduce the air pollution load generated by its energy sector (chapter 8).

Households

Water supply for domestic and municipal needs accounts for the largest share of water use in Belarus. Water used in 2014 for these purposes, an amount of 473 million m^3, accounted for 32.78 per cent of the total water use in the country. There was a steep reduction, by 34 per cent, in household water use, from 750 million m^3 in 2005 to 495 million m^3 in 2010, which can be attributed mostly to such measures as metering water consumption and introducing water charges; a further mild decrease in water use by 4.4 per cent was observed from 2010 to 2014. Per capita water use dropped from 210 litres per day in 2005 to 143 litres per day in 2010 and 137 litres per day in 2014. These numbers are comparable with the pattern of water use in European cities located in similar climatic zones.

Belarus relies heavily on groundwater, which is qualitatively better than surface water, for providing urban and rural water supply. Around 92 per cent of the country's water supply needs are met by groundwater. Groundwater for centralized water supply systems is abstracted by all water utilities with the exception of the Minsk Vodokanal where surface water is used to supplement groundwater. The intake of water from the Vileika reservoir for Minsk's water supply is expected to be phased out in 2020 and replaced with groundwater abstraction.

The overall water supply and wastewater service coverage is high in Belarus, and has shown steady growth over the last several years. In 2014, the coverage of the urban population served by a centralized water supply system reached 97.7 per cent, while centralized sewerage coverage in urban areas was 92 per cent. However, there is a visible contrast in service coverage between urban and rural areas, where 29 per cent of the population lack access to centralized water supply systems and 62 per cent are not connected to centralized sewerage. Services are more developed in larger settlements, the so-called "agro-towns", where around half of the rural population resides, while in scattered villages and farms the population relies mostly on public or private shallow wells and individual sanitation facilities.

Standards of the water supply services are also high in urban areas, where water is supplied continuously by almost all water utilities and, generally, meets the requirements for potable water. As there is a high content of iron in the natural water throughout the country, iron-removal water treatment is applied widely by water utilities. In rural areas, the water supply services in larger settlements are of better standards in comparison with small villages and farms. The latter take their water from boreholes, tube wells and dug wells, numbering about 400,000 in the country; in addition to the high content of iron, this water often contains other contaminants such as nitrates and could be subject to bacteriological contamination.

Urban wastewater, which is often a mix of sewage and industrial effluent, is a principal source of pollution of water bodies in the country. The volume of disposed wastewater decreased by 14 per cent from 2005 to 2010 and amounted to 1,052 million m^3 in 2010. Since then, the annual volume of wastewater has remained more or less constant, slightly exceeding 1,000 million m^3 (table 5.2). Thus, the pattern of wastewater disposal generally follows changes in water use. Expansion of infrastructure for wastewater treatment and increasing its efficiency is one of the socioeconomic development priorities of the country.

Agriculture and land reclamation

Intensive reclamation of wetlands in the country has made a major contribution to the expansion of the land area used for agriculture. As of 2014, one third, or 2.9 million ha, of the total agricultural land of the country was land reclaimed by drainage.

However, the draining of wetlands is a major anthropogenic factor affecting the hydrology of Belarus's water resources, as wetlands feed downstream rivers, trap floodwaters and recharge groundwater supplies. Excessive draining of the wetlands may also result in the steep lowering of the groundwater table and need for irrigation of the affected areas.

Irrigation takes place solely on the land that has been excessively drained, the area of which slightly varies around 30,000 ha. In 2013, 5.0 million m^3 of water, mainly withdrawn from ponds and canals, was used for irrigation, of which 1.4 million m^3, 28 per cent, was groundwater, even though its use for irrigation is restricted. In 2014, the volume of water for irrigation declined to 3.2 million m^3.

Table 5.2: Wastewater disposal, 2005–2014, million m^3

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Wastewater disposed into surface water bodies	1 124.0	1 059.0	1 015.0	966.0	974.0	967.0	979.0	993.0	951.0	931.0
Insufficently treated	10.0	9.0	9.0	11.0	3.0	6.0	6.0	3.0	3.0	3.0
Insufficently treated (per cent of the total wastewater subject to treatment)	1.0	1.0	1.0	2.0	0.4	1.0	1.0	0.4	0.5	0.5
Treated to standards	846.0	817.0	760.0	709.0	685.0	671.0	662.0	666.0	654.0	635.0
Not requiring treatment	268.0	233.0	246.0	246.0	286.0	290.0	311.0	323.0	294.0	293.0
Wastewater disposed into filtration fields and ground	110.0	106.0	103.0	99.0	86.0	85.0	87.0	85.0	83.0	80.0
Total wastewater disposal	**1 234.0**	**1 165.0**	**1 118.0**	**1 065.0**	**1 060.0**	**1 052.0**	**1 066.0**	**1 078.0**	**1 034.0**	**1 011.0**

Source: National Statistical Committee, 2015.

Most of the water in the agricultural sector is supplied for agro-industrial activities. The volume of water supplied for animal breeding, poultry farming and other agriculture-related activities other than irrigation decreased by 11 per cent, from 121 million m^3 in 2005 to 107.6 million m^3 in 2010, and then slightly increased to 111.4 million m^3 in 2014. Around 99 per cent of this water was taken from groundwater sources. But for fish-farming ponds, water is only temporarily withdrawn (378 million m^3 in 2014) from water bodies and then discharged back almost in full, but loaded with some organic pollutants.

Agriculture is the main source of diffuse pollution of surface water and groundwater with biogenic elements, mostly due to the increasing use of inorganic nitrogen and phosphorus fertilizers that lead to excessive content of nitrates and phosphates in water and to the eutrophication of surface water bodies. Manure that is not properly stored, processed and applied as an organic fertilizer also constitutes a considerable source of pollution.

Nitrate pollution is seriously affecting the water quality in shallow wells in rural areas, a prevailing source of drinking water supply there. In several areas near fertilizer storage sites, groundwater pollution has been observed at the depth of 14–16 m, and the zone of pollution extends up to 1.5 km from its source. The methodology for assessing diffuse pollution of surface water ("Methodology for calculating the transfer of biogenic substances and assessment of the status of small rivers") was approved by 1999 Order No. 331 of the Ministry of Natural Resources and Environmental Protection and has not been updated since then.

The pollution load on water resources from diffuse sources is regulated through setting water protection zones along the shores of water bodies and restricting economic activities there. The procedures and rules for that set by the 2006 Resolution of the Council of Ministers No. 377 were in effect until May 2015. However, the 2014 Water Code has introduced changes in allocation of water protection zones that resulted in reducing their area and allowed for some economic activities, such as animal breeding farms, there, which increases the risk of water pollution by their effluents.

Inland water transport

The use of water bodies for transportation of goods and people, which was widely practised in the past, has been declining over the last several years. The total length of usable waterways on the selected sections of the Dnieper, Pripyat, Berezina, Sozh, Neman and Western Dvina Rivers is around 1,600 km, with 10 river ports. In 2013, less than 1 per cent of the total freight and 0.01 per cent of the total number of passengers were moved with inland water transport.

Inland waterway transport is generally considered a clean, safe, and energy efficient mode of transport compared with land-based systems, which are often confronted with congestion and capacity problems. Despite the presence of numerous rivers and lakes, this potential, however, has remained largely underdeveloped due to the lack of the required infrastructure along the waterways network. At the same time, inland shipping and engineering work for making water streams and bodies navigable can have a considerable environmental impact on water bodies, which is currently considered local and moderate.

Tourism

The country's water resources are insufficiently used for recreational purposes. In 2012, there were 18

recreational zones of national significance on rivers, lakes and reservoirs; accommodation in hotels and camps located on the banks of water bodies was available for 109,000 persons. At the same time, only 0.5 per cent of the country's lakes lend themselves to organized recreation. The 2011 State Programme for the Development of Tourism for 2011–2015 (chapter 11) calls for an increase in water-related recreational activities.

On the other hand, development of tourist camps and other recreational facilities on the banks of rivers and lakes increases the risk of their pollution and contamination of groundwater due to discharge of inadequately treated sewage and leakage from septic tanks. Growth of uncollected waste generated by tourists and holidaymakers is also a looming pollution threat to many water bodies in the country.

5.3 Wastewater management

After a significant drop in the 2000s, the volume of wastewater discharges has been relatively constant over the last several years (table 5.2). In 2014, the total volume of discharged wastewater was estimated at 1,011 million m^3, of which 931 million m^3 went to surface water bodies and 80 million m^3 to filtration fields, wastewater retention ponds and eventually to groundwater.

Around 33 per cent of the wastewater disposed into surface waters required no treatment, 66.6 per cent was treated in compliance with appropriate regulations and norms, and 0.4 per cent, 3.4 million m^3, was not adequately treated to the allowable standards. Thus, progress was made in reducing the discharge of untreated or inadequately treated wastewater by threefold since 2005.

Nevertheless, wastewater remains the largest source of pollution of the water bodies. The target of reducing the disposal of pollutants into water bodies by 20 per cent by 2016, set up in the 2011 Programme of Socioeconomic Development for 2011–2015, will not be achieved, as the preliminary data for 2014 indicate only a 7 per cent reduction compared with 2010.

There is a decreasing trend in the discharge of oil products, ammonium ion, nitrite ion and sulfate ion, but the disposal of suspended solids and several metals has increased (table 5.3). The procedures for determining ELVs of chemical and other substances in disposed wastewater are set in the Technical Code of Practice TCP 17.06-08-2012, which has reflected some aspects of the approach promoted in the EU Urban Wastewater Treatment Directive (91/271/EEC). Norms and requirements for wastewater disposal are set in the permits for special water use by the oblast committees of the Ministry of Natural Resources and Environmental Protection.

The largest share of wastewater comes as sewage from the municipal sector, followed by the industrial sector. Large industries often have their own wastewater treatment facilities on-site, but many others discharge their wastewater into municipal sewerage systems. Although industrial wastewater is to be treated to certain standards on the site before being discharged into the sewerage system, industrial effluents are frequently disposed of either not satisfactorily treated or without pretreatment. The mix of municipal sewage containing mostly organic materials with industrial wastewater loaded with a wide range of harmful substances is highly detrimental to the performance of municipal WWTPs.

Table 5.3: Pollution load, 2005–2014, tons

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Organic matter (BOD)	9 000.0	8 900.0	8 300.0	8 100.0	7 900.0	8 000.0	8 400.0	8 770.0	8 380.0	8 400.0
Suspended substances	13 800.0	14 600.0	13 600.0	12 000.0	12 600.0	13 200.0	12 600.0	12 100.0	13 600.0	12 000.0
Sulphate ion	63 700.0	62 700.0	59 500.0	60 700.0	63 500.0	56 500.0	59 600.0	60 600.0	57 700.0	47 000.0
Ammonium ion	6 000.1	6 425.7	6 026.6	5 575.2	5 384.7	5 470.8	5 941.4	5 692.0	5 301.3	5 000.0
Nitrite ion	594.7	338.1	250.3	196.7	191.4	157.0	195.1	181.1	148.3	140.0
Copper	8.9	9.8	10.0	7.5	6.7	5.0	6.2	7.3	5.8	5.0
Iron	361.3	464.6	401.3	396.0	387.3	458.5	484.0	511.2	381.7	280.0
Zinc	37.3	34.0	31.8	30.6	25.0	26.6	24.1	23.7	24.8	..
Nickel	7.5	8.5	8.3	5.7	4.1	3.9	4.0	5.3	5.7	3.0
Chromium	9.2	10.6	8.1	5.9	4.7	4.9	4.1	2.8	3.3	4.0
Petroleum and petroleum products	158.8	195.1	145.6	135.3	134.6	121.6	112.8	120.3	98.4	110.0

Source: National Statistical Committee, 2015.

Moreover, many municipal WWTPs do not have technical capacities to treat specific pollutants generated by industries. The general requirements for disposing of industrial effluents into municipal sewerage systems are contained in the Rules for using communal water supply and sewerage systems adopted by 1995 Order of the Ministry of Housing and Utilities No. 128. These Rules are currently under revision with a view to prompting industries to treat their wastewater on-site to the specific standards before discharging it into the sewerage system.

The diffused polluted runoff from the urban areas that is classified as wastewater has to be collected and treated separately from municipal wastewater in different stormwater drainage systems in all cities with a population of more than 100,000. However, because of the shortage of funds for construction of facilities for its treatment, only 43 per cent of the work planned under the Programme of Socioeconomic Development for 2011–2015 was completed by the end of 2014.

5.4 Water monitoring

Under the NEMS (chapter 1), three areas deal with water: (i) surface water, (ii) groundwater, and (iii) local monitoring of both surface water and groundwater, and wastewater at its discharge points into water bodies.

Surface water

The monitoring of surface waters consists of regular observations of their state by testing their hydrochemical and hydrobiological parameters, surveying hydromorphological features of rivers and lakes, as well as observing the hydrological regime of water bodies. It has been undergoing realignment in order to fulfil the provision of the 2014 Water Code for determining an ecological status for surface water bodies, based on hydrobiological indicators with reference to hydrochemical and hydromorphological indicators. This is a step towards achieving the compatibility of the surface water monitoring with the EU standards.

The network of observation points for surface water hydrochemical monitoring expanded over the last decade, from 214 in 2005 to 300 in 2014; however, the current density of the network of 1.4 observation points per 1,000 km^2 is still below the density recommended for the EU countries.

Judging by the aggregated Water Pollution Index (WPI) for hydrochemical water quality, there has been a steady trend towards improving the quality of surface water. In 2003, only 41 per cent of surface waters were tagged by the WPI as relatively clean; 58.4 per cent were tagged as moderately polluted and 0.6 per cent as extremely polluted. Ten years later, in 2013, the percentage of clean and relatively clean water at the observation points increased by 2.2 times and reached 90.7 per cent. Over the same period, the percentage of moderately polluted water decreased by 6.3 times to 9.3 per cent, with no surface water classified as polluted or extremely polluted. In 2013, the greatest anthropogenic impact on water quality, with excessive quantities of biogenic elements, was observed in the Dnieper, Pripyat and Western Bug river basins. High concentrations of metals such as iron, copper, manganese and zinc in the surface waters was due to their natural background content.

The classification of surface water quality by the WPI is being replaced, as envisaged in the 2014 Water Code, with the gradation of hydrochemical status of surface waters by five classes of quality. The rules for determining this status are stipulated in technical regulations TCP 17.13-08-2013 and TCP 17.13-09-2013, which came into force in 2014.

The methodological and organizational aspects of the hydrobiological monitoring of surface water have undergone revision as priority is assigned to hydrobiological indicators in determining the ecological status of water bodies, as stipulated by the 2014 Water Code. The rules for defining ecological, or hydrobiological, status of river and lake ecosystems, TCP 17.13-10-2013 and TCP 17.13-11-2013, respectively, came into effect in 2014.

Data obtained from hydrochemical and hydrobiological monitoring of surface water are collected, processed, analysed and consolidated in the Information and Analytical Centre for the Surface Water Monitoring (IAC Surface Water), which is affiliated with the Republican Centre for Hydrometeorology, Radiation Control and Environmental Monitoring (chapter 1).

Hydromorphological monitoring is a relatively new type of observation for Belarus. The recently approved guidance standards for assessing the hydromorphological features of rivers (STB 17.13.04-01-2012/EN 14614:2004) and for determining the degree of modification of river hydromorphology (STB 17.13.04-02-2013/EN 15843:2010), both adapted from the relevant European standards, provide a regulatory legal base for developing this type of monitoring in the country. Based on these standards, the hydromorphological features of several river sections where large

hydrotechnical facilities are located have been studied.

The monitoring of the hydrological regime of large rivers, lakes and water reservoirs is carried out at 137 observation points by the Republican Centre for Hydrometeorology, Radiation Control and Environmental Monitoring. Water level and temperature are being monitored daily and posted in real time on the Internet (www.pogoda.by). The consolidated hydrological information is also published in annual reports on surface water resources and their regime.

There is no regular monitoring of contaminated river bottom sediments, which can be a major long-lasting source of secondary pollution of surface waters. Such sediments have usually been accumulated downstream of large cities and industrial complexes. Their monitoring is required not only for quantifying their contribution to the pollution of surface water, but in order to plan and perform remedial measures such as dredging for the river sections with heavily polluted bottom sediments.

Groundwater

The network for groundwater monitoring conducted under the NEMS continued to shrink over the last decade. The number of hydrogeological stations decreased from 101 in 2004 to 94 in 2014, while the number of observation wells on these stations dropped threefold, to 354, over the same period. Hundreds of wells have been decommissioned for various technical reasons or due to the shortage of funds for keeping them in operation. A concern is that insufficient network capacity can compromise the reliability of the assessment of the state of groundwater resources.

The monitoring has revealed that the annual mean level of groundwater tables, measured in one third of the wells with automated gauges, lowered insignificantly, from 0.3 m to 1.0 m, over many years of groundwater abstraction alone in several regions, mainly in the south-east of the country. In 2013, the quality of shallow groundwater was within the drinking water norms and standards in 74 per cent of the tests, while, for deeper aquifers, 82.7 per cent of tests met the norms. High iron and manganese content was observed, along with a reduced content of fluorine in the tests that failed to meet the norms. In a few cases, where a field of deep boreholes is located in an urban area or an industrial zone, the local pollution of groundwater with harmful substances induced by human activities was observed.

The Information and Analytical Centre for the Groundwater Monitoring (IAC Groundwater) affiliated with the Research and Production Centre for Geology is in charge of keeping the database of groundwater observations and assessing the state of groundwater.

Besides the NEMS monitoring, groundwater is also observed by water utility companies at the well fields of deep boreholes – water sources for centralized water supply systems. The observations of groundwater tables and quality are currently conducted at 464 wells at 54 groundwater intakes in 21 cities. The monitoring has revealed that depression cones have formed around each groundwater intake. In several cases, these cones merged and formed larger depression cones with a diameter of up to 20 km. However, the lowering of groundwater tables in the cones does not yet exceed its projected drop.

Local monitoring

Local monitoring within the NEMS is carried out at sites of wastewater discharges into water bodies and locations of large identified and potential polluters of groundwater. As of 1 January 2015, there were 163 observation points at wastewater discharges sites and 263 for groundwater monitoring. Water sampling and testing is the responsibility of the legal entities – owners of the selected enterprises and facilities, the list of which is approved and regularly amended by the Ministry of Natural Resources and Environmental Protection. The primary data are collected, processed and analysed by the Information and Analytical Centre for Local Environmental Monitoring (IAC Local Monitoring) at the Belarusian Research Centre “Ecology”.

At the sites of wastewater discharges into surface water bodies, testing is done to identify the pollutants in the discharged wastewater, as well as to monitor water quality in the recipient water body downstream of the site for the impact of wastewater. The list of pollutants with their permissible concentrations in wastewater is issued for each enterprise or facility with its permit for special water use. Concentrations of pollutants in the water downstream of 91 per cent of the discharge sites, as observed in 48,500 tests in 2013, were higher, on average, by 1.1–2 times than for the same substances upstream of the discharge sites, and there was prevalence of biogenic pollution. The highest anthropogenic load was observed on the Svisloch River downstream of the site for wastewater discharged by Minsk Vodocanal.

Photo 5: Berezina River, Borisovskiy rayon

The local monitoring of groundwater in 2013 performed for pesticide disposal sites, solid waste landfills, sludge treatment facilities and storage sites of industrial wastes, indicated that, in 3.9 per cent of some 27,500 tests, the concentrations of nitrogen compounds and metals, except iron, and total mineralization, exceeded their respective MACs. The concentration of iron exceeded its MAC in 4.8 per cent of the tests.

Bathing waters

The quality of bathing waters is subject to the SanPin 2.1.2.12-33-2005 "Hygienic requirements for the protection of surface waters from pollution" approved by the 2005 Resolution of the Chief State Sanitary Officer No. 198, and "Hygienic requirements for the maintenance and operation of water bodies by using them for recreational purposes" approved by the 2008 Resolution of the Ministry of Health No. 238. It has been slowly but steadily improving. In the designated bathing locations, the share of microbiological tests exceeding the norms decreased from 9.02 per cent in 2005 to 6.94 per cent in 2014, while the ratio of tests not meeting sanitary and chemical requirements and norms fell from 15.08 per cent to 10.13 per cent over the same period. The information on the quality of bathing waters is published in the annual state reports on the sanitary-epidemiological situation in the country by the Ministry of Health, on its website.

During summer seasons, around 900 designated bathing locations on rivers and lakes are closely monitored by the Sanitary Epidemiological Service of the Ministry of Health. Every year, a number of bathing locations in the recreational zones downstream of cities are closed for swimming because their sanitary conditions do not meet the required norms and allowable water pollution levels. The target was set to achieve compliance of the quality of bathing waters at all recreational zones with their microbiological standards in the 2015 bathing season.

Drinking water

The quality of drinking water provided by utilities via centralized water supply systems is mainly within the respective national norms, the SanPin 10-124 adopted in 1999, and is monitored by the Sanitary Epidemiological Service. Groundwater abstracted from deep aquifers is usually of drinking quality, except for high natural content of iron and low content of fluorine; therefore, it is treated by many utilities for excessive iron removal. As a result, the share of water tests with excessive content of iron from the communal water supply systems decreased from 22 per cent in 2009 to 16.3 per cent in 2012. Nevertheless, high iron content in the water supplied by utilities remains the main drinking water quality issue. In the wake of the Chernobyl NPP accident in 1986, drinking water from all the supply sources is

also monitored for radionuclides cesium-137 and strontium-90.

In rural areas, the population uses groundwater from shallow, mostly unconfined aquifers, which is often compromised, not only by high content of iron but also by excessive concentration of nitrates that have seeped down due to extensive use of fertilizers on agricultural lands. Typically, this water comes to its users without appropriate treatment from small-scale water supply systems or is taken from shallow dug wells. The requirements for the sources of non-centralized water supply are formulated in the "Hygienic requirements for the sources of non-centralized water supply of the population" approved by 2010 Resolution of the Ministry of Health No. 105. Although the quality of water in rural areas has been getting better, as the share of tests from dug wells with excessive content of nitrates went down from 28.6 per cent in 2009 to 23.6 per cent in 2012, high concentration of iron and nitrates is still of great concern. Also, the shallow groundwater is subject to bacteriological contamination.

Data management

On the whole, the observation of and reporting on the state of surface and groundwater are well established, although methods of data collection and processing are not fully harmonized with international classifications and requirements, methodologies for determining some environmental indicators are not yet sufficiently developed, and technologies for data processing, storage and presentation require upgrading. Currently, there are three separate databases that are run by their respective IACs with no interconnection and exchange of information between them. Although the consolidated data are submitted by each IAC to the NEMS Main Information and Analytical Centre (MIAC) at the Belarusian Research Centre "Ecology", for incorporation into its respective database, these data are also treated there independently. The MIAC database is not linked with the three water-related databases; therefore, files with data are emailed when required.

The current structure of the cluster of water-related databases is not the most suitable for making an integrated evaluation of the state of water resources and, in particular, for determining the comprehensive ecological status of surface water bodies. Enabling data to flow on a common platform and consolidating the existing databases would improve the efficiency of the management of water resources and contribute to making the country's data and information systems more compatible with the Shared Environmental Information System (SEIS) (chapter 1).

5.5 River basin management

With the introduction of the new Water Code in April 2014, the river basin management approach is now at the core of water management policy. The 2014 Water Code provides for the preparation of river basin management plans (RBMPs), as a tool for implementing the basin management principle, for the parts of the Dnieper, Pripyat, Neman, Western Dvina and Western Bug river basins located within the territory of Belarus. The drafting of the first RBMP was completed for the Belarusian part of the Upper Dnieper river basin in February 2015. The preparation of an RBMP for the Western Bug River is planned for 2016. The technical regulation for preparing an RBMP has been drafted.

Previously, water management at the river basin level was envisaged through development of a scheme of complex use and protection of water resources for each major river basin. These documents were prepared for the Neman and Western Dvina river basins and they are valid until replaced with new RBMPs.

The comprehensive Upper Dnieper RBMP contains a considerable number of various measures and estimates of the investments required for achieving good ecological status for the majority of water bodies in the basin by 2021. As the basin is spread over three oblasts and no basin authority is envisaged, the implementation of the plan will require close coordination of the activities by all the parties concerned, as well as their accountability for the progress achieved.

In this regard, the basin councils to be set up in compliance with the 2014 Water Code will provide an institutional framework for management of river basins with the participation of central, oblast and local authorities, water users and the public. The regulation on the procedures for the basin councils was approved by the 2015 Resolution of the Council of Ministers No. 152. Their main task is to formulate recommendations about management decisions in the respective river basins for local executive and administrative bodies, and the Ministry of Natural Resources and Environmental Protection and its organs. Some aspects of their functioning, such as criteria for representation of various groups of stakeholders, methodological guidance, secretarial support, and funding issues are not yet defined and tested.

5.6 Developments in water infrastructure systems and their management

Reservoirs

There are around 160 water reservoirs with the total volume of 3,100 million m^3 and effective storage of 1,240 million m^3 of water. They are used for various purposes, such as water supply for irrigation, fish farming, recreation, cooling of heated waters from thermal power plants and hydropower generation. More than 50 per cent of them are channel-type reservoirs created by low-head dams and have insufficient storage capacities for flow regulation and flood control.

In accordance with the 2009 Law on State Ecological Expertise, any proposed reservoir is subject to an SEE procedure if it is created by a dam of 2 m high or higher and has a surface area of 2 km^2 or more. The TCP 17.06-06-2012 provides the rules for determining characteristics of dams and reservoirs.

Drainage and irrigation systems

In Belarus, due to its climatic conditions and widespread wetlands, there is a need for land reclamation with drainage rather than irrigation, except in areas where the groundwater level has fallen too much due to excessive drainage. Over the last 10 years, there was no expansion of the land area reclaimed with drainage.

As of 2014, the area of 2.9 million ha, comprising 14 per cent of the country's land area and 33 per cent of its agricultural land, was drained for agricultural purposes, mostly with the aim of turning marshes into meadows, pastures and cultivated land. In addition, around 0.5 million ha were drained for non-agricultural purposes, such as the development of housing estates, industrial sites and land transport infrastructure. Subsurface drainage systems exist on more than 75 per cent of the drained area, with the rest being drained by open canals. The area under irrigation has been relatively constant at around 30,000 ha since 2011. Moving sprinkler irrigation systems are mostly used for delivering water to the fields.

Drinking water supply and treatment infrastructure

In 2013, there were 197 water intakes in 112 cities, large settlements and industrial zones. Groundwater is channelled to water plants for treatment and then potable water is pumped to distribution networks for delivery to consumers. In order to reduce the iron content in the water supplied to the population, iron-removal plants are employed, with 487 of them in operation in 2014, compared with 462 plants in 2011. All production facilities (boreholes, treatment plants) are reportedly metered, and residential customer meters have been almost universally installed.

Due to the decreased water demand, water supply systems are oversized; their utilization ratio (i.e. actual production to installed capacity) was 39 per cent for water intake facilities and 45 per cent for potable water treatment plants in 2011. The underutilization of the available capacity is detrimental to their performance. The optimization of operation of water supply infrastructure is an issue requiring more attention.

The water supply systems have considerable water losses as most cast iron and steel pipelines, laid down several decades ago, have deteriorated and have been experiencing heavy water leakage. However, in recent years, they have been progressively but slowly replaced with plastic pipes, which has resulted in decreasing water transportation losses.

From 2008 to 2013, there was a 36 per cent reduction in water loss, and the amount of water lost during delivery from intakes to users in 2013 was 83 million m^3, accounting for 5.5 per cent of the total water abstracted (table 5.1).

Sewerage and wastewater treatment plants

The wastewater infrastructure is solid, but ageing and oversized. Most municipal WWTPs built in the 1970s and 1980s were not designed to remove nutrients, nitrogen and phosphorus. Over the last decade, many wastewater treatment facilities have been rehabilitated and new plants for treating wastewater built; nevertheless, a sizable share of wastewater facilities is still not functioning efficiently and in need of more effort and investment for their rehabilitation. The current rate of replacement does not seem sufficient.

The installed capacity at the existing wastewater treatment facilities is excessive. It increased by 24 per cent, from 1,329 million m^3 in 2005 to 1,640 million m^3 in 2013, while their utilization ratio dropped from 63.6 per cent to 40 per cent. This can be attributed to the reduction in disposed wastewater, which has almost halved since 1991 and has resulted in the decommissioning of unused capacities and some obsolete facilities for their renovation and modernization.

Hydropower plants

In 2009, there were 41 small and obsolete hydropower plants (HPPs) with a total installed capacity of 16.1 MW. Under the 2010 State Programme for Construction of Hydroelectric Power Plants in the Republic of Belarus in 2011–2015, which envisaged a 7.4 times increase in installed hydropower capacity, from 16.1 MW in 2009 to 118.2 MW in 2015, several small HPPs have been rehabilitated and put back into operation, while a number of new HPPs, including the country's largest, the Grodnenskaya HPP on the Neman River, with an installed capacity of 17 MW, have been commissioned. Another one, the Nemnovskaya HPP with installed capacity of 20 MW, is planned on the Neman River, several kilometres upstream of the border with Lithuania. With an output of 138 million kWh in 2013, the share of hydropower in overall electricity generation in the country was 0.44 per cent. Several more HPPs, including the Vitebskaya on the Western Dvina River, with a designed installed capacity of 40 MW, are under construction.

The sites and technical parameters of dams and water reservoirs used for hydropower production are to be selected in a way that allows for prevention of the inundation of human settlements, minimizing the loss of agricultural land and forest and taking into consideration other environmental factors. All hydropower projects are also subject to SEE (chapter 2).

For planning, design and construction of hydropower projects on transboundary rivers, Belarus is to follow the rules and procedures set up in the ECE Espoo Convention and bilateral agreements with its neighbouring countries. A concern can be raised about possible changes in the hydrological regime and water quality of the Neman, Western Dvina and Dnieper Rivers due to the planned construction of HPP cascades on these rivers. The cascades will consist of two plants on the Neman River and four plants on each of the Western Dvina and the Dnieper Rivers.

5.7 Legal, policy and institutional framework

Legal framework

Although Belarus has relatively well-developed legislation in place, it has taken appropriate steps to refine its legislation in order to integrate environmental considerations more efficiently into water policies. The 2014 Water Code, adopted in place of the 1998 Code, represents a major stride towards making Belarus's legislation more compatible with the EU legal setting in the water sector.

The new Water Code, in force since May 2015, is the principal legal act for pursuing state policy for sustainable development, and protection and rehabilitation of the country's surface water and groundwater resources. It incorporates the principle of achieving the good ecological status of surface water, which is a major step towards integrating environmental concerns into water management policies. The management at the river basin level and public participation in decision-making regarding water resources protection and utilization are also included. Other management principles stipulated in the Water Code are sustainable multipurpose use of water resources, priority for use of groundwater for drinking water supply, prevention of water pollution and payment for water use.

With the 2014 Water Code, Belarus moves towards a major water management reform, which will require many changes in both subsidiary legislation in the water sector and the legal acts in other sectors. The 2015 Resolution of the Council of Ministers No. 152 has introduced a number of the required amendments in the legislation and adopted the regulations regarding the functioning of basin councils, issuance of permits for special water use and maintenance of the State Water Cadastre (SWC). Many regulatory legal acts and technical regulations and norms have already been revised or drafted for the first time in order to put into practice the provisions of the 2014 Water Code. For example, the 2015 Resolution of the Ministry of Natural Resources and Environmental Protection No. 19 approved the Instruction on Establishment of Basin Councils. More than 20 other legal acts of the Ministry on various aspects of water management are still under revision.

Belarus puts particular effort into harmonizing its water-related legislation with EU legal acts, which is among the goals of the Water Strategy until 2020. There are a number of recently adopted technical regulatory legal acts that follow the relevant EU regulations but need to be made applicable for the conditions of Belarus through implementing various administrative, technical, capacity-building and other measures. The main challenge now is effective enforcement of the updated legislation. Intensive preparatory work and close cooperation with other ministries, agencies and administrative territorial organs is required to cope with this challenge. Under these circumstances, a "roadmap" for reforming management in the water sector would provide a better vision of the action required for several years ahead.

There are several other laws related to water resources management. The 2008 Code on Subsoil Resources governs the use of groundwater. The 1999 Law on Drinking Water Supply covers the provision of water supply to the population. The 1992 Law on Environmental Protection deals with the protection of water resources.

Strategies, programmes and plans

The National Strategy for Sustainable Socioeconomic Development of the Republic of Belarus for the period until 2030 (NSSD-2030), which has succeeded NSSD-2020, is the principal development policy document for the country, and covers, among other matters, water-related policy areas of work in the context of environmental management and protection. It continues to pursue a number of major policy issues outlined in NSSD-2020, such as application of regulatory measures and economic incentives to reduce the use of water of drinking quality by industries and to decrease the disposal of pollutants in wastewater into water bodies; employment of water saving technologies; reduction in water loss and unaccounted-for water; and public awareness-raising. However, in NSSD-2030 the focus for the 2016–2020 period is shifted onto strategic assessment of the country's water resources, creation of a state system for efficient management of the use and protection of water resources, assessment of the impact of natural and anthropogenic factors on water resources and a hydrological regime of water bodies. For the 2021–2030 period, the emphasis is on the formulation of a master plan for development of the country's water resources sector, refining an institutional framework in the water resources sector and pursuing river basin management. The document also calls for entering into international agreements for the rational use and protection of waters of the transboundary basins of the Western Dvina, Dnieper and Pripyat Rivers.

The operational priorities related to the protection and development of water resources and their sustainability are incorporated in the country's 2011 Programme of Socioeconomic Development for 2011–2015. As of 2014, the targets on the expansion of water recycling and recirculation systems, extension of coverage with the metering of groundwater abstraction for agriculture activities, and reduction of water transportation losses, were already achieved. However, there has been no progress or insufficient progress towards achieving the targets set for reduction in the use of groundwater and in the discharge of pollutants into water bodies, development of urban stormwater drainage systems and facilities for its treatment for large cities, and decommissioning of wastewater filtration fields.

The 2011 Water Strategy until 2020 outlines the basic principles of the policy and identifies the key action areas for the protection and use of water resources in the country. The Strategy was formulated, in particular, with a view to facilitating and justifying the revision of the 1998 Water Code in the context of integrated water resources management by taking into consideration the requirements of the EU Water Framework Directive and reflecting provisions of the ECE Convention on the Protection and Use of Transboundary Watercourses and International Lakes. The targets of the Water Strategy are correlated, in general, with the relevant targets of the Programme of Socioeconomic Development for 2011–2015, but the indicators are not defined in absolute figures, which hampers their verification.

The State Programme on Water Supply and Sanitation "Clean Water" for 2011–2015, the implementation of which is coordinated by the Ministry of Housing and Utilities, is aimed at expanding population coverage with supply of good quality potable water and sanitation services. It also contains provisions for improving the protection of surface water and groundwater sources of water supply from pollution, and more efficient treatment of wastewater. The Programme contains a detailed list of implementation indicators, most of which seem to be achievable by 2016. The preceding programme "Clean Water" resulted in increased coverage of the country's population with centralized water supply by 6 per cent and of sewerage systems by 12 per cent.

The Environmental Protection Strategy until 2025 outlines detailed goals and targets related to the protection of surface water and groundwater resources from pollution, and rational use of water resources. A number of the targets are replicated in other strategies and programmes.

The State Programme for Sustainable Rural Development 2011–2015, the implementation of which is coordinated by the Ministry of Agriculture and Food, calls, in general, for measures to prevent transfer of mineral fertilizers from fields into water bodies and groundwater. However, the envisaged increase in the use of fertilizers by up to 10 per cent by 2016, which is coupled with the reduction in size of water protection zones, would notably contribute to water pollution unless the measures are identified and their implementation is enforced.

The procedures for annual reporting about the progress in the implementation of the state, sectoral and regional programmes, their effectiveness and related expenses, are established (chapter 1).

Institutional framework

The management structure on protection and use of water resources follows the pattern of administrative governance of the country arranged at three levels, namely: national, oblast and local (rayon and town). The main responsibility for the management of water resources lies with the Ministry of Natural Resources and Environmental Protection. The Ministry exercises its authority directly at the national level, and through its committees in each oblast and Minsk City, and inspection units at the local level (chapter 1). The inspection units are subordinated to their respective oblast committees.

The management at the river basin level, as envisaged in the 2014 Water Code, will be exercised through advisory basin councils to be set up by the Ministry in all the five large river basins of the country. In each river basin, the council will be located in the oblast, which has the largest territorial share in that basin.

Subordinated to the Ministry, there is a think tank, the Central Research Institute for Complex Use of Water Resources, which performs research, provides decision support in the water resources management sector, and runs the SWC.

Several other ministries, as well as oblast and local authorities, are involved in the management of water resources within their competence. The Ministry of Health is in charge of setting quality standards for drinking water and bathing waters and monitoring their conformity to the standards. The Ministry of Housing and Utilities deals with the provision of water supply and sanitation services and wastewater disposal, with water utilities (vodocanals) under its jurisdiction. The Ministry of Agriculture and Food is responsible for water supply for agricultural activities and agro-industry, as well as wetlands draining and irrigation. Coordination of the activities of all the parties involved lies with the Ministry of Natural Resources and Environmental Protection.

In the Ministry of Natural Resources and Environmental Protection, there is quite a small group of specialists dealing with water resources management in its central office (3 specialists) and oblast committees (18). In addition, there are just five inspectors specifically assigned with responsibilities in the water management sector at four of the Ministry's 120 town and rayon inspection units. At the other inspection units, the inspectors dealing with water management issues also have responsibilities with other sectors. Although these specialists are assisted by experts from several research institutes and centres subordinated to the Ministry, the Ministry still lacks capacity for water resources management, especially for the period of management reforms in the water sector. The insufficient administrative and managerial capacity at the national, oblast and local levels does not facilitate the implementation and enforcement of the updated water legislation.

Regulatory, economic, fiscal and information measures

Regulatory instruments

The main regulatory instrument used in Belarus to control the development of water resources and their protection from pollution is a permit for water abstraction and wastewater discharge, which is called "a permit for special water use". The permit allows municipal, industrial and other users to abstract a specified amount of water from surface and groundwater sources for reasonable and beneficial uses. Such a permit is required for all users withdrawing more than 5 m^3 of water per day. The permit also stipulates specific limits and conditions of allowable discharge of wastewater into water bodies, the ground or a municipal sewerage system. A list of substances permissible for disposal, with their allowable concentrations in wastewater and the maximum mass of each pollutant permissible for discharge over a year, is a part of the special water use permit. The latest changes in the water use permitting system were introduced by the 2014 Water Code and the Regulation on the issuance of special water use permits was approved by the 2015 Council of Ministers Resolution No. 152. As stipulated by these acts, the permits are issued by territorial bodies of the Ministry of Natural Resources and Environmental Protection within a defined period of time with streamlined procedures.

Another regulatory measure to protect water resources from pollution from diffuse sources is allocation of zones along the banks of water bodies where some activities, which can lead to the pollution of water resources, are prohibited, while other activities, if permitted, are subject to stringent environmental protection requirements, which, however, are not always enforced. Moreover, these zones have not been delineated along all the water bodies, yet. The 2014 Water Code has reduced the size of water protection zones and allowed for some activities that were previously restricted. For

instance, the minimum width of the water protection zones along the large rivers was reduced from 700 to 600 m and animal breeding farming and oil products storage facilities were allowed there. At the same time, the requirements for preventing pollution from the settlements, industrial and agricultural facilities located in such zones have been strengthened, but often not properly met in practice. Animal breeding farms and complexes, for example, are obliged to have waterproof manure storage tanks and arrange for the timely removal of their content. However, the enforcement of these requirements will take consistent effort and time.

Economic and fiscal instruments

Belarus levies tax on water abstraction and applies pollution tax for disposing of wastewater. The tax is also levied for storing sludge produced at wastewater treatment facilities. The tax rates are revised annually and tend to increase. The rates of tax on water abstraction depend on the use for which water is withdrawn, and range, as of 2015, from 6 roubles per m^3 for water for agriculture-related activities to 22,970 roubles per m^3 for water for production of alcoholic drinks. The rates of tax for discharging wastewater are differentiated by the kind of recipient water body. The lowest rate is for discharging wastewater into watercourses, 610 roubles per m^3, and the highest fee – to discourage this practice – for disposing wastewater into the ground, 47,110 roubles for m^3. Since 2011, there are no fines for exceeding the allowable volume of water abstracted or wastewater discharged. However, in the case of exceeding the permitted allowable concentrations of harmful substances in the wastewater discharged into the recipient water body by a utility, fines are applied to the legal entity and its executive officer. Compensation for the damage caused is also required. The tax rate for storage of sludge is 810 roubles per ton. The tax rates are set annually in accordance with the Tax Code.

The charges are applied for the provision of water supply and sewerage services by utilities. Since 2013, progressive tariffs for these services have been introduced. The basic subsidized tariff is applied when water use does not exceed 140 litres/capita/day, while a much higher tariff is charged for the water used over this threshold. Wastewater tariffs typically follow the same structure as water tariffs. The tariffs are set by the oblast administrations, and the rate of their collection is relatively high. The cross-subsidies between industry and household consumers, used widely until recently to increase affordability of water services to the population, have been gradually eliminated.

Information measures

The SWC, in operation since 1990, is a comprehensive interagency database covering all aspects of the state of water resources and their use. It contains, among other things, data classified by administrative unit and river basin on hydrological observations, quality of surface water and groundwater, water availability and use. SWC, run by the Central Research Institute for Complex Use of Water Resources since its inception, is a major, efficient and indispensable tool for managing water resources in the country. The latest Regulation on the maintenance and use of SWC, approved by the 2015 Resolution of the Council of Ministers No. 152, has updated its functions and expanded its coverage areas. Information about, for instance, the ecological status of water bodies, inland waterways and hydrotechnical structures will be incorporated into SWC. However, SWC's information technologies, software and hardware are obsolete, and human resources are limited in order to cope efficiently with the tasks. SWC is also not compatible with other databases in the water resources sector.

The access of the public to the information regarding the state of the water bodies and water use is provided mainly through publication of annual reports and statistical data on the websites of the NEMS and SWC (http://www.cricuwr.by/gvk/default.aspx). Not all SWC information is accessible through the Internet. As the current legislation does not provide for public participation in law-making (chapter 1), there have been no public hearings for drafts of new legal acts of great interest to the public, such as the new Water Code. However, the draft Water Code was discussed at the Public Coordination Environmental Council under the Ministry of Natural Resources and Environmental Protection.

The 2014 Water Code declares the rights of citizens and public organizations to participate in the wide range of activities related to the protection and use of water resources (e.g. to be represented in the river basin councils, to initiate public ecological expertise and bring a case to court for compensation for environmental damage), but the modalities for implementing some of these rights (e.g. participation in the river basin councils) are not yet defined.

Public participation in the protection of water resources is mostly limited to local campaigns for cleaning small rivers and protection of shallow groundwater from pollution.

Water-related global, regional and bilateral agreements

Belarus has been a Party to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes since 2003 and to the Protocol on Water and Health since 2009. In December 2013, Belarus set the targets under the Protocol and procedures for reporting on the progress in their implementation, together with a list of indicators, some of which are linked to water management. Belarus is also a Party to the Ramsar Convention on Wetlands (chapter 7).

Under bilateral agreements, Belarus has been cooperating with its neighbouring countries on their common transboundary waters. The joint Belarusian–Russian commission has been functioning under the 2002 agreement with the Russian Federation, which covers the transboundary waters in the Dnieper, Western Dvina and the Neman river basins. Belarus also entered into agreement in 2001 with Ukraine on the joint use and protection of transboundary waters in the Dnieper, Pripyat and Western Bug river basins, and both countries nominated their respective plenipotentiaries to govern its implementation. The cooperation between Belarus and Poland on the Western Bug River, which forms their international border for 178 km, is still based on the 1964 agreement between the USSR and Poland on border waters, but a draft new agreement was tabled by Belarus in October 2014.

The issues related to transboundary water cooperation are also covered by the agreements on environmental protection between Belarus and Latvia (1994 intergovernmental agreement) for the Western Dvina River and between Belarus and Lithuania (1995 interagency agreement) for the Neman River. Belarus and Lithuania are working to develop an interministerial technical protocol on cooperation in the protection and use of water resources of the transboundary Neman river basin. In compliance with the provisions of the respective agreements, Belarus and the neighbouring countries exchange hydrological data and water quality information, agree on measures for the protection and use of water resources, and coordinate flood mitigation activities and action to be taken in the event of emergency.

With the proclamation of the basin-level approach to water management in the 2014 Water Code, cooperation with other co-basin countries would move towards joint water management at the respective transboundary basins as envisaged in the NSSD-2030. There is also a prospect of creating an international river council for the whole basin of a transboundary river, in which the national basin councils will be represented. Such a council can be entrusted, as its prime task, with coordination of national activities for preparing a management plan for the whole transboundary river basin.

Several multilateral basin-specific agreements on the transboundary river basins that are shared by Belarus have been drafted.

Progress achieved by Belarus in implementation of MDG water-related commitments is shown in box 5.1.

International technical assistance

The majority of the technical assistance projects supported by the international community and development partners have contributed to the integration of environmental considerations in water policies and practices in Belarus.

Output 1 of the UNDP/EU project “Support to the development of a comprehensive framework for international environmental cooperation in the Republic of Belarus” was aimed at facilitating progressive approximation of Belarus’s water management legislation with the EU regulations in the light of the then draft of the new Water Code.

Over the period 2011–2013, a comparative analysis of Belarus’s water legislation with the relevant EU regulations was made and a considerable number of regulatory legal acts and technical regulations were drafted to enable, in particular, the implementation of the river basin management principle and introduction of assessment of the ecological status of water bodies in the country.

Under the project “Environmental Protection of International River Basins” (EPIRB), funded by the EU, the Upper Dnieper RBMP was drafted over the period 2013–2014. The draft Plan, the first of its kind in Belarus, covering a Belarusian part of the Dnieper river basin, was presented in March 2015 for public consultation and is to be finalized by the end of 2015.

The project “River Basin Management and Climate Change Adaptation in the Neman River Basin”, implemented by ECE with the support of the Environment and Security Initiative (ENVSEC) and UNDP Belarus over the period 2012–2014 has resulted in the formulation of an adaptation strategy to climate change for the co-basin countries, Belarus, Lithuania and the Russian Federation, in the transboundary Neman river basin.

Box 5.1: Water-related indicators under Goal 7 of the Millennium Development Goals

Target 7.A: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources

- Indicator 7.5, "Proportion of total water resources used": From 2000 until 2014, Belarus decreased water withdrawn by 17.5 per cent and the water used decreased by 19.2 per cent for the same period. In 2014, the amount of 667 million m^3 was withdrawn from the surface water sources, which accounts for 1.1 per cent of the total annual mean renewable surface water resources estimated at 57,900 million m^3; the amount of 843 million m^3 was abstracted from the groundwater resources, which accounts for 32.4 per cent of the proven exploitable groundwater resources of 2,600 million m^3.

Target 7.C: Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation

- Indicator 7.8, "Proportion of population using an improved drinking water source": Belarus has almost reached the goal of the universal coverage of its urban population with drinking water from improved sources. As of 1 January 2015, 97.7 per cent of its urban dwellers were supplied through piped connections by centralized water systems. The country has also made significant progress in expanding the coverage of its rural population with drinking water supply from improved sources. As of 1 January 2015, 80.7 per cent of its rural population1) had access to centralized and local water supply systems.
- Indicator 7.9, "Proportion of population using an improved sanitation facility": Coverage of the urban population served with centralized sewage disposal systems reached 91.9 per cent as of 1 January 2015. In rural areas1), 37.9 per cent of the population had access to centralized and local sewerage systems as of 1 January 2015.

Note: [1)] Coverage of rural population may refer only to those who reside in agro-towns, where water supply and sanitation services are provided by local utilities reporting to the Ministry of Housing and Utilities.

The strategy identifies potential impacts of climate change on water resources and economy sectors in the Neman river basin, makes assessment of their vulnerability to those changes, and suggests some measures for mitigating the impacts.

5.8 Conclusions and recommendations

Pollution load from diffuse sources in residential and industrial areas and cultivated land is a major contributor to contamination of water bodies and shallow groundwater. However, the methodology for assessing diffuse pollution has not been updated since 1999. Some measures have been taken to reduce diffuse pollution. Stormwater drainage systems have been in operation in a few cities to intercept and treat polluted urban runoff. Water protection zones have been introduced along the banks of water bodies to restrict economic activities which could be sources of pollution there, but the delineation of water protection zones has not been complete.

However, so far, not much progress has been made in curbing diffuse pollution. Polluted runoff from cultivated land remains the main source of diffuse pollution of water bodies and groundwater with nitrogen and phosphorus due to ever-increasing use of fertilizers and manure in modern-day agricultural practices.

Recommendation 5.1:

The Ministry of Natural Resources and Environmental Protection, in cooperation with the Ministry of Agriculture and Food and other agencies and authorities concerned, should:

(a) Develop, based on internationally recognized approaches, methodologies and regulations for the assessment of polluted diffuse runoff from cultivated land, residential and industrial areas and its impact on water resources, and develop appropriate measures for reducing diffuse pollution, with an emphasis on agriculture-related activities;

(b) Revise and complete the delineation of water protection zones in compliance with the requirements of the 2014 Water Code, and enforce the implementation of the existing legislation aimed at preventing pollution generated by activities in those zones.

There is no regular monitoring of contaminated sediments, which are usually accumulated on the bottom of the river sections downstream of large cities and industrial complexes and which can be a long-lasting source of secondary pollution of surface waters. Their monitoring is required for quantifying their contribution to the pollution of surface water and for planning and performing remedial measures such as dredging for the sections with heavily polluted sediments.

Recommendation 5.2:
The Ministry of Natural Resources and Environmental Protection should:

(a) Assess the impact of contaminated bottom sediments on the quality of surface waters based on internationally agreed methodologies, and implement remedial measures to reduce the pollution generated by contaminated bottom sediments;
(b) Consider the inclusion of the monitoring of bottom sediments in activities for the monitoring of surface waters.

In compliance with the 2014 Water Code, basin councils will be created in the five main river basins to provide an institutional framework for management at the basin level, with the participation of central, oblast and local authorities, water users and the public. Their main task is to formulate recommendations about management decisions in the respective river basins for administrative and executive bodies at various managerial levels. The regulation on the authority and basic procedures for the basin councils was approved by the 2015 Resolution of the Council of Ministers No. 152 and subsequent Instruction on Establishment of Basin Councils, approved by the 2015 Resolution of the Ministry of Natural Resources and Environmental Protection No. 19.

However, establishing the river basin councils is a new concept in Belarus and many aspects of their functioning, such as detailed criteria for representation of various groups of stakeholders, methodological guidance and funding issues are not yet defined and tested and may require adjustment after a certain period of their work. With a view to benefiting from similar experience in other countries, Belarus may seek support from regional and international organizations with relevant expertise to launch a pilot basin council project.

Recommendation 5.3:
The Ministry of Natural Resources and Environmental Protection should:

(a) Continue efforts to create a river basin council as a pilot project for one of the major river basins, preferably for the Upper Dnieper River Basin for which a basin management plan is at the final drafting stage, in order to work out modalities for the effective and smooth set up and functioning of the new institution;
(b) Apply, in due time and taking into consideration the lessons learned, the tested working arrangements for creating councils in the other river basins.

The State Water Cadastre (SWC), in operation since 1990, is an efficient and indispensable tool for managing the country's water resources. The Central Research Institute for Complex Use of Water Resources hosts SWC. In 2015, its functions and coverage areas were updated and expanded. Information about, for instance, the ecological status of water bodies, inland waterways and hydrotechnical structures will be covered in SWC. However, with its current capacity, such as outdated information and communication technologies and limited human resources, SWC cannot face this challenge.

Recommendation 5.4:
The Ministry of Natural Resources and Environmental Protection should:

(a) Take appropriate measures to strengthen technical and human capacities to address the new scope of the State Water Cadastre;
(b) Ensure that Shared Environmental Information System (SEIS) principles are applied to the State Water Cadastre;
(c) Arrange for public access to a wider range of the information available in the State Water Cadastre and make the information easier to understand by presenting it in a more user-friendly manner.

Chapter 6

WASTE MANAGEMENT

6.1 Trends in waste management

The definition of waste used in Belarus encompasses a much wider range of materials than in international practice; it also includes by-products or materials which can be reused in production on-site. Thus, the reported data on waste are not directly comparable with waste data from, for example, Western Europe. Monitoring industrial waste is performed at the point of generation in Belarus, while international practice records industrial waste data on the input to treatment or disposal facility. Achieving a high level of industrial waste recovery is also required. This leads to the fact that the reported amount of industrial waste recovery is high, often exceeding the real amount of generated waste.

Classification of generated waste is described in the 2007 Resolution of the Ministry of Natural Resources and Environmental Protection No. 85. The classification includes more than 1,400 types of waste divided into the following groups:

- Waste of vegetable or animal origin;
- Waste of mineral origin;
- Waste from chemical plants and associated industries;
- Health-care waste;
- Waste (sediments) from water treatment at boiler and heating facilities and for drinking, from treatment of sewage water, rainwater and from water use for power plants;
- Municipal waste and similar waste from industries.

Municipal solid waste

Municipal solid waste (MSW), according to the definition used in Belarus, includes waste from consumption and also production waste included in the list of municipal waste to be removed by local executive and administrative authorities; such list is approved by the Ministry of Housing and Utilities.

MSW generation is monitored by collection companies and reported to the Ministry of Natural Resources and Environmental Protection in tons and to the National Statistical Committee in m^3 (table 6.1).

However, an uncertainty is hidden in the presented data. The law requires reporting in m^3, which are estimations based on vehicle capacity mainly due to the fact that mini-dumpsites are too small for weighbridges. Also, the key legal documents regulating financing of MSW management are using m^3 of waste as a parameter for defining unit fees or costs. On the other hand, the current priority of achieving a high level of material recovery from waste is resulting in the need to collect data on waste in tons. The practice shows that information on MSW in tons allows better evaluation of the impact of current policies. Therefore, the published information on MSW in m^3 is based on estimation and information in tons is a combination of direct weighing of MSW and recalculation of m^3 to tons using a factor of 0.2 t/m^3.

MSW generation has a growing trend; per capita waste generation has doubled during the last decade. This increase can be caused by both an actual increase in waste generation and by improved monitoring of collected waste amounts. The average MSW composition was derived from analyses in Minsk, Gomel, Mogilev, Bobruisk and Polotsk (table 6.2). Also, analysis of waste composition was performed in Minsk Oblast in 2013.

MSW is collected by waste management departments of local housing and utility services, operating on a rayon level.

The waste management department typically collects MSW from residential areas, commercial and industrial sectors, garage cooperatives and dacha cooperatives, and also operates a local disposal site. Minsk City adopted a more advanced set-up, dividing the responsibilities for waste collection and waste disposal. MSW in Minsk is collected by SpecKommunAvtoTrans (about 60 per cent) and by Remondis Minsk (about 40 per cent). Waste sorting and disposal is performed by the Unitary Enterprise “Ekores”.

The responsibility for organizing collection services is on local executive and administrative authorities, while provision of equipment (facilities, vehicles and containers) is the responsibility of the Ministry of Housing and Public Utilities.

Photo 6: Separate waste collection, Minsk

Table 6.1: MSW from settlements, 2005–2014

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Thousand m^3	14 058	15 012	14 580	15 946	16 739	17 139	18 380	18 299	19 434	19 967
Thousand tons	2 812	3 049	3 220	3 411	3 615	3 765	3 623	3 640	3 887	3 993
Per capita (kg/capita)	291	317	337	358	380	397	382	385	411	421

Source: National Statistical Committee, 2015.

Table 6.2: MSW composition, weight percentage

	Belarus	Minsk Oblast
Biodegradable waste	42.2	39.0
Plastics	6.3	7.6
Glass	5.6	6.6
Paper, cardboard	4.1	6.5
Metals	2.1	2.0
Textiles	1.7	1.5
Other	38.1	36.8

Sources: Draft Technical Code of Practice: Rules of Municipal Waste Management; Draft Waste Management Strategy for Minsk Oblast, 2014.

MSW collection services are available to all citizens and organizations. While in 2005 only about 35 per cent of the urban population received regular waste collection services, 99 per cent of the urban population was serviced in 2014. Contracts for MSW collection are agreed with individual households, and commercial and industrial clients, as well as with garage cooperatives and dacha cooperatives.

Containers for MSW are mostly 0.7 m^3, but in areas where separate collection is introduced, these are being replaced by 1.1 m^3 euro-containers. Containers are located inside courtyards, away from main streets and sometimes collection is obstructed by parked cars. In the countryside larger containers (4–12 m^3) are also used or waste is delivered by residents directly to a collection vehicle (bell system).

According to the Ministry of Housing and Public Utilities, MSW was collected by 1,792 collection vehicles and residential areas were equipped with 114,000 containers in 2013, of which about 50,000 containers were for separate collection. The number of containers for separate collection is not sufficient; currently there are about 200 people per container and the target value is 50 people per container.

Belarus is implementing separate collection of MSW, providing containers for dry (paper, plastics, glass) and for wet (biodegradable) waste. Separate collection is available in the capital, oblast and rayon centres. The dry fraction is delivered for sorting and the wet fraction is sent for disposal.

MSW is disposed to mini-dumpsites (minipoligoni) or to rayon dumpsites (poligoni). Mini-dumpsites are used in remote countryside areas, but their number is decreasing: while in 2007 about 4,500 mini-dumpsites were registered, their number decreased to 2,351 in 2014 (table 6.3). MSW which was disposed to mini-dumpsites was redirected to rayon dumpsites. The annual input to a mini-dumpsite is estimated at less than 1,000 tons of MSW per year.

There are 170 rayon dumpsites in Belarus, typically one per rayon, but larger rayons may have two or three of them. These disposal sites are usually equipped with basic machinery, a weighbridge and bottom sealing. Each of them annually receives about 10,000 to 15,000 tons of MSW.

This structure of disposal sites for MSW is not complying with the regional approach to waste management, based on a smaller number of landfills with annual input of at least 50,000–100,000 tons. Also, the high number of disposal sites means that potential pollution sources are scattered throughout the country and controlling their impact on human health and the environment is difficult.

The largest MSW disposal sites are serving Minsk. Ekores operates the disposal sites Trostenets and Severniy for MSW and the disposal site Prudishche for industrial waste. These disposal sites are developed with bottom sealing of disposal cells and the system for collection of leachate; waste is disposed according to an approved operation plan and access to them is controlled. The disposal site Trostenets was remediated after completion and landfill gas from this site is currently used for energy generation.

The first site complying with international standards for controlled landfilling is planned in the Puhovichi rayon, which was chosen as a pilot for the EU Waste Governance project.

Separation of secondary materials from MSW is strongly enforced by national legislation and the number of containers and MSW processing facilities is growing (table 6.4).

Table 6.3: Dumpsites by type and oblast, 2014, number

	MSW - rayon site	MSW - mini-dumpsite	Industrial site
Brest	31	336	119
Vitebsk	26	478	56
Gomel	27	677	87
Grodno	24	369	45
Minsk City	2	0	60
Minsk Oblast	40	173	219
Mogilev	20	318	45
Total	**170**	**2 351**	**631**

Source: Ministry of Natural Resources and Environmental Protection, 2014.

Table 6.4: Implementation of separate waste collection, 2005, 2010, 2012–2014

	2005	2010	2012	2013	2014
Number of containers for separate collection	16 800	40 400	45 150	47 620	68 860
Urban population coverage by separate collection (%)	34.8	79.0	87.0	97.0	99.0
Collected recyclables (t)	3 840	33 300	38 760	55 000	79 700

Source: Safronova I., Implementation of state policy in municipal solid waste and secondary material resources, Conference on presentation of Minsk Oblast Waste Strategy, 2015.

In total, waste sorting plants are operating in 81 rayons. Large waste sorting facilities are operating in Brest, Baranovichi, Novopolotsk, Gomel and Mogilev. Waste sorting lines are installed in Minsk (2), Pinsk, Polotsk, Svetlogorsk and Soligorsk. In addition, development of sorting facilities is planned for Minsk, Vitebsk, Grodno, Borisov, Bobruisk and Orsha. Additional recyclables are collected through a network of buy-out points, where citizens can sell recyclables. Although, originally, these buy-out points were focused on recyclables only, now, the range of collected MSW fractions also includes energy saving lamps, batteries and household equipment.

Industrial waste

The leading production industries include machinery, metal, food, energy and chemicals. Industrial activities are concentrated in Minsk, oblast centres and other towns. Soligorsk is the centre of salt mining, which is used for production of potassium-based fertilizers. The chemical industry is based in Grodno, producing a wide range of inorganic and organic chemical products.

Control over industrial waste management is well developed. Information on generation, processing, treatment, disposal and accumulation of industrial waste is regularly collected in tons according to the Classification of generated waste. Interfaces for transforming this classification to the classification of the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal and to the EU List of Waste were already developed, and thus can provide reporting of waste according to international standards.

In total, 40.3 million tons of industrial waste were generated in 2013. Excluding mining waste, 29 million tons were generated in production industries (table 6.5). Of that, 23,750 tons were assigned to the first or second hazard class and 1.39 million tons were in the third hazard class. The sum of reused, recycled and disposed waste is higher than the amount of generated waste, because it also includes waste from previous years that was stored on-site.

Most of the industrial waste registered in 2013, 59.1 per cent, is recovered directly by generators or is given/sold to others for reuse and recycling. Another 27 per cent is used as auxiliary material in various works and services, 6.3 per cent is used as raw material in production and 4.6 per cent is used for energy generation. Industrial waste is typically disposed of to disposal sites and tailing ponds that are under the control of the waste producing company. Older disposal sites (prior to 1990) usually do not have pollution control barriers, but newer sites are developed with such barriers.

Hazardous waste

Hazardous waste is characterized by four hazard classes, the first being the most hazardous and fourth the least hazardous. The main criterion for assigning a hazard class is toxicity of the waste. In addition, the risk of fire can cause a waste to be ranked as hazardous; this development is an important step towards full harmonization with the hazardous waste definition used by the Basel Convention.

Hazardous waste of the first and second classes must not be disposed of in common disposal sites. These wastes are stored at the place of origin or they are incinerated or their hazardous properties are chemically neutralized.

Chemical and thermal treatment is done directly by generators of this waste.

Data on hazardous waste indicate a growing trend. While in 2005 only 192,000 tons of hazardous waste was reported, this waste increased to 918,200 tons in 2010 and the latest data show 1.714 million tons of hazardous waste in 2014. This increase can be explained by improved reporting from waste generators and implementation of new legislation.

Table 6.5: Industrial waste by class of hazard, 2013, thousand tons

Hazard class	Generated	Reused, recycled	Disposed of
First	10.57	9.64	1.21
Second	13.18	6.59	6.72
Third	1 391.67	1 075.44	759.04
Fourth	27 598.86	9 184.17	22 848.02
Total	**29 014.28**	**10 275.84**	**23 614.99**

Source: Environmental bulletin, Ministry of Natural Resources and Environmental Protection, 2013.

Historical waste

Due to its gradual transition towards a modern economy, Belarus does not suffer as urgently as other former Soviet countries from abandoned industrial facilities. Therefore, the need for clean-up of pollution generated in the past is not considered urgent.

However, significant amounts of waste were accumulated in the past and suitable methods for its destruction or neutralization are not fully implemented. Although the locations of sites with the most accumulated waste are known, the country lacks a systematic approach to identification of potential threats to human health and the environment from accumulated waste.

Potassium mining and processing resulted in the accumulation of more than 900 million tons in the Soligorsk rayon, occupying more than 600 ha and reaching 110–130 m in height. Tailing ponds for clay-salt sludge, also resulting from potassium mining and processing, cover an area of 1,113 ha.

Chemical industries in Gomel Oblast are producing large amounts of phosphogypsum waste, resulting from production of phosphorus-based fertilizers. This waste also contains residues of fluorides, and sulphuric and phosphoric acids, resulting in its high acidity (pH 2.8–3.5). Phosphogypsum waste occupies an area of 89 ha, reaching 50–60 m in height.

Two companies, in Bobruisk and Rechitsa, which operated from 1951 until 2000, accumulated 3.36 million tons of lignin waste, generated from wood hydrolysis and alcohol production.

Mining and quarrying waste

Waste from mining accounts for more than half of the waste generated by industries in Belarus. Waste is generated from opening new mines (accessing mineral resources) and from processing extracted ore. Mineral resources mined in Belarus include potash salt, raw salt, construction materials and oil. In terms of the size of potassium deposits, Belarus ranks third in the world, and potash fertilizers are a major export of Belarus. Waste generated by the JSC Belaruskaliy which produces potassium-based fertilizers is reported as “waste salts” (table 6.6). The total accumulated waste from potassium mining and processing was nearly 98,000 tons by the end of 2014.

Waste from agriculture and the food industry

The share of agriculture (economic activity "Agriculture, hunting and forestry") in GDP declined from 12.1 per cent in 2000 to 8.4 per cent in 2005 and then to 7 per cent in 2013. The food industry is growing and its share of total manufacturing increased from 20.1 per cent in 2005 to 26.6 per cent in 2014.

State sector companies and farms are the predominant form of ownership; thus, it is expected that data collection covers most of them. Data on waste from agriculture and the food industry are stable, without recognizable shifts in methods of waste management (table 6.7).

The amount of waste recycled or given to others for secondary use is high; only about 10 per cent is sent for storage, treatment or disposal. This is also typical for waste from agriculture and the food industry in other countries. About half of the waste which cannot be recycled is sent for disposal and 25 per cent is used as fuel.

Manufacturing waste

Manufacturing represented 23.1 per cent of GDP in 2013. It is decreasing slightly relative to other sectors, because of the fast growing services sector. The key components of manufacturing are machinery, chemicals and metallurgy. Under the waste classification system used in Belarus, manufacturing waste is divided into waste of mineral origin (table 6.8) and waste from chemical processes, excluding waste salts (table 6.9).

Two thirds of mineral waste is stored or disposed of on sites belonging to waste generators and one third is disposed of together with municipal waste. Nearly 80 per cent of mineral waste is registered in the subcategory “Other solid mineral waste” of the Classification of generated waste and also includes excavated earth and construction waste.

Medical waste

Health-care facilities divide generated waste into four groups. Group A is similar to municipal waste; recyclables are separated from this waste and residual waste is disposed to the nearest municipal disposal site.

Table 6.6: Waste salts from potassium mining, 2009–2013, tons

	2009	2010	2011	2012	2013
Generated	13 473 308	27 803 918	28 931 350	25 616 030	22 255 820
Reuse, recycling	973 207	884 121	813 490	763 080	914 550
Total disposal	12 500 168	26 919 801	28 117 900	24 852 980	21 341 360
Disposal on tailing ponds, sludge fields	12 497 834	26 917 408	28 115 170	24 758 410	21 239 810
Disposal on disposal sites	2 326	2 366	2 670	2 640	2 430
Stored on-site	8	27	70	20	10
Treatment	0	0	0	91 900	99 120

Source: Belarusian Research Centre "Ecology", 2015.

Table 6.7: Agricultural and food industry waste, 2009–2013, tons

	2009	2010	2011	2012	2013
Generated	4 819 697	5 258 974	4 584 680	4 874 070	5 227 620
Reuse, recycling	4 749 183	5 183 472	4 377 590	4 855 110	5 269 880
Total disposal	278 064	385 141	448 990	449 580	417 590
Disposal on tailing ponds, sludge fields	5 053	1 506	1 440	9 980	17 550
Disposal on disposal sites	115 228	212 753	226 820	244 360	208 900
Stored on-site	60 905	70 380	120 720	95 070	85 180
Treatment	96 877	100 501	100 010	100 170	105 970

Source: Belarusian Research Centre "Ecology", 2015.

Table 6.8: Waste of mineral origin, 2009–2013, tons

	2009	2010	2011	2012	2013
Generated	7 310 153	9 269 141	8 879 920	8 620 040	9 605 540
Reuse, recycling	5 680 883	7 277 674	6 942 490	6 903 500	12 944 720
Total disposal	1 842 745	2 278 083	2 113 070	2 002 530	1 142 350
Disposal on tailing ponds, sludge fields	677 341	837 811	923 780	968 430	102 250
Disposal on disposal sites	786 328	1 001 027	733 970	694 760	752 040
Stored on-site	373 027	439 131	455 200	339 330	288 010
Treatment	6 144	115	110	20	50

Source: Belarusian Research Centre "Ecology", 2015.

Table 6.9: Waste from chemical industries excluding waste salts, 2009–2013, tons

	2009	2010	2011	2012	2013
Generated	704 240	402 433	428 130	331 840	376 300
Reuse, recycling	188 457	192 231	214 940	228 290	280 400
Total disposal	527 832	220 818	225 970	118 850	122 830
Disposal on tailing ponds, sludge fields	8 309	10 717	10 330	17 070	31 740
Disposal on disposal sites	37 213	48 360	53 880	51 870	41 030
Stored on-site	10 533	16 501	31 110	18 990	20 190
Treatment	472 271	145 241	130 650	30 940	29 860

Source: Belarusian Research Centre "Ecology", 2015.

The waste belonging to the other three groups, which includes health-care waste requiring special attention (Group B), highly infectious waste (Group C) and other hazardous waste (Group D), is sterilized and then sent for disposal, or it is incinerated in hospital boilers. A specialized incinerator for medical waste with capacity of 370 tons per year has operated in Minsk City since 2014. Anatomical waste is burned in crematoria or buried in specially allocated sites in cemeteries. An important instrument is the instruction on health-care waste management, which in fact corresponds to a waste management plan. This instruction defines responsibilities for health-care waste management within a hospital, describes rules for recording generated waste, introduces the principle of waste separation according to waste groups, and describes methods of collection, storage,

disinfection, transportation and disposal of health-care waste.

Data on health-care waste show considerable variations on year-by-year basis (table 6.10). This may indicate incomplete reporting of data in those situations where changes to practice are required by environmental legislation. There is a notable increase in recovered waste in 2013; this may be the result of the availability of sorting facilities for municipal waste.

Radioactive waste

Radioactive waste management in Belarus covers small sources from use in research, medicine and industry. Spent fuel management includes waste from nuclear research and, in the planning stage, waste from the NPP that is under construction. A specific issue for Belarus is the management of radioactive pollution from the Chernobyl NPP disaster.

Small sealed radioactive sources are managed by Ekores. Ekores operates a Radon-type facility located two km from Minsk. The entire facility includes two old underground storage facilities operated from 1963 to 1979, two near-surface solid waste storage facilities built in 1977 and a storage facility built in 2003. The facility was upgraded in 2013, when the conditioned waste storage facility and waste processing facility with laboratories were built. Ekores receives up to three tons of low- and intermediate-level solid waste annually.

A liquid radioactive waste processing facility (commissioned in 2012) is located on the territory of the State Scientific Institution "The Joint Institute for Power and Nuclear Research – Sosny" of the National Academy of Sciences of Belarus, which is 1.2 km from Minsk.

In the period 1985–1987, the mobile NPP "Pamir-630D" was tested in the "Iskra" complex of the State Scientific Institution "The Joint Institute for Power and Nuclear Research – Sosny". Fuel from the reactor core is placed in the pool-type storage within the "Iskra" complex. In 2010, spent fuel was sent to the Russian Federation under an intergovernmental agreement. The spent nuclear fuel storage and management facility "Iskra" is currently being decommissioned.

Collection, transportation, storage and disposal of radioactive waste from decontamination of territories polluted by the Chernobyl NPP disaster is performed by the Republican Specialized Unitary Enterprises "Polessye" (Gomel) and "Radon" (Mogilev). This waste is stored in three categories of decontamination waste disposal facilities:

- Category 1 facility is specialized for waste with specific activity of Cs-137 higher than 100 kBq/kg. It contains in a single facility 3,088 tons in 300 cells with total activity 74.5×10^{10} Bq (20.14 Cu) which were disposed of in 1991;
- Category 2 facility contains radioactive waste with specific activity of Cs-137 from 1.0 kBq/kg to 100 kBq/kg. In total, nine facilities of this category were developed and they store 283,154 tons with total activity 159×10^{10} Bq;
- Category 3 facility was created during the initial post-catastrophe period as emergency sites. There are 81 facilities of this category in Gomel, Brest and Mogilev oblasts.

In addition, one radioactive waste storage facility contains waste from the former location of USSR military forces in Rechitsa, Gomel Oblast.

Belarus is developing an NPP in Ostrovets, Grodno Oblast. Commissioning is planned for 2018. The NPP development includes facilities for radioactive waste and spent nuclear fuel from plant operation. Nuclear fuel spent in the reactors is expected to be temporary stored at the NPP, then it will be transferred to a long term storage site in Belarus and part of it will be sent to the Russian Federation for processing.

Table 6.10: Waste from health care facilities, 2009–2013, tons

	2009	2010	2011	2012	2013
Generated	6 809	4 833	11 080	4 650	8 500
Reuse, recycling	611	1 348	1 450	1 460	4 060
Total disposal	6 338	4 381	9 660	9 650	4 510
Disposal on tailing ponds, sludge fields	0	0	0	0	0
Disposal on disposal sites	2 485	2 977	5 320	5 200	2 820
Stored on-site	35	810	160	170	130
Treatment	3 819	594	4 180	4 280	1 550

Source: Belarusian Research Centre "Ecology", 2015.

By specific streams

Organic – biodegradable waste

Composting of the biodegradable fraction of MSW is not yet developed in Belarus as a component of the waste management infrastructure, nor are there targets in waste management programmes. Experimental separation of biodegradable waste was done under project in Mosty and Kobrin (box 6.1). In rural areas, home composting is done on a voluntary basis.

Used oil

The management of oil products containing waste is rather well developed. At present, nearly 90 per cent of collected waste oils are being reused for energy recovery and for production purposes. Waste is being incinerated in various boiler houses and other installations for production of heat and energy. Several enterprises are processing oil containing waste to prepare waste-derived fuel. According to National Statistical Committee data, 25,000 tons of used oils were separately collected in 2013.

The Belarusian Railways is processing waste oils, oil sludge and water-oil mixtures that are generated from railroad transport operations. The capacity of the facility is 9,500 m^3/year of water-oil mixtures and 1,700 m^3/year of oil sludge.

Recyclables

Separate collection of municipal waste implemented in Belarus includes paper, cardboard, glass and plastics. The amounts of sorted out recyclables is growing, due to investment in development of waste sorting lines and the expansion of separation collection schemes.

A further boost to increasing the yield of recyclables was the introduction of the extended producer responsibility principle in Belarus. The scheme is managed by the state institution "Operator of Secondary Raw Materials", which was founded in 2012.

Belarus has sufficient capacity to process recyclables separated from municipal waste, but it is reaching its capacity. For example, in 2013, the total demand for waste paper processing was estimated at 392,000 tons per year and 284,000 tons of waste paper was collected. Similarly, glass industry demand was estimated at 145,000 tons of waste glass and collection produced 83,000 tons. Collected waste textiles (12,000 tons) exceed processing capacity threefold and the 37,000 tons of collected waste plastics exceed processing capacity almost twofold. The remaining amounts are stored at sorting facilities or exported to neighbouring countries.

Scrap metal recycling

Recycling of ferrous and non-ferrous metals is separated from management of municipal waste. These metals are collected through a network of buy-out points operated by the state company Belvtormet. This company received 773,000 tons of waste and scrap of ferrous metals and 15,400 tons of non-ferrous metals in 2013. Scrap steel represented 85.6 per cent of collected ferrous metals and the most collected non-ferrous metal was scrap of aluminium (50.5 per cent). Collected metals are used for production of various goods by enterprises subordinated to Belvtormet or are traded on the Belarusian Universal Commodity Exchange.

Construction waste

Belarus gives attention to management of construction waste. In total, 1.7 million tons of construction waste were generated in 2013, of which 1.1 million tons were reused. The main fractions of construction waste generated were asphalt from road maintenance, waste from demolition of buildings and reinforced concrete.

The reuse of construction waste ranges from simple use as filling material and an inert layer over disposed waste at district dumpsites to recycling by crushing and sorting to secondary gravel. Disposal of construction waste is limited to 10 per cent of annual input of a disposal site. Crushing of construction materials in mobile units is offered by several companies in Minsk and Brest.

Obsolete pesticides

In the past, Belarus accumulated large quantities of obsolete pesticides. In the period 1970–1990, obsolete pesticides were buried in underground sites, but the latest practice is to store these chemicals in above-ground storage facilities, where they can be inspected and sent for final treatment. Belarus is developing a special facility for storage, treatment and disposal of hazardous waste, including obsolete pesticides, in Dubrovka, in Chechersk rayon in Gomel Oblast.

The latest estimate shows that 10,632 tons of obsolete pesticides were identified in Belarus (table 6.11).

Box 6.1: Pilot projects in Kobryn and Mosty on MSW management

Kobryn (Brest Oblast) and Mosty (Grodno Oblast) had the same waste management situation as other towns in Belarus. Local authorities tried to organize a separate waste collection process but it turned out to be difficult because of poor material and technical resources, the low level of local population awareness in the sphere of separate waste collection and lack of a general strategy. All these factors contributed to the situation, with broken vehicles not taking out the waste, mini-dumpsites emerging around the towns and nearby villages, and people refusing to collect waste separately, resulting in overfilled containers and the self-made sorting plant not working efficiently. Dangerous waste (batteries, accumulators, fluorescent lamps) were disposed of to dumps, which contributes to pollution of groundwater by heavy metals. Disposal of biodegradable waste resulted in generation of methane and carbon dioxide, which are GHGs.

The EU/UNDP project started in 2011 with a survey among the local population to determine the level of environmental awareness, and knowledge of the advantages of separate waste collection and the positive and negative sides of existing MSW management systems. Based on survey results, MSW management strategies were elaborated for Mosty and Kobryn rayons and approved in 2012. Steps to improve the situation were taken with close cooperation of the project team with local authorities, the Ministry of Natural Resources and Environmental Protection, the Ministry of Housing and Public Utilities, municipal services organizations and environmental NGOs. The work was organized as follows:

- A broad information campaign on the positive economic and environmental consequences of separate waste collection was launched; this included interactive lessons for local children, environmental contests and actions, and meetings at enterprises and with residents of apartment blocks;
- Improvement of key elements of the MSW management system in Mosty and Kobryn through purchasing and use of necessary machinery and equipment (more than 1,000 containers [including zinc containers] for plastic, glass, paper, dangerous and large-scale and mixed waste, 14 garbage trucks for different types of waste, and 920 bio-bins);
- Local landfill management: two new bulldozers were procured to ensure effective compression of the waste at the landfill, which can reduce the emission of contaminants into the environment;
- Installation of new sorting plants to ensure effective termination of the separate waste collection process.

The project was evaluated in 2013 and the results indicate the positive impact of implemented improvements. The amount of collected PET bottles and glass has increased by up to 1.5 times. The use of new vehicles has reduced fuel consumption by 1,100 litres over the previous corresponding period. The use of bins for biogenic waste (for the first time in Belarus) will allow the reuse of more than 115 tons of bio-waste as organic fertilizer. More than 50 kg of hazardous waste was separated from MSW during three months of operation of special centres for collecting such waste in Mosty.

Table 6.11: Obsolete pesticide management, 2014

	Amount of obsolete pesticides and their mixtures (tons)				Number of storage sites	
Oblast	**Total**	**Repackaged on-site**	**Repackaged**	**Stored underground**	**Underground**	**Above ground**
Brest	..	..	..	..	0	0
Vitebsk	1 515	550	..	965	3	19
Gomel	6 301	0	3 171	3 130	1	1
Grodno	1 348	1 348	..	..	..	37
Minsk	927	927	..	..	0	69
Mogilev	531	..	..	531	1	0
Total	**10 623**	**2 826**	**3 171**	**4 626**	**5**	**126**

Source: Report on situation in obsolete pesticide management, Ministry of Natural Resources and Environmental Protection, 2014.

This number is a conservative estimate, because clean-up works on individual underground storage sites may reveal additional pesticides or soil polluted by them. The last time such revision had to be done was in connection with the rehabilitation of Petrikovski storage facility, when the original estimate of 1,423 tons increased to 4,823 tons after assessment of the real situation on-site.

Belarus has started the process of transferring pesticides from underground to above-ground storage facilities and to the facility in Chechersk rayon. This is leading to the reduction of the volume of pesticides stored in unsafe conditions and the number of waste storage facilities. Grodno Oblast reduced the number of its storage facilities from 56 to 36 and Vitebsk Oblast from 33 to 19.

A recent, large international project on pesticides targeted rehabilitation of underground storage in Slonim rayon. It was expected that 892 tons of pesticides were buried there, but in reality 2,103 tons of pesticides, polluted packaging and soil were extracted from the storage facility. Of that 1,784 tons were sent to Germany for thermal destruction and the rest was stored in a new above-ground facility.

The majority of works on inventorization, repackaging and storage of pesticides is financed from oblast budgets from allocations on environmental protection.

The development of the facility in Chechersk as the final point for obsolete pesticides found in Belarus is reaching the final stage with the opening of a tender on supply of a hazardous waste incineration plant with capacity of 1,000–1,500 t/y. Currently, the facility in Chechersk is used as a long-term storage facility for hazardous waste, including pesticides. In total, 3,342 tons of repackaged obsolete pesticides, polluted packaging and soil were stored in Chechersk in the period 1999–2014.

The efforts to improve the management of obsolete pesticides are contributing to better environmental quality and the reduction of risks to the population. These are dangerous activities and the risk of accidents is high. In July 2014, a fire in Chechersk facility destroyed 100 plastic containers containing pesticides. The cause of ignition was illegal mixing of various types of pesticides and other waste in a container.

All identified storage facilities for obsolete pesticides are regularly monitored. The vast majority of water samples did not exceed MACs.

Polychlorinated biphenyls

In 2011 the total volume of liquid polychlorinated biphenyls (PCBs) in power capacitors and transformers in Belarus was estimated at 1,560 tons (in both in service or out of service equipment). The total weight of PCB-containing equipment and waste (gross) was equal to some 5,000 tons. The volume of PCBs in out of service equipment totaled 520 tons or 34 per cent from the total volume of accumulated PCBs. By 2011 26,600 power capacitors (47 per cent of their total number) and 38 transformers (13 per cent) were decommissioned and/or put into reserve. As a result of exporting PCB-containing equipment for utilization in France in 2012 the total amount of PCBs in the country decreased by 17 per cent and is equal now at some 1,300 tons.

6.2 Pressures from waste

The examples of negative environmental impact from disposed municipal and industrial waste have a common feature – pollution migration barriers were not installed or they are inadequate. Where generated waste is disposed to a modern landfill instead of an unprotected site, a substantial decrease in environmental impact may be achieved. For example, the JSC Naftan was disposing its waste onto an uncontrolled site until 1995. Then the waste was disposed to a new controlled site and the old site was rehabilitated in 1997. Groundwater monitoring shows that COD pollution has decreased fourfold, comparing its current level to the pre-1997 levels.

When waste is neutralized through thermal treatment, data from the local environmental monitoring are taken into account. Local environmental monitoring is performed for emissions of polluting substances, including dioxins/furans. At present there are no accredited laboratories in Belarus to undertake these analyses. Therefore enterprises use the laboratories located outside Belarus which involves some limitations for the use of obtained information, as well as issues with regard to reliability of results. The enforcement authorities do not have the opportunity to control these substances.

Characterization of pollution sources

The environmental impact of waste disposal is to be described for all waste disposal sites included in the Register of sites for neutralization, storage and disposal of waste. This Register provides information on site, capacity, operational practice, environmental protection measures and type of treated/disposed of waste. Full information on each registered site, including environmental impacts, is provided in detail in the ecological passport of a waste disposal site.

The Register included 67 industrial and 157 municipal waste disposal sites in 2010. Industrial waste sites covered an area of 978 ha, excluding potassium salt waste. The majority (70 per cent) of these sites were located in Gomel and Mogilev oblasts and 60 per cent of industrial waste sites were put into operation before 1990. However, only 22 sites had an ecological passport in 2009. The Register is developing and in 2014 it included 631 sites for short- or long-term storage and disposal of industrial waste.

Only 8 per cent of these sites do not have pollution migration barriers and are a source of significant pollution of groundwater. Groundwater monitoring

wells were operated at 58 industrial waste sites in 2009, typically there are 4–10 wells around one site. Large disposal sites, such as phosphogypsum disposal and hazardous waste treatment and disposal sites, have more than 50 monitoring wells. MACs were exceeded at 73 per cent of industrial waste disposal sites, mostly by nitrogen compounds, mineralization and heavy metals.

Municipal waste disposal sites listed in the Register covered an area of 884 ha, of which 65 per cent was occupied by waste in 2009. Only 34 per cent of the sites had an ecological passport, but about 75 per cent of them monitor groundwater quality and have natural or artificial barriers to control the spread of pollution.

Negative impact on the environment was observed at 63 per cent of the municipal waste disposal sites, where MACs were exceeded for a range of compounds, mainly nitrogen compounds, oil-based substances and salts. This figure also indicates that pollution control barriers are not sufficient to stop pollution from disposal sites. In addition, small disposal sites were not included in the evaluation of environmental impacts.

Water

In Belarus, there is an increased risk of groundwater contamination from disposal sites, especially in marsh areas, because the groundwater level is near to the surface. For example, investigation in the Minsk Oblast shows that the groundwater layer in some areas is only three metres beneath the surface, or less.

Rainwater transports soluble salts to the Soligorsk water reservoir and to the Sluch River. Before the development of the potassium industry, concentration of chlorides in the Sluch River in the period 1959–1963 was about 14 mg/l. Mining activities in the period 1968–1976 resulted in an increase to 100 mg/l. Implementation of pollution control measures in 1974–1975 reduced salinity to 40 mg/l.

Groundwater is also strongly affected. Significant quantities – estimated at more than 35 million tons – of chloride salts that migrated to groundwater and increased the values of chlorides are observed in an area of 3,000 ha to a depth of 100–120 m. This pollution is spreading and represents a serious threat to drinking water resources in the south of Belarus.

Chemical industries in Gomel are producing large amounts of phosphogypsum waste, resulting from production of phosphorus-based fertilizers. This waste also contains residues of fluorides, sulphuric acid and phosphoric acid, resulting in its high acidity (pH 2.8–3.5). Phosphogypsum waste occupies an area of 89 ha, reaching 50–60 m in height. The polluted area of shallow groundwater is estimated at 600 ha, and MACs are exceeded for mineralization by 8 times, for sulphates by 10–15 times, for fluoride by 40 times and for phosphates by 4 times.

In 1951–2000 two companies in Bobruysk and Rechitsa accumulated 3.36 million tons of lignin waste. Except for lignin, this waste also contains sulphuric acid and products of lignin decomposition: formaldehyde, methanol, phenols and phenantrene. Concentration of sulphate ions in the groundwater 500 m from the waste heap, where it can influence water in the Derazhnya River, is around 20 mg/l. Lignin decomposes due to natural processes, and at a distance of over 300 m from the waste site, compounds from the site do not exceed MACs.

Soils

Mining and chemical industries present sources of soil pollution. Mainly in Soligorsk, soil is exposed to the threat of subsidence of the earth's surface caused by large-scale underground mining and increased salinity from wind-borne salts.

Wind erosion of industrial waste heaps in Gomel can transport fluorides, sulphates and phosphates to neighbouring areas and decrease the quality of agricultural land.

The impact of mini-dumpsites on soils was not investigated, but they risk polluting surrounding soils by littering.

Air

Air pollution from waste is caused mainly by fires. According to the Ministry of Emergency Situations, firefighting units were deployed to burning waste in 32,881 cases, accounting for 75 per cent of all fires in 2013. Although this number does not distinguish between fires on dumps, on container stands or just in small amounts of littered waste, waste fires are frequent. In addition, increased risks are connected with industrial waste, for example, accumulated lignin waste has the potential to self-ignite, which may result in emissions of dioxins.

Human health

Emissions, whether solid, liquid or gaseous, have a negative impact on human health. Therefore, buffer areas were defined and established around sites and facilities where waste is stored, treated or disposed in

Belarus. For example, disposal sites for municipal and industrial waste have to be at least 1,000 m from residential areas and waste incineration and treatment facilities at least 500 m. However, rapid development of housing in Minsk and in industrial centres is causing the expansion of new residential quarters into these buffer zones. For example, the village of Bolshoy Trostenets is 0.7 km and Maliy Trostenets 1 km from the disposal site Trostenets. Residential areas are 400–500 m from Borisov disposal site. The oldest waste lignin site in Bobruisk is located within the town.

6.3 Legal, policy and institutional framework

Legal framework

Waste management is regulated in line with international standards but, due to its history, differs in terminology and is using specific regulatory instruments. The legislation has developed from sanitary norms regulating the cleaning of towns from garbage, and then standards for disposal operations were added. The latest development in waste management legislation is focused on recovery of recyclables through separation and sorting. Belarus authorities actively amend existing legislation on waste to reflect developments in the waste sector. However, although legislation is in place, full implementation has not yet been achieved, especially in construction of controlled landfills and identification of the impact of waste management activities on the environment. Moreover, the legislation does not support specialization. Without specialization, incentives to build modern landfills, install weighbridges, introduce gate fees and improve data on municipal waste are limited.

The 2007 Law on Waste Management adopted in place of the 1993 Law, introduces modern principles of waste management, including minimization of waste generation, the importance of recycling and reduction of the negative impact of waste on human health and the environment. It defines MSW as waste from consumption, and similar waste from production and industrial waste as waste from production. The Law defines "waste generation norm" as the maximum allowable amount of waste which is generated by a unit of produced material or energy. The Law also requires the definition of limits on the amount of waste that can be stored and that can be disposed of for a given time period. In addition, the Law defines the responsibilities of state administration in waste management, requires the preparation of national and territorial programmes on waste management, enables economic incentives supporting improvements in waste management and defines the procedure for assigning hazard classes to generated waste.

Further, the Law stipulates the responsibilities of legal and physical persons in waste management. Attention is given to waste management planning, data collection and reporting, monitoring of waste generation activities and training of personnel. Specific requirements are set for waste generators, operators of waste management facilities and operators servicing the municipal sector. The Law on Waste Management bans the dumping of recyclables in disposal sites.

The Law requires that industrial waste management is regulated by the instruction on waste management. Municipal waste generated in residential areas shall be collected and disposed of according to a municipal waste management scheme. Waste generated in other than residential areas, for example, cooperatives, protected or recreational areas, also has to be collected and disposed of according to an approved waste management scheme. The instruction and scheme in fact correspond to the generator's waste management plan and must be approved by territorial bodies of the Ministry of Natural Resources and Environmental Protection.

The Law also introduces extended producer responsibility for waste generated from goods which have lost their original properties. Waste should be separated at source according to types defined in the classification and stored or disposed of only in designated areas.

The Law is supported by extensive secondary legislation (regulations, technical standards, sanitary standards, etc.). These are approved by the resolutions of the Council of Ministers or of the Ministry of Natural Resources and Environmental Protection, Ministry of Housing and Public Utilities or Ministry of Health. Activities concerning the collection and processing of recyclables are regulated by decrees of the President.

The 2010 Resolution of the Council of Ministers "On selected issues related to waste management" No. 1104 introduces the implementing regulations for the Law on Waste Management. These include the Regulation on approval of instruction for industrial waste management; Regulation on approval of schemes for management of waste generated in garage cooperatives, dacha cooperatives and other cooperatives as well as on lands of nature protection, resort, recreation and historic and cultural purposes; Regulation on the procedure of issuing, suspending and cancelling permits for the storage and disposal of

waste; Regulation on registration of waste recycling facilities, storage and disposal facilities; and Regulation on approval of waste generation norms. The provisions of Resolution No. 1104 are further detailed by the 2010 Resolution No. 44 of the Ministry of Natural Resources and Environmental Protection "On selected measures to implement Resolution No. 1104 of the Council of Ministers dated 23 July 2010".

The 2012 Decree of the President No. 313 "On selected issues related to management of waste from consumption" introduces procedures for implementation of extended producer responsibility and the list of recyclables regulated by these procedures, and defines recovery targets for municipal waste (waste from consumption) and for packaging. Producers or importers of plastics, glass, paper, cardboard, kitchenware, tableware and composite packaging are required to recycle these recyclables by their own collection schemes or they have to enter a contract with an operator organizing collection, treatment and reuse. Retail shops should provide space for collecting recyclables and packaging on their premises. Recyclables collection targets for municipal waste are 15 per cent in 2015, 20 per cent in 2017 and 30 per cent in 2020. Packaging collection targets are 35 per cent in 2015, 40 per cent in 2017 and 50 per cent in 2020. There is no progress report evaluating the achievement of these targets.

The 2012 Resolution of the Council of Ministers No. 708 supplements the Decree of the President No. 313 by defining rights and responsibilities of the operator organizing collection, treatment and reuse of recyclables and packaging. This Resolution also sets product fees that are collected from importers and producers for products which will became waste, and payments for collected recyclables and packaging.

Collection of data on waste is defined in the 2014 Resolution No. 27 of the Ministry of Natural Resources and Environmental Protection. They are also laid down in the TCP 17.02-12-2014 (02120) "Environmental protection and nature use. Procedures for inventory on environmental protection and for completion of accounting forms on environmental protection".

Rules for transportation of waste are defined in the 2008 Resolution No. 112 of the Ministry of Natural Resources and Environmental Protection "On approval of the form of the passport accompanying the carriage of waste from production and the Instruction on the procedure of its preparation".

An inventory of waste generated in a production facility should be prepared according to the 2008 Resolution No. 17 of the Ministry of Natural Resources and Environmental Protection "On approval of the Instruction on the procedure of inventory of waste from production". Results of the annual waste inventory are used for development of instructions for waste management and accounting of waste management, preparation of documents for obtaining a permit for storage and disposal of waste from production, calculations of limits for the storage and disposal of industrial wastes, approval of norms for waste from production and reporting on waste to the National Statistical Committee.

For municipal waste, standards are set in accordance with the 2003 Regulation No. 18/27 of the Ministry of Housing and Public Utilities and the Ministry of Natural Resources and Environmental Protection "On approval of the Rules of setting standards for generation of municipal waste".

Health care waste is regulated by the Sanitary rules and standards 2.1.7.14-20-2005 "Rules for medical waste management" approved by 2005 Resolution No. 147 of the Chief State Sanitary Officer. Health-care waste is divided into four groups:

- Group A – non-hazardous waste, which includes recyclables, organic and other waste;
- Group B – health-care waste requiring special attention, specifically anatomical waste, sharps, pharmaceutical waste and waste polluted by body liquids, infectious waste and cytostatics;
- Group C – highly infectious waste;
- Group D – other hazardous waste, similar to industrial waste.

The "Rules for medical waste management" require that medical waste is managed according to an instruction for health-care waste management. The Ministry of Health prepared a sample instruction to help health-care facilities to adopt proper waste management methods. This regulation is aligned with the Law on Waste Management in reference to waste classification, record keeping and statistical reporting. Each health-care facility has to assign a person responsible for waste management. Personnel handling waste must be trained.

Health-care waste, except Group A, has to be collected and stored in single-use containers. The "Rules for medical waste management" provide recommended methods for safe management of health-care waste, for example, incineration, pyrolysis, sterilization by heat and chemical disinfection.

The key legislative act establishing radioactive waste safety requirements is the 1998 Law on Radiation Safety of the Population.

The 2008 Law on the Use of Atomic Energy establishes requirements on management of spent nuclear materials and operational radioactive waste, as well as storage facilities.

The 2012 Law on Sanitary and Epidemiological Well-Being of Population specifies, among others, obligations of organizations dealing with sources of ionizing radiation, including radioactive waste.

Management of Chernobyl-originated radioactive waste is governed by the 2012 Law on Legal Regime of Territories Exposed to Radioactive Contamination as a Result of the Chernobyl NPP Disaster, which is further supported by several technical codes of practice and sanitary rules and standards.

Strategies and programmes

The State Programme of Collection (Procurement) and Processing of Recyclables for 2009–2015, approved by 2009 Decree of the President No. 327, was updated in November 2012 and is aimed at increasing volumes of recyclables and development of new processing facilities.

The Programme describes the situation in recovery of recyclables in 2008 and specifies expected demand for recyclables until 2015. It envisages implementation of extended producer responsibility for selected recyclables, development of economic measures supporting collection and processing of recyclables, and increasing demand for secondary materials.

Actions envisaged by the Programme include installation of new waste sorting lines, extension of the network of buy-out points, increase of containers for separate collection at source and provision of equipment for companies collecting recyclables, and specifies volumes of collected recyclables that are expected to be achieved by 2015.

The Programme is being implemented and data from 2013 indicate that targets set in this programme are achievable. Table 6.12 shows actual volumes of separation in 2008, 2013 and 2014 and the target volume for 2015. This was achieved by increasing the coverage by separate collection and new waste sorting facilities.

The Concept for Municipal Waste and Recyclables Management for the years 2014–2020 was approved by the 2014 Order of the Ministry of Housing and Public Utilities No. 78. It provides examples from international practice, describes the current situation in Belarus and defines directions for further development and improvement of municipal waste and recyclables management.

Key problems in the current MSW management system identified in this document include the insufficient level of waste fees, which do not cover costs of service provision, and that the system of separate collection needs further development, planning of waste management infrastructure at oblast level is not sufficiently coordinated and the polluter-pays principle is not well emphasized in the legislation.

Main directions for the development of municipal waste management for the period 2014–2020 are aimed at the expansion of separate collection of recyclables in combination with the development of waste sorting facilities. The network of buy-out points for recyclables should also increase, but they should develop into household waste recycling centres, where recyclables and other fractions can also be collected free of charge. The collection of packaging at source should be developed in line with the extended producer responsibility principle.

Table 6.12: Implementation of the State Programme for Collection (Procurement) and Processing of Recyclables, selected years, thousand tons

	Actually collected in 2008	Actually collected in 2013	Actually collected in 2014	Target set for 2015 in Programme
Paper and cardboard	174.9	284.4	329.4	450.0
Glass	28.0	83.2	122.9	145.0
Plastics	17.1	37.2	47.9	43.0
Textiles	8.8	12.3	12.0	13.0
Used tyres	13.1	37.0	39.6	45.0

Sources: State Programme for Collection (Procurement) and Processing of Recyclables, Ministry of Natural Resources and Environmental Protection, 2013; Vtoroperator, 2014.

Modernization of existing sorting facilities and development of new ones should be supported by an improved tariff policy, attraction of investment and the creation of a competitive environment.

The expected targets of this document to be achieved by 2020 include an increase in the waste fractions separated from municipal waste for secondary use, an increase in municipal waste undergoing separation to more than 1 million tons per year and gaining more than 815,000 tons of recyclables. An ambitious target is to operate municipal waste management on self-financing principles. It is also expected that the private sector will provide investments in waste management services.

The 2015 Strategy for Integrated Municipal Solid Waste Management in Minsk Oblast for 2015–2029, approved by the Minsk Oblast Council of Deputies decision No. 86, presents measures for improvements of municipal waste management for the period 2015–2029. Besides strengthening separate collection and increasing the number of containers for separate and mixed waste, the strategy aims to optimize waste collection and disposal by introducing a regional approach, and proposes division of Minsk Oblast into seven collection areas. This is a new feature compared with documents developed in other oblasts and, when implemented, would result in operational cost savings and enable the development of modern landfills. The estimated cost of introduction of this new system for Minsk Oblast is estimated at €8.3 million.

The 2011 National Implementation Plan under the Stockholm Convention on Persistent Organic Pollutants for 2011–2015, approved by the 2011 Decree of the President No. 271 (as revised by the 2012 Decree of the President No. 153) is the second plan since Belarus acceded to the Stockholm Convention in 2003. The plan is aimed at protecting human health and the environment from the impact of POPs. Objectives of this plan are to provide for environmentally sound storage and destruction of the POP wastes that are presently stocked in the country, as well as detection, survey and cleaning of POP-contaminated areas, development of the national system of environmental and human health monitoring in relation to the impact of POPs, and improvement of control over accidental release of POPs in the process of production. The plan also targets improvement of the legislation, registration of, research and public awareness on POPs management. The budget allocation for implementation of this plan in 2011–2015 amounts to 72,875.4 million roubles.

The Strategy for the Management of Radioactive Waste from Belarusian NPP, approved by the 2015 Resolution of the Council of Ministers No.460, outlines the strategic approach to the management of radioactive waste from operation of the NPP which is under construction. The document refers to principles of safe management of radioactive waste defined by procedures of the International Atomic Energy Agency and specified in the design documentation of the NPP. Expected sources of radioactive waste are aerosols trapped in air filters protecting controlled zone, drain water and solid waste from NPP operation. It is expected that the NPP will generate annually about 33 m^3 of waste from waste water per each of two reactors with reserve for emergency situation of 57 m^3. Generation of solid waste is estimated to 40 m^3 of very low and low activity waste, 5 m^3 of medium activity waste and 0.5 m^3 of high activity waste. This waste will be stored is surface-type storages (one per reactor), enclosed in single-use containers with capacity of 1.5 m^3 of radioactive waste.

High activity waste will be stored at NPP during its entire operation period and less radioactive waste will be stored for 10 years. Capacities of storages were estimated to 4,900 m^3 for very low and low activity waste, 600 m^3 for medium activity waste and 60 m^3 for high activity waste.

Long-term planning under this Strategy envisages identification of suitable long-term storage site and declaration of intent for its design and equipment by 2023. Design work for this site should be completed by 2026 and the start of operation is planned for 2028.

For financing of radioactive waste management it is expected to establish a fund for increasing radiation safety of nuclear facilities which will finance research and construction of mentioned facilities. A fund for financing NPP decommissioning is also to be established.

Institutional arrangements

The President of the Republic of Belarus defines the national policy in waste management and conditions for financial support to waste management companies, and approves national waste management programmes. The President also defines targets for waste recycling and the list of goods that are subject to the extended producer responsibility system.

The Council of Ministers is responsible for ensuring implementation of national policy and defining rules for issuing permits for import, export and transit of

hazardous waste as well as the level of monetary deposits for import or transit of hazardous waste in Belarus. These permits are issued by the Ministry of Natural Resources and Environmental Protection.

The Ministry of Natural Resources and Environmental Protection plays a coordinating role in waste management regulation and implementation, excluding recyclable materials.

The Ministry of Housing and Public Utilities implements the national policy of municipal waste management, including definition of technical operational standards, and coordinates collection and processing of recyclables through a specialized company.

The Ministry of Health is responsible for establishing hygienic norms and standards for waste removal from residential areas. This Ministry is specifically responsible for regulating management of waste generated by health-care facilities.

The Ministry of Energy is responsible for management of radioactive waste and development of facilities for its safe storage.

The Ministry of Emergency Situations is responsible for development and implementation of national plans for management of explosive and flammable waste.

The Ministry of Trade is responsible for permitting import and export of hazardous waste to and from the territory of the Customs Union, as well as suspending, renewing or cancelling these permits.

In cooperation with the Ministry of Health and Ministry of Emergency Situations, the Ministry of Natural Resources and Environmental Protection approves the Classification of generated waste, including definition of the level and class of hazard for individual waste types. Together with the Ministry of Health, Ministry of Emergency Situations and Ministry of Housing and Public Utilities, the Ministry of Natural Resources and Environmental Protection defines the requirements for preparation of the instruction for waste management for industrial waste and, in cooperation with the Ministry of Health, defines the requirements for preparation of the municipal waste management scheme. The Ministry of Natural Resources and Environmental Protection, in cooperation with the Ministry of Housing and Public Utilities, defines rules for collection, recycling and disposal of waste.

Local councils of deputies approve territorial waste management plans. Local executive and administrative bodies prepare and implement territorial waste management plans, organize collection of municipal waste, operation of waste disposal sites and collection of recyclables. They are also responsible for implementing measures to prevent negative impact of waste on human health and the environment.

The SI “Operator of Secondary Raw Materials” organizing collection, treatment and reuse of recyclables and packaging is a state institution established by the Ministry of Housing and Public Utilities for implementation of the extended producer responsibility principle in Belarus. This organization receives product fees and distributes payments for collected recyclables and packaging.

Regulatory, economic and information instruments

Waste generation norms are defined from the material balance of a production process. Waste disposal norms are defined depending on the amount of recyclables present in the generated waste. On the one hand, this approach creates a baseline against which waste generators are inspected, but on the other hand, it may lead a waste generator to report waste “as expected” by the established/normed amounts.

Financial instruments are aimed at achieving full cost recovery of municipal waste management. Collection companies operating in an oblast have to calculate and report a cost-based waste fee for collection and disposal in relation to the subsidized waste fee actually collected from the population. This benchmarking helps with the comparison of waste fees between oblasts and the level of required subsidy from the central budget.

According to 2015 data, the collected waste fee represents, on average, 85 per cent of the cost-based fee.

Cross-subsidizing is still present in the financing of waste management. Waste fees for commercial entities are higher than for residents and the practice shows that private recycling companies prefer commercial waste over municipal waste (chapter 3).

The waste fee in Belarus does not distinguish between collection fee and disposal fee. This is not a problem if collection and disposal services are

provided by the same company, as it is commonly the case in Belarus. But, in a situation as in Minsk, where these two activities are separated, the company operating the disposal site has to cross-subsidize operation of the disposal site from income generated by waste sorting and other activities.

Information campaigns in waste management are primarily focused on increasing separation of recyclables. The "Operator of Secondary Raw Materials" initiated the campaign "Target 99", which presents to the public possibilities of where to bring recyclables and what recyclables and waste fractions are covered by the existing collection schemes. In 2015, the same company started a competition between schools, "Planet without Waste", on collection of paper and PET bottles.

Waste-related global agreements

Belarus has joined the key global agreements on hazardous waste management and management of radioactive waste. Implementation of all these international agreements is supported by legislation. Belarus created relevant institutional frameworks for implementation of these agreements.

Belarus acceded to the Basel Convention in 1999 and developed a national system of control on import, export and transit of waste. Permits for transboundary movement of waste are issued by the Ministry of Natural Resources and Environmental Protection. Import of waste is permitted only for recycling. Belarus completed alignment of regulations for transboundary movement of waste with the Eurasian Economic Union. To ensure that transport of waste is completed as intended, a deposit of €40 per ton is required of imported or transited waste.

Key partners of Belarus in export of waste are Latvia, Poland, the Russian Federation and Ukraine. Waste imports originate mainly from Ukraine, Poland and Germany. The main commodities in transboundary movements are ferrous and non-ferrous metals.

Belarus exported 823.1 tons of PCB containing waste to France under the Basel Convention in 2012. This represents 17 per cent of PCB waste identified in country. Belarus also exported 1,784 tons of obsolete pesticides to Germany in 2013.

Belarus acceded to the Stockholm Convention on Persistent Organic Pollutants in 2004. This Convention helps Belarus to prepare programmes and action plans to minimize the negative impact of obsolete pesticides, PCB-containing equipment and other POPs on human health and the environment.

Belarus signed the Minamata Convention on Mercury in September 2014 and has drafted a roadmap towards ratification, which is expected in 2016. No inventory of mercury, mercury compounds and products containing mercury was carried out in sectors such as healthcare (which uses equipment containing mercury) and energy (which uses relays with a mercury switch as well as luminescent lamps containing mercury).

The Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management was ratified by Belarus in 2002 and entered into force for Belarus on 24 February 2003. The Fifth National Report of 2014 on implementation of obligations deriving from the Convention requirements encompasses activity and events of the period following the year 2012.

Projects

Belarus participated in the EU-funded Waste Governance project for ENPI-East countries in 2009–2013 with a total budget of €5.8 million. Under this project, the Puhovichi rayon was selected as a pilot rayon, where an inventory of disposal sites, a waste management strategy and a modern landfill project were prepared. The EBRD is considering financing the construction of an EU-compliant regional sanitary landfill, together with a sorting facility, composting facility and vehicles and equipment for improvement of the waste collection system for the Puhovichi and Cherven rayons.

In the period 2011–2014, the large-scale and multi-target EU/UNDP project "Support to the development of a comprehensive framework for international environmental cooperation in the Republic of Belarus" was launched in Belarus to work on all environmental issues (the project budget is €5,159,469). Under the project, national and international experts work on improving environmental legislation on biodiversity conservation, MSW and water management, and ecological certification. One of the activities related to waste is pilot projects in Kobryn and Mosty on MSW management (box 6.1).

The World Bank provided US$42.5 million to the Integrated Solid Waste Management Project, which supports the design, construction, and supervision of a 120,000-ton-per-year modern mechanical waste separation plant in Grodno and improvement of the collection of separate waste in the city. The initiative seeks to recover recyclable materials and includes the implementation of public information and awareness-

raising activities. This project component started in 2010 and is expected to end in 2016.

The second component (2010–2013) of this project was financed by the Global Environment Facility to the tune of US$26.7 million. It helped to strengthen the national capacity to manage hazardous waste specifically that associated with POPs, and supported Belarus in meeting its obligations under the Stockholm Convention.

6.4 Conclusions and recommendations

Waste management in Belarus relies on a strong legal framework, which is being updated and follows international practice, especially in collection of recyclables. However, past waste management practices and limited financing have a negative influence on the speed of modernization of waste management services.

The key challenge facing waste management in Belarus is the transformation of disposal practice, from small disposal sites to oblast-controlled landfills. The first step is already achieved, by formulating and adopting the Strategy for Integrated Municipal Solid Waste Management in Minsk Oblast for 2015–2029 that aims at optimization of waste collection and disposal by introducing a regional approach, and proposes the division of Minsk Oblast into seven collection areas. This is a new feature compared with documents developed in other oblasts and, when implemented, would result in operational cost savings and enable the development of modern landfills.

Recommendation 6.1:
The Ministry of Natural Resources and Environmental Protection and the Ministry of Housing and Public Utilities should support:

(a) Minsk Oblast authorities in the implementation of the Strategy for Integrated Municipal Solid Waste Management in Minsk Oblast for 2015–2029;
(b) Preparation of waste management programmes for all oblasts.

Although there is little information available on the use of mini-dumpsites, it can be assumed that these sites present risk to the environment and human health. The practice of using mini-dumpsites is outdated. Experience from other countries shows that abandoning such practice is a long process. It requires redirection of waste to new disposal sites, and evaluation of potential risks from mini-dumpsites and their rehabilitation.

Recommendation 6.2:
The Ministry of Natural Resources and Environmental Protection and the Ministry of Housing and Public Utilities, in cooperation with oblast authorities, should prepare a plan to gradually phase-out mini-dumpsites, develop a methodology for risk assessment of these sites and prioritize their rehabilitation, with the aim to reduce their impact on human health and the environment.

The current legislation and practice of waste management assumes that the waste collector and operator of a disposal site is the same legal entity. One of the preconditions for successful modernization of waste management is the division of these two functions into different entities, as is done in Minsk, for example. This change would enable greater involvement of private business in waste management and increase the effectiveness of waste management services through specialization. Currently, as waste legislation does not support specialization, there is little incentive to build modern landfills, install weighbridges, introduce gate fees and improve data on municipal waste.

Recommendation 6.3:
The Government should consider the introduction of legislative changes to allow waste companies to specialize in collection only or in operation of waste disposal/processing facilities.

Management of industrial waste is well organized at the level of generation and recovery, but disposal practice is behind international practice, especially for sites storing waste generated in large volumes in the past. The impact of these sites on the environment is known in the most outstanding cases, but methodology for comparable evaluation of risks is not in place. Rehabilitation of large industrial waste sites may be very costly, but this is an opportunity for involving international donors, who can provide the necessary financing and expertise.

Recommendation 6.4:
The Ministry of Natural Resources and Environmental Protection and the authorities responsible for industrial waste sites management should consider developing a hotspot list of industrial waste sites based on risk assessment as well as investigating opportunities for involving international donors in the rehabilitation of industrial waste disposal sites.

The definition of waste in Belarus encompasses a much wider range of materials than in international practice; it also includes by-products or materials which can be reused in on-site production. The

approach to regulating municipal waste is based on cubic metres, which causes uncertainty in reporting data on municipal waste. Reported waste data cannot be directly compared with waste data from other countries. Monitoring of waste in Belarus is carried out at the point of generation, while international practice is to record waste data on the input to a treatment or disposal facility. As a result of this approach, the reported amount of industrial waste recovery is high, often exceeding the real amount of generated waste. Such an approach may also cause difficulties in communicating the achievements of Belarus in waste management in international reporting.

Recommendation 6.5:
The Ministry of Housing and Utilities should consider aligning the definition of waste with international practice and making appropriate legislative changes to fully introduce regulation of municipal waste management in tons.

The Minamata Convention on Mercury is designed to protect human health and the environment from anthropogenic emissions and releases of mercury and mercury compounds. It is expected that, over the next few decades, the Convention would enhance the reduction of mercury pollution from targeted activities responsible for the major release of mercury to the immediate environment. A roadmap towards ratification was drafted in Belarus. No inventory of mercury and products containing mercury was carried out in the health and energy sectors.

There are no accredited laboratories for dioxins control in Belarus.

Recommendation 6.6:
The Government should:

(a) Carry out an inventory of mercury and products containing mercury;
(b) As soon as appropriate capacities for implementation are available, ratify the Minamata Convention on Mercury;
(c) Establish a laboratory for dioxins control.

Chapter 7

BIODIVERSITY AND PROTECTED AREAS

7.1 Current situation and trends in ecosystems and species

Landscapes

Belarus has four distinctive geographic regions, which contain critical habitats that support biodiversity and specific land use activities impacting on these habitats:

- Northern lake district – mostly forested bogs and lakes in the north;
- Polessye lowlands – wetlands, rivers and swamps associated with the Pripyat River basin in the south;
- Moraine plains – elevated plains with remnant steppe elements in the east, often used for agriculture;
- Mixed conifer and deciduous forest – European broadleaf and taiga forests, often converted to agriculture in the west.

Ecosystems and species

Terrestrial ecosystems occupy 11.623 million ha, or 56 per cent of the country's surface; those ecosystems are composed of forests – 8.653 million ha (74 per cent), shrubs – 0.771 million ha (7 per cent), natural meadows – 0.889 million ha (8 per cent), marshes – 0.847 million ha (7 per cent) and water bodies – 0.463 million ha (4 per cent).

During the period 2009–2014, forest cover increased from 38.5 per cent to 39.6 per cent. The area of wetland preserved in its natural state has not changed and is about 867,000 ha. However, forest swamps, bushes and reeds are degraded because of the overgrowth of open areas. Floodplain degradation is observed as a result of the overgrowth of shrubs and meadow as well as the expansion of invasive species. In the same period, the area of grassland decreased by 121,900 ha, or 3.86 per cent.

There are 107 wild species of trees and bushes in Belarus, of which 28 species are trees and the others bushes and shrubs. Pine is the most common species in Belarusian forests, accounting for more than half (55.7 per cent) of the forest resources in the country and for 50.6 per cent of wooded land. The remainder is composed of birch (18.6 per cent), spruce (11.1 per cent), alder (9.1 per cent), oak (2.9 per cent), aspen (2.0 per cent) and other species (0.6 per cent).

Many rare and endangered animal species live in the old coniferous forests, including the flying squirrel, brown bear, badger and European lynx. The forests are also home to rare birds such as the osprey, short-toed eagle, hobby, merlin, three-toed woodpecker, Ural owl and Tengmalm's owl. All these species thrive in coniferous stands interspersed with peatlands and marshes. Coniferous forests also provide a habitat for reptiles and amphibians such as the smooth snake and Natterjack toad.

There are 200 species of edible mushrooms growing in the forests. Around 20 of them are harvested, including the king bolete, chanterelle, orange-cap boletus, rough-stemmed boletus, yellow-footed bolete and conical morel.

River ecosystems are rich in freshwater fish species, including carp species such as bream and roach, along with pike, catfish, groundling, river perch, stickleback and eel species.

Threatened species

The 2014 fourth Red Data Book contains 505 species, of which there are 202 species of animals (188 in the third edition) and 303 of plants (293 in the third edition) (table 7.1). Belarus published the third edition of the Red Data Book for animals in 2004 and for plants in 2005. Fishes listed in the Red Data Book include sterlet (*Acipenser ruthenus*), brook trout (*Salmo trutta*), grayling (*Thymallus thymallus*), barbel (*Barbus barbus*) and others. The European bison population is currently threatened and ex-situ protection is carried out to form a genetically stable population in the natural habitat. There are conservation plans for rare species of wild animals and plants. In 2011–2014, conservation plans were developed and approved for 31 plant species and 11 animal species. Management plans were also approved for each of the eight micro-populations of the European bison.

Photo 7.1: White Water-lily

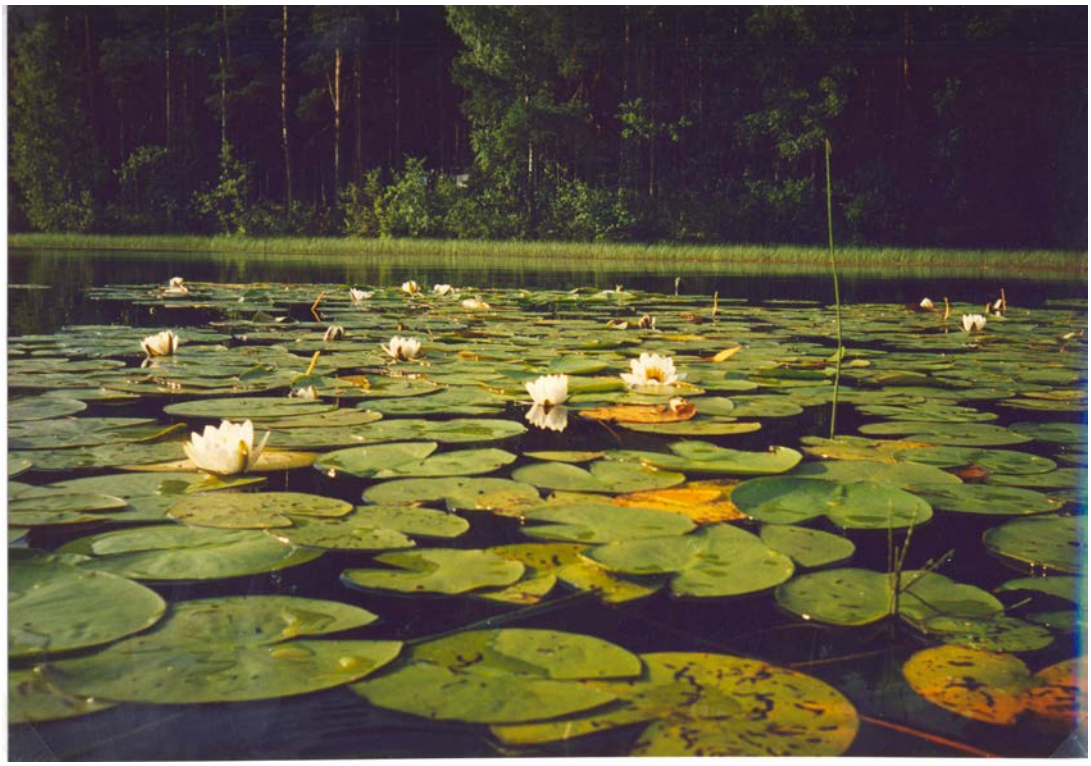


Table 7.1: Rare and endangered wild fauna and flora species listed in the Red Book of the Republic of Belarus or protected under international treaties to which Belarus is a Party, 2010–2014, number

	2010	2011	2012	2013	2014
Plants	274	293	293	293	303
Mammals	17	17	17	17	20
Birds	71	71	71	71	70
Reptiles	2	2	2	2	2
Amphibians	2	2	2	2	2
Fish and fish-shaped	10	10	10	10	10

Source: Environmental Protection in the Republic of Belarus 2010–2014, Statistical book, National Statistical Committee, 2015.

Endemic species

Belarus has no endemic species of animals. Only four plants are classified as endemic: *Tragopogon gorskianus Rchb.f.*, *Tragopogon bjelorussicus*, *Gypsophila belorossica Barkoudah* and *Alchemilla pallecisa*. No programme is developed or implemented to protect them.

Alien species

One of the main water corridors through which invasive species from the Black and Caspian Seas penetrate Central and Western Europe passes through the territory of Belarus.

About 300 species of alien invasive plants have been enumerated in Belarus during the last 50 years, while people have intentionally imported roughly 1,500 different species of trees and shrubs and 5,000 herbaceous plants. In Belovezhskaya Pushcha National Park, more than 120 non-native species of trees and shrubs have been discovered. In the Berezinsky Biosphere Reserve, the most common invasive plant is Sosnowsky's hogweed, which was brought into Belarus for processing into silage. The situation is similar in national parks and preserves, where alien plant species make up 10 to 20 per cent of the local flora.

The total number of invasive animal species is 30.

Hunting

Belarus has 50 game species, of which 21 are mammals and 29 are birds, and 31 commercial fish

species, which have yielded an average 803,060 tons annually during the last decade. The list of game species, which are hunted, is established by the 2005 Decree of the President No. 580 "On selected measures to improve the efficiency of game and fisheries management and improve public management thereof".

In the period 2010–2014, the elk population in husbandries increased by 32 per cent while the number of hunted animals increased by 56.2 per cent (tables 7.2 and 7.3). Game husbandries regulate the number of foxes, in the course of implementation of activities to combat rabies, and consequently their number decreased by 26.3 per cent over this period. Despite the decrease in hunting in the last three years, the populations of grouse and capercaillie continue to decline.

The decrease in the number of wild boar in 2013–2014 is due to efforts to combat swine fever. On 21 June 2013, African swine fever was detected in a village of the Grodno Oblast and, by August, it had spread to other regions of Belarus. This highly contagious disease caused up to 100 per cent mortality of livestock. The Government had to take preventive measures to fight the outbreak, such as killing livestock on large pig farms as well as those owned by private households, and reducing wild boar populations in husbandries.

Table 7.2: Population of major game species, 2010–2014, thousand

	2010	2011	2012	2013	2014	Change 2010-2014
Elk	22.8	24.3	26.9	27.9	30.1	32.0
Red deer	9.4	10.0	11.3	12.2	13.6	44.7
Boar	69.7	74.0	77.8	80.4	8.6	-87.7
Roe deer	69.1	69.5	73.3	74.0	71.5	3.5
Squirrel	118.3	113.7	126.7	111.1	102.4	-13.4
Hare	161.3	169.4	161.3	154.1	152.8	-5.3
Fox	40.3	42.7	37.0	33.8	29.7	-26.3
Muskrat	36.9	32.3	35.1	27.6	24.4	-33.9
Mink	21.4	21.6	23.7	22.3	22.5	5.1
Beaver	63.3	60.5	64.4	62.0	63.4	0.2
Bear, number	111.0	117.0	110.0	123.0	119.0	7.2
Wood grouse	8.9	9.3	8.9	9.1	8.2	-7.9
Black grouse	37.4	37.9	36.1	34.6	39.9	6.7

Source: Environmental Protection in the Republic of Belarus 2010–2014, Statistical book, National Statistical Committee, 2015.

Table 7.3: Hunted (extracted) major game species, 2010–2014, thousand

	2010	2011	2012	2013	2014
Elk	1.6	1.9	2.4	2.5	3.3
Red deer	0.7	0.7	0.8	0.9	1.1
Boar	25.9	28.4	29.7	48.1	30.6
Roe deer	5.9	6.1	6.6	6.2	6.6
Squirrel	2.3	2.6	4.1	3.5	2.5
Hare	47.5	42.0	44.1	40.5	40.1
Fox	22.6	18.2	16.9	16.4	15.2
Muskrat	3.0	2.8	2.2	2.2	1.8
Mink	2.5	2.4	3.0	3.7	4.0
Beaver	2.3	14.3	6.0	6.3	6.0
Wood grouse	0.2	0.1	0.1	0.1	0.1
Black grouse	0.3	0.2	0.2	0.2	0.2

Source: Environmental Protection in the Republic of Belarus 2010–2014, Statistical book, National Statistical Committee, 2015.

Photo 7.2: Wild boars

7.2 Protected areas and ecological networks

The system of specially protected natural areas (conservation areas) comprises four categories: nature reserves, national parks, preserves (habitat/species management areas) and natural monuments. The latter two are divided into protected natural areas of national and local significance. The 1994 Law on Specially Protected Natural Areas also recognizes protected areas of international significance.

As of 1 January 2015, the total area of protected natural territories amounted to 8.2 per cent of the country's total territory. Following the proclamation in February 2015 of new protected areas, the total area of protected natural territories amounted to 8.6 per cent of the country's total territory, and as of 1 September 2015 it reached 8.7 per cent of the country's total territory (table I.3). The system of specially protected natural territories comprises one nature reserve (Berezinsky Biosphere Reserve), four national parks (Belovezhskaya Pushcha, Braslav Lakes, Pripyatsky and Narochansky), 363 preserves, of which 96 are of national significance and 267 of local significance, and 886 natural monuments, of which 319 are of national significance and 567 of local significance (map 7.1 and table I.2).

Since 2006, management plans were developed for the Berezinsky Biosphere Reserve, four national parks and 13 national preserves. These management plans also take into consideration economic activities in order to provide financial resources, such as production of dairy products labelled with the brand of the national park.

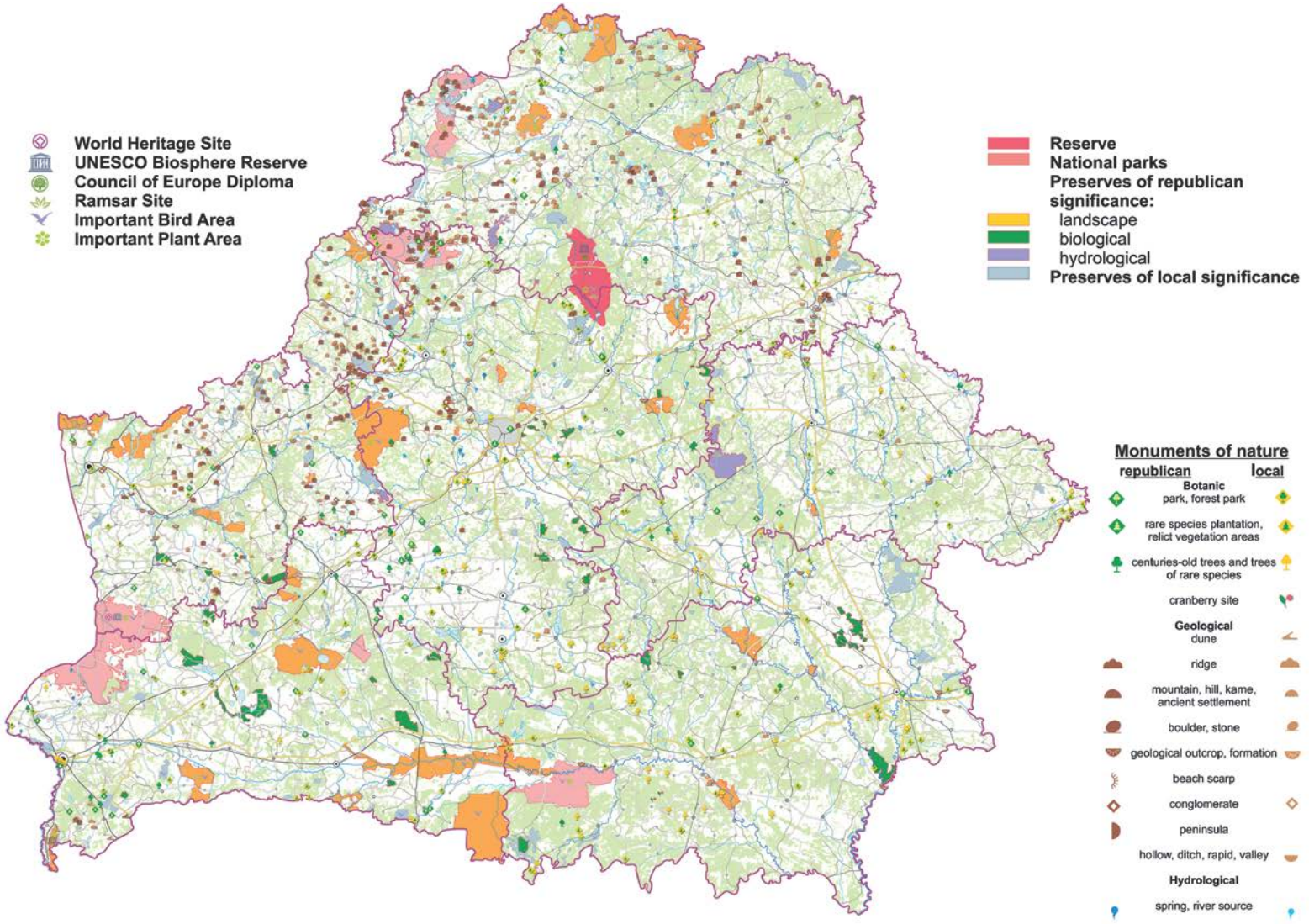
Three specially protected natural areas are included in the World Network of Biosphere Reserves created within the UNESCO programme Man and the Biosphere: Berezinsky Biosphere Reserve, Belovezhskaya Pushcha National Park and the Pribuzhskoye Polessye biosphere reserve/landscape preserve, which is part of the transboundary (Belarus–Poland–Ukraine) biosphere reserve "Western Polessye". A part of the Belovezhskaya Pushcha National Park is included in the UNESCO List of World Heritage Sites. Belovezhskaya Pushcha National Park and Berezinsky Biosphere Reserve were awarded the Council of Europe's European Diploma for Protected Areas.

The Polessye State Radiation and Ecological Reserve was created in the zones affected by the 1986 Chernobyl NPP accident (box 7.1). It does not belong to the system of specially protected natural areas. Rather, it is meant to regulate human activities and to enable rehabilitation work in the area.

Wetlands

Since 2005, nine new Ramsar sites have been designated. In 2005, Belarus designated Prostyr. In 2010, it designated Berezinsky Biosphere Reserve.

Map 7.1: Specially protected natural areas



Source: Specially protected natural areas of the Republic of Belarus / State Scientific and Production Association "Scientific and Practical Center of the National Academy of Sciences of Belarus for Biological Resources": N. Yurgenson, E. Shushkova, E. Shlyahtich, V. Ustin – Minsk, 2013 (the map has been prepared in the framework of the activity No. 29 of the State Programme for Development of the System of Specially Protected Natural Areas for 2008–2014).
Note: The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.

Box 7.1: Polessye State Radiation and Ecological Reserve

A reserve on the land of the Belarusian sector of a 30-km zone surrounding the Chernobyl NPP was created in 1988, of 131,309 ha in a part of the territories contaminated as a result of the Chernobyl disaster. The project aimed at (i) overseeing the wildlife living in conditions with high radiation levels and (ii) forest planting, which prevents emission of radioactive particles with dust. All kinds of plants and animals appropriate to this climatic zone were introduced. A part of the reserve was fenced with barbed wire to prevent the undesirable migration of animals. In 1993, an additional 84,800 ha were included in the Polessye State Radiation and Ecological Reserve, bringing its total area to 216,200 ha. The Reserve is located on the territories of Khoiniksky, Braginsky and Narovlyansky rayons of Gomel Oblast. The Polessye State Radiation and Ecological Reserve is managed by the Department on Liquidation of the Consequences of the Accident at Chernobyl NPP of the Ministry of Emergency Situations.

Thirty years after the Chernobyl disaster, about six million ha of forests in the north of Ukraine and southern Belarus still have higher levels of radioactivity than before the accident – particularly high 137Cs concentrations are found in mushrooms, berries and game. These high levels are expected to continue for several decades due to the persistent recycling of radiocaesium in forest ecosystems.

In the period 2012–2013, seven Ramsar sites were designated: Duleby Islands-Zaozerye, Kozyansky, Morochno, Pripyatsky National Park, Stary Zhaden, Vigonoshchanskoe and Vydritsa. These designations take the country's total to 16 sites covering more than 600,000 ha. Moreover, management plans are now being implemented for eight Ramsar sites (Berezinsky Biosphere Reserve, Mid-Pripyat State Landscape, Osveiski, Pripyatsky National Park, Sporovsky Biological Reserve, Vigonoshchanskoe, Yelnya and Zvanets). Two wetlands (Kotra and Prostyr) are part of transboundary wetlands.

Emerald Network

Belarus acceded to the Bern Convention on the Conservation of European Wildlife and Natural Habitats in 2013. However, the country has participated in the programme to create the Emerald Network since 2009. In December 2014, the Standing Committee of the Bern Convention approved the nomination of 16 Belarusian specially protected natural areas for inclusion in the Emerald Network: Berezinsky Biosphere Reserve, the four national parks and 11 national preserves (Sporovsky, Srednyaya Pripyat, Zvanets, Yelnya, Vygonoshchanskoye, Osveysky, Olmanskiye bolota, Krasny Bor, Lipichanskaya Pushcha, Sinsha and Shvakshty). In 2015, Belarus submitted 64 additional territories for inclusion in the Emerald Network.

National ecological network

Belarus has not yet established a national ecological network. The draft scheme of the national ecological network was developed by the Ministry of Natural Resources and Environmental Protection in cooperation with the National Academy of Sciences of Belarus, oblast executive and administrative authorities, and other stakeholders, including governmental entities and NGOs (map 7.2).

Most of the corridors of the future ecological network are waterways. Some areas that are to become part of the national ecological network are not currently under the protected area system and do not yet have a special status of protection.

The legal framework for establishing the national ecological network is provided by the 1992 Law on Environmental Protection. The Law stipulates that the development of the national ecological network shall take into account catchment areas (basins) and the requirements on the development and functioning of ecological networks stipulated in international agreements to which Belarus is a Party.

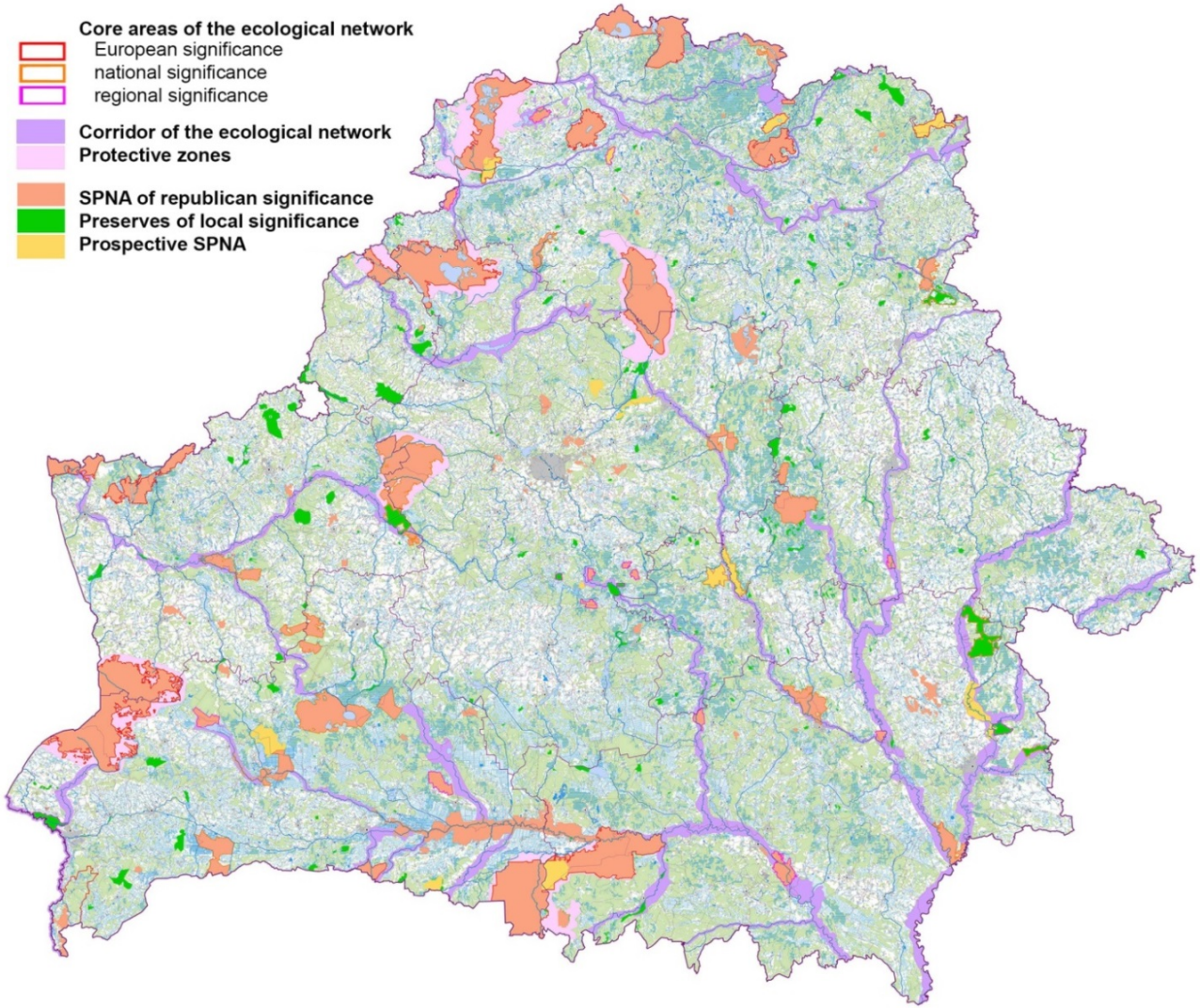
Requirements for the content of the national ecological network scheme and criteria for selecting areas for inclusion in the network are established by the 2010 Resolution of the Council of Ministers No. 1733, revised by the 2014 Resolution of the Council of Ministers No. 1066. In accordance with the State Programme for Development of the System of Specially Protected Natural Areas for 2015–2019 (2014 Decree of the President No. 367), research on the formation of the national environmental network is expected to be carried out in 2016 with funding from the state budget.

The approval of the scheme is a prerogative of the President.

Important bird areas

In 2005, Belarus had 20 Important Bird Areas (IBAs). In 2015, 51 sites were identified, covering an area of 1.5 million ha (7.6 per cent of country's territory). Of the 51 sites, 12 are protected, 33 are under partial protection and six have no protection status.

Map 7.2: Draft national ecological network



Source: The National Ecological Network / State Scientific and Production Association "Scientific and Practical Center of the National Academy of Sciences of Belarus for Biological Resources": N. Yurgenson, E. Shushkova, E. Shlyahtich – Minsk, 2014 (the map has been prepared in the framework of the activity No. 14 of the State Programme for Development of the System of Specially Protected Natural Areas for 2008–2014)
Notes: The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.
SPNA = specially protected natural areas.

Photo 7.3: European bison

Most Belarusian IBAs have international significance because they host breeding populations of globally threatened and near-threatened bird species, such as the aquatic warbler, greater spotted eagle, black-tailed godwit, great snipe, roller and ferruginous duck.

Important plant areas

There has been no change in the number of Important Plant Areas (IPAs) in Belarus since 2005. Of the 10 IPAs, two currently have no protection status, four have a high level of national protection and four have a lower level of national protection. Several IPAs are recognized in European and international programmes. Eight IPAs are located in protected areas but do not have effective site management plans for plant conservation in place.

Deforestation threatens most IPAs. The other significant threats are the lack of management planning, intensified forest management, land improvement measures, tourist and recreation pressure, fires and the absence of monitoring.

Future development

In accordance with the Scheme for the rational location of republican specially protected natural areas until 1 January 2025, approved by the 2014 Resolution of the Council of Ministers No. 649, it is planned to designate three national preserves (Spory, Bely Mokh and Zhada), as well as to transform 20 national preserves, including one preserve, Svislochsko-Berezinsky, into the Svislochsko-Berezinsky National Park, and one local preserve, Morochno, into the Morochno National Preserve. The borders of other 18 preserves (Buslovka, Luninsky, Olmanskiye bolota, Pribuzhskoye Polessye, Stronga, Babinovichsky, Kozyansky, Korytensky Mokh, Krasny Bor, Servech, Vydritsa, Strelsky, Lipichanskaya pushcha, Kupalovsky, Podsady, Falichsky Mokh, Ostrova Duleby and Staritsa) will also be transformed.

7.3 Pressures on species and ecosystems

Land uptake

Land uptake has continued to grow in Belarus, especially due to an increase in building road infrastructure. Nevertheless, progress can be reported on reducing transportation infrastructure impacts with the cooperation between the Ministry of Natural Resources and Environmental Protection and the Ministry of Transport in order to mitigate the impacts of these transport infrastructure developments on migrating animals. Good results in respect of amphibians and large animals such as moose have been reported.

Habitat fragmentation and man-made barriers for migratory species

Man-made barriers for migratory species are also increasing with the development of modern forms of agriculture, the reduction of open spaces and modifications to and an increase in road infrastructure.

Once widespread across temperate Europe, mesotrophic fen mires have almost disappeared in the twentieth century as a result of drainage, land reclamation, peat extraction, development and changes in surrounding land use and water level. Their range is now almost exclusively restricted to Belarus, Poland, Ukraine and the Russian Federation.

Nevertheless, the transformation of wetland habitats into agricultural land has continued to impact upon biodiversity. Open marshes that once covered about 10 per cent of the country's territory and accounted for two thirds of its swamps have been drained by nearly two thirds and transformed into farmland. As a result, about 50 per cent of waterfowl species in Belarus are now listed as rare in the Red Data Book.

Logging and deforestation

Currently, wood vegetation and flora are undergoing considerable change linked to the intensification of forestry activity. Almost one fifth of forests are made up of wood cultures. In these forest plantations, biodiversity is increasingly reduced, wood is mainly grown for harvesting and the consequences on soil formation are vast, and there are negative repercussions on habitats and species.

The volume of illegal logging amounted to 6,297 m^3 of timber in 2014, a significant increase on the 3,529 m^3 in 2010. Due to the effective control mechanisms, 75 per cent of the violations are detected and sanctioned, and, overall, illegal logging plays a minor role (0.06 per cent of fellings) in the country's forestry sector.

One type of forest that has been under severe pressure due to climate change and changes in hydrological regime of soils is the floodplain oak forests. The Prypyatsky National Park faces the issue of shrinkage of oak trees, degradation and disintegration of plantations. There is a gradual substitution of oak forests by soft-wooded broadleaved forests and accumulation of dead oak timber (the estimates of experts of the National Academy of Sciences speak of 245,000 m^3 of oak dead wood, including 145,700 m^3 in floodplain oak forests).

Agriculture, drainage and eutrophication

The species-rich traditional farming systems predominantly found in Belarus until recent years have now made way for intensified agriculture and monoculture. As a consequence, farmland birds have steadily declined. Termination of traditional forms of land use (mowing and grazing) leads to the overgrowth of sedge marshes and river meadows' bushes and reeds, and, as a result, reduces the number of unique plant and animal species (e.g. aquatic warbler, snipe, curlew, black-tailed godwit, spotted eagle).

The draining of wetlands is a major anthropogenic factor affecting not only the hydrology of water resources but also biodiversity. As of 2014, the area of 2.9 million ha was drained for agricultural purposes (chapter 5).

Agro-industrial activities represent another issue for biodiversity conservation. Water supplied for animal breeding, poultry farming and other agriculture-related activities other than irrigation is taken predominantly from groundwater sources, and then almost fully discharged onto surface water, but loaded with some organic pollutants. Manure that is not properly stored, processed and applied as an organic fertilizer constitutes a considerable source of pollution. Annually, large-scale industrial pig farms produce 20–22 million tons of wastewater and manure, which are the main cause of eutrophication and have consequences on biodiversity. Few large-scale pig farms have effective systems of manure management and utilization. The 2014 Water Code has widened the scope of economic activities allowed in water protection zones to include animal breeding farms, which further increases the risk of water pollution by their effluents (chapter 5).

Poaching and illegal fishing

Within the five-year period 2009–2014, the State Inspectorate on Fauna and Flora Protection under the President reported 24,200 cases of illegal fishing and 5,300 cases of poaching, both punishable by the 2003 Code on Misdemeanours and the 1999 Criminal Code. Environmental criminal cases under article 281 (illegal fishing) decreased from 326 in 2010 to 282 in 2014 and under article 282 (illegal hunting) decreased from 342 in 2010 to 184 in 2014 (table 2.8).

Climate change

One of the main pressures on biodiversity is climate change, causing a reduction in habitat for boreal plant

and animal species, and a decrease in population numbers of some species of wild plants and animals of inundated, riverside and wetland ecosystems. A decrease in the number of areas for boreal species of wild plants has been registered in the northern and eastern regions of the country, while some new species typical of steppe and forest-stepped zones have appeared.

Another effect is the emergence of certain bird species with southern origins, especially exacerbating inter-specific competition near water sources. Introduction of invasive species such as the American mink, giant hogweed, echinocystis and Canadian goldenrod leads to the competitive exclusion of Belarusian species of fauna and flora.

Other pressures

Disruption of the natural hydrological regime of ecosystems, as a result of drainage reclamation and hydraulic engineering, leads to the degradation of wetlands, weakening and shrinkage of deciduous forests, strengthening processes of distrophization of water bodies (overgrowth, eutrophication, water quality), and swallowing and drainage of ponds, small rivers and streams.

Peat and forest wildfires lead to the development of undesirable plant successions, accompanied by a significant reduction in biodiversity and synanthropization of vegetation.

Degradation of spawning conditions (overgrowing shallow water shrubs, reeds, changes in water quality) leads to a decrease in diversity of fish species.

7.4 Biodiversity monitoring

Biodiversity monitoring is part of the NEMS (chapter 1). At the national and regional levels, it is carried out by the National Academy of Sciences of Belarus. The institutions responsible for biodiversity monitoring within the National Academy of Sciences include the State Scientific Institution "Institute of Experimental Botany named after V. F. Kuprevich" and the State Scientific and Production Association "Scientific and Practical Centre for Bioresources of the National Academy of Sciences of Belarus".

Flora monitoring is carried out by the State Scientific Institution "Institute of Experimental Botany named after V. F. Kuprevich" and the Limnology Laboratory of the Belarusian State University. Fauna monitoring is carried out by the State Scientific and Production Association "Scientific and Practical Centre for Bioresources of the National Academy of Sciences of Belarus".

The integrated monitoring of ecological systems in specially protected natural areas is carried out by the staff of scientific departments of these areas under the supervision of the National Academy of Sciences. The results of integrated monitoring are shared with the Ministry of Natural Resources and Environmental Protection (for integrated monitoring in preserves) and the Affairs Management Department of the President (for integrated monitoring carried out in the territory of Berezinsky Biosphere Reserve and four national parks).

Fauna and flora monitoring

Monitoring information and establishing patterns of changes in individual parameters characterizing the state of the fauna is based on the analysis of data collected at 115 observation points. Fauna monitoring comprises the observation of:

- Wild animals subject to hunting and their habitats;
- Wildlife subject to fishing and their habitats;
- Wild animals included in the Red Book and their habitats;
- Wildlife protected in accordance with the international obligations of Belarus and their habitats.

Flora monitoring is carried out in five areas:

- Meadow and meadow-marsh vegetation, which analyses the floristic composition, productivity and ecological condition of plant communities and edaphotopes and compiles a list of rare, unique and economically valuable plant communities of meadows and grassy marshes;
- Aquatic vegetation, observing matter that grows in ponds and streams, its populations and plant communities and their habitat;
- Protected species of plants and fungi, under a programme that covers the populations of species of plants (including fungi) included in the Red Book or protected in accordance with the international obligations of Belarus, as well as their habitats;
- Species for non-wood forest products, including populations and resources of edible wild berries and mushrooms as well as their habitats;
- Invasive plant species, covering the populations of invasive plant species and their habitat.

Integrated monitoring of ecological systems in specially protected natural areas

The integrated monitoring of ecological systems in specially protected natural areas is a system of regular observations of the natural ecosystems in specially protected natural areas (reserves, national parks and preserves), either with the existing levels of protection, exploitation and impact on the ecosystems or in the absence of such impacts. The goals of the integrated monitoring are to provide information support for decision-making on environmental safety, protection, sustainable use of the resources of specially protected natural areas, and conservation of biological and landscape diversity on the basis of assessment of ecosystems, their dynamics and developmental forecast.

As of 1 January 2015, the network of observation points of the integrated monitoring of specially protected natural areas amounted to 929 observation points in terms of flora and forests and 368 for monitoring the animal world. The network covers the Berezinsky Biosphere Reserve, the four national parks and 30 national preserves. Repeated monitoring observations were carried out in 13 national preserves.

Alien and invasive plant species monitoring

In 2011, the country launched a system of monitoring alien and invasive plant species. As of early 2015, more than 70 permanent observation points have been set up; in addition, a specialized database on the location of the most harmful invasive species is maintained. In 2013–2014, in the territory of the city of Minsk and Vitebsk Oblast, an inventory of habitat of invasive plant species was carried out.

In 2013, the 15 most widespread invasive species of plants and six invasive species of animals were monitored. Rayon executive committees approve annual plans containing measures to restrict the distribution and abundance of Sosnovsky cow parsnip (*Heracleum sosnowskyi*). Plans containing measures to restrict the spreading of invasive Canadian goldenrod, wild cucumber (*Echinocystis lobate*), black locust (*Robinia pseudoacacia*) and American maple (*Acer negundo*) were approved.

Electronic databases of flora and fauna

In Belarus, the State Flora Cadastre is used in accordance with the 2004 Resolution of the Council of Ministers No. 1580 “On approval of the Regulations on the procedure of maintaining the State Flora Cadastre and using its data”. In addition, as part of the State Flora Cadastre and for each rayon, the inventory book and databases of alien invasive species are maintained. The inventory of fauna is carried out in accordance with the Regulations on the State Cadastre of Fauna and use of its data, approved by the 2007 Resolution of the Council of Ministers No. 1837 “On selected issues related to wildlife monitoring and inventory”.

7.5 Legal, policy and institutional framework

Legal framework

The 1992 Law on Environmental Protection names biodiversity conservation and priority conservation of natural ecosystems, typical and rare natural landscapes and biotopes among key principles of environmental protection. It describes the country’s nature protection system, including such aspects as specially protected natural areas, natural territories under special protection (e.g. parks and boulevards, water protection zones, sanitary protection zones next to water intakes, typical and rare natural landscapes and biotopes, habitats of wild animals and plants included in the Red Book) and the national ecological network. In 2010, detailed provisions on the management of biosphere reserves were included in the Law. In 2013, detailed provisions on typical and rare natural landscapes and biotopes were introduced.

The 1994 Law on Specially Protected Natural Areas, issued in new edition in 2000, defines categories of specially protected natural areas: reserves, national parks, preserves and monuments of nature. The Law describes procedures for their proclamation, as well as their protection regimes and management systems. The Law also regulates procedures for proclamation of, and protection regimes and management systems for specially protected natural areas of international significance, such as those included in the World Network of Biosphere Reserves, world heritage lists, etc.

The 2003 Law on Plant World describes the use of plants, rules for introduction of various limitations and prohibitions to ensure the protection of plants, requirements on plant protection in urban planning and development activities, as well as rules for the protection of wild plants that belong to rare or endangered species in Belarus or are protected in accordance with international treaties, and other issues.

The 2007 Law on Wildlife defines measures for the protection of wild animals and their habitats, including various limitations and prohibitions that can be introduced by the Ministry of Natural

Resources and Environmental Protection and local executive and administrative authorities. It also regulates the protection of rare and endangered species of wild animals as well as species protected in accordance with the international treaties to which Belarus is a Party, and describes the procedures for inclusion of species in the Red Book. The Law defines measures to control the numbers of wild animals (e.g. invasive alien species or wild animals that harm the environment, health or property). The Law sets the framework for the use of wildlife (hunting, fishing, etc.) and for keeping wild animals in captivity.

The 2006 Law on the Safety of Genetic Engineering (chapter 1) regulates permitting in the area of GMOs. It also provides for mandatory state GMO safety expertise to determine the acceptability of release of GMOs into the environment for trials/testing or for economic purposes. The state GMO safety expertise is organized by the Expert Council on Biosafety of the Ministry of Natural Resources and Environmental Protection. The conclusions of expertise are to be taken into account by the Ministry of Natural Resources and Environmental Protection in decision-making on permits for release of GMOs into the environment for trials/testing purposes, and by the Ministry of Agriculture and Food in decision-making on the registration of new plant varieties or animal species.

The 1999 Criminal Code provides for responsibility for illegal hunting, illegal fishing, destruction of natural complexes and specially protected natural areas and other crimes.

Other relevant laws include the 2003 Code of Administrative Offences and the 2005 Law on Plant Protection.

The 2013 Presidential Decree No. 551 introduced notable changes to the Rules for Game Management and Hunting, Rules for Fisheries and Fishing, and Rates for Determination of Damage to the Environment by Natural and Legal Persons from Illegal Removal or Destruction of Wild Animals and Adverse Impact on their Habitats (all originally approved by the 2005 Presidential Decree No. 580). The notion of "wild animals belonging to undesired species" was excluded from the Rules for Game Management and Hunting. The Decree prohibited carrying cartridges filled with bullets and buckshot when hunting for furred and feathered wildlife game species. Also, the Decree introduced changes in the procedures for issuance of a state certificate attesting the right to hunt, in particular by introducing obligatory training prior to taking the examination to obtain a certificate. The Decree raised the level of decision-making, from rayon councils of deputies to oblast executive committees, for decisions on the lease of hunting areas. With regard to paid amateur fishing, the Decree prohibited intensive methods of fishing. The time periods for the spring ban on fishing were differentiated for commercial fishing and amateur fishing. In addition, the Decree raised, on average threefold, the rates for determination of damage to the environment.

The 2014 Resolution of the Ministry of Natural Resources and Environmental Protection No. 30 banned, starting from 1 January 2015 and in the territories important for reproduction of migrating birds, the hunting of white-fronted goose, bean goose, gray goose, Canada goose, mallard, garganey, pochard and tufted duck during the spring hunting season.

The monitoring of fauna is carried out in accordance with Regulations approved by the 2013 Resolution of the Council of Ministers No. 653. The monitoring of flora is conducted in accordance with Regulations approved by the 2004 Resolution of the Council of Ministers No. 412. In addition, there is an Instruction on the procedure for conducting integrated monitoring of ecological systems in specially protected natural areas, approved by the 2009 Resolution of the Ministry of Natural Resources and Environmental Protection No. 63.

A technical code of practice, TCP 17.02-10-2013, approved in 2013, defines the procedure for the valuation of ecosystem services in order to inform decision-making in the environmental field.

Two other technical codes of practice were approved in 2014 to regulate rules for the protection of wild animals (TCP 17.07-01-2014) and plants (TCP 17.05-01-2014) which belong to species included in the Red Book of the Republic of Belarus.

Policy framework

Strategy for the Conservation and Sustainable Use of Biological Diversity in the period 2011–2020

The Strategy for the Conservation and Sustainable Use of Biological Diversity in the period 2011–2020, approved by the 2010 Resolution of the Council of Ministers No. 1707 "On some issues on conservation and sustainable use of biological diversity", replaced the previous one dating back to 1997. The goals of the Strategy are to (i) prevent a decrease in the numbers and diversity of species of wild animals, plants and ecosystems and restore rare and

endangered species of wild animals and plants, their populations and genetic diversity, sustaining their numbers, which is necessary for their sustainable existence, and (ii) use biological diversity in such a way and with such intensity as not to lead, in the longer term, to its depletion, and so to allow for conserving its ability to satisfy the economic, aesthetic and other needs of the present and future generations.

The Strategy provides for 28 expected results, many of which include quantitative indicators of implementation. Many expected results have already been reached or show good progress in implementation. For example, management plans are developed for 16 specially protected natural areas, against the target of 20. Also, progress has been reached in developing instruments for the economic valuation of biodiversity through the development and adoption of TCP 17.02-10-2013, and the application of economic valuation of biodiversity during the recent preparation of management plans for several specially protected natural areas (Yelnya, Sprovsky and Zvanets preserves), as well as preparation of documentation to proclaim new specially protected natural areas.

At the same time, there are areas in which implementation has been difficult. For example, the Strategy aims to provide conservation of populations of rare and endangered species of wild animals and plants, including several bird species (greater spotted eagle, serpent eagle, fish hawk, golden plover, black-tailed godwit, double snipe, aquatic warbler, etc.) via protecting their main biotopes. However, in practice, despite measures of protection, the population of most globally endangered bird species continues to decline, mainly due to the progressive overgrowth of open marshes and meadows by forests and shrubs as a consequence of the termination of traditional uses (mowing and grazing) and as a result of disturbance of the hydrological regime. From 2000 to 2013, the number of aquatic warblers decreased from 6,000–10,000 to 3,100–5,600 (singing males).

The Strategy was updated to ensure full coverage of the Aichi biodiversity targets (2015 Resolution of the Council of Ministers No. 743).

National Strategy for Development and Management of the System of Specially Protected Natural Areas until 1 January 2015

Among the achievements of the National Strategy for Development and Management of the System of Specially Protected Natural Areas until 1 January 2015, approved by the 2007 Resolution of the Council of Ministers No. 1920, are the adoption of amendments to the legislation on specially protected natural areas and the development of management plans for these areas. The goal of the Strategy – to achieve, by 2015, 8.3 per cent coverage of the country by specially protected natural areas – was achieved following the proclamation of new specially protected natural areas in February 2015 by the 2015 Resolution of the Council of Ministers No. 71, which brought this value to 8.6 per cent.

State Programme for Development of the System of Specially Protected Natural Areas for 2008–2014

The State Programme for Development of the System of Specially Protected Natural Areas for 2008–2014, approved by the 2008 Presidential Decree No. 146, facilitated the financing of concrete activities for implementation of the National Strategy for Development and Management of the System of Specially Protected Natural Areas until 1 January 2015. Major achievements from implementation of the State Programme included the development of recreation activities in over 26 preserves, improvement of tourism infrastructure to attract tourists to the national parks and active development of ecological and botanical tourism.

National Strategy for Development of the System of Specially Protected Natural Areas until 1 January 2030

The National Strategy for Development of the System of Specially Protected Natural Areas until 1 January 2030, approved by the 2014 Resolution of the Council of Ministers No. 649, provides the vision for the development of the system of protected areas that would be representative of all typical and rare natural landscapes and biotopes.

The goal of the Strategy is to finalize the development of the national ecological network and integrate it into the Pan-European ecological network, including through the creation of transboundary specially protected natural areas and biosphere reserves. The Strategy places an emphasis on the development of awareness-raising activities by state nature protection institutions and of tourism in specially protected natural areas.

The Strategy includes:

- Revised criteria for proclamation of specially protected natural areas;

- A list of the specially protected natural areas that are most promising for the development of tourism.

The Scheme for the rational location of republican specially protected natural areas until 1 January 2025, approved by the 2014 Resolution of the Council of Ministers No. 649, envisages the creation of the fifth national park – Svislochsko-Berezinsky – in Mogilev Oblast. The national park will be created on the basis of a Svislochsko-Berezinsky republican preserve proclaimed by the 2015 Resolution of the Council of Ministers No. 71.

State Programme for Development of the System of Specially Protected Natural Areas for 2015–2019

The State Programme for Development of the System of Specially Protected Natural Areas for 2015–2019, approved by the 2014 Presidential Decree No. 367, provides for concrete activities to enhance the system of protected areas and their funding sources in the total amount of 119,730 million roubles.

Strategy on Implementation of the Convention on Wetlands of International Importance, especially as Waterfowl Habitat

The Strategy on Implementation of the Convention on Wetlands of International Importance, especially as Waterfowl Habitat was approved by the 2009 Resolution of the Council of Ministers No. 177. As part of implementation efforts, seven new Ramsar sites were designated in 2012–2013. National management plans were updated for three bird species (great spotted eagle, great snipe, aquatic warbler) and developed for three species (bittern, smew, roller). Also, descriptions of five potential Ramsar sites were prepared and submitted to the Ramsar Convention Secretariat: the Dnieper River floodplain, Drozbitka-Svina, Golubitskaya Puscha, Polessye Valley of the River Bug, and Servech. The ban on spring hunting for waterfowl was introduced in 32 wetland areas. Among major challenges, the latest national implementation report to the Ramsar Convention names the degradation of wetlands due to changes in agricultural practices, degradation of mires and peat deposits, and insufficient resources for carrying out wetland monitoring.

Strategic documents on hunting

The State Programme for Development of Hunting for 2006–2015, approved by the 2005 Presidential Decree No. 580, prioritized the development of legislation on hunting and the hunting sector, implementation of biotechnical measures to increase the numbers of game species, protection of hunting areas, regulation of the number of "wild animals belonging to undesired species", development of hunting tourism, improvement of hunting tools and methods, optimization and rational use of hunting areas, and increase in the number of staff engaged in the hunting sector.

The Concept of development of the hunting sector in the Republic of Belarus, approved by the 2014 Resolution of the Council of Ministers No. 1029, aims to provide basic directions for state policy in the hunting sector for the next decade. It emphasizes the need to improve legislation on hunting and to develop effective forms of control over the state of populations of game species.

The State Programme for Development of Hunting for 2016–2020, approved by the 2015 Resolution of the Council of Ministers No. 296, places emphasis on increasing the numbers of game species, in particular hoofed animals (elk, deer and roe deer), to optimal levels and ensuring their sustainable use. The Programme provides for measures to ensure accessibility of hunting to Belarus citizens and raising the interest of hunters in sustainable use of game resources. The Programme also envisages scientific and research activities for better management of hunting resources.

State Programme for Development of Fisheries for 2011–2015

The State Programme for Development of Fisheries for 2011–2015, approved by the 2010 Resolution of the Council of Ministers No. 1453 and revised by the 2012 Resolution of the Council of Ministers No. 159, aims to ensure stable supply to the population of high quality fish products, as well as rational use of fish resources and the preservation of fish biodiversity. Among other matters, the Programme provides for the creation in Belarus of a genetic reserve of sturgeon, salmon, whitefish, carp and herbivorous species.

Action plans on European Bison

Two Action Plans on Conservation and Rational Use of European Bison (for 2010–2014 and for 2015–2019) were adopted to ensure the revival of this species. The number of bison in Belarus grew from 826 animals at the beginning of 2011 to 1,134 animals at the beginning of 2013. In 2014, 10 micro-populations of bison existed in the country.

Implementation of the Action Plan for 2015–2019 is expected to lead, by 2020, to (i) an increase in the population to 1300 animals, (ii) the creation of two new micro-populations, and (iii) an increase in immune resistance and a decrease in the incidence of diseases among animals due to assessment of their genetic potential and selective and stock-breeding activities.

State Programme of Conservation and Use of Reclaimed Lands for 2011–2015

The State Programme of Conservation and Use of Reclaimed Lands for 2011–2015, approved by the 2010 Resolution of the Council of Ministers No. 1262, provides for intensive efforts to rehabilitate melioration systems, that is, reclaimed lands together with their hydrotechnical and other infrastructure. In the period 2011–2013, implementation efforts resulted in (i) reconstruction and rehabilitation of melioration systems on 162,100 ha, (ii) agromeliorative works implemented on reclaimed agricultural lands on 107,000 ha, (iii) cleaning of 23,200 km of the meliorative network from excess silting, and (iv) clearing of 79,800 km of the meliorative network of shrub vegetation. It is important that projects to rehabilitate melioration systems provide for environmental protection measures, in particular to prevent the pollution of surface water and groundwater.

Other

The State Programme of Socioeconomic Development and Integrated Management of Natural Resources of the Pripyat Polessye region for 2010–2015, approved by the 2010 Presidential Decree No. 161, and the State Programme for Development of the Resort Area of the Narochansky Region for 2011–2015, approved by 2010 Presidential Decree No. 514 (chapter 11), aim to preserve the unique beauty of the natural landscapes and conserve the biodiversity of these regions along with targeted efforts to increase tourism there.

Institutional arrangements

The functions of the Ministry of Natural Resources and Environmental Protection with regard to biodiversity include, among others: decisions or proposals for decisions on proclamation, transformation or termination of specially protected natural areas in accordance with legislation; participation in the development and functioning of the national ecological network; maintenance of the Red Book of the Republic of Belarus; introduction of restrictions and bans for some uses of wildlife; introduction of limits, quotas and other norms for removal of wild animals from their habitats; and issuance of CITES permits. Territorial bodies of the Ministry are responsible for enforcement of legislation in the area of environmental protection and rational use of natural resources, including nature protection legislation.

The nature protection legislation is also enforced by the State Inspectorate on Fauna and Flora Protection under the President, which has wide control prerogatives, notably over observance of hunting and fishing rules as well as protection of the forest fund and land (chapter 2).

Five state nature protection organizations of the Affairs Management Department of the President are responsible for the management of four national parks and the Berezinsky Biosphere Reserve. Their activities typically include conservation of natural landscapes and biodiversity, including protection activities; tourism, excursions and recreation activities; forest management and woodworking; organization of hunting and fishing; and environmental education.

The State Nature Protection, Scientific and Research Institution “Polessye State Radiation and Ecological Reserve” is a subordinated institution of the Department on Liquidation of the Consequences of the Accident at Chernobyl NPP of the Ministry of Emergency Situations. The tasks of the Polessye State Radiation and Ecological Reserve include measures to prevent transfer of radionuclides to nearby territories; control of the state of radiation; radiation and ecological monitoring of soil, air, water, flora and fauna; research to evaluate the impact of radioactive pollution and develop rehabilitation activities; protection from fires and unauthorized entry; and forestation of lands, especially those affected by wind and water erosion.

Local councils of deputies are responsible for approval of regional schemes of rational location of the specially protected natural areas of local importance. Local executive and administrative authorities are responsible for implementation of these schemes. Local executive and administrative authorities take decisions on the proclamation, transformation and termination of preserves and monuments of nature of local importance.

The organizations of the National Academy of Sciences provide scientific support to environmental and nature protection activities, including the monitoring of flora and fauna, and maintain a number of valuable scientific collections (box 7.2).

Box 7.2: Scientific collections of the National Academy of Sciences

The following scientific collections are maintained by the institutions of the National Academy of Sciences of Belarus:

- A herbarium and living plant collections of the State Scientific Institution (SSI) Central Botanical Garden;
- A herbarium of the SSI "Institute of Experimental Botany named after V. F. Kuprevich";
- Collections of non-pathogenic microorganisms in the SSI Institute of Microbiology;
- Collections of fruits, berries, nuts and grapes of the Republican Unitary Enterprise (RUE) Institute for Fruit Growing;
- Collections of seeds of grains, legumes, cereals, fodder, oilseeds, sugar beet and flax in the RUE Scientific and Practical Centre for Agriculture;
- Collections of fungal strains in the SSI Forest Research Institute.

The information portal of the Central Botanical Garden includes the website "Plants of Belarus" (http://hbc.bas-net.by/plantae/) which contains information about more than 1,600 species growing in the wild and 9,500 cultivated plants. It also includes the website "Botanical Collections of Belarus" (http://hbc.bas-net.by/bcb/) with information about 157 collections (36 herbaria, 119 collections of living species and 2 others).

Since 1998, the Institute of Genetics and Cytology of the Academy of Sciences of Belarus implements the functions of the National Biosafety Coordination Centre. The Centre collects and analyses information on legislation, scientific research, field tests, import, export and use of GMOs and GMO products. It facilitates exchange of information and awareness activities and works on the development of legislation and guidance materials on the topic.

The Centre for Study of Invasive Species was created in 2007 as an inter-institutional research unit within the SSI "Institute of Experimental Botany named after V. F. Kuprevich", the Central Botanical Garden and the State Scientific and Practical Association "Scientific and Practical Centre for Bioresources", all of which are part of the National Academy of Sciences of Belarus. It is hosted by the Scientific and Practical Centre for Bioresources. The goal of the Centre for Study of Invasive Species is to coordinate activities in the field of identification, assessment and prediction of the introduction and spread of invasive alien species of animals and plants in the territory of Belarus, as well as to develop measures to prevent, minimize and reduce the damage caused by the spread of these species.

Regulatory instruments

Biodiversity-related permitting is centralized. The Division of Biological and Landscape Diversity of the Ministry of Natural Resources and Environmental Protection issues CITES permits and authorizations for removing wild animals and plants from their habitats. In the period 2010–2014, 66 CITES permits were granted, including 26 for import and 40 for export operations. Forty-eight permits for the removal of wild animals and plants listed in the national Red Book were issued, mostly for scientific purposes. At the same time, 151 permits for the removal of wild animals from their habitat were granted.

As of August 2015, there were two permits issued by the Ministry of Natural Resources and Environmental Protection for the release of non-pathogenic GMOs into the environment for trials/testing (in June 2014 and in June 2015).

7.6 Biodiversity-related global, regional and bilateral agreements

Convention on Biological Diversity

Belarus has been a Party to the 1992 Convention on Biological Diversity since 1993. The fifth national implementation report was submitted in 2014. In September 2015 Belarus finalized the revision of its Strategy for the Conservation and Sustainable Use of Biological Diversity to ensure full coverage of Aichi biodiversity targets.

Belarus has been a Party to the 2000 Cartagena Protocol on Biosafety since 2002. The country submitted its second national report in 2011. In 2012, a Strategic plan of implementation in the Republic of Belarus of the Cartagena Protocol on Biosafety to the Convention on Biological Diversity was approved by the Minister of Natural Resources and Environmental Protection.

A recent achievement has been the country's accession, in 2014, to the 2010 Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization. In 2014, the National Coordination Centre on Access to Genetic Resources and Benefit Sharing was set up at the Institute of Genetics and Cytology of the National Academy of Sciences of Belarus.

The country is not a Party to the 2010 Nagoya–Kuala Lumpur Supplementary Protocol on Liability and Redress to the Cartagena Protocol on Biosafety.

Ramsar Convention

Belarus made its declaration of succession in respect to the 1971 Convention on Wetlands of International Importance, especially as Waterfowl Habitat, in 1999, at the time it designated the first Ramsar site on its territory, and stated that the Convention came into force for the country on 25 August 1991. As at 2015, Belarus has 16 Ramsar sites, of which nine have been designated since 2005. The Strategy on Implementation of the Convention on Wetlands of International Importance, especially as Waterfowl Habitat, was approved by the 2009 Resolution of the Council of Ministers No. 177. The latest national report on the implementation of the Ramsar Convention was submitted in 2015.

Convention on International Trade in Endangered Species of Wild Fauna and Flora

Belarus has been a Party to the 1973 Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) since 1995. Belarus annually reports to the CITES Secretariat on CITES permits issued.

Convention on the Conservation of Migratory Species of Wild Animals

Belarus has been a Party to 1979 Bonn Convention on the Conservation of Migratory Species of Wild Animals since 2003. The latest national implementation report was submitted in 2014.

In July 2015, through the 2015 Decree of the President No. 333, the country took a decision to accede to the 1995 Agreement on the Conservation of African-Eurasian Migratory Waterbirds (AEWA). As of 29 October 2015, the instrument of accession was not yet deposited. The Decree provides for accession with a reservation that Belarus will not apply some of the bans listed in Annex 3 (Action Plan) of the AEWA: paragraph 2.1.2(a) on the prohibition of the taking of birds during their various stages of reproduction and rearing and during their return to their breeding grounds; paragraph 2.1.2(b) on the prohibition of the use of all indiscriminate means of taking and the use of all means capable of causing mass destructions, as well as local disappearance of, or serious disturbance to, populations of birds; and paragraph 4.1.4 on phasing out the use of lead shot for hunting in wetlands.

Belarus is a Non-Party Range State for the 1991 Agreement on the Conservation of Populations of European Bats (EUROBATS). Belarus has submitted several national implementation reports under this Agreement. According to the latest one, of 2014, 19 species of bats have been registered and confirmed for the territory of Belarus, including one new species (*Pipistrellus kuhlii*) which has been recently noted for the first time. The main threats for bats include loss of roosts and forage habitats due to the economic development of the territory (forestry, buildings' construction and reconstruction), disturbance and exclusion from roosts, and a negative attitude to bats by humans.

The report highlights numerous measures taken to increase public awareness in order to decrease disturbance of bats and ensure the protection of their habitats, and describes the legislation in place to protect bats.

Convention on the Conservation of European Wildlife and Natural Habitats

In 2013, Belarus acceded to the 1979 Bern Convention on the Conservation of European Wildlife and Natural Habitats. Belarus made a reservation at the time of accession that it will not apply the provisions of Article 6 of the Convention in respect to two species: grey wolf (*Canis Lupus*) and European otter (*Lutra lutra*).

The country also made a reservation that it will not apply the provisions of Article 8 of the Convention in respect of several prohibited means and methods of killing, capture and other forms of exploitation listed in Appendix IV:

- Snares, nets – in respect of the capture or killing of Eurasian beaver (*Castor fiber*), European otter, Eurasian red squirrel (*Sciurus vulgaris*), European pine marten (*Martes martes*), beech marten (*Martes foina*), European polecat (*Mustela putorius*), grey wolf (*Canis Lupus*);
- Semi-automatic weapons with a magazine capable of holding more than two rounds of ammunition – in respect of the capture or killing of all game animals;
- Devices for illuminating targets, sighting devices for night shooting comprising an electronic image magnifier or image converter, artificial light sources – in respect of the capture or killing of grey wolf, European roe deer (*Capreolus capreolus*), elk (*Alces alces*), red deer (*Cervus elaphus*), fallow deer (*Cervus dama*) or sika deer (*Cervis Nippon*) in the periods of hunting which is allowed in the nighttime;

- Tape recorders – in respect of the capture or killing of all game animals;
- Aircraft – in respect of the capture or killing of grey wolf;
- Motor vehicles in motion – in respect of the capture or killing of all game animals.

Amendment on genetically modified organisms

Belarus is a Party to the 1998 Aarhus Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, but is not a Party to the 2005 Almaty Amendment on GMOs to the Convention, which refers to public participation in decision-making on the deliberate release of GMOs into the environment and the placing of GMOs on the market. Belarus has a developed legislation on GMOs, with the 2006 Law on the Safety of Genetic Engineering being at the forefront. The latest national implementation report for the Aarhus Convention highlights that, due to the absence of applications for permits for deliberate release of GMOs into the environment or their placement on the market, there is no practice of public participation in this area.

Bilateral agreements

In order to ensure conservation of transboundary protected areas, Belarus has signed agreements with Latvia, Poland and Ukraine.

7.7 Conclusions and recommendations

Since 2005, there have been intensive efforts to develop the national ecological network; however, this work is not yet completed. Some areas that are to become part of the national ecological network are not currently under the protected area system and do not yet have a special status of protection.

One of the main goals of the National Strategy for Development of the System of Specially Protected Natural Areas until 1 January 2030 is to finalize the development of the national ecological network and its integration into the Pan-European ecological network.

The establishment of an ecological network in every country might create conflicts between sectoral (agriculture, transport, etc.) interests and environmental considerations. Close collaboration between environmental, sectoral, land management and spatial planning stakeholders is of added value in designing an ecological network.

Recommendation 7.1:
The Government should design and establish a national ecological network, in particular by:

(a) Ensuring cooperation of environmental, sectoral (agriculture, transport, etc.), land management, spatial planning and other stakeholders, in the development of the network;
(b) Allocating protection status to those areas that will be part of the ecological network but that are currently not under the system of specially protected natural areas and do not have a special protection status.

Belarus has developed relevant strategic documents to ensure implementation of biodiversity-related agreements. It regularly submits national implementation reports. Since 2005, Belarus has acceded to the 2010 Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization and the 1979 Bern Convention on the Conservation of European Wildlife and Natural Habitats.

The country is active under but not yet a Party to the 1991 Agreement on the Conservation of Populations of European Bats, which provides a framework of cooperation for the conservation of bats throughout Europe, Northern Africa and the Middle East, through legislation, education, conservation measures and international cooperation measures. Also, the country is not a Party to the 2005 Almaty Amendment on GMOs to the 1998 Aarhus Convention, although participation in the Amendment would ensure opportunities for the Belarusian public to participate in decision-making on deliberate release of GMOs into the environment and their placement on the market, thereby widening the application of the Convention's public participation pillar and increasing the quality of decision-making on GMOs.

Recommendation 7.2:
The Ministry of Natural Resources and Environmental Protection should initiate accession to the:

(a) 1991 Agreement on the Conservation of Populations of European Bats;
(b) 2005 Almaty Amendment on Genetically Modified Organisms to the Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus Convention).

Accession to the 1979 Bern Convention on the Conservation of European Wildlife and Natural Habitats has been an important step for Belarus, which will allow the country to be more fully engaged in the development and implementation of biodiversity conservation policies at international level. Upon accession to the Convention, Belarus made reservations regarding certain species and means or methods of killing, capture and other exploitation.

Recommendation 7.3:

The Government should work to progressively reduce the use of the methods of killing, capture and other forms of exploitation listed in appendix IV of the Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention) with a view to ultimately withdrawing the respective reservation, or part(s) of it, made at the time of accession.

PART III: INTEGRATION OF ENVIRONMENTAL ASPECTS INTO SELECTED SECTORS/ISSUES

Chapter 8

ENERGY AND ENVIRONMENT

8.1 Introduction

Belarus' energy resources are represented by small quantities of hydrocarbons and more significant resources of biomass, mainly wood/wood waste and peat. Peat is plentiful and is used as household fuel. The country's coal reserves consist of low-grade lignite (1,500–1,700 kcal/kg) and their use is seen as unacceptable for environmental reasons. Belarus is a flat country with limited potential for hydropower. Nor is it foreseen that other non-conventional sources of energy, such as wind, solar and geothermal power, will significantly contribute to the energy balance in the future.

Belarus has some oil reserves and two oil refineries – Novopolotskiy and Mozyrskiy. Novopolotskiy is a large oil refinery and petrochemical facility that produces various types of fuels, lubricating oils, bitumen and petrochemical products. At Mozyrskiy oil refinery, petroleum, diesel oil with low sulphur content, commercial butane and illuminating kerosene are produced.

The development of the energy sector depends on the feasibility of increasing the share of local fuels and renewables in energy consumption. Taking into consideration the shortage of the country's energy resources and constantly changing prices of imported fuels, enhancing energy efficiency and energy security in Belarus is a strategically important task.

In the period 2005–2011, the GDP per unit of energy use defined with a purchasing power parity (PPP) in US$ per koe steadily increased, from approximately US$3.5/kg to US$5.2/kg. In addition, the GDP per unit of energy use with a constant 2011 PPP in US$ also increased, from US$4/kg to US$5.2/kg in the same period. On the other hand, energy use (expressed in koe per capita) increased in an unstable way, from 2,800 kg/capita to 3,100 kg/capita between 2005 and 2011 with a slight decrease of approximately 150 kg/capita from 2008 to 2009 (figure 8.1). At present, the energy intensity of the economy is 1.4–1.8 times lower than in Kazakhstan, the Russian Federation and Ukraine, but still 1.5–1.8 times higher than the average energy intensity in Europe.

8.2 Trends in energy balance

At present, the energy used is based mainly on the import of natural gas and crude oil (table 8.1). While the development of local fuels, such as coal, peat and biofuels, is a goal of national energy policies, the share of domestic energy resources is still very low.

Thus, a notable disparity in the Belarusian energy sector is observed whereby the largest part (about 85 per cent) of total primary energy supply (TPES) is provided by imported oil and gas, while domestic resources (primarily, peat, wood and wood waste) provide only about 15 per cent of TPES.

Reserves and production

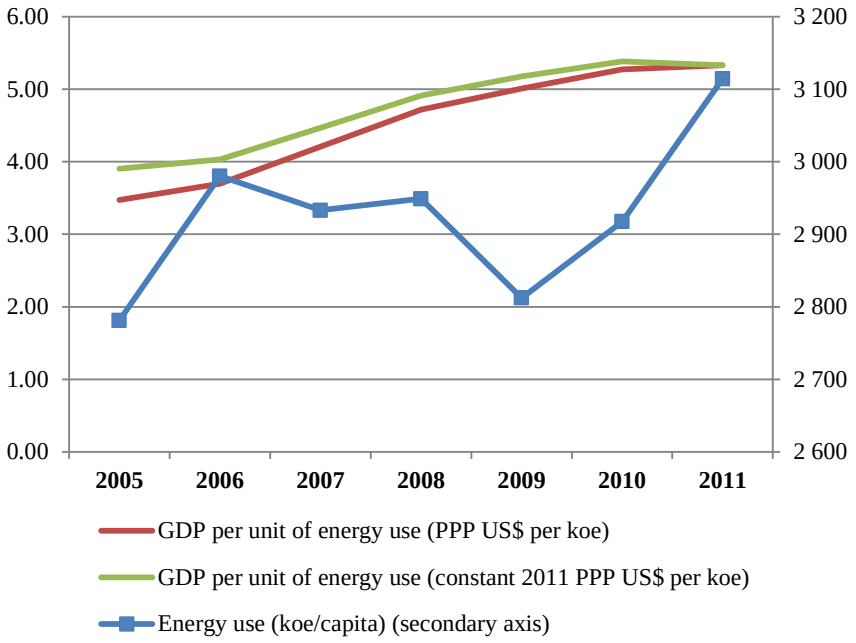
The fuel resources of Belarus include oil, associated gas, peat, brown coal and oil shale. Belarusian oil deposits are concentrated in the eastern part of the Pripyat Trough. To date, about 75 oil deposits have been explored; the largest of them are the Rechitsk, Ostashkovich and Vishansk fields. Annual oil extraction is about 1.6–1.7 million tons.

Belarus has more than 9,000 peat deposits, which contain 4 billion tons of peat (1.36 billion toe). In the period 2010–2013, the average volume of peat consumption for fuel production was 0.4–0.5 million toe.

Industrial reserves of oil shale are concentrated in two deposits – the Lyubansk and Turovsk fields. Oil shale exploration can only be done through underground mining. Currently, the development of these resources is not economically sound.

Explored reserves of brown coal amount to 160 million tons. The Zhitkovich, Brinevsk and Tonezhsk fields located in Gomel Oblast can be prospectively developed. Brown coal could be easy solidified together with peat to form peat briquettes. The Lelchitsk field is now being explored; its reserves are estimated at 250 million tons. Its coal can be added to the energy balance of the country by direct combustion or by thermo-chemical treatment.

Figure 8.1: Energy intensity, 2005-2011



Source: World Development Indicators. Accessed on 14 April 2015.

Table 8.1: Energy balance, 2012, ktoe on a net calorific value basis

Supply and consumption	Coal and peat	Crude oil	Oil products	Natural gas	Nuclear	Hydro	Geothermal, solar etc.	Biofuels and waste	Electricity	Heat	Total*
Production	651	1 668	0	181	0	6	1	1 610	0	0	4 117
Imports	321	21 777	6 469	16 809	0	0	0	0	894	0	46 270
Exports	- 144	-1 653	-17 634	0	0	0	0	0	- 241	0	-19 672
International marine bunkers**	0	0	0	0	0	0	0	0	0	0	0
International aviation bunkers**	0	0	0	0	0	0	0	0	0	0	0
Stock changes	- 85	- 10	- 65	- 56	0	0	0	0	0	0	- 217
Total primary energy supply	743	21 782	-11 230	16 933	0	6	1	1 610	654	0	30 499
Transfers	0	0	0	0	0	0	0	0	0	0	0
Statistical differences	1	- 7	0	0	0	0	0	0	0	0	- 7
Electricity plants	0	0	- 56	-2 502	0	- 4	- 1	0	1 004	0	-1 561
CHP plants	- 34	0	- 208	-6 669	0	0	0	- 95	1 644	3 600	-1 762
Heat plants	- 99	0	- 174	-2 607	0	0	0	- 587	0	2 842	- 625
Gasworks	0	0	0	0	0	0	0	0	0	0	0
Oil refineries	0	-21 775	21 476	0	0	0	0	0	0	0	- 299
Coal transformation	- 5	0	0	0	0	0	0	- 5	0	0	- 10
Liquefaction plants	0	0	0	0	0	0	0	0	0	0	0
Other transformation	0	0	0	0	0	0	0	- 5	0	0	- 5
Energy industry own use	- 13	0	-1 047	- 224	0	0	0	- 26	- 397	- 520	-2 228
Losses	- 29	0	- 3	- 120	0	0	0	0	- 293	- 561	-1 006
Total final consumption	562	0	8 758	4 812	0	0	0	891	2 613	5 360	22 995
Industry	268	0	185	1 468	0	0	0	62	1 148	1 647	4 778
Transport	11	0	3 594	331	0	0	0	5	135	0	4 077
Other	265	0	861	1 725	0	0	0	824	1 329	3 713	8 716
Residential	211	0	106	1 575	0	0	0	511	544	2 337	5 285
Commercial and public services	50	0	108	50	0	0	0	244	649	1 211	2 312
Agriculture/forestry	4	0	647	99	0	0	0	69	135	165	1 119
Fishing	0	0	0	0	0	0	0	0	1	0	1
Non-specified	0	0	0	0	0	0	0	0	0	0	0
Non-energy use	18	0	4 118	1 288	0	0	0	0	0	0	5 224
of which: Petrochemical feedstocks	0	0	0	1 288	0	0	0	0	0	0	1 288

Source: http://www.iea.org/statistics/statisticssearch/report/?country=BELARUS&product=balances&year=2012. Accessed on 1 August 2015.
Notes: * Totals may not add due to rounding.
** International marine and aviation bunkers are included in transport for world totals.

Photo 8: Children painting competition on water and energy saving

Table 8.2: Production of domestic energy resources, 2005–2013

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Fuel peat, thousand tons	2 307	2 125	2 502	2 361	2 216	2 352	2 704	2 679	2 269
Oil, incl. gas condensate, thousand tons	1 785	1 780	1 760	1 740	1 720	1 700	1 681	1 660	1 645
Associated gas, million m^3	228	219	201	203	205	213	222	218	228
Biogas, thousand tons of reference fuel	..	..	..	..	..	3	4	6	13
Firewood, thousand m^3	4 739	5 370	5 537	5 508	5 010	5 437	6 292	6 173	6 150
Other fossil fuels, thousand tons of reference fuel	378	408	429	476	456	495	528	539	526
Wind and hydropower, million kWh	37	37	36	40	46	46	46	78	146

Source: National Statistical Committee, 2015.

Hydrocarbons

Increasing the production and consumption of domestic fuels aims to reduce imports of natural gas. However, production of fossil fuel resources has not increased since 2005 and still does not play a substantial role (table 8.2).

In the period 2005–2013, the production of fuelwood has increased by 29.77 per cent, while wind and hydropower have seen an increase in production of almost 4 times. The vast majority of domestic energy resources are renewable or non-conventional by nature.

Transit

The country's most important strategic infrastructures are gas and oil transportation systems. Belarus is an important actor for Russian gas export to Europe. The gas transit network supplies Belarus with gas and provides reliability and stability of gas delivery to Europe. The average capacity of the gas transportation system is 63 billion m^3 a year. There are almost 3,000 km of crude oil pipelines, 750 km of oil products pipelines and 7,800 km of natural gas pipelines in the country, which deliver oil and gas products.

Beltransgas and other owners of the pipelines perform proper maintenance and reinstallation as well as modernization of gas distribution stations. The pipeline system is very important for the national economy since it also delivers gas to thermal power plants (TPPs) and residents as well as oil to refineries. In 2013, the Russian Federation's Gazprom supplied Belarus with 20.3 billion m^3 of gas while the volume of gas transported amounted to 48.8 billion m^3. The volume of gas transported can potentially be increased by 30 per cent, or about 15 billion m^3.

There are three underground gas storage sites on the terrirory of Belarus, with total capacity of around 1.1 billion m^3. The Belarusian oil transportation system deals with Russian oil transit and delivers raw materials to Belarus' refining infrastructure.

Refineries

There are two refineries – Novopolotskiy and Mozyrskiy – with total annual capacity of 21 million tons of crude oil. The modernization of the refineries, which was mainly done from 2000 to 2012, allowed the country to produce a wider spectrum of products of better quality and consequently reduce the import of oil products. The transit of crude oil and natural gas and export of petroleum products through export refining capacity grew consistently in recent years.

Electricity sector

Overall installed electricity capacity in Belarus is more than 9,000 MW; 42 per cent is in large condenser-type TPPs, around 54 per cent in large combined heat and power (CHP) plants, and the rest in small heat plants and hydropower plants (HPPs). There is a steady tendency to increase power capacity. While ageing facilities with 900 MW capacity should be decommissioned by 2018, it is planned that total installed capacities will grow to 11,900 MW by 2020, including construction of an NPP (comprising two units, each of 1,200 MW). Installed capacity in Belarus is ageing.

Potential capacity of all watercourses in Belarus is 850 MW; 520 MW is technically available and 250 MW is economically efficient. Water potential will be used by the construction of new HPPs and reconstruction of existing ones.

As of 1 January 2015, 51 HPPs with overall capacity of 34.6 MW are in operation, including the largest, Grodnenskaya, with 17 MW capacity.

There exists a central network of heat and electricity supply in Belarus. Belenergo supplies about half of the heat demand. The rest is covered by heating systems operated by local industrial associations. Almost 100 per cent of transmitted electrical energy goes through Belenergo electrical networks.

The installed power capacity fully covers the demand in the country. A relatively small share of electricity is imported from abroad for reasons of economic efficiency and energy security.

Currently, the main share of electricity is generated by combustion of imported natural gas. By 2015, the Belarusian energy system should reduce fuel consumption in electricity production by 10 per cent compared with 2005 and preliminary data show that this goal will be met.

The goal to have average fuel consumption not more than 230 g of reference fuel for generation of kWh is almost achieved. The centralized heat supply system allows for the effective development of energy capacities, producing electricity based on heat consumption – this is one of the most efficient methods of energy production.

In 2005, fuel consumption per kWh amounted to 274.6 g of reference fuel; in 2012, it dropped to 254.6 g of reference fuel. Fuel expenses declined by 20 g of reference fuel. While average fuel consumption for electricity generation is still higher than the targeted 230 g of reference fuel, modernized TPPs have already reached that indicator, thanks to the installation of advanced steam-gas generators.

In 2013, electricity generation reached 31,495 GWh, 6,716 GWh was imported and overall energy consumption reached 37,865 GWh (table 8.3).

Although wind and hydropower production has increased since 2005, it still accounts for only a very small share of national power production. Wind power capacity is still at an early stage of development. Currently, there are 47 wind turbines with total capacity of only 26 MW. At the same time, the wind power potential is high enough – 1,600 MW.

At present, only about 0.8 per cent of electricity produced in Belarus comes from RES. Belarus plans to increase this to 9 per cent by 2035. The first pilot projects have already been put into operation: hydro 17 MW (Grodno, 2012), wind 1.5 MW (Grabniki, 2011) and biogas 0.5 MW (Lebedevo, 2013).

Table 8.3: Electricity production, 2005–2013, GWh

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Production, GWh	30 961	31 811	31 829	35 054	30 405	34 890	32 203	30 794	31 495
of which, at:									
thermal power	30 924	31 775	31 793	35 014	30 359	34 844	32 157	30 716	31 349
hydropower	36	35	35	39	45	45	42	72	138
wind turbines	1	1	1	1	1	1	4	6	8
Imports	4 936	5 479	4 344	2 397	4 478	2 971	5 736	7 899	6 716
Exports	900	1 120	..	558	7	271	151	298	346
Consumed in the country	34 997	36 170	36 173	36 893	34 876	37 590	37 788	38 395	37 865

Source: National Statistical Committee, 2015.

Belarus' main power supply strategic targets include a coal-fired plant, an NPP, four HPPs with total capacity of 120 MW, and wind projects with total capacity of 300 MW. If fully implemented, this strategy would bring the share of power generated using imported gas down to 55 per cent by 2020, from over 90.7 per cent in 2009, leading to a decrease of one third of gas demand.

Belarus has its first 2,400 MW NPP under construction in Ostrovets, Grodno Oblast. The first reactor of 1,200 MW is planned to be in operation in 2019, and the second, of the same capacity, in late 2020.

The NPP would impact on the current energy balance and is expected to reduce gas imports by 5 billion m^3 annually. While imports of natural gas cost for 2013 and 2014 of US$3.4 billion, the NPP's operational costs for fuel and waste management would be 25 per cent of this. Once the NPP is commissioned, the country will be able to save up to 5.6 million tons of oil equivalent (> US$1.7 billion) and replace almost 25 per cent of consumed natural gas per year.

The Government anticipates that the plant will reduce the production cost of power generation and create new opportunities to export electricity to the EU. The introduction of nuclear fuel into the energy balance would reduce the country's environmental impact by reducing GHG emissions by 7–10 million tons every year. Heat supply from Belenergo meets half of the demand while the rest is covered by the heat supply systems owned by industrial and municipal enterprises (table 8.4).

CHP plants account for almost half the required heat energy and the rest is supplied by boiler stations. Belarus has developed heat supply systems to industry and buildings. Large cities have central systems of heat supply.

Natural gas is used as the main type of fuel; heating oil, biomass and secondary sources of heat are used in smaller amounts.

In 2012, natural gas accounted for the largest share (90.3 per cent) of fuel used in electricity and heat energy production (figure 8.2). Domestic energy resources accounted for 7.3 per cent (including peat and fuelwood, 6.2 per cent), coal accounted for 0.1 per cent and associated gas 1.1 per cent. The Government recognizes the importance of energy sector diversification and energy saving in increasing energy efficiency, in particular, through the creation of highly efficient equipment, construction of mini-TPPs and use of local and renewable energy sources. The production of heat and electricity at CHP plants allows for effective fuel consumption. However, it is necessary to emphasize some problems with the systems of centralized heat and power supply. One of them is loss of heat and electricity. The losses of heat energy reached 8.1 per cent in 2001. The main reasons for such losses are:

- The unsatisfactory condition of heating networks;
- The absence of devices tracking and controlling energy systems;
- Ineffective thermal equipment;
- Higher installed capacity of heat sources.

At the end of 2012, heat losses had been reduced to 7.9 per cent. This was achieved by:

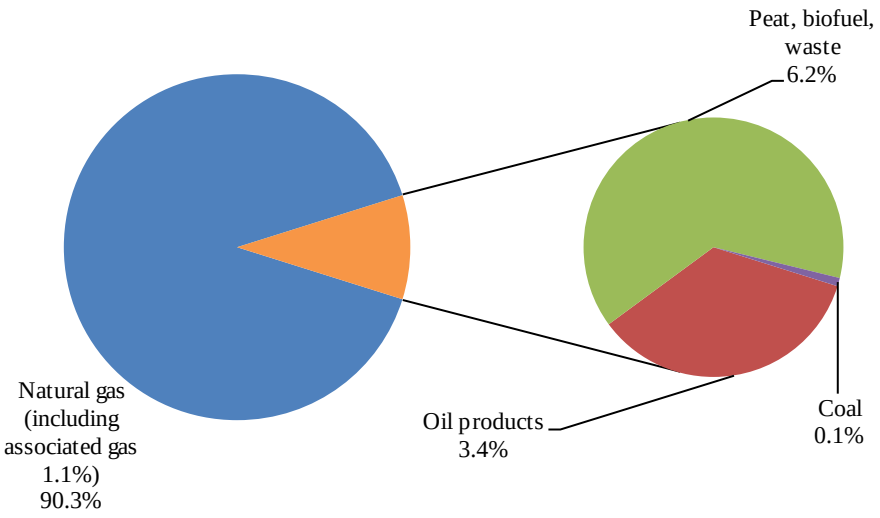
- Replacement of heat networks, applying pre-insulated pipes;
- Activation of highly efficient thermal equipment;
- Analysis of and control over heat losses;
- Optimization of heat supply schemes, installation of lower efficiency heat sources;
- Turning boiler stations into mini-power plants which use natural gas, local and renewable sources of energy.

Table 8.4: Heat production, 2005–2013, thousand Gcal

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Total production	**73 496**	**74 383**	**69 733**	**67 454**	**67 769**	**72 475**	**68 960**	**71 437**	**69 482**
including:									
Thermal power plants	**32 348**	**32 936**	**32 983**	**32 012**	**33 069**	**36 867**	**35 129**	**36 625**	**36 991**
including:									
public condenser-type power plants	334	336	308	295	224	247	217	223	224
public CHP plants	28 642	29 385	27 823	26 848	27 632	30 851	29 116	30 610	30 737
CHP and mini-CHP plants of organizations	3 372	3 215	4 852	4 869	5 213	5 769	5 796	5 792	6 030
Boiler plants	**36 673**	**36 652**	**31 711**	**30 012**	**29 231**	**29 849**	**28 108**	**28 595**	**26 157**
including:									
regional boiler plants	17 434	17 761	15 433	14 960	14 943	15 516	14 566	15 354	14 433
boiler plants of organizations	19 239	18 891	16 278	15 052	14 288	14 333	13 542	13 241	11 724
Waste-heat utilization plants	**4 475**	**4 795**	**5 039**	**5 430**	**5 469**	**5 759**	**5 723**	**6 217**	**6 334**

Source: National Statistical Committee, 2015.

Figure 8.2: Structure of fuel used in electricity and heat energy production, 2012, per cent



Source: http://www.iea.org/statistics/statisticssearch/report/?country=BELARUS&product=balances&year=2012. Accessed on 1 August 2015.

Belarus has a well-developed electricity system, with a total power generation capacity exceeding 9,200 MW, a grid length of over 240,000 km and more than 63,000 industry employees. The high-voltage power grids of the Belarusian electricity system are part of the larger high-voltage ring connecting the Baltic countries, Poland, the Russian Federation and Ukraine. Balances have been developed for electricity and gas supplies within this high-voltage ring.

Consistent efforts are being made to reduce losses in the electricity supply networks of the Belarusian energy system. Losses are about 11–13 per cent, which includes about 2 per cent commercial losses.

Firewood

Forests cover about 40 per cent of the territory of Belarus. Forest resources occupy an area of 9.4 million ha, and standing volume is estimated at 1.5 billion m^3; this increases by about 28 million m^3 annually. Firewood consumption in the last few years is around 6 million m^3 annually. The annual resource potential of fuelwood and wood waste is estimated at 11.65 million m^3 (3.1 million toe). The production of fuelwood and wood waste resources is expected to reach 10.56 million m^3 by 2015 and 11.65 million m^3 by 2020. Currently, fuelwood is used in seven mini-CHP plants and more than 3,000 boilers.

8.3 Environmental pressures

The main focus of environmental safety control in the energy sector is an integrated approach to the rational use and saving of energy resources at all stages of production and refining, on the basis of progressive, energy-efficient and environmentally friendly technologies. The use of RES is also considered to be effective in reducing emissions and, therefore, represents solutions to environmental problems.

Fossil fuels

Oil and fuel peat production meets environmental standards, including reclamation efforts.

Energy transportation

In general, pipelines are the safest and most efficient method of moving fossil fuels. Many pipelines cross water bodies. For many of these crossings, the pipeline builders dam the water course, lay the pipeline underneath it or divert water away from the area where the pipeline is installed. And because these pipelines are often slated to go through rural parts of the country, one of the concerns of residents is that the pipeline and noisy compressor stations that can go along with it would disrupt their way of life and disturb the environment.

Transportation of gas and especially oil creates significant environmental risks. It raises the possibility of loss of habitats for wildlife as well as accidental spills. Belarus follows international guidelines and practice on the management of risk of spills from pipelines. The greatest threats of oil discharge during operations are posed by pipeline leaks and release of bunker oil. In 2009, Belarus shut off a pipeline that carries more than 10 million tons of oil a year to Latvia from the Russian Federation, due to the poor condition of the pipe, which was manifest in leaks and defects.

Refineries

Refineries are sources of air, water and soil pollution. In accordance with data from the Ministry of Natural Resources and Environmental Protection, concentrations of air pollutants do not exceed allowable limits around the refineries. Refineries are obliged to carry out both self-control and local environmental monitoring (chapter 2). Industrial waste from refineries undergoes a full cycle of deep cleaning at the cleaning facilities, which include units for mechanical, physical and chemical, and biological purification. The extent of the refineries' purification of industrial wastes often exceeds similar parameters at many industrial enterprises in Western Europe.

Electricity production

Thermal power plants

The country's TPPs mainly use natural gas. Natural gas is considered to be the cleanest of all fossil fuels as combustion by-products are primarily carbon dioxide and water vapour with low levels of nitrogen oxides and hardly any particulate matter. In generating a given quantity of energy through combustion, natural gas will produce approximately 30 per cent less carbon dioxide than oil and 45 per cent less carbon dioxide than coal.

Emission standards for large combustion plants are close to those established in EU Directive 2001/80/EC on the limitation of emissions of certain pollutants into the air from large combustion plants. TPPs' emissions are to be regularly monitored. For TPPs with capacity of 25–50 MW, monitoring is conducted monthly by accredited laboratories. By March 2015, TPPs exceeding 50 MW must install a continuous monitoring system, but some TPPs have requested a delay in installation. The following power plants with a capacity above 50 MW are expected to be equipped with continuous automatic outlet measurement and recording of air pollutants by 2015:

- Svetlogorskaya CHP, RUE "Gomelenergo";
- Berezovskaya TPP, RUE "Brestenergo";
- Molodechno electricity networks and Minsk CHP-3, RUE "Minskenergo";
- Bobruiskaya CHP-2 and Mogilev CHP-2, RUE "Mogilevenergo";
- Zhodinskaya CHP, RUE "Minskenergo", and Baranovichi heating networks, RUE "Brestenergo".

Nuclear power plant

Nuclear power generation does not directly produce or emit harmful substances. As with all energy sources, pollution is associated with supporting activities such as mining, manufacturing and transportation.

NPPs emit negligible amounts of carbon dioxide throughout their life cycle and the routine health risks are much lower than those associated with coal. However, there is a risk potential if containment fails, which in nuclear reactors can be brought about by over-heated fuels melting and releasing large quantities of fission products into the environment.

The construction and operation of an NPP can potentially have environmental impacts associated with this type of development. It is important to ensure compliance with the international standards of power plant construction and operation and make the compliance strategy known to all stakeholders. Therefore, the application of internationally adopted standards, taking into consideration recommendations of the International Atomic Energy Agency (IAEA) in respect of design, siting, operational safety, radiation safety and safe management of radioactive waste, will provide necessary safeguards to reduce environmental and health risks.

An EIA procedure, in line with international agreements and adequately embedded into the national environmental assessment framework, is an important mechanism that ensures that environmental, including health, considerations, as well as public opinion, are thoroughly taken into account.

Greenhouse gas emissions

In 2012, when total GHG emissions in Belarus were 89.3 million tons of CO_2 equivalent, the energy sector share was 62 per cent. In 2013, carbon dioxide (56.1 million tons of CO_2 equivalent) forms the biggest proportion of GHG emissions, followed by methane (1.9 million tons of CO_2 equivalent) and nitrous oxide (0.13 million tons of CO_2 equivalent) (table 8.5).

In the period 2000–2012, the level of CO_2 emissions was rather stable. This is due to the fact that increased emissions stemming from heavy reliance on fossil fuels were offset by energy efficiency enhancement and some increase in renewable energy use. The energy efficiency and renewable energy measures for the period 2011–2015 mitigate the impact of increased shares of coal, peat and petroleum coke in the total energy balance and ensure emissions reduction. After 2005, when energy-saving measures and some use of RES were implemented, GHG emissions were reduced annually by 10–12 million tons of CO_2 equivalent compared with 1990. GHG emissions from the energy sector amounted to 58.14 million tons of CO_2 equivalent in 2013. During the period 2005–2012, the dynamic of GHG emissions was relatively stable.

The 2011 National Programme for Development of Local and Renewable Energy Sources for the period 2011–2015 gives an estimate of the potential reduction of GHG emissions due to the substitution of RES (table 8.6). In the period 2011–2015, the Programme plans to change the structure of the fuel and energy balance, in particular, to expand the use of coal, peat and petroleum coke, which will increase GHG emissions from energy and industrial plants. GHG emissions increased from 2011 to 2013 by 5 million tons of CO_2 equivalent, at an average of 4.4 per cent a year (table 8.5).

Thus, this annual trend in rising emissions will potentially lead to a total increase in emissions by almost 9 million tons of CO_2 equivalent for the period from 2011 to 2015. However, implementation of measures on energy saving and use of RES will offset these effects and reduce GHG emissions (at least 11 million tons of CO_2 equivalent), giving a total of around 2.7 million tons of potential emissions reductions, which is in line with Belarus' international commitments.

The sixth National Communication to UNFCCC provided GHG emission projections until 2020. For the energy sector, three scenarios/measures were developed and various options considered for the development of the energy sector and demand for electricity and heat (table 8.7):

- Scenario without any measures;
- Scenario with measures;
- Scenario with additional measures.

Table 8.5: GHG emissions from the energy sector, 2005, 2009–2013, million tons of CO_2 equivalent

	2005	2009	2010	2011	2012	2013
Total	**55.300**	**54.800**	**56.400**	**53.400**	**55.300**	**58.140**
of which:						
CO_2	53.258	52.918	54.279	51.315	53.330	56.100
CH_4	1.933	1.786	2.038	1.941	1.910	1.910
N_2O	0.120	0.120	0.124	0.124	0.170	0.130

Source: Environmental Protection in the Republic of Belarus 2010–2014, Statistical book, National Statistical Committee, 2015.

Table 8.6: Potential reduction of GHG emissions due to the development of RES, 2011–2015, thousand tons of CO_2 equivalent

Planned measures	Potential emissions reduction
Use of biomass as a source of fuel (fuelwood, straw)	1 152
Use of biogas technologies	1 046
Construction of new HPPs, reconstruction of working HPPs	197
Construction of wind generators	318
Total	**2 713**

Source: National Programme for Development of Local and Renewable Energy Sources for the period 2011–2015.

Table 8.7: Energy sector GHG emission projections until 2020, million tons of CO_2 equivalent

Scenario	1995	2000	2010	2014	2015	2016	2017	2018	2020
without any measures	58 225	59 832	89 886	114 202	119 772	124 411	129 141	133 723	143 055
with measures	58 225	52 684	56 442	58 089	60 370	61 827	63 077	64 166	58 071
with additional measures	58 225	52 684	56 442	57 717	59 803	60 775	61 769	62 589	55 383

Source: Sixth National Communication of the Republic of Belarus to UNFCCC, 2015.

8.4 Energy intensity and efficiency by end use

Since 2005, national GDP has increased by more than 1.5 times. Over the same period, the energy intensity of GDP has decreased by 1.3 times. Active energy saving has been observed. From 2005 to 2013, electricity consumption by businesses and public organizations increased slightly (table 8.8). This can be explained by successful energy-saving measures in the country. However, household consumption increased somewhat more.

Heat consumption by businesses and public organizations, as well as by the population, shows a slight decrease (table 8.9). This can be explained by the introduction of energy-saving/efficiency measures. Total final energy consumption in the period 2005–2013 increased.

Increased energy efficiency is to be achieved by the implementation of modern, energy efficient technologies in all sectors of the economy. Steam-gas and gas turbine technologies with at least 57 per cent efficiency coefficient are expected to be introduced. In manufacturing industry, emphasis would be placed on the modernization of moulding, thermic and galvanic operations, with the installation of effective, automatized incinerators with at least 50 per cent efficiency coefficient. In the housing and utility sector, reconstruction of boiler stations and construction of mini-CHPs is planned, along with equipping the heat networks with pre-insulated pipes and thermal modernization of buildings. During the period 2005–2012, energy consumption by industry remained at essentially the same level, with some fluctuation (table 8.10).

In 2012, residential energy consumption had increased slightly, by about 3 per cent, compared with 2005. However, because of fluctuations throughout the period, no constant tendency is detectable. Energy consumption by commercial and public services declined in the period 2005–2008 but then increased, and in 2012 it even exceeded the 2005 level, by around 13 per cent.

Transport and non-energy use are responsible for noteworthy increases in total energy consumption in the period 2005–2012. These sectors increased by 1.45 and 1.67 times, respectively.

Energy and carbon intensity based on GDP is 1.5–1.8 times higher in Belarus than in other European countries with a similar climate; however, it is 1.4–1.5 times lower than in the Russian Federation or Ukraine. This implies improvement in Belarus and a large potential to increase energy efficiency and the share of renewable energy in the total energy balance.

Energy service companies

Energy service companies (ESCOs) play a critical role in the improvement of energy efficiency in many countries. In Belarus, the first ESCO started operation in early 2005. However, to develop ESCOs remains a challenge due to a number of barriers.

Table 8.8: Power consumption by organizations and households, 2005–2013, GWh

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Consumption	34 997	36 170	36 173	36 893	34 876	37 590	37 788	38 395	37 865
of which:									
by organizations	30 581	31 371	31 058	31 478	29 308	31 701	31 679	32 065	31 479
by population	4 416	4 799	5 115	5 415	5 568	5 889	6 109	6 330	6 386

Source: National Statistical Committee, 2015.

Table 8.9: Heat energy consumption by organizations and households, 2005–2013, thousand Gcal

	2005	2006	2007	2008	2009	2010	2011	2012	2013
Consumption	73 496	74 383	69 733	67 454	67 769	72 475	68 960	71 437	69 482
of which:									
by organizations	49 088	49 887	47 430	46 476	45 698	49 036	46 703	48 063	46 069
by population	24 408	24 496	22 303	20 978	22 071	23 439	22 257	23 374	23 413

Source: National Statistical Committee, 2015.

Table 8.10: Energy consumption by economic sector, 2005–2012, ktoe

Sectors	2005	2006	2007	2008	2009	2010	2011	2012
Industry	4 806	4 874	4 935	5 088	4 339	4 753	4 786	4 778
Transport	2 815	3 291	3 346	3 770	3 649	3 849	3 959	4 077
Other	8 147	8 300	7 947	7 744	8 053	8 438	8 251	8 716
Residential	5 109	5 182	4 922	4 745	4 876	5 228	5 033	5 285
Commercial and public services	2 023	2 033	1 905	1 769	2 080	2 148	2 118	2 312
Agriculture/forestry	1 015	1 084	1 120	1 228	1 096	1 061	1 100	1 119
Fishing and non-specified	0	0	0	2	0	1	1	1
Non-energy use	3 133	3 895	3 623	2 924	2 861	2 632	3 893	5 224
Total final consumption	**18 901**	**20 360**	**19 851**	**19 525**	**18 903**	**19 672**	**20 890**	**22 995**

Source: http://www.iea.org/statistics/statisticssearch/report/?country=BELARUS&product=balances&year. Accessed on 1 August 2015.

No legislative basis for the establishment, development and operation of an ESCO exits. Moreover, in the industry sector as well as in state-funded organizations, current accounting rules and taxation systems do not take into consideration benefits from energy savings in the overall cash flow of enterprises, rather discouraging energy conservation. Most potential ESCO projects are long term, while commercial bank loans are only available for up to seven years and the interest rate is relatively high.

By giving state-funded organizations more budget flexibility, ESCO projects could encourage energy savings and efficiency. ESCOs could enter into financing arrangements with banks and take on loan risk while providing energy services to state-funded organizations. This would allow state-funded organizations to reap the benefit of energy efficiency.

8.5 Alternative sources of energy

Belarus has some renewable energy potential. Biofuel has the greatest potential, as do wind, solar, biogas and hydro energy. For Belarus, which imports 80–85 per cent of all its fuel resources, it is very critical to add renewables to its energy balance. RES could replace about 30 per cent of national fuel consumption for electricity and heat production.

According to the National Agency of Investment and Privatization, the estimated technical potential of renewables is around 80 million toe, which represents (approximately) more than three times Belarus's total current energy consumption. However, currently, only a small proportion of energy comes from renewable resources, as the legislation in this area has been developed only recently and the institutional and technical capacity to develop RES is still to be built.

The share of renewable energy in total energy consumption in the period 2005–2012 increased, with average annual growth of around 4 per cent. Constant growth of the RES share can be seen from 2005, when the Government set a renewable energy target as a priority and an investor-friendly environment (tariffs, purchase and link to the national grid guarantees, and other support and benefits) emerged.

Significant progress in legislation and government support of renewable energy has been made. The 2010 Law on Renewable Energy Sources, 2011 National Programme for Development of Local and Renewable Energy Sources for the period 2011–2015 and other legal acts and programmes have been instrumental in this respect.

The 2010 Law established feed-in tariffs (FITs) for electricity generated from RES and provides for guaranteed connection of certified RES plants to the grid, as well as for a purchase guarantee by the state-owned electricity company (Belenergo) of all electricity produced by these plants (chapter 3).

The Ministry of Natural Resources and Environmental Protection administers the certification of RES plants; the issued certificates are valid for a period of 10 years. The Tax Code provides some tax incentives designed to support the development of RES. Imports of equipment used for the production, transfer and reception of RES energy are exempt from VAT. Moreover, land used by RES plants is exempt from land tax and there is a reduction coefficient applied to the environmental tax for wastewater discharged by RES plants.

Wind

The average annual wind velocity in Belarus is less than 4 m/s and in the majority of sites it varies from 3–4 m/s. Nevertheless 1,840 sites in the country have been identified with average wind speed of 5.5–6.5 m/s near the ground and 6.5–7.5 m/s at a height of 40 m. This demonstrates energy potential of 1,600 MW and annual electricity generation of 2.4 billion kWh.

According to the National Programme for Development of Local and Renewable Energy Sources for the period 2011–2015, the Government planned to construct 460 MW wind turbines. The most powerful wind turbine in Belarus, with capacity of 1.5 MW, was commissioned in Grabniki (Grodno Oblast) in 2011 (table 8.11). The height of its tower is 90 m and blade length 40 m, producing average annual electricity production of around 84 GWh. Belarus is planning to launch a number of wind turbines with a total capacity of 162–450 MW by 2016.

Table 8.11: Wind power generation, MW

Location	Capacity
Grabniki, Novogrudok rayon	1.500
Zanaroch, Myadel rayon	0.850
Polykovichi-2, Mogilev rayon	0.800
Bobrujsk UKDPP "Vodokanal"	0.250
Raica, Korelichi rayon	0.231
Krasnogorka, Braslav rayon	0.132
Zhukovo, Mogilev rayon	0.080
Volma, Dzerzhynsk rayon	0.006
Total	**3.849**

Source: State Cadastre of Renewable Energy Sources, 2015.

Solar

Belarus has only 1,815 sunshine hours on average per year, with the average energy density of solar radiation of 32 W/m², taking into account cloudy periods and night time.

At present, six solar power plants with capacity ranging from 6–10 MW are in operation. They are mainly used for electrical herding systems and local supply of cottages and small farms with electricity.

According to the National Programme for Development of Local and Renewable Energy Sources for the period 2011–2015, 170 solar water heaters are planned to be launched during this period.

The main area of solar energy use is in solar water heaters in agriculture and for household needs. There is a demand for solar electric batteries. A household solar water-heating unit with a thermal capacity of 160 kW was put into operation in Soligorsk rayon in 2010.

Hydro

Belarus' highest hydro energy potential is in the river basins of the Neman, Western Dvina and Dnieper Rivers. Belarus has planned to construct two HPPs on the Neman River (Grodnenskaya and Nemnovskaya HPPs) with total capacity of 37 MW, four on the Western Dvina River (Polotskaya, Vitebskaya, Beshenkovichskaya and Verkhnedzvinskaya HPPs (box 8.2)) with total capacity of 112 MW, and four on the Dnieper River (Orsha, Rechitskaya, Shklovskaya and Mogilev HPPs) with total capacity of 20.3 MW.

Box 8.2: Development of an HPP cascade on the Western Dvina River

One of the country's flagship projects is the construction of a cascade of four HPPs on the Western Dvina River, with a total capacity of up to 130 MW. The cascade will include the Polotskaya, Vitebskaya, Beshenkovichskaya and Upper Dvina HPPs. The project is being implemented by Vitebskenergo. Polotskaya HPP is the first to be built, with a capacity of 21.75 MW. The plant is expected to generate 112 million kWh a year.

The Eurasian Development Bank (EDB) lent its support to the project in November 2010, signing a loan agreement with RUE Vitebskenergo to finance construction of the power plant. The Bank began loan disbursements to the US$142.7 million project in February 2011. EDB's financing will total US$99.8 million over 10 years, with the loan guaranteed by the Government.

EDB funds will finance the construction at Polotskaya HPP of a 124 m high concrete dam and a turbine room housing five generators. The project includes engineering, construction, supply of equipment and spare parts, installation, start-up, testing and training. Construction began in the autumn of 2011 near Luchno village in Polotsk District (Vitebskaya Oblast). The hydro-electric generating equipment was ordered at the same time and is now being manufactured.

Source: Eurasian Development Bank (http://www.eabr.org/e/projects/edb/index.php?id_4=288). Accessed on 1 August 2015.

This will increase the total capacity of the Belenergo HPPs to nearly 180 MW. The construction of Grodnenskaya HPP (17 MW) was completed in 2012 and it is already in operation. Polotskaya HPP (22 MW) is currently under construction.

In addition, the Osipovichskaya HPP on the Svisloch River (2.2 MW), Vilejskaya HPP on the Vilejk River (1.6 MW) and Chigirinskaya HPP on the Drut River (1.5 MW) were constructed and are in operation.

In the period 2016–2020, it is planned to construct six additional large HPPs on the Dnieper and Western Dvina rivers with a total capacity of 70.3 MW, and phase their introduction, which would be under the management of Belenergo. In addition, there are plans for mini- and micro-HPPs. These measures would allow the country to set up three HPP cascade systems by 2020 and be able to fully use the potential of its hydro energy sources by 2020.

Geothermal

According to the Belarusian Renewable Energy Association, the most favourable conditions for the use of thermal waters are in Pripyat and Podlasie-Brest depressions where underground heat potential is estimated at 3–6 t e.f. per m^2 of surface. The pore water temperature is 80˚C and above. The salinity increases with an increase in the depth brines, thus requiring special technological solutions.

The largest geothermal installation, with a capacity of about 1–1.5 MWt, for providing heat to greenhouses, operates in the suburbs of Brest.

At present, the total geothermal potential in Belarus is being estimated. Development of this activity will be carried out within the framework of research and development programmes during the period 2015–2020.

Biomass

Fuelwood is the most significant RES in Belarus and is being promoted in the interest of reducing GHG emissions. The annual accumulation of timber biomass is assessed at 32 million m³, from which 10–12 million m³ are harvested. At present, only 2.0–2.5 million m³ of firewood is used by households and 3.0–3.5 million m³ of fuelwood/industry waste is burned in municipal and governmental building boilers. New designs have been developed for boilers using wood waste, with capacity of 0.25–1.5 MW and efficiency up to 82 per cent. The following CHP plants are in operation, using wood chips as fuel: Retchitsa (4.2 MW), Pruzshany (3.7 MW), Vilejka (2.4 MW) and Osipovichi (1.2 MW).

There are 7 biogas plants for communal waste and sewage sludge in operation, with a total capacity of 2 MWe. There are 167 MSW burial facilities with an actual burial volume of 206.6 million m³ and potential energy output of 470,000 t e.f. per year. They will reach 20–25 per cent bio-processing efficiency for gas production.

Another substantial energy source is biogas from digestion of animal manure and other organic waste. In Belarus, there are about 250 cattle-breeding complexes and 70 poultry farms. Approximately 1.7 billion m³ of biogas can be produced from these annually.

The first biogas power plant in Belarus was constructed in 2008. The most powerful such plant, with capacity of 4,800 kW, was commissioned in 2013 in agro-town Lebedevo. As of March 2015, 17 biogas plants and power stations function on landfill gas, with total capacity of 22.7 MW.

A landfill gas power plant project is being implemented at the "North" landfill near Minsk. After the launch, its capacity will reach 5.6 MW.

8.6 Legal, policy and institutional framework

Legal framework

The 2007 Directive of the President No. 3 "Economy and prudence – main factors of national economic safety" provides basic directions on energy and economic security and gives indications to republican and local authorities, industries, other institutions and organizations on developing programmes, policies and measures for energy efficiency improvement.

The 2010 Law on Renewable Energy Sources provides for:

- Guaranteed connection of installations that use RES to the nearest connection point of the state power grid;
- Adjustment of the state power grid to provide secure transmission of electrical power produced from RES;
- Tax concessions and other privileges pursuant to legislation, for example, when imported equipment is intended for use with RES;
- The obligation of state suppliers of energy to purchase all energy generated in RES installations, while assuring FITs.

The Law establishes the State Cadastre of Renewable Energy Sources and certain instruments that raise incentives for RES investors and producers through the introduction of FITs, green certificates and other arrangements.

The 2015 Decree of the President No. 209 "On the use of renewable energy sources" ensures that stimulating coefficients for determination of tariffs for electrical energy produced from RES will not be disturbed during the 10 years from commencement of operation of a RES installation, provides stimulating coefficients dependent on the timely commencement of operation of a RES installation, and introduces the system of quotas for modernization and construction of RES installations. The manner of determination and distribution of such quotas is to be defined by the Council of Ministers. The quota system is meant to ensure optimized development of the various types of RES.

The 2015 Law on Energy Saving establishes the overall legal and institutional framework for energy conservation and national monitoring and reporting systems on energy saving, including:

- Approaches to indices to be established on energy conservation;
- Provisions for development and implementation of energy conservation programmes;
- Provisions for energy audit of organizations;
- Provisions for consumption rate setting for energy resources;
- Provisions for state expertise of energy efficiency;
- Requirements for supervision over rational and effective use of fuel and energy resources;
- Directions for economic stimulation of activities on energy conservation.

The Law regulates measures aiming at reduction of the energy intensity of the national economy and introduces a number of new elements, such as energy audits, and energy management and fiscal instruments. The Law regulates the following activities:

- Manufacturing and supply of energy generating and energy consuming equipment, machinery, mechanisms and materials, as well as devices for metering, controlling and regulating the consumption of fuel and energy resources;
- Activities relating to the development and application of unconventional and renewable energy sources, and the use of energy from waste;
- Development and introduction of efficient energy conservation control systems and controls for the efficient use of fuel and energy resources.

One of the basic principles of the Law is creating a system of financial and economic mechanisms that provide economic incentives to producers and users for the efficient use of fuel and energy resources, the use of unconventional and renewable energy sources in the fuel and energy sector, as well as the investment of funds in energy-saving activities. Users and producers of fuel and energy resources that conduct energy conservation activities may be provided with state support. The energy supplied to the national grid by any small and unconventional energy generating facility with high efficiency and using RES shall be paid for at prices that provide incentives for the construction of such facilities.

The 2008 Law on the Use of Atomic Energy sets out rules concerning construction, operation and decommissioning of nuclear installations and storage sites, handling of nuclear materials during operation and storage of radioactive wastes, and other issues related to nuclear energy use. The 2013 Decree of the President No. 499 "On construction of the Belarusian nuclear power station" provides for the construction of the NPP in Ostrovets, Grodno Oblast, in the period 2013–2020.

The procedures for environmental assessment of projects are regulated by the 2009 Law on State Ecological Expertise (chapter 2). Strategic environmental assessment (SEA) as such does not exist in Belarus, although some elements of SEA are present in the legal framework (chapter 1).

At present, no legislation on the energy market in Belarus supports further development of the national energy system according to market rules. No law on energy covers all aspects of the energy sector, including production, transport, distribution and consumption, to transform the sector into a well-functioning competitive market.

Policy framework

The key principles of the state energy policy include ensuring energy security through improving the fuel and energy mix in parallel with the rational use of energy resources, increased use of local fuels and RES, and promotion of energy efficient and environmentally friendly clean technologies in all sectors of the economy.

The Concept of Energy Security of the Republic of Belarus, approved by the 2007 Decree of the President No. 433, identifies 12 indicators, including the energy intensity of GDP. The Concept sets the following targets:

- Compared with 2005, to reduce the energy intensity of GDP by 31 per cent in 2010 (with GDP growth of 156 per cent), by 50 per cent in 2015 (with GDP growth of 229 per cent) and by 60 per cent in 2020 (with GDP growth of 319 per cent). While the goal for 2010 was almost achieved – the energy intensity of GDP based on primary and secondary energy consumption in the period 2005–2010 decreased, with an average annual reduction of 5.7 per cent – it is difficult to say whether the target for 2015 can be met;
- To achieve total energy savings (at the same level of GDP) of at least 7.1–8.9 million toe in the period 2011–2015 and at least 5.2 million toe in the period 2016–2020;
- To raise the share of domestic energy resources in boiler and furnace fuels to 30 per cent by 2015 and 32 per cent by 2020.

There are a number of other sectoral policy documents that were adopted before 2009. However, the global economic crisis and volatile prices of imported fuel caused a decline in fuel and power consumption in Belarus in 2009. It also triggered the correction of development goals for the energy sector in Belarus and development of new documents.

The Strategy for Development of the Energy Potential of the Republic of Belarus, approved by the 2010 Resolution of the Council of Ministers No. 1180, is one of the core documents that provides a framework and road map for low-carbon energy development. It leaves unchanged the long-term goals of the energy policy defined in the 2007 Concept of Energy Security and Directive of the President No. 3, but specifies the parameters and mechanisms of medium-term development, taking into account changes in economic conditions. The document sets up the main goals of development of the fuel–energy complex, including capacities to be built:

- Combined-cycle gas turbine units with installed capacity of 400 MW in Lukoml Power Plant and Beresa Power Plant;
- A coal-fired power plant with installed capacity up to 920 MW in 2015;
- An NPP with installed capacity up to 2,340 MW by 2020.

The Strategy provides for the gradual elimination of cross-subsidization of energy tariffs by 2014–2015. By 2015, subsidized natural gas and energy tariffs for companies and individual entrepreneurs are expected to be fully withdrawn and household energy tariffs would cover 100 per cent of costs. There is no evidence that this plan will be introduced in 2015.

Energy tariffs remain low and do not include environmental costs. Therefore, pricing policy does not provide incentives to use energy efficiently and to invest in RES. Government plans to reform the electricity sector by creating a wholesale market have been delayed, and electricity remains heavily subsidized for households.

Modernization and regulation of government subsidies will encourage business entities to introduce energy-saving technologies, make better use of local and imported natural resources, and develop market relations in all sectors of the economy. As of August 2015, the legal and

institutional frameworks to secure investments in energy efficiency projects are not in place.

The State Programme for Construction of Hydroelectric Power Plants in the Republic of Belarus in 2011–2015, approved by the 2010 Resolution of the Council of Ministers No. 1838, supports rehabilitation of existing small HPPs all over the country and building a number of new cascade hydropower installations with total capacity of more than 100 MW and annual power generation of 0.5 billion kWh. As of 2014, four major hydropower projects have been implemented, totaling 22.3 MW, including Grodnenskaya HPP (17 MW).

The Programme for Construction of Energy Generation Facilities Fuelled by Biogas for 2010–2015, approved by the 2010 Resolution of the Council of Ministers No. 1885, enables the application of provisions of the Law on Renewable Energy Sources to the utilization of biogas from agricultural waste, communal sewage, landfills and livestock waste. It aims at manufacturing 32 biogas units with total capacity of 34.71 MW in the period 2010–2015. The main directions of this programme include biogas-fired CHPs at livestock and poultry farms, with total capacity of 19.99 MW, and ten WWTPs with installation of mini-CHPs, with total capacity of 13.72 MW. Total electricity production from these facilities should reach 285 million kWh. This will substitute for the import of 79,000 tons of reference fuel. As of 2014, a total of 5 biogas plants and power stations function on landfill gas. Their total capacity now reaches 8.38 MW.

The State Programme "Peat" for 2008–2010 and for the period until 2020, approved by the 2008 Resolution of the Council of Ministers No. 94, aims to increase peat consumption in the energy balance. In the period 2008–2020, the consumption of peat should reach 12.1 million tons of reference fuel. This will substitute for the import of 10.5 billion m^3 of natural gas. The Programme defines the economically efficient annual volumes of peat consumption for fuel production and projects on peat fuel use as 1.3 million toe in 2015 and 1.4 million toe in 2020.

The National Energy Saving Programme for 2011–2015, approved by the 2010 Resolution of the Council of Ministers No. 1882, is an ambitious low-carbon energy road map. It aims to reduce the energy intensity of GDP by 50 per cent in 2015 compared with 2005. The Programme includes a number of energy efficiency improvement measures, which should be achieved by the installation of modern, energy efficient technologies in all sectors of the national economy with a total effect of about 11.7 million tons of CO_2 equivalent of GHG emissions reduction compared with a business-as-usual scenario.

In the past, the energy intensity of GDP reduced by a factor of 2.3 at an average annual rate of 4.3 per cent. This was possible through strong government interventions (both regulatory and financial) in highly centralized and state-owned companies in the energy sector. The new National Energy Saving Programme is unlikely to receive the same levels of government financial support due to budgetary constraints; therefore, additional financial resources will be needed. At present, there is no sustainable lending market for energy efficiency investments which could meet the Government's energy efficiency investment challenge. In addition, energy tariffs and collections are not maintained at levels that provide incentives to consumers to invest in energy efficiency projects.

The 2011 National Programme for Development of Local and Renewable Energy Sources for the period 2011–2015 sets out the target of no less than 30 per cent of domestic energy production by 2015, with an almost twofold increase by 2015 in the use of local and renewable energy sources compared with 2010 (to 5.7 million toe) and substitution of up to 2.4 billion m^3 of imported natural gas. This target is to be reached by installing, by 2015, heat and power generation facilities using wood/straw/municipal waste fuel (27.45 MW electricity, 1,004 MW thermal), biogas (60 MW), wind (168 MW), solar (170 solar water heaters) and heat pumps (6.4 MW), as well as construction and rehabilitation of HPPs (102 MW).

As of 2014, eight wind turbines have been installed, with total capacity of 3.849 MW (table 8.11). Four HPPs have been constructed (Grodnenskaya and the smaller Osipovichskaya, Vilejskaya and Chigirinskaya), with total capacity of 22.3 MW. Five biogas plants are operating on landfill gas, with total capacity of 8.38 MW.

The State Programme for Development of the Belarusian Energy System for the period until 2016, approved by the 2012 Resolution of the Council of Ministers No. 194, was drafted for the purposes of further development of technical potential. It envisages the reduction of CO_2 and NO_2 by at least 15 per cent compared with 2010 through the implementation of a number of technological measures, including the installation of modern gas cleaning facilities, use of optimal combustion

parameters and introduction of advanced burners and boilers. Its targets are defined as follows:

- Compared with the level of 2005, the energy intensity of GDP is to be reduced by at least 50 per cent in 2015 and by at least 60 per cent in 2020;
- Under similar GDP growth rates, the total energy saving is to be at least 7.1–8.9 million toe in the period 2011–2015 and at least 5.2 million toe in the period 2016–2020.

The State Programme "Scientific support to development of nuclear energy in the Republic of Belarus for the period 2009–2010 and up to 2020" approved by the 2009 Resolution of the Council of Ministers No. 1116 includes the issues of environmental monitoring.

The Environmental Protection Strategy of the Republic of Belarus for the period until 2025, approved by the 2011 Decision of the Board of the Ministry of Natural Resources and Environmental Protection No. 8-P, specifies the following tasks related to the energy sector:

- Reducing harmful effects on the environment and revival of natural systems (by, among other measures, the introduction of energy saving technologies; reduction of the energy intensity of production; dust and gas detecting systems for fuel-burning equipment when transforming the fuel into solids or during construction of new energy facilities; production and consumption of motor fuels with better environmental characteristics; wider use of biodiesel fuel and bioethanol; and wider use of public transport with better environmental characteristics, and of electric transport);
- Reducing waste generation, maximizing the use of waste as secondary raw materials, and prevention of the harmful effects of waste on the environment (by, among other measures, using the combustible fraction of waste as a fuel to generate electricity and heat by 2025, composting the organic component of waste in cities with a population exceeding 70,000, and extraction of landfill gas at waste sites, where this is economically efficient);
- Reducing impact on climate and ensuring adaptation to climate change in the social and economic spheres (by, among other measures, the gradual transition to low-carbon energy development, with the widest possible use of alternative and renewable energy sources, biofuels and nuclear energy; boosting economic motivation in production and use of environmentally friendly fuels, including non-carbon fuels; and construction of biogas plants).

To assess performance, a system of forecasted indicators for the period up to 2025 has been developed as part of this Strategy. In particular, energy-related emissions, such as GHG emissions, should reach not more than 110 million tons.

Institutional framework

The Ministry of Energy is responsible for energy issues. Within the Ministry of Energy, the Department of Energy Efficiency is responsible for the implementation by subordinated organizations of this Ministry of programmes to decrease the use of fossil fuel for the production of heat and electricity.

The Department of Energy Efficiency of the State Committee on Standardization is the main institution responsible for the development and implementation of state policy on energy efficiency and renewable energy, and control of the rational use of fuel, electricity and heat. The Department has its own units and enterprises at different levels of government, including oblasts, Minsk City and other municipalities. With their assistance, the Department organizes and monitors the implementation of state policies and programmes.

The state-owned enterprises State Production Association Belenergo (electricity and heat supplier) and State Production Association Beltopgas (gas supplier) are both controlled by the Ministry of Energy. Belenergo is the main producer of electricity and heat and accounts for about 70 per cent of total consumption. Six energy supply companies operated by Belenergo provide Minsk City and six oblasts with electricity and heat. Beltopgas supplies the economy and households with natural gas, solid fuels and liquefied natural gas. Beltopgas is also responsible for peat extraction and the peat processing plant. There are seven energy distributing companies, which provide Minsk City and six oblasts with natural gas.

<u>Other stakeholders</u>

The legislation allows foreign investors to own newly built power plants. Foreign companies are interested in the construction of power plants, both TPPs and those operating on RES. There are different types of state support available for both local and foreign investors. The legislation guarantees the inclusion of independent energy producers in the state energy system and acquisition of the energy produced. In recent years, there has been an increasing number of

independent electricity producers, both Belarusian and joint enterprises.

Small energy production companies employing shareholders' equity are primarily engaged in construction of mini-TPPs as industrial associations and at the local level; their potential development includes boiler stations, heat tracking and control systems, compressed air systems, steam distribution and electricity control. Independent energy producers, operating mini-HPPs and mini-TPPs, use wood and wood waste for mini-TPPs and operate biogas stations.

However, the electricity sector remains a state monopoly. Investments in the modernization of the sector based on the introduction of energy efficient equipment and technologies and deployment of energy efficient production units using local fuels and RES, are limited. Natural gas supply is also monopolized by the state, and its development is planned by the Government.

Regulatory instruments

Energy tariffs play a critical role in the introduction of energy efficiency measures. The Government is now taking active measures to improve tariff policies, for instance by the:

- Gradual optimization of energy tariffs, by:
  - Introducing differentiated electricity tariffs depending on the user's connection point, and further differentiation by the level of consumption;
  - Switching to electricity tariffs differentiated by the time of day (i.e. day tariff, night tariff);
  - Introducing technically and economically justifiable heat tariffs, depending on the technical characteristics of the heat transfer fluid;
- Creation of economic motivation for the use of energy-saving technologies in production processes and household energy consumption;
- Determination of electricity tariffs for different activities (generation, transfer, distribution, final use);
- Gradual removal of cross-subsidies for energy tariffs, including household consumption.

In the current energy tariff system there is cross-subsidization between consumer groups (mainly between households and industry), and the types of energy and lower tariffs for some entities are not fully justifiable. In the period 1998–2001, household tariffs covered only 8–20 per cent of costs. However, due to the specific measures taken in the period 2003–2007, much progress has been made. Removal of cross-subsidization of natural gas and electricity tariffs was planned but has not been implemented to date; cross-subsidization of heat tariffs was partially removed.

Energy-related global and regional agreements

As an Annex I Party to the UNFCCC and a Party to the Kyoto Protocol, Belarus is obliged to implement concrete policies and measures to reduce GHG emissions, particularly in the energy sector. Therefore, energy efficiency and other energy-related issues are acknowledged and implemented through a number of legal and strategic documents.

Belarus is a member of the Energy Charter Conference, although its ratification of the Energy Charter Treaty, signed in 1994, is still pending. The Working Group on Energy Efficiency and Related Environmental Aspects prepared the In-Depth Review of the Energy Efficiency Policy of Belarus in 2013.

Belarus is a signatory to the 1992 Agreement on Coordination of Interstate Relations in the Electric Power Industry of the Commonwealth of Independent States and the 1998 Agreement on the Parallel Operation of Power Systems of the CIS Member States. It is also bound by the 2003 Decision of the Interstate Council of the Eurasian Economic Community (EurAsEC) "On the Fundamentals of Energy Policy of the EurAsEC Member States" and the 2005 Agreement "On Joint Development of the Fuel and Energy Mix of the Member States of the Eurasian Economic Community".

Belarus is a Party to the Espoo Convention (chapter 2) but is not a Party to its Protocol on SEA (chapter 1).

8.7 Energy sector development scenarios and their environmental implications

The country has limited reserves of explored fossil fuels and is heavily reliant on imported gas, which has a dominant position in the energy balance. To address this, the Government pursues an energy sector development scenario that focuses on ensuring energy security by diversification of the energy mix, increased use of local fuels and RES, and promotion of energy efficient technologies. To achieve this goal, Belarus plans to build a coal-fired plant and an NPP, as well as numerous HPPs and wind projects, with total investment of around €3.4 billion in the energy

sector. The Government anticipates that, if fully implemented, this strategy would bring the share of power generated using imported gas down to 55 per cent by 2020.

More diverse supply of energy resources reduces overall system risk by reducing exposure to individual technology failure. However, the main disadvantage of this scenario is that, effectively, it is focused on the provision of an energy-intensive economy reliant on electricity and heat. The current national energy policy stipulates selling electricity at low prices, which, in turn, stimulates excessive consumption and does not provide sufficient preconditions for energy conservation. Cross-subsidization presents a problem; it is an energy pricing mechanism that does not fulfil its stabilizing function, which causes significant damage to the country's economy.

This raises one of the most important issues – how to motivate households to save energy, which implies the need for reform of the household sector. Should an effective motivating system be created, the State could attract inward investment into energy-saving equipment and technologies.

Operating an NPP will not necessarily reduce gas consumption significantly, because a notable amount of electricity in Belarus is generated in combined cycle power plants. In the coming decade, the future NPP cannot replace numerous CHP powered by natural gas, which generate electricity and supply heat to local consumers. Although the dependency on imported gas will be reduced with the commissioning of the NPP, there will be a new reliance on imported uranium to fuel it.

Therefore, an alternative scenario for energy sector development would imply placing greater emphasis on the creation of an effective motivating system, whereby the State can attract inward investment into energy-saving equipment and technologies to modernize its energy plants, and providing economic incentives to enterprises and the public to pursue energy-saving policy and development of RES.

8.8 Conclusions and recommendations

The absence of an independent energy regulatory authority, the prominent role of the state-controlled Belenergo in the tariff setting process for electricity, and the absence of a market structure in the energy sector are among the barriers to meeting energy efficiency targets. The electricity sector is still a state monopoly and measures to improve tariff setting policy are lacking.

Energy pricing remains inadequate to encourage efficient use of energy, and market mechanisms for setting energy tariffs are still absent. Government plans to reform the electricity sector by creating a wholesale market have been delayed, and electricity remains heavily subsidized for households. Cross-subsidization is a mechanism of energy pricing that does not fulfil its stabilizing function, which causes significant damage to the economy of the country.

Motivating households to save energy is an important question to be addressed and implies the need for reform of the household sector. Should an effective motivating system be created, the State could attract inward investment into energy-saving equipment and technologies.

Recommendation 8.1:
The Government should:

(a) Pursue a policy of restructuring electricity tariffs to eliminate cross-subsidies and achieve price levels that reflect the costs of production in the power sector, while taking adequate measures to protect socially vulnerable groups;
(b) Guarantee that the financial resources saved through energy efficiency measures are accumulated in the budgets of the respective organizations undertaking such measures.

There are barriers to ESCO operations, in particular, the legislative basis for the development and operation of an ESCO is not sufficiently developed. In the industry sector, as well as in state-funded organizations, current accounting rules and taxation systems do not take into consideration benefits from energy savings in the overall cash flow of the company, which rather discourages energy conservation. Most potential ESCO projects are long term, while commercial bank loans are only available for up to seven years and the interest rate is relatively high.

Recommendation 8.2:
The Government should improve the framework conditions to allow growth of the market for energy services, in particular by:

(a) Allowing banks to finance long-term projects;
(b) Reconsidering the public sector procurement and tendering rules to facilitate the operation of energy service companies (ESCO);
(c) Adopting a model ESCO contract.

Belarus' main energy supply targets include a 1,000 MW coal-fired plant and an NPP. Construction and operation of a 2,400 MW NPP can potentially have significant environmental impacts, and it is important to ensure its compliance with the international standards on power plant construction and operation and make this compliance strategy known to all stakeholders. Strategic environmental assessment does not exist in the legislation of Belarus.

Recommendation 8.3:
The Government should:

(a) Apply recommendations of the International Atomic Energy Agency (IAEA) to provide necessary safeguards to reduce environmental and health risks associated with nuclear power plant construction and operation;
(b) Carry out strategic environmental assessments on major energy sector plans and programmes under development, even though strategic environmental assessment is not yet provided for in the legislation.

Limited energy resources complemented by a very energy-intensive economy are strong prerequisites for the continuing development of RES to improve energy interdependence and facilitate reduction of GHG emissions. Although notable progress has been achieved in development of RES since 2005, legislation on renewable energy, economic incentives, affordability of loans, and technical and institutional capacity require further development, and only a small proportion of energy comes from renewable resources. This is an important element of energy security in Belarus, as the vast majority of its domestic energy resources are renewable or non-conventional by nature.

The current national energy policy stipulates selling electricity at low prices, which, in turn, stimulates excessive consumption and does not provide sufficient incentives for energy conservation.

Recommendation 8.4:
The Government should:

(a) Improve the institutional framework in the renewable energy sector to facilitate implementation of the strategic goals set;
(b) Maintain economic incentives by regularly reviewing and keeping adequate feed-in tariffs for energy generated from renewable energy sources;
(c) Create an effective motivating system to attract inward investment into energy-saving equipment and technologies to modernize energy plants in the country;
(d) Provide economic incentives for enterprises and households to pursue energy-saving policies and for the development of renewable energy sources;
(e) Develop a national low carbon development strategy.

At present, there is no legislation on an energy market in Belarus that supports further development of the national energy system according to market rules. No law on energy covers all aspects of the energy sector, including production, transport, distribution and consumption, to transform the sector into a competitive market. Government plans to reform the electricity sector by creating a wholesale market have been delayed.

Recommendation 8.5:
The Government should:

(a) Develop and implement a restructuring of the power system with the establishment of wholesale and retail markets;
(b) Set up a procedure for relationships among business entities in the electricity sector to transform the sector into a well-functioning competitive market and to provide incentives for attracting investment to energy development;
(c) Gradually introduce the transformation from purely administrative measures towards measures based on economic incentives and market mechanisms.

Some differences were observed between energy-related data, in particular, on renewable energy sources, included in various sources (international databases which rely on the information provided by the country, national statistics, national strategic documents, etc.).

Recommendation 8.6
The Government should improve monitoring and verification of data from the energy sector in accordance with internationally agreed standards.

Chapter 9

TRANSPORT AND ENVIRONMENT

9.1 Overview of transport sector and transport infrastructure

The development of the transport sector is determined to a large extent by Belarus' strategic position as a transit country in the global supply chains for east–west and north–south trade flows. In response to these factors, Belarus has invested in important infrastructure projects to increase the effectiveness of its transport system and improve its trade logistics and transport connectivity in order to support competitiveness and job creation and to achieve long-term sustainable economic growth.

Among the stated priorities of the Government is to mitigate the environmental impacts of the transport sector by modernizing the country's transport infrastructure and vehicle fleet, among other things. The country's participation in the Eurasian Economic Union can be expected to impact on its priorities in the years to come, due to the strengthening of environmental requirements within the Union, as reflected in vehicle and fuel standards.

According to the Strategy for Reduction of Adverse Impacts of Transport on Atmospheric Air of the Republic of Belarus for the period until 2020, in urban areas, vehicle emissions are the primary source of air pollution, although their share has declined in recent years. A number of factors are responsible for the transport sector's contribution, including a steep increase in the number of vehicles over the last 10 years and the old age of the vehicle fleet.

A closer look at the data, however, shows that, despite this increase, total air polluting emissions from mobile sources have declined, as a general rule. This is due to improvements in fuel and vehicle standards, the gradual introduction of traffic optimization systems in big cities and the extensive use of public transport.

Despite the economic downturn, in 2013, around 287,000 persons were working in the transport sector, or about 6.3 per cent of the total number of employees of organizations in the country (table 9.1).

In recent years, Belarus continued to invest in the modernization of its transport sector, despite the economic downturn (table 9.1).

However, it is apparent that this heavy investment is based on subsidies that have become increasingly difficult over time (table 9.2). In the area of electric transport in cities, the share of cost recovery had declined to low levels by 2013: 35.5 per cent for tramways, 38.4 per cent for trolleybuses and 45.5 per cent for metro services. This level of subsidization is not sustainable in the long run. The situation with buses is only slightly better, since cost recovery was also below 50 per cent in 2013.

Furthermore, some of the investments are taking place in modal options in which passenger turnover appears to have declined over time. At the same time, virtually no flows of official development assistance (ODA) have been directed to the country for transport.

Despite Belarus' serious efforts to strengthen its position as a transit country, its position in the global Logistics Performance Index (LPI) has declined considerably (table 9.3). The LPI is based on questionnaire responses by actual users of these services.

Belarus has dropped almost 20 positions, from seventy-fourth in 2007 to ninety-first in 2012 (table 9.3). The country's position further worsened in 2014, when it dropped eight positions, and it is currently ranked ninety-ninth of some 160 countries that are ranked in this index.

Table 9.1: Employment and fixed capital investment in transport, 2005, 2009–2013

	2005	2009	2010	2011	2012	2013
Employed in transport (thousand persons)	270.8	289.6	287.5	282.7	282.7	287.0
As per cent of total number of employees of organizations in the country	6.1	6.2	6.1	6.1	6.1	6.3
Fixed capital investment in transport, billion roubles	9.5	6.1	7.0	8.3	11.0	8.1

Source: Transport and Communications in the Republic of Belarus, Statistical book, National Statistical Committee, 2014.

Table 9.2: Share of expenditures on maintenance and operations reimbursed by passenger fares, 2005, 2009–2013, per cent

	2005	2009	2010	2011	2012	2013
Urban electric transport						
of which:						
Tramway	43.2	44.8	44.2	37.0	32.9	35.5
Trolleybus	50.1	38.5	38.0	35.9	35.2	38.4
Metro	64.6	56.8	59.5	49.1	40.2	45.5
Buses						
of which:						
Urban	54.7	53.0	55.9	48.2	45.1	48.2
Suburban	60.2	62.0	57.9	49.6	50.2	44.8

Source: Transport and Communications in the Republic of Belarus, Statistical book, National Statistical Committee, 2014.

Table 9.3: Logistics Performance Index position, 2007, 2012, 2014

Component	2007	2012	2014
LPI rank	74.0	91.0	99.0
LPI score	2.5	2.6	2.6
Customs rank	50.0	121.0	87.0
Customs score	2.7	2.2	2.5
Infrastructure rank	54.0	65.0	86.0
Infrastructure score	2.6	2.8	2.6
International shipments rank	127.0	107.0	91.0
International shipments score	2.1	2.6	2.7
Logistics competence rank	120.0	89.0	116.0
Logistics competence score	2.1	2.7	2.5
Tracking and tracing rank	66.0	98.0	113.0
Tracking and tracing score	2.7	2.6	2.5
Timeliness rank	78.0	114.0	93.0
Timeliness score	3.0	2.9	3.1

Source: World Bank, 2014.

Overall, between 2007 and 2014, Belarus dropped 25 positions. The most dramatic drops in the component variables took place in Tracking and tracing, on which the country fell from sixty-sixth to 113th position (down 47 positions) and in Customs, on which it fell from fiftieth to eighty-seventh position.

It is worth noting that, between 2007 and 2012, the country had dropped 71 positions on the Customs rankings, but had recovered 34 positions between 2012 and 2014. The Customs variable measures the efficiency of the clearance process (i.e. speed, simplicity and predictability of formalities) by border control agencies, including Customs. A decline along this dimension, besides having economic effects, may also have important environmental impacts to the extent that it is associated with longer queuing lines at the borders.

However, the record is mixed, when one looks at the International shipments ranking, on which the country gained 36 positions (from 127th to 91st), confirming its increasingly important role in international commerce.

Road sector

Roads are distinguished between public and non-public ones. As of 2014, public motor roads (including streets) exceeded 100,000 km (table 9.4). Public roads are state property, and are divided into national and local roads depending on their functional purpose. The length of national roads is about 15,754 km and of local roads 70,995 km. Non-public roads are for civilian and military uses. Civilian non-public roads include, for example, access roads to infrastructure facilities, such as pipelines.

In 2014, paved roads account for 87,208 km (85.8 per cent) of public roads. Paved local roads extend to 59,109 km (84 per cent). Paved roads consisting of asphalt and cement account for about 47,000 km (63 per cent), those of gravel for 27,000 km (36 per cent) and the remainder, of black gravel, for 1 per cent.

Table 9.4: Length of public motor roads, 2009–2014, km

	2009	2010	2011	2012	2013	2014
Total	**86 337**	**86 392**	**86 491**	**100 385**	**100 030**	**101 523**
of which:						
Paved roads	74 523	74 650	74 838	84 993	86 869	87 208

Source: Transport and Communications in the Republic of Belarus, Statistical book, National Statistical Committee, 2014.
Note: From 2012, length of roads includes length of streets.

The more internationally important highways of Belarus are those that are part of Trans-European Transport Corridors II and IX. Specifically, the highway M-1/E30 from Brest and through Minsk to the border of the Russian Federation is a section of Trans-European Transport Corridor II: Berlin–Warsaw–Minsk–Moscow–Nizhny Novgorod. The length of this highway on Belarusian territory is 610 km. The traffic intensity in some areas reaches 8,500–10,000 vehicles per day. The highway M-8/E95 from the Russian border, via Vitebsk and Gomel to the border of Ukraine, is a section of Trans-European Transport Corridor IX, which connects Finland, Lithuania, the Russian Federation, Belarus, Ukraine, the Republic of Moldova, Romania, Bulgaria and Greece. It crosses Belarusian territory from the north to the south. Its length on Belarusian territory is 456 km.

On the territory of Belarus there are also 12 international routes on highways of the CIS, with a total length of 3,607 km or about 23 per cent of the total length of all Belarus' national roads.

Number of vehicles

Since 2005, the number of motor vehicles has increased by 47.5 per cent, from 2.2 million in 2005 to 3.2 million in 2013. The steep increase is primarily due to the increase in passenger cars, from 1.7 million in 2005 to 2.7 million in 2013 (table 9.5). Urban metro transport vehicles increased by 1.1 per cent.

Rail sector

Belarus has invested in modernizing and upgrading its rail network since 2009. Although the total length of general purpose railway tracks has reduced slightly since 2009, the total length of electric tracks has increased, from 16.3 per cent of total length in 2009 to 18.4 per cent in 2014 (table 9.6). The most important railway hubs are those of Baranovichi, Brest, Gomel, Kalinkavichy, Minsk, Mogilev, Orsha, Polotsk Vitebsk and Zhlobin.

The renewal of its rolling stock is one of the most important investment projects of Belarusian Railways. It acquired 4,259 wagons in 2012 as part of the State Programme for Development of Railway Transport in the Republic of Belarus for 2011–2015. The aim of the Programme is to acquire 12,500 units of new rolling stock by the end of 2015.

In terms of rail safety, no information was made available to allow an assessment of the issue and its potential environmental impacts to be made.

Aviation

There are seven international airports: Minsk National, Minsk-1, Gomel, Brest, Grodno, Mogilev and Vitebsk. Minsk National airport is by far the most important, for both passenger and cargo transport. Since 26 November 2014, it has been certified according to standard ISO 14001:2004. It has a total capacity of 35,000 aircraft per year. In 2013, the airport received 15,951 aircraft, reaching almost 46 per cent of its capacity, and in 2014, 18,910 aircraft, reaching 54 per cent of its capacity. The picture is similar when looking at the number of passengers. The airport is built to receive 5.8 million passengers per year. In 2013, it reached 2.2 million and, in 2014, 2.6 million passengers. The transport of cargo has remained well below capacity: the airport has a capacity of 54,000 tons per year, but in 2013, 10,475 tons of goods, or about 16 per cent of capacity, were transported. In 2014, the volume almost doubled to 19,899 tons or about 32 per cent of capacity. Since the upgrading of installations, annual gross emissions from stationary sources at Minsk National airport have dropped from 19,963 tons to 17,797 tons.

In 2015, the civil aviation fleet consisted of 101 aircraft. The national airline, Belavia, is the main air passenger carrier, operating scheduled and charter flights. In total, five airlines are registered in Belarus: Aircompany Grodno, Belavia, Genex, Rubistar and Transaviaexport Airlines.

Table 9.5: Vehicles, 2005, 2009–2013, number

	2005	2009	2010	2011	2012	2013	Per cent change 2005-2013
Government transport vehicles	**369 974**	**408 061**	**413 567**	**415 298**	**424 051**	**428 950**	**15.94**
of which:							
Motor road transport vehicles [1]	367 628	405 771	411 213	412 945	421 700	426 579	16.04
of which:							
Freight	..	269 378	277 204	275 328	279 841	285 388	..
Passenger cars	..	102 820	100 215	104 048	107 775	107 318	..
Buses	29 870	33 573	33 794	33 569	34 084	33 873	13.40
Urban electric transport, metro	2 346	2 290	2 354	2 353	2 351	2 371	1.07
of which:							
Trolleybuses	1 782	1 734	1 772	1 775	1 741	1 752	-1.68
Tramway cars	341	284	280	276	273	283	-17.01
Metro cars	223	272	302	302	337	336	50.67
Private transport vehicles [2]	**1 825 782**	**2 464 903**	**2 631 452**	**2 777 149**	**2 774 832**	**2 810 248**	**0.54**
of which:							
Freight transport vehicles	77 091	114 288	119 402	121 133	123 274	128 805	67.08
Passenger cars	1 737 060	2 339 834	2 501 187	2 646 507	2 640 759	2 670 567	53.74
Buses	11 631	10 781	10 863	9 509	10 799	10 876	-6.49
Total motor vehicles [1]+[2]	**2 195 756**	**2 872 964**	**3 045 019**	**3 192 447**	**3 198 883**	**3 239 198**	**47.52**

Source: Transport and Communications in the Republic of Belarus, Statistical book, National Statistical Committee, 2014.

Table 9.6: Railway tracks at year end, 2009–2014, km

	2009	2010	2011	2012	2013	2014
General purpose railway tracks	5 511	5 503	5 503	5 483	5 490	5 491
of which						
electric	898	898	899	899	1 013	1 012
share electric (per cent)	16.29	16.32	16.34	16.40	18.45	18.43
Density of railway tracks, km per 1 000 km^2	26.50	26.50	26.50	26.40	26.40	26.40

Source: Transport and Communications in the Republic of Belarus, Statistical book, National Statistical Committee, 2014.

Inland water transport

Belarus has no access to the sea. As of 1 January 2015, the length of navigable waterways amounted to 1,744.5 km. The network includes 10 ports located in the cities of Bobruisk, Brest, Gomel, Grodno, Mikashevichy, Mogilev, Mozyr, Pinsk, Rechitsa and Vitebsk. Ports in Bobruisk, Gomel and Mozyr include railway sidings. According to the 1996 European Agreement on Main Inland Waterways of International Importance, the Dnieper–Bug Canal and the Pripyat River are part of the main waterway E-40 from Gdansk, Poland, through Pinsk to Kherson, Ukraine. The navigation period is from March to November.

In recent years, the number of transport ships has declined modestly, whereas passenger ships have increased in number (table 9.7). It is nevertheless the case that inland water transport accounts for a small share of cargo (less than 1 per cent) and a negligible share of passenger transport in Belarus (tables 9.9 to 9.12).

The Republican Transport Unitary Enterprise (RCUE) "Belarusian Shipping Company" is the key waterway transport operator in Belarus. Inland waterway transport operators transport goods along the rivers of Belarus and, internationally, on the Dnieper River towards the Black Sea ports.

The main cargoes carried via inland waterways are sand and sand-gravel, crushed stone and gravel, timber, potash, granulated slag and, in general, oversized and heavy cargo.

No information was made available on environmental impacts from inland water transport, the number of accidents, if any, environmental management of existing ports or the handling of permits and licences of operators and ports.

Table 9.7: Inland water transport, 2005, 2009–2013, number

	2005	2009	2010	2011	2012	2013	Per cent change 2005-2013
Transport ships in common use (including tug boats and push boats)	258	259	257	245	242	237	-8.14
Auxiliary ships	154	220	218	211	224	220	42.85
Passenger ships in common use	10	10	11	12	12	14	40.00

Source: Transport and Communications in the Republic of Belarus, Statistical book, National Statistical Committee, 2014.

Pipelines

The length of pipelines for gas and oil has remained constant between 2009 and 2013 (table 9.8). The length of oil product pipelines has more than halved in the same period. No information was made available on the environmental impacts of pipeline transportation or accidents with environmental consequences.

Passenger transport

Transported passengers represent the number of passengers carried for a certain period of time. Data for the carriage of passengers include passengers entitled to free travel. In 2013, number of passengers transported by all means of transport was 2,451 billion, which is 3.5 per cent less than in 2005. Transportation of passengers by metro has increased since 2005 from 250 to 328 million, by air – from 0.5 to 1.6 million and by taxi carriage – from 1.5 to 13.7 million (table 9.9).

Overall, passenger turnover increased by about 9.3 per cent, from 24,354 million passenger-km to 26,618 million passenger-km (table 9.10). The increases are observed due to steep rises in traffic by metro (31.1 per cent), bus (14.2 per cent), air (by 3.6 times) and taxi (an elevenfold increase). Passenger turnover for rail has declined by 13.1 per cent.

Freight transport

When looking at the broad picture of freight transport across all modes in the period 2005–2013, transport by rail, road and inland water have increased, while that by pipeline and air have declined (table 9.11).

Table 9.8: Pipelines at year end, 2009–2014, km

	2009	2010	2011	2012	2013	2014
Total	**12 237**	**11 280**	**11 262**	**11 235**	**11 264**	**11 571**
For gas	7 678	7 490	7 483	7 502	7 530	7 837
For oil	2 995	2 983	2 972	2 983	2 983	2 983
For oil products	1 564	807	807	750	751	751

Source: Transport and Communications in the Republic of Belarus, Statistical book, National Statistical Committee, 2014.

Table 9.9: Passenger transportation by mode of transport, 2005, 2009–2013, million persons

	2005	2009	2010	2011	2012	2013
Total	**2 540.3**	**2 209.7**	**2 395.8**	**2 438.5**	**2 453.2**	**2 451.2**
Railway	104.5	83.5	83.6	89.0	100.5	99.4
Bus	1 509.9	1 257.0	1 410.0	1 440.3	1 435.8	1 415.5
Tramway	90.7	82.7	83.7	85.3	89.2	84.1
Trolleybus	582.6	519.9	535.0	546.2	536.0	508.2
Metro	250.4	254.2	273.6	268.0	281.4	328.3
Inland water	0.2	0.2	0.2	0.3	0.3	0.3
Air	0.5	0.8	1.0	1.0	1.3	1.6
Taxi	1.5	11.5	8.7	8.4	8.7	13.7

Source: Transport and Communications in the Republic of Belarus, Statistical book, National Statistical Committee, 2014.

Table 9.10: Passenger turnover by mode of transport, 2005, 2009–2013, million passenger-km

	2005	2009	2010	2011	2012	2013
Total	**24 354**	**19 932**	**23 498**	**23 671**	**25 295**	**26 618**
Railway	10 351	7 401	7 578	7 941	8 977	8 998
Bus	9 231	7 247	10 194	9 923	10 016	10 546
Tramway	352	298	301	305	320	300
Trolleybus	2 037	1 826	1 891	1 931	1 925	1 873
Metro	1 678	1 703	1 833	1 796	1 885	2 200
Inland water	2	3	3	4	4	3
Air	684	1 284	1 571	1 643	2 036	2 490
Taxi	19	170	127	128	133	208

Source: Transport and Communications in the Republic of Belarus, Statistical book, National Statistical Committee, 2014.

Table 9.11: Freight transported by mode of transport, 2005, 2009–2013, thousand tons

	2005	2009	2010	2011	2012	2013
Total	**393 453**	**420 055**	**455 978**	**493 275**	**484 371**	**471 210**
of which:						
Pipeline	164 646	146 683	142 992	142 791	137 359	134 199
of which: Transit	129 281	108 630	110 443	103 644	96 270	96 568
Railway	125 097	133 996	139 937	152 775	153 673	140 040
of which: International	90 236	86 054	90 376	108 039	107 850	95 947
of which: Transit	43 458	43 439	45 613	50 531	45 442	46 708
Motor road	100 685	133 893	166 862	190 989	189 302	192 475
of which: International	4 772	5 224	6 765	7 601	9 159	10 633
of which: Transit	..	1 504	1 672	1 871	2 381	2 691
Inland water	3 011	5 458	6 168	6 711	4 023	4 486
Air	14	25	19	9	14	11
of which: International	14	25	19	9	14	11

Source: Transport and Communications in the Republic of Belarus, Statistical book, National Statistical Committee, 2014.

Cargo transportation increased between 2005 and 2013, from roughly 101 million tons to 192 million tons. Freight carried by rail has increased modestly, from 125 to 140 million tons (19.9 per cent increase). Freight carried by inland water increased by almost 49 per cent. Pipeline transport has declined by some 18.5 per cent. Cargo carried by air declined from 14,000 to 11,000 tons, although there were wide fluctuations during the intervening years, reaching as high as 25,000 tons in 2009.

The situation looks slightly different when looking at freight turnover (table 9.12). There, only road transport witnessed a steep rise, from 9,351 million ton-km in 2005 to 25,603 million ton-km in 2013 (2.7 times), thus offsetting stagnation or decline in other modes. The steepest declines can be seen in air transport (decreased by 2.2 times), pipelines (by 17.6 per cent) and inland water (by 6.7 per cent). Railway turnover remained more or less the same between 2005 and 2013.

9.2 Environmental pressures

Air

The impact of the transport sector on air pollution has stabilized and, in recent years, even reversed, in both absolute and percentage terms. Compared with 2009, emissions of air pollutants from transport in 2013 have declined by some 20 per cent, from 1.14 million tons to 0.93 million tons (table 9.13). As a percentage, their share in total air polluting emissions has declined, from 72 per cent in 2005 to 68 per cent in 2014 (chapter 4). However, these developments are significant because they are occurring against the backdrop of a sharp increase in the vehicle fleet, leading to an increase in the total engine power consumption of fuel and energy resources. The use of road transport is increasingly decoupled from environmental impacts since the two are clearly moving in opposite directions (figure 9.1).

Table 9.12: Freight turnover by mode of transport, 2005, 2009–2013, million ton-km

	2005	2009	2010	2011	2012	2013
Total	**127 320**	**121 172**	**128 144**	**134 269**	**131 684**	**130 752**
of which:						
Pipeline	74 261	64 785	65 743	65 258	61 134	61 220
of which: Transit	63 490	53 542	56 283	53 825	50 445	50 165
Railway	43 559	42 742	46 224	49 406	48 351	43 818
International	33 339	28 743	31 667	36 192	34 461	30 865
of which: Transit	17 339	16 433	18 499	19 875	17 341	17 312
Motor road	9 351	13 512	16 023	19 436	22 031	25 603
Inland water	90	83	110	143	134	84
Air	59	50	44	27	34	27
of which: International	59	50	44	27	34	27

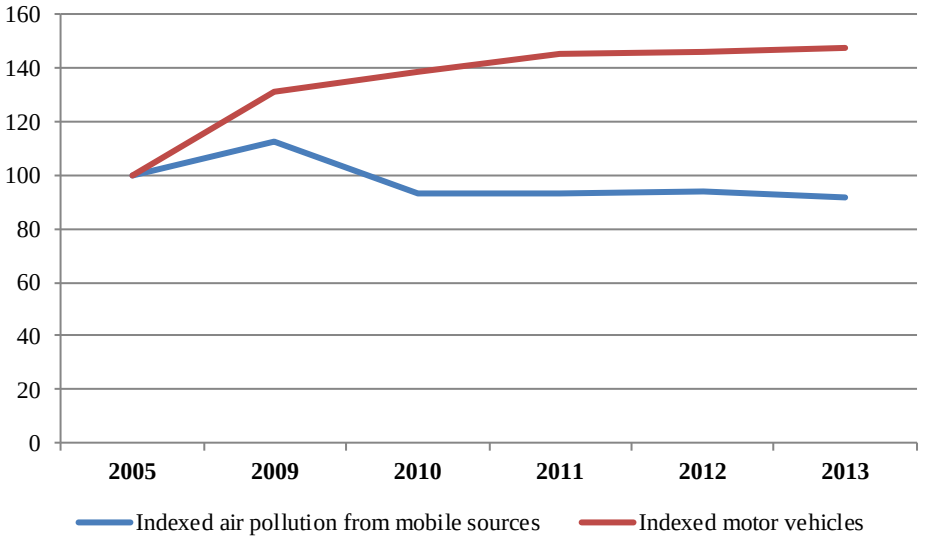
Source: Transport and Communications in the Republic of Belarus, Statistical book, National Statistical Committee, 2014.

Table 9.13: Air polluting emissions from mobile sources by selected pollutants, 2005, 2009–2013, thousand tons

	2005	2009	2010	2011	2012	2013
Total	**1 013.9**	**1 137.2**	**942.2**	**944.4**	**955.8**	**928.4**
Carbon monoxide	698.7	777.8	619.1	612.8	618.2	604.4
Hydrocarbons	190.0	214.4	190.8	193.4	198.5	192.7
Nitrogen dioxide	94.2	109.7	99.9	104.9	105.7	101.7
Sulphur dioxide	1.3	1.3	2.6	2.7	2.7	0.3
Soot	29.7	34.0	29.8	30.5	30.8	29.3
Benzpyrene, tons	0.8	0.9	0.8	0.8	0.8	0.7

Source: Transport and Communications in the Republic of Belarus, Statistical book, National Statistical Committee, 2014.

Figure 9.1: Decoupling of motorization from air pollution, 2005, 2009–2013, (2005=100)



Source: ECE Secretariat calculations based on data from tables 9.5 and 9.13.

The first phase is from 2005 until 2009, when decoupling is relative, in the sense that the emission of air pollutants from mobile sources increases but not as steeply as the level of motorization. By contrast, between 2009 and 2013, decoupling is absolute, in the sense that air pollutants from mobile sources decline in absolute terms while the levels of motorization continue to increase. Two of the most important causes underlying this decoupling are the stringent vehicle and fuel standards applied in the country, a situation very different than that observed in 2005.

Photo 9: Parking for bicycles, Minsk

No authoritative studies on the health impacts of the transport sector in Belarus were carried out. One positive development is the dramatic decline in the emission of sulphur dioxides from transport that is recorded in year 2013, due to improvements in the quality of fuel.

GHG emissions

According to the sixth National Communication to the UNFCCC, transport is the second largest source of GHGs after heat and electricity production. Emissions from transport in 2012 amounted to 7,217.2 Gg of CO_2 equivalent, or 8.1 per cent of total emissions; this is 44.8 per cent less than emissions in the transport sector in 1990, which had reached 13,074 Gg of CO_2 equivalent. A reduction in emissions from transport is also observed due to other factors, such as changes in the volume of natural gas transportation through the territory of Belarus, significant growth in the price of motor fuels, and as a result of decreasing purchasing power.

For Future Inland Transport Systems

The use of the For Future Inland Transport Systems (ForFITS) tool (Annex VI) provides projections of transport sector CO_2 emissions for the reference scenario and four additional scenarios: high GDP growth, high fertility, fuel price increase, and nuclear/increased electrified rail. The estimated well-to-wheel (WTW[5]) CO_2 emissions in 2012 from the transport sector in Belarus show that emissions from passenger vehicles were almost 45 per cent less than those from freight vehicles (8.9 billion kg vs 16 billion kg).

Under the Reference scenario, this accounts for the expected evolution of socioeconomic parameters such as population and GDP. It includes default data in ForFITS on the expected evolution of fuel consumption characteristics by powertrain to reflect future improvements in vehicle technology and their associated costs. Other characteristics defining the transport system in the base year (e.g. fuel taxation schemes, road pricing, passenger/freight transport system structure, fuel characteristics, behavioural aspects) remain unchanged in projections.

The four additional scenarios are characterised as follows:

- High GDP growth scenario: This increases projected GDP growth beyond that in the reference scenario to simulate a return to levels of growth typical of an emerging economy (5 per cent annual growth);
- Higher fertility scenario: This evaluates the impact of projected population based on the high

[5] Well to wheel (WTW) refers to CO_2 emissions from vehicle operation as well as emissions from the production of the fuel used for vehicle operation.

fertility scenario provided by the United Nations Population Division.

- Fuel price increase scenario: This projects all fuel prices to consumers to double by 2030 based on a combination of increased prices and taxes;
- Nuclear/increased electrified rail scenario: This is a combined scenario, reflecting an interconnected scenario whereby an increase in nuclear energy leads to both an increase in the electrification of rail and an increased preference for rail in freight transport:
  - Nuclear power: Currently, Belarus uses no nuclear power, but this is expected to change soon as a new nuclear power plant is put into operation. The proposed scenario will decrease the difference in well-to-tank (WTT)[6] emissions between Belarus and France – a country that relies heavily on nuclear power – by half by 2030;
  - Electric share of rail: Given the expected increase in availability of nuclear power as well as investments that Belarus has made in electrifying its rail network, a reasonable scenario is one whereby the share of electric rail increases. Currently, 80 per cent of new passenger rail and 37 per cent of new freight rail locomotives are electric powered. The proposed scenarios will increase these shares to 90 per cent and 50 per cent, respectively, by 2030;
  - Modal share of freight rail: Shares of freight transportation have been shifting away from rail in recent years. Expected increases in electrified rail lines and public support for this type of transportation could reverse this trend. The proposed scenario will see a gradual increase in the modal share of freight rail back to 2005 levels by 2030.

The projections of future CO_2 emissions under the five scenarios show the strong effect that future GDP growth in Belarus will have on emissions (table 9.14).

For the reference scenario, projections of CO_2 emissions from the transport sector in Belarus show an overall increase of more than 25 per cent by 2030, with slightly higher increases in emissions resulting from freight transport in comparison with passenger transport. This difference can be largely explained by the projected decline in population over this time period in contrast with the projected economic growth.

Likewise, projections of future CO_2 emissions under the five scenarios show the impact of this expected economic growth. An increase in the average annual growth of GDP to 5 per cent (compared with approximately 2 per cent in the reference scenario) is projected to result in a more than 70 per cent increase in WTW CO_2 emissions in 2030 when compared with the reference scenario. The projected effect of the three other scenarios is not nearly as pronounced, but important differences can still be observed.

For the fuel price increase scenario, transport activity is reduced by almost 9 per cent in terms of passenger-km and over 12 per cent in terms of ton-km in 2030 when compared with the reference scenario. These projected decreases in activity translate to a more than 10 per cent decrease in overall WTW CO_2 emissions in 2030.

While the nuclear/increased electrified rail scenario results show little change in transport activity, increases in transport efficiency are projected as a result of greater use of electrified rail and a lower WTT emissions rate for electricity, attributed to the expected availability of nuclear power. Under this scenario, an overall decrease in WTW emissions of approximately 8 per cent is expected in 2030 compared with the reference scenario.

Lastly, the high fertility scenario results in a much lower projected impact when compared with other scenarios. The range of possible changes in population is not substantial and the effect on transport emissions is not as direct as in the case of the other scenarios.

These results together show the effect of socioeconomic factors as well as positive steps that can be taken by Belarus to limit emissions from both the passenger and freight transport sectors. Belarus faces challenges in that its expected future economic growth would typically correspond to an increase in CO_2 emissions. However, improvements in the efficiency of its transport sector could help mitigate these issues.

The results provided in table 9.14 (and further developed in annex VI) demonstrate the potential impact of improving transport infrastructure and increasing the efficiency of the transport sector through a shift to transporting freight by rail more frequently and by specifically increasing the use of electric rail.

[6] Well to tank (WTT) refers to CO_2 emissions from the production of the fuel used for vehicle operation.

Table 9.14: Main ForFITS output: reference and alternative policy scenarios

	2012	2030				
		Ref	High GDP growth	High fertility	Fuel price increase	Nuclear/ Electrified rail shift
passenger-kilometres, billion	83.69	107.34	168.87	107.34	98.09	107.43
ton-kilometres, billion	100.42	129.16	218.91	129.06	113.15	130.69
Energy use, million toe	6.83	8.58	14.72	8.54	7.68	8.04
WTW CO_2 emissions, billion kg CO_2	24.96	31.41	53.63	31.27	28.09	28.82
WTW CO_2 emissions per capita, kg CO_2/person	2 637.60	3 579.75	6 112.54	3 477.17	3 201.61	3 284.44
WTW CO_2 emissions intensity, kg CO_2/GDP * 1 000	169.31	165.35	179.23	164.61	147.88	151.71

Note: GDP is measured in purchasing power parity (PPP) units at 2012 prices.

Projections generated by ForFITS based on these scenarios show that pursuing such policies can adjust downward the current trend of increasingly high WTW CO_2 emissions stemming from the transport sector of Belarus. With the aim of mitigating the impact of future CO_2 emissions from its transport sector, the country should further explore the relative cost of implementing the following measures:

- Notwithstanding the known risks associated with nuclear energy, nuclear energy generation would lead to reduction of the GHGs emissions from the transport sector and would allow increasing the efficiency of the production of electricity;
- Developing the infrastructure necessary to support a shift towards the increased use of rail for freight transport;
- Electrifying rail as necessary to support a shift towards the increased use of rail for freight transport and to maximize the impact of increased efficiency in electricity production;
- Considering increasing fuel prices with the aim of further rationalizing overall transport activity, while keeping in mind the need to mitigate impacts on economically weaker/vulnerable social groups.

Other environmental pressures from transport

No information was made available on pressures from transport to water, land uptake, soil, noise, biodiversity or landscapes.

9.3 Road safety

The current road safety record, as reflected in official statistics, shows a measurable improvement (table 9.15). The annual number of registered accidents nationwide that resulted in death or injury in the period 2005–2013 has decreased by some 40 per cent, from 7,717 cases in 2005 to 4,730 cases in 2013.

This improvement is reflected even more emphatically in the decrease in the number of fatalities and injuries over the same period. The number of fatalities has been practically halved, from 1,673 in 2005 to 894 in 2013.

The improvement in terms of numbers of persons injured was more modest, around 40 per cent, from 8,047 in 2005 to 5,033 in 2013. Road traffic accidents per 100,000 inhabitants have decreased from 80 in 2005 to 50 in 2013.

According to the Concept of Traffic Safety in Minsk City "Kind Road" for 2012–2015, approved in 2011 by the Minsk City Council of Deputies, analysis of road accidents in Minsk City for the period 1997–2010 showed the following elements as threats to road safety:

- Vulnerability of unprotected traffic participants (pedestrians, cyclists, children, and disabled people) – 70 per cent of accidents;
- Pedestrian access to areas not intended for traffic – 60 per cent;
- Design of street and road environments – 60 per cent;
- Hours of darkness – 55 per cent;
- Traffic participants' mistakes and poor assessment of situations – 55 per cent;
- Speed of vehicles – up to 55 per cent;
- Anti-social behaviour by traffic participants (e.g. driving or otherwise participating in traffic while under the influence of alcohol, driving without a licence) – 30 per cent.

9.4 Greening the sector: electrifying public transport

Belarus has invested in electrifying public transport in major cities and has maintained systematic data covering the entire country. At the same time, however, when compared with the actual trends of passenger transport, it is clear that greening urban transport in this way has not yet resulted in equivalent increases in

passenger turnover, with the notable exception of metro passengers in Minsk. There has been a steep rise in the use of metro – available only in the capital – by more than 31.1 per cent, from around 250 million passengers in 2009 to 328 million passengers in 2013 (table 9.16).

The decreasing passenger transportation by both trams and trolleybuses is apparent in all cities except Minsk. From 2005 to 2013 the passenger turnover decreased by 14.6 per cent for trams, and by 8 per cent for trolleybuses (table 9.17). Passenger turnover for urban electric transport in 2013 increased by 7.5 per cent compared with 2005.

Tram lines decreased by 22.92 per cent in total length from 2005 to 2013 (table 9.18).

Despite the relative decline in passenger turnover for trolleybuses, the length of trolleybus lines increased by more than 62.3 per cent between 2005 and 2013, mostly in Minsk but also in Brest, Gomel, Grodno and Vitebsk.

Only in Minsk has the number of trolleybus passengers increased; in all other cities it has decreased (table 9.16). Length of operating metro tracks has increased from 2005 to 2013 by 75.4 per cent.

Table 9.15: Road safety, 2005, 2009–2013

	2005	2009	2010	2011	2012	2013
Registered road traffic accidents that resulted in death or injury of persons, cases	7 717	6 739	6 363	5 897	5 187	4 730
Fatalities due to road traffic accidents, persons	1 673	1 322	1 190	1 200	1 039	894
Injuries due to road traffic accidents, persons	8 047	7 198	6 832	6 334	5 569	5 033
Road traffic accidents per 100 000 population, number	80	71	67	62	55	50

Source: Transport and Communications in the Republic of Belarus, Statistical book, National Statistical Committee, 2014.

Table 9.16: Passenger transportation by urban electric transport, 2005, 2009–2013, million persons

	2005	2009	2010	2011	2012	2013
Total passengers transported	**923.7**	**856.8**	**892.3**	**899.5**	**906.6**	**920.6**
of which, by:						
Tramway – total	**90.7**	**82.7**	**83.7**	**85.3**	**89.2**	**84.1**
of which, by town:						
Minsk	34.6	39.2	39.2	39.4	43.8	39.7
Vitebsk	50.6	40.7	41.9	43.4	43.2	42.4
Novopolotsk	3.4	2.8	2.6	2.5	2.3	2.0
Trolleybus – total	**582.6**	**519.9**	**535.0**	**546.2**	**536.0**	**508.2**
of which, by town:						
Minsk	200.5	204.5	222.2	225.6	218.0	208.4
Brest	39.5	29.1	29.6	31.3	31.6	30.3
Vitebsk	52.8	47.9	48.3	50.1	49.9	47.2
Gomel	104.3	94.2	94.0	96.8	93.5	90.1
Grodno	83.1	63.6	62.6	64.5	63.3	57.2
Mogilev	72.9	57.8	56.8	56.7	59.2	54.6
Bobruisk	29.5	22.8	21.5	21.2	20.6	20.3
Metro (Minsk City)	**250.4**	**254.2**	**273.6**	**268.0**	**281.4**	**328.3**

Source: Transport and Communications in the Republic of Belarus, Statistical book, National Statistical Committee, 2014.

Table 9.17: Passenger turnover of urban electric transport, 2005, 2009–2013, million passenger-km

	2005	2009	2010	2011	2012	2013
Total	**4 066.4**	**3 827.5**	**4 025.1**	**4 031.9**	**4 129.6**	**4 373.1**
Tramway	351.4	298.3	301.0	305.6	320.0	300.2
Trolleybus	2 037.1	1 826.0	1 891.1	1 930.6	1 924.4	1 873.4
Metro (Minsk City)	1 677.9	1 703.2	1 833.0	1 795.7	1 885.2	2 199.5

Source: Transport and Communications in the Republic of Belarus, Statistical book, National Statistical Committee, 2014.

Table 9.18: Length of operating tracks of urban electric transport (in two-way terms), 2005, 2009–2013, km

	2005	2009	2010	2011	2012	2013
Total tramways	**102.1**	**93.6**	**78.1**	**83.6**	**93.6**	**78.7**
of which, by town:						
Minsk	31.5	46.3	30.8	36.3	46.4	31.4
Vitebsk	36.1	36.1	36.1	36.1	36.1	36.1
Novopolotsk	11.2	11.2	11.2	11.2	11.2	11.2
Total trolleybus lines	**468.1**	**568.8**	**576.6**	**607.4**	**564.8**	**759.6**
of which, by town:						
Minsk	250.3	335.6	339.3	368.6	326.9	521.4
Brest	24.8	29.5	29.9	29.9	29.9	30.2
Vitebsk	21.4	21.3	23.3	23.3	23.3	23.3
Gomel	67.9	73.2	73.2	73.2	75.6	75.6
Grodno	36.2	41.7	43.4	44.9	41.6	41.6
Mogilev	50.1	50.1	50.1	50.1	50.1	50.1
Bobruisk	17.4	17.4	17.4	17.4	17.4	17.4
Metro tracks (Minsk City)	**27.6**	**43.1**	**43.1**	**43.1**	**48.4**	**48.4**

Source: Transport and Communications in the Republic of Belarus, Statistical book, National Statistical Committee, 2014.

9.5 Emission and fuel standards for vehicles

In accordance with the technical regulations of the Customs Union, since the beginning of 2015, only diesel emission class K5 is available on the market. Compared with the lower class of K4, K5 has tightened regulatory parameters for sulphur content (10 ppm), making this fuel fully compliant with European standard EN590: 2009 (Euro 5).

Current fuel standards for petrol correspond to Euro 4 standard (50 ppm sulphur). It is expected that Euro 5 standard for petrol will become obligatory by 2016. Current standards are contained in GOST 31077-2002 "Fuel for internal combustion engines. Unleaded gasoline. Specifications".

Technical regulations on various fuels are contained in the Technical Regulation of the Customs Union 013/2011 "On the requirements for automobile and aviation gasoline, diesel and marine fuels, fuel for jet engines and oil" (chapter 2), which is developed along the European standard EN 228-1993.

Environmental requirements, rules and methods for the determination of pollutants in exhaust gases at admission, production and operation of vehicles, as well as requirements for technical diagnostics and measuring instruments are contained in STB 2169-2011 "Motor vehicles equipped with compression-ignition engines. Opacity of exhaust fumes. Limits and methods of measurement" and STB 2170-2011 "Motor vehicles equipped with positive-ignition engines. Emissions of pollutants in exhaust gases. Limits and methods of measurement".

Calculations of emissions of pollutants into the air are used to estimate the parameters of environmental impacts of motor vehicles on the environment. The methodological guidance for such calculations is provided by the TCP 17.08-03-2006 "Environmental protection and nature use. Atmosphere. Emissions of pollutants into the atmospheric air. Rules for calculation of emissions by motor vehicles in human settlements".

9.6 Legal, policy and institutional framework

Legal framework

The legal framework includes the 1998 Law on Frameworks for Transport Activities, 2006 Air Code, 2002 Code on Inland Water Transport, 1999 Code on Merchant Shipping, 2014 Water Code, 2007 Law on Automobile Transport and Freight, 2006 Law on Forwarding Activity, 2002 Law on Pipeline Transport, 1999 Law on Rail Transport, 2008 Law on Road Traffic, 1994 Law on Automobile Roads and Road Activity, 2001 Law on Transport of Dangerous Goods, and 2014 Law on Urban Electric Transport and Metro, as well as a vast body of subsidiary legislation

Policy framework

Strategy for Reduction of Adverse Impacts of Transport on Atmospheric Air of the Republic of Belarus for the period until 2020

The most important policy document aimed at mitigating the environmental impacts of the transport sector is the Strategy for Reduction of Adverse Impacts

of Transport on Atmospheric Air of the Republic of Belarus for the period until 2020, endorsed in 2013 by the Board of the Ministry of Natural Resources and Environmental Protection and later approved by the Deputy Prime Minister.

To implement the Strategy, a range of regulatory measures is envisaged. These include measures for the reduction of harmful emissions of mobile sources. Traffic planning and the deployment of intelligent transportation system (ITS) solutions for major cities also feature quite prominently. The list of measures also includes intersectoral cooperation, including transport planning, road construction and urban transport. The Strategy also includes modernization of vehicles and use of high quality fuels. All these measures are being implemented in the country to various degrees.

At the core of the Strategy lies the principle of shifting freight and passenger flows towards more environmentally friendly modes of transport. The Strategy recognizes the importance of the "polluter pays" principle and aims at its gradual implementation in order to reduce transport-generated harmful impacts on the environment, through a step-by-step increase in customs duties for the import of vehicles of low environmental classes with parallel reduction of custom duties for the import of vehicles of high environmental classes.

In terms of priorities, the Strategy places emphasis on transport planning, improving safety and reducing the negative impacts of transport, primarily in relation to major cities, resort areas and areas adjacent to the international transport corridors.

The Strategy sets the following quantified goals:

- Reduce by 2020 the share of emissions from mobile sources in gross emissions of pollutants into the air from 72 per cent to 65 per cent;
- Reduce by 2020 the emissions of air pollutants from the exhaust gases of mobile sources to no more than 900,000 tons per year, while the annual reduction of emissions of air pollutants from the exhaust gases of cars should not be less than 1 per cent;
- Increase by 2020 the share of public transport with improved environmental characteristics and of electrical transport in towns with a population of over 100,000 people to 50 per cent;
- Update the rolling stock and increase the overall share of motor vehicles of high environmental classes (4 and above) in 2020 to 50 per cent;
- Update the aircraft fleet, including 100 per cent decommissioning by 2020 of Tu-154 aircrafts that do not meet modern environmental requirements;
- Renew and modernize the rolling stock of Belarusian Railways, and increase total electrification of railway lines with a total reduction of emissions of pollutants into the air from mobile sources of Belarusian Railways by 20 per cent.

Some goals, for example, on reducing air emissions, seem achievable; in 2013, total emissions of air pollutants from mobile sources amounted to 928,400 tons, or 2.9 per cent less than in 2012, even as the vehicle fleet of the country grew by more than 1.3 per cent and fuel consumption increased by 2.1 per cent.

The Action Plan that accompanies the Strategy identifies the responsible bodies and deadlines for the implementation of selected interventions. The allocated budget is not clear, as the funding for the majority of interventions is to be "determined in the course of implementation". It is therefore not possible to assess the economic costs and implications of implementation of the Strategy. Implementation of the Strategy and its Action Plan are to be ensured through the relevant state and sectoral programmes.

Programme for Development of Inland Water and Maritime Transport in the Republic of Belarus for 2011–2015

The Programme for Development of Inland Water and Maritime Transport in the Republic of Belarus for 2011–2015, approved by the 2010 Resolution of the Council of Ministers No. 1895, aims to increase carriage by inland water transport, modernize inland water transport, create a maritime trade fleet, integrate inland water transport in Belarus into the European water transport system and improve the environmental situation at inland waterways.

In addition to various technical and infrastructural measures, the Programme provides for the development of recommendations on prevention of pollution of inland waterways by wastewater and oil products from ships, as well as on navigation safety. The draft of this Programme went through a pilot SEA in 2010 within the framework of an EU/UNDP project.

State Programme for Development and Maintenance of Motor Roads in the Republic of Belarus for 2015–2019

The State Programme for Development and Maintenance of Motor Roads in the Republic of Belarus for 2015–2019, approved by the 2014

Resolution of the Council of Ministers No. 1296, includes a chapter on environmental protection and rational use of natural resources. Among other matters, it provides for the:

- Introduction into motor roads of modern engineering solutions to protect the environment from adverse impacts (including noise protection devices, protection nets to prevent the penetration of animals onto roads, treatment facilities to prevent the pollution of water bodies);
- Rehabilitation of territories destroyed during the construction and repair of motor roads;
- Beautification and greening of automobile roads, taking into account snow barriers, and decorative and noise protection functions;
- Introduction of new design solutions, materials and technologies to reduce dust formation and prevent water and wind erosion;
- Application of technological design solutions to prevent the disturbance of natural landscapes;
- Implementation of measures to ensure the integrity of wild animal habitats and migration pathways;
- Application of low waste, energy- and resource-saving technologies.

Reconstruction and development of republican motor roads require the positive conclusion of the state ecological expertise.

State Programme for Motor Transport Development in 2011–2015

The State Programme for Motor Transport Development in 2011–2015, approved by the 2010 Resolution of the Council of Ministers No. 1886, provides for, among other measures, annual reduction in the number of vehicles of ecological class Euro-0, 1 and 2; reduction of emissions of pollutants into air from spent gases by 1–2 per cent annually; and the introduction of modern systems of automated traffic management for buses on urban and suburban regular passenger routes. Implementation of the Programme has allowed the geographical scope of application of automated traffic management to be widened with the use of satellite navigation. Difficulties in implementation include the issue of renewal of the vehicle fleet (mostly, buses), as the pace of renewal has decreased.

State Programme for Development of Railway Transport in the Republic of Belarus for 2011–2015

Among other measures, the State Programme for Development of Railway Transport in the Republic of Belarus for 2011–2015, approved by the 2010 Resolution of the Council of Ministers No. 1851, provides for the electrification of railways, modernization of the system of electricity supply, and energy-saving and environmental measures (including introduction of automated systems of recording energy consumption; increased use of wood, oil and other waste as fuel in the boiler houses of railway organizations; introduction of renewable and alternative energy sources; and implementation of measures to decrease the use of fuel and energy resources by Belarusian Railways).

It is expected that the environmental effects of the Programme will include a decrease in emissions of pollutants into the air from mobile sources by 20 per cent, increase in treated and decontaminated oil sludge by 25–30 per cent, decrease in oil containing waste by 10–12 per cent and decrease in water consumption by 5–10 per cent. In the framework of the Programme, new technology for the treatment and disposal of oil sludge was introduced at the washing and steaming station in Barbarov village, Gomel Oblast.

Strategic documents on road safety

Implementation of the Concept of Road Safety in the Republic of Belarus, approved by 2006 Resolution of the Council of Ministers No. 757, included a variety of measures (i.e. improvements in the legal framework and the adoption of new standards for the technical state and safety of trolleybuses and motorbikes, preparation of annual analytical reports on road safety in Belarus, preparation of information and methodological materials, etc.).

There has been an impressive decline in the number of road accidents, as well as fatalities and injuries, in the past decade (table 9.15).

The Concept of Traffic Safety in Minsk City “Kind Road” for 2012–2015, approved in 2011 by the Minsk City Council of Deputies, addresses the causes of traffic accidents one by one. The results of implementation are regularly tracked and available online (http://baes.by/). They show impressive achievements against each goal of the Concept.

Other documents

Of high importance, especially for urban communities, are measures for the electrification of transport, which were implemented as part of the State Programme to Supply Cities of the Republic with Land-based Urban Electric Transport for 2009–2013, approved by 2009 Resolution of the Council of Ministers No. 686. The Programme provided for the

construction of new and repairs to existing trolleybus and tram lines. Despite the investments in electrifying public transport in major cities, these efforts have not yet resulted in equivalent increases in passenger turnover for land-based electric transport (tables 9.16 and 9.17).

Urban policies aimed at mitigating noise levels are envisaged in the Main Directions of the National Urban Development Policy for 2011–2015, approved by the 2011 Decree of the President No. 385. This document, although not strictly transport related, includes measures aimed at reducing noise levels in urban environments, for example, through the installation of sound barriers along transport routes, the use of noise protection woodwork for the construction of residential and public buildings, and the organization of sanitary protection zones.

The Strategy of Innovative Development of the Transport Sector of the Republic of Belarus until 2030, approved in 2015 by the Ministry of Transport and Communications, provides for a long-term vision of the sector. The introduction of modern geoinformation, analytical, navigation and communication systems and implementation of measures on resource efficiency and energy saving are among the main directions identified for the development of the sector.

The Concept of Development of Cycling in Minsk City was developed within the framework of the project "Development of design documentation for the system of road safety on the road network of Minsk". It was adopted in 2011 by the Minsk City Council of Deputies. The overall strategy of the development of cycling includes five areas: organizational support, adaptation of street and road environment to cycling, construction of cycling paths and parking lots, promoting cycling and safety of cyclists.

Institutional framework

The Ministry of Transport and Communications is responsible for state policy in transport sector. Technical inspection of vehicles is conducted regularly by "Beltehosmotr". Rail transport is managed by the State Association "Belarusian Railways" subordinated to the Ministry of Transport and Communications.

The Ministry of Internal Affairs is responsible for registering vehicles, recording traffic accidents and issuing driver licences.

The Ministry of Natural Resources and Environmental Protection is responsible for, among other things, determining fuel quality standards and measuring air pollution.

Local executive and administrative bodies manage various modes of transport and oversee local roads in cities, towns and villages.

Transport-related global and regional agreements of particular importance to the environment

Belarus is a Contracting Party to 23 United Nations transport agreements administered by ECE. Of particular importance from an environmental point of view is the fact that, in 2004, Belarus acceded to the 1997 Agreement concerning the Adoption of Uniform Conditions for Periodical Technical Inspections of Wheeled Vehicles and the Reciprocal Recognition of Such Inspections. Participation in this Agreement will contribute towards the improvement of the roadworthiness of vehicles travelling on the roads of Belarus.

Belarus is also Party to United Nations agreements governing the transport of dangerous goods (European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR)) and special cargoes, including perishable foodstuffs (Agreement on the International Carriage of Perishable Foodstuffs and on the Special Equipment to be Used for such Carriage (ATP)). Given its position as a transit country and the high impact of accidents involving such cargoes on the environment and human health, participation in these instruments strengthens the capacity of the country to better prepare for such types of events, as well as strengthen its position as a transit corridor.

Belarus has not yet signed and ratified the 1993 Protocol to the ADR and the 2000 European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN).

9.7 Conclusions and recommendations

Belarus invests heavily in the promotion of sustainable transport, including through the promotion of electrified public transport. However, these investments are not yet based on a solid financial footing with adequate levels of cost recovery. Sustainable transport can be achieved through having a solid financial basis.

Recommendation 9.1:
The Government, together with local authorities, should ensure the financial sustainability of its transport policy by:

(a) Improving the cost recovery of public transport;

(b) Prioritizing investments in types of transport where passenger loads justify them and taking measures aimed at increasing passenger demand.

Because of the slow pace of vehicle renewal in Belarus, transport can still be identified as the number one cause of impacts on the quality of air in Minsk. The situation has improved in recent years, despite the constant increase in the number of vehicles, due to more stringent vehicle and fuel standards having been adopted nationwide.

Recommendation 9.2:
The Government should introduce economic incentives to facilitate the renewal of the country's aging fleet with a view to improving the situation regarding motor vehicles.

The urban traffic performance of Minsk is improving through the application of domestically developed intelligent transportation system (ITS) solutions. However, the application of these solutions to improve the traffic situation and mitigate the negative environmental, health, economic and social impacts of motorized transport is not widely practised.

Recommendation 9.3:
The Government should ensure that the local executive and administrative bodies continue to deploy intelligent transportation system (ITS) solutions in order to improve traffic demand management and mitigate the negative externalities caused by urban transport.

Belarus is a Party to the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR), which is intended to ensure the safety, security and facilitation of transport operations. Carriers from one country can carry dangerous goods through and to any other country that is a Contracting Party without additional safety requirements imposed by transit or destination countries.

The ADR also allows mutual recognition of certificates, that is, packaging certificates, vehicle certificates, tank certificates and driver training certificates. The ADR is regularly updated and kept in line with the UN Recommendations on the Transport of Dangerous Goods, that is, with international regulations for the transport of dangerous goods by sea and air. The entry into force of the 1993 Protocol of amendment to the ADR would strengthen the ADR (accession by all ADR contracting parties is required).

Belarus is not yet a Party to the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN). The goals of the ADN are to increase the safety of the international carriage of dangerous goods by inland waterways; contribute effectively to the protection of the environment, by preventing any pollution resulting from accidents or incidents during such carriage; and facilitate transport operations and promote international trade. Given the impact of accidents involving such cargoes on the environment and human health, Belarus would benefit as a transit country through participation in such agreements.

Recommendation 9.4:
The Government should consider accession to the following United Nations transport agreements, in order to improve the environmental performance of the transport sector and its competitiveness as a transit country:

(a) The 1993 Protocol amending article 1 (a), article 14 (1) and article 14 (3)(b) of the European Agreement of 30 September 1957 concerning the International Carriage of Dangerous Goods by Road (ADR);

(b) The 2000 European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways (ADN).

Chapter 10

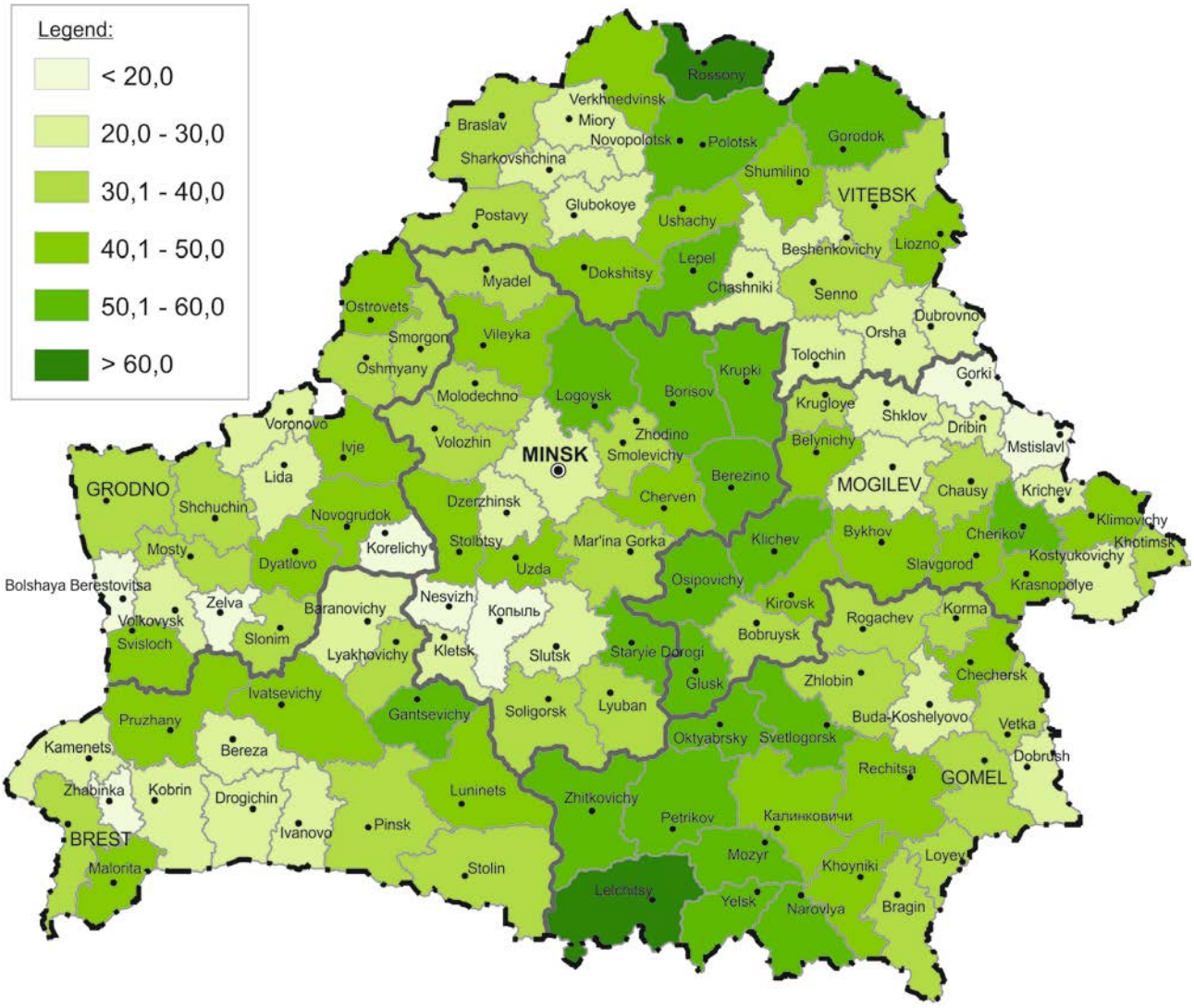
FORESTRY AND ENVIRONMENT

10.1 Current situation

Extent and type of forests

Belarus is rich in forests, which represent an important asset for the country's biodiversity conservation and economic development (map 10.1). As of 1 January 2015, forests extend over an area of 8.653 million ha, corresponding to about 42 per cent of the country's land area (table 10.1). Such coverage has been constantly expanding and has almost doubled over the last 60 years. This is mainly due to natural afforestation of former low-quality agricultural lands, and to planting on lands allocated to afforestation activities. The extent of forest land and other wooded land is about 1 ha per inhabitant, which is higher than the average of 0.4 ha per inhabitant in Central European countries. The oblasts with the greatest forest lands are Gomel (46 per cent), Vitebsk (40.2 per cent) and Minsk (38.4 per cent).

Map 10.1: Country forest coverage, 2014, percentage



Source: National Statistical Committee, 2014.
Note: The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.

Table 10.1: Extent of forest area, 2005, 2010, 2014

	Land area (end of year 1 000 ha)			Percentage of land area	Area per inhabitant (ha/inhabitant)
	2005	2010	2014	2014	2014
Total forest fund	**9 185.0**	**9 275.0**	**9 342.0**	**45.0**	**1.0**
of which:					
Forest land	8 393.0	8 567.0	8 653.0	42.0	0.9

Source: Form 22-land "Report on the presence and distribution of land", State Property Committee of the Republic of Belarus.

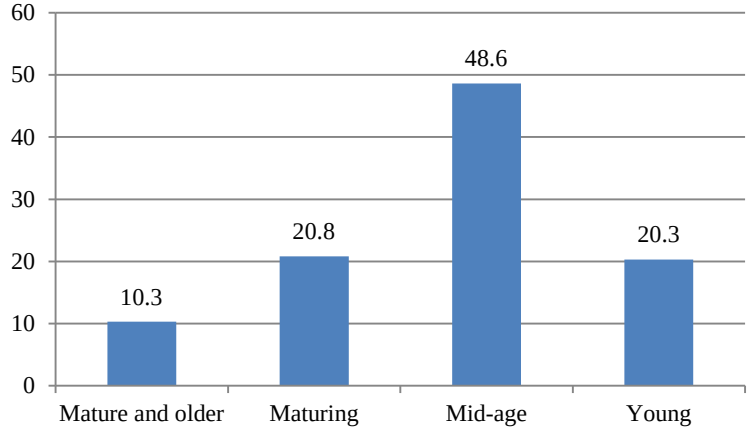
The areas covered by primary forests, other naturally regenerated forests and planted forests extend over 400,000 ha, 6.3 million ha and 1.9 million ha respectively. Over the last 10 years, while the extent of primary forests and other naturally regenerated forests has remained stable, planted forests increased by about 10 per cent.

The total wood growing stock of the country's forests is estimated at about 1.7 billion m^3, of which 1.1 billion m^3 is coniferous and 560 million m^3 broadleaved. The wood growing stock per inhabitant is 176 m^3, which is more than three times the average for Central European countries. The growing stock available for wood supply is 1.3 billion m^3. The volume of mature stock is 248.1 million m^3. The annual wood increment amounts to 31.4 million m^3. The average annual wood increment and the average stand volume per ha of wooded lands is 208 m^3. The biomass (living biomass) stock and carbon stock (dead wood and litter) in forests amount to 1,380 and 1,450 million metric tons respectively, with a constant increase since 2005.

In terms of age structure, 20.3 per cent of forest stands in Belarus are classified as young, 48.6 per cent as mid-age, 20.8 per cent as maturing, and 10.3 per cent as mature and older (figure 10.1). The average age is 54 years. Over the last 20 years, the area of maturing, mature and older forest stands has been steadily expanding, which is mainly due to a change in the regulation of allowable annual volumes of timber harvesting. However, this area is still small and forests composition in terms of age structure needs to be evened by at least 10 years.

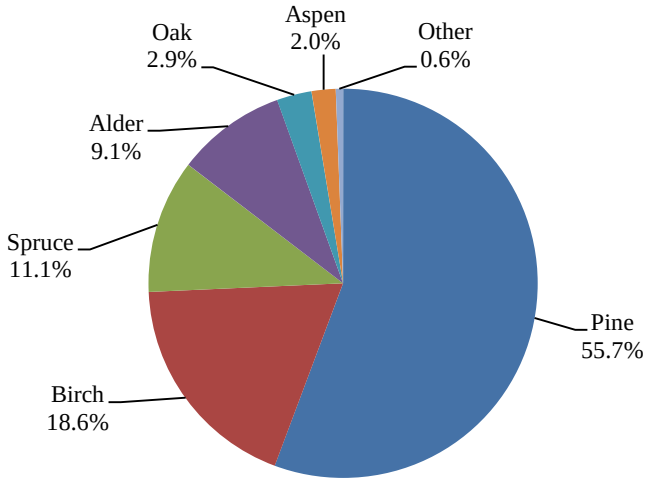
Belarus has large forests and extensive freshwater aquatic systems, including bogs, mires, wetlands, lakes and rivers that provide habitats for many species. There are 107 wild species of trees and bushes, of which 28 species are trees and the others are bushes and shrubs. Pine is the most common species in Belarusian forests, as it accounts for more than half of the forest resources in the country (55.7 per cent) (figure 10.2). The rest is composed of birch (18.6 per cent), spruce (11.1 per cent), alder (9.1 per cent), oak (2.9 per cent), aspen (2 per cent) and other species (0.6 per cent).

Figure 10.1: Composition of forest resources by age, 2014, per cent



Source: FAO Forest Resource Assessment (FRA) programme 2010/2015, 2015.

Figure 10.2: Composition of forest resources by species structure, per cent



Source: FAO Forest Resource Assessment (FRA) programme 2010/2015, 2015.

Pine and spruce forests dominate in the northern part of Belarus. Coniferous species (pine and spruce) account for 67 per cent of forest resources and broadleaf species (birch, alder, oak, aspen) for the remaining 33 per cent. This imbalanced species composition adversely affects biodiversity and limits the resistance to climate change impacts.

Protective and specially protected forest areas

Of the total forest area, 51.8 per cent is classified as either "protective" or specially protected areas (also termed Group I forests), which increased from 42 per cent to 51 per cent between 1997 and 2015. As of January 2011, 11.2 per cent (1.054 million ha) of such areas are designated as special protective forest sites. Although these sites allow some intervention (e.g. selective thinning and sanitary cutting), their share remains higher than in the rest of Europe.

Forest disturbances

Forest fires

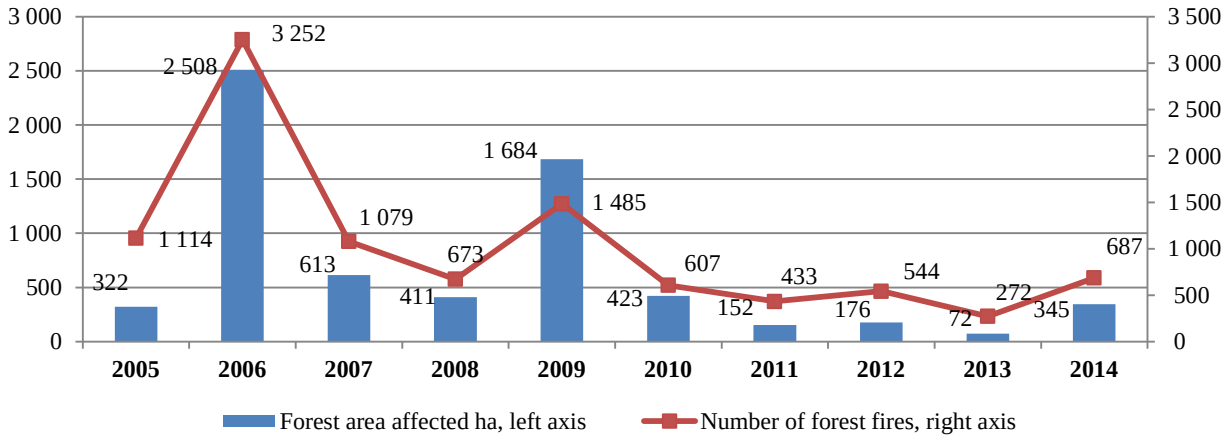
The presence of large areas of coniferous forests with understorey vegetation provides conditions favourable to forest fires. Since 2005, a total of 10,146 fires burned 6,706 ha of forests, with an average of 1,014 fires and 671 ha of forests burned per year, which is an improvement compared with the previous decade (figure 10.3). Belarus has an effective fire management and control system in place, necessary personnel and state budgetary support. In 2010, for instance, Western Russia experienced large-scale catastrophic fire events. Belarus, which suffered the same climatic conditions, had no large-scale fires and the fires were promptly detected and extinguished.

Priority actions for the decrease of forest fire hazard levels include: silvicultural measures for reducing wildfire hazard in coniferous forests, particularly the introduction of less flammable and economically valuable broadleaved tree species intermixed in pure coniferous stands; construction of anti-fire barriers consisting of firebreaks and internal fuel breaks, fire-resistant forest edges and shaded mineralized shelter belts; and the creation of a multi-level fire suppression and extinguishing system on the basis of streamlined land and aerial forest fire prevention services, supported by space-borne remote sensing information.

Pests

The forest area affected by pests and diseases has gradually decreased from 200,012 ha in 2005 to 191,927 ha in 2014. Adverse weather and climatic conditions contributed to the spreading of pests (including the pine tree lappet, the common pine sawfly, the stellate-weaver sawfly and the gypsy moth) and diseases. During the same period, 435 ha of forests were damaged by pests and 6,589 ha were affected by forest diseases. The most severe impacts occurred in spruce, oak, ash and, in some places, black alder stands.

Figure 10.3: Forest fires and forest area affected by fires, 2005–2014



Source: National Statistical Committee, 2015.

A higher probability of pest outbreaks, as well as an expansion of the species composition of pests, is expected due to climate change. In particular, it is expected that an increase in insect pest populations may develop in the mild winter/dry and hot summer conditions, and that pine pests may become particularly active. In order to improve pest management, it will be necessary to strengthen ground-based methods of general reconnaissance and detailed monitoring of pests for the purpose of prompt detection of pathologic processes in forests, and to further develop pheromone monitoring and expand the range of pheromones by two to three types, every subsequent 10 years.

Adaptation to climate change

Despite the fact that exposure and sensitivity to climate change is considered lower in Belarus than in other countries of Europe and Central Asia, climate change impacts, including on forests, have already been observed.

A decrease in the number of areas for boreal species of wild plants has been registered in the northern and eastern regions of the country, while some new species typical of steppe and forest-steppe zones have appeared. The distribution ranges of European spruce, European hornbeam and grey alder are considered likely to change as well.

A partial shift of the southern boundary of spruce towards the north by 20–30 km has been observed and it is expected that, in the southern part of the country, the increment of spruce trees will reduce by 8–10 per cent by 2025 and 20 per cent by 2050. Projections of changes in the current increment of pine forests for 2025 and 2050 versus the period 1961–1990 under the most likely climate change scenario are illustrated in map 10.2.

In the last 20 years, the country has already observed mass drying of spruce forests due to more frequent droughts and groundwater recession, particularly in Mogilev, Vitebsk and Minsk Oblasts, which cause mass propagation of stem borers, including the European spruce bark beetle.

Illegal logging

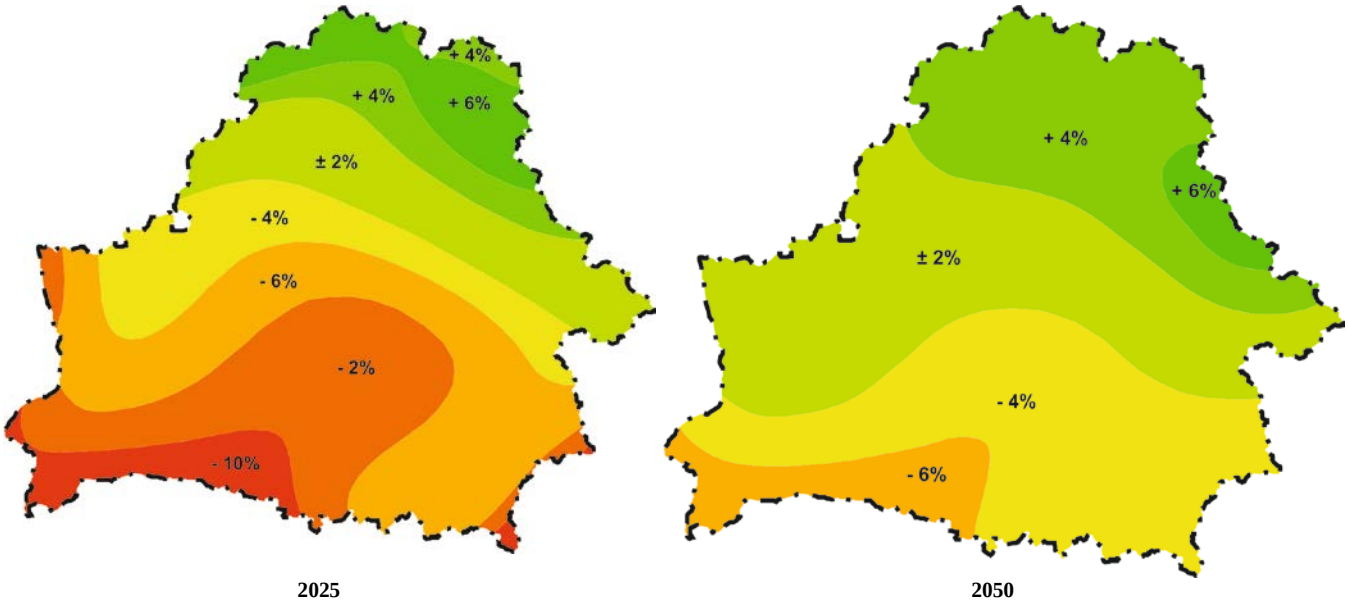
Belarus has specific policies on illegal logging and the Ministry of Forestry undertakes significant efforts for its prevention, with about 13,000 foresters conducting inspections. Illegal logging amounted to 6,297 m^3 of timber in 2014, an increase on the 3,529 m^3 in 2010. Due to the effective control mechanisms, 75 per cent of the violations are detected and sanctioned, and, overall, illegal logging plays a minor role in the country's forest sector (0.06 per cent of fellings).

Radioactive contamination

The Chernobyl NPP accident contaminated area covers about 18 per cent of forests in the country. As of 2011, 179,000 ha of forests are being monitored for radiation. As of 1 January 2015, 15 per cent of forests remain contaminated.

In about one fourth of this forest area, 50 per cent of mushrooms and 20 per cent of berries still have some level of contamination and harvesting activities are prohibited. Radiological monitoring stations are used to collect and analyse contamination and identify areas for intervention.

Map 10.2: Projections of changes in the current increment of pine forests in 2025 and 2050



Source: Draft Strategy on Adaptation of Forestry of the Republic of Belarus to Climate Change until 2050, Ministry of Forestry.
Note: The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.

Slowly decreasing radiation levels have made some reclassification of forest areas possible since the accident. Contaminated areas are under increased forest fire surveillance and have been given extra resources for fire prevention and firefighting, as large-scale forest fires in the most contaminated areas could release radioactivity into the atmosphere, with harmful impact on human beings and biodiversity.

Trends in forestry

Reforestation and afforestation

Since 1990, forests have gone through intensive afforestation and reforestation, due to the establishment of a well-functioning forestry system – from forest seed harvesting to wood processing and storage, and from growing standard planting stock to forest cultivation and thinning. In 2014, the area of afforestation and reforestation was 32,349 ha and, during the period 2005–2014, on average, 41,079 ha have been afforested and reforested each year (figure 10.4). The main reasons for such an increase is the transfer of low-productive agricultural lands for the afforestation, increased volumes of main cuttings, and sanitary clear cuts on the territories of dying (drying off) spruce stands.

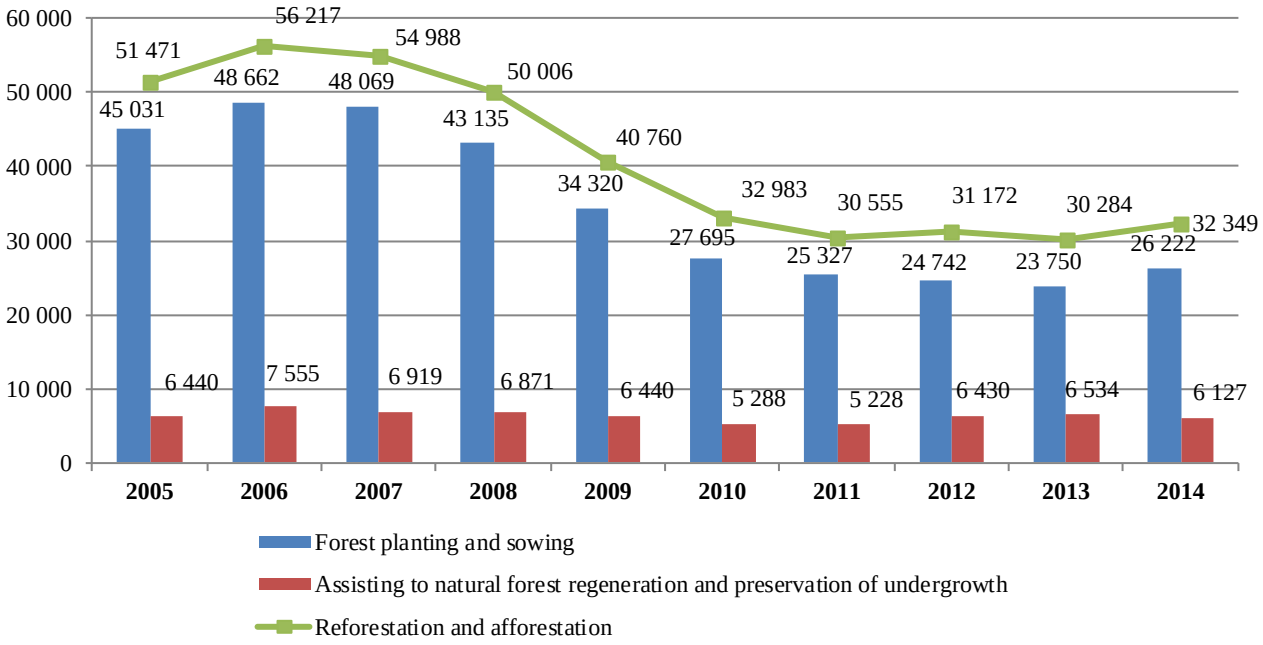
Most of the reforestation and afforestation efforts concern economically valuable species, such as pine, spruce and oak; with smaller local programmes for planting birch, alder and lime, and reintroducing larch. In 2014, the Ministry of Forestry maintained 275.5 million standard seedlings in nurseries of state forest enterprises (FEs), for about 285 species and types of ligneous plants. Some problems have been encountered with afforestation of marginal farmland, as seedlings had difficulty competing with long-established grasses, ungulates, or rodents that harm plantations. Such plantations are registered as forest only after seven years.

In 2014, 24.64 ha of irrigation system were built, 27 greenhouses covering 0.73 ha were put into operation, including seven sanitary facilities. The total investment in the nursery business amounts to 21.4 billion roubles, with earnings from the sales of nursery products amounting to 30.5 billion roubles, equivalent to 146 per cent of the annual target.

One of the priorities of forestry development activities is the use of new, selected plant material, ecologically adapted to local soil and climatic conditions. Currently, only about 20 per cent of plantations are established based on selected seeds. The objective is that all new forest plantations will use selected plant material, with the establishment of forest plantations preceded by autumn tillage.

Photo 10.1: Forest in National Park "Narochansky"

Figure 10.4: Reforestation and afforestation, 2005–2014, ha



Source: National Statistical Committee, 2015.

Economics of forestry

In 2013, the total timber harvest amounted to about 18.5 million m^3 of marketable timber, of which about 11 million m^3 was of industrial roundwood, with a sensible increase since 2005 (table 10.2). In the same year, about 535,311 ha were harvested. Over this area, thinning accounted for about 144,900 ha, selective sanitary cuts 89,317 ha, regeneration and restocking cuts 1,304 ha and reconstruction cuts 2,200 ha, while the cuts in the area of radioactive contamination extended over an area of 81 ha.

Currently, less than 60 per cent of the annual increment is harvested. This relatively low degree of harvesting of forest timber resources is mainly due to the structure of the forest industry in the country, with relatively low demand for pulpwood and restrictions for harvesting, due to: (i) the expansion of protected natural areas in forests, (ii) the inaccessibility of swamp forests, (iii) the radioactive contamination of certain forest areas, and (iv) limitations caused by the actual age structure.

In the same year, wood-fuel removals amounted to 7.6 million m^3, an increase over the last 10 years, regardless of whether removal was for industrial, commercial or domestic use. This is mainly due to changes in wood removals, use and taxation policies, as well as to changes in the value of wood sale orders, also related to exchange rate fluctuations. Currently, wood-fuel is used in seven mini-scale CHPs and more than 3,000 boilers (chapter 8).

In terms of international trade, in 2013, the country exported about 2.7 million m^3 of roundwood and 852,000 m^3 of sawn wood, 760,000 m^3 of paper and paper board and 131,770 tons of wood pulp (table 10.3), for a total value of US$534 million and with a trade surplus amounting to US$212 million – which marks an increase since 2005. Forest products were exported to 25 countries, the main destinations being Poland (47.9 per cent), Germany (11.4 per cent), Lithuania (10 per cent), Latvia (8.62 per cent), Belgium (3.46 per cent), Sweden (3.25 per cent) and the Netherlands (3 per cent).

In addition to timber resources, Belarusian forests provide non-wood forest products, such as fruits and berries, mushrooms, gum, and birch juice. In 2013, 16,614 tons of wild fruits and berries and 6,681 tons of mushrooms were harvested. Non-timber forest resources represent an important source of rural income and gathering for self-consumption. Picking wild mushrooms and berries is popular and gathering wild medicinal herbs has a long tradition.

Citizens have free access to forests and to these resources, except in specially protected areas. While the contribution of non-wood forest products to GDP in Belarus is higher than in most CIS countries, it is lower than in more developed forest-based economies, for example in most of Scandinavia and Canada, indicating further potential for growth.

Despite the positive trends in production and international trade, in Belarus, the relative economic importance of the forestry sector has been decreasing over the years (table 10.4). According to available data for 2011, the contribution of forestry to GDP amounts to US$575 million, equivalent to 1.1 per cent of GDP. Although this is higher than in the Russian Federation (0.8 per cent), it remains significantly lower than in countries such as Finland (4.3 per cent) or Latvia (6.5 per cent). The consumption of forest products is reported to amount to 835 m^3 per 1,000 inhabitants in 2010, a slight decrease since 2005. In the same year, in Finland, it amounted to 4,681 m^3 and, in Latvia, to 1,796 m^3 per 1,000 inhabitants.

In terms of revenues, the more limited access to government budget resources over the years has been offset by higher extra-budgetary income from forest management, use of forest lands and revenue from sale of timber, seeds and planting materials. Some 70 per cent of forest management costs are now self-financed by the revenues of FEs from sales of timber and other forest trade and services. This compares with a share of 30 per cent around 2005. In contrast, the nature reserves and national parks are largely financed from the state budget (82.5 per cent in 2014); these funds are supplemented by own income from tourism and other activities and donor funds.

The analysis of these trends leads to the conclusion that, at present, the economic potential of forests is not fully exploited, and that there is large scope for development in terms of increased harvesting on a sustainable basis and processing for export as well as for domestic consumption.

Table 10.2: Wood removal and production, selected years, thousand m^3

	2005	2010	2012	2013
Total	**8 696**	**10 365**	**18 067**	**18 522**
Wood fuel	1 340	2 292	7 443	7 633
Industrial roundwood	7 356	8 073	10 624	10 889
of which:				
Sawnwood	2 737	2 571	2 571	2 557
Paper and paperboard	917	479	782	1 052
Wood-based panels	61	51	55	33
Wood pulp	284	588	360	308

Source: ECE/FAO Timber Database, 2014.

Table 10.3: Wood export and import, 2005–2013

		2005	2006	2007	2008	2009	2010	2011	2012	2013
Exports										
Wood fuel, including wood for charcoal	1 000 m^3	74.55	74.55	74.55	74.55	4.39	4.62	11.00	27.35	40.65
Industrial roundwood (wood in the rough)	1 000 m^3	1 443.00	1 443.00	1 443.00	1 443.00	1 475.10	2 217.30	2 509.00	2 476.00	2 659.00
Sawnwood	1 000 m^3	1 196.90	1 196.90	1 196.90	280.52	336.71	467.66	607.00	732.00	852.00
Wood-based panels	1 000 m^3	359.30	359.30	359.30	359.30	340.00	370.67	373.54	435.63	760.22
Wood pulp	1 000 mt	0.10	0.10	0.10	0.10	0.10	0.12	0.14	0.00	0.00
Paper and paperboard	1 000 mt	85.50	85.50	85.50	85.50	184.16	222.37	114.00	165.00	130.77
Imports										
Wood fuel, including wood for charcoal	1 000 m^3	0.50	0.50	0.50	0.50	0.50	0.50	0.00	0.10	0.07
Industrial roundwood (wood in the rough)	1 000 m^3	76.00	76.00	76.00	76.00	4.95	34.91	13.00	13.00	18.57
Sawnwood	1 000 m^3	115.50	115.50	115.50	115.50	8.48	8.90	11.00	17.00	14.00
Wood-based panels	1 000 m^3	189.90	189.90	189.90	189.90	410.91	549.72	494.26	557.53	538.00
Wood pulp	1 000 mt	39.40	39.40	39.40	39.40	35.19	48.13	23.11	27.02	13.84
Paper and paperboard	1 000 mt	140.50	140.50	140.50	140.50	259.75	284.31	179.00	201.00	104.40

Source: ECE/FAO Timber Database, 2014.

Table 10.4: Contribution of forestry to GDP, 2000, 2005, 2011

	Belarus			Finland	Latvia	Russian Federation
	2000	**2005**	**2011**	**2011**	**2011**	**2011**
GDP in US$ million at 2011 prices	1 077	552	575	9 645	1 675	13 075
Per cent of GDP	2.7	2.3	1.1	4.3	6.5	0.8

Source: ECE/FAO Timber Database 2014.

Photo 10.2: Honey fungus

The status of the forestry industry has been at the centre of political debate in recent years, as it is considered rather underdeveloped given the vastness of the resources; production facilities are outdated and only minor investments have been undertaken to upgrade harvesting and production technology. Recent developments, such as the 2015 Decree of the President No. 211 regulating the export of unprocessed wood as of 2016, respond to the government aim to change from a roundwood exporter into a producer of products of high user/consumer value. However, such developments need to be accompanied by suitable measures to improve the framework conditions for entrepreneurs and investors.

Forest road density

Because of the gently rolling topography in Belarus, forests are easily accessible. However, there are wide areas that are currently inaccessible due to the wet and boggy parts of the terrain. Belarus has an average forest road density of 6 km per 1,000 ha of forest, which is low compared with the European average of 20 km per 1,000 ha of forest. Of the forest roads managed by the Ministry of Forestry, which extend over 1,086 km, it is estimated that about 80 per cent require repair works. The Programme on Transport Development for Forest Fund and Construction of Forest Roads in the Forests of the Republic of Belarus until 2010 was approved by the 2006 Resolution of the Council of Ministers No. 1172, and followed by the Programme of Construction of Forest Roads in 2011–2015, approved by the 2010 Resolution of the Council of Ministers No. 1046. In 2012, a special fund was established in the Ministry of Forestry to finance forest road construction by charging a fee on standing timber sales.

In the period 2011–2014, as a result of the Programme, 469.7 km of forest roads were constructed in the forest fund of the Ministry of Forestry. In 2014 alone, 30 roads (160 km) were constructed, including 25 roads (136 km) in the forest fund of the Ministry of Forestry and five roads (23 km) in the forest fund of the Affairs Management Department of the President. Although the enhancement of the forest road network still remains a priority for the country, plans for the enhancement of the forest road networks are not based on multifunctional construction principles and do not give due consideration to soil erosion, habitat loss and natural landscape impacts.

Low forest road density can have a negative impact on sustainable management of forests, as it can cause overexploitation of forests close to existing roads with associated negative environmental impacts, reduce forest productivity in such areas and increase costs of harvesting in the long term. It is estimated that around 1.5 million m^3 of the prescribed cuts is not utilized, also due to the inaccessibility of boggy

areas. This implies that such volumes remain in the forest with an increase of their senescence and age-related decay.

Forest ownership and management

All forests and the land on which forests grow are owned by the State. The Ministry of Forestry manages 85.5 per cent of the forest fund, with 97 legal entities engaged in forestry management, the FEs (leskhoz). The rest is managed by the Affairs Management Department of the President (8 per cent), Ministry of Emergency Situations (2.3 per cent), Bellesbumprom (2.1 per cent), Ministry of Defence (1 per cent), National Academy of Sciences (0.4 per cent), local authorities (0.4 per cent) and Ministry of Education (0.3 per cent). There are no community owned or managed forests in Belarus.

Forestry and forest use activities are regulated by forest management projects (the equivalent of forest management plans), which are developed for each legal entity engaged in forestry. Forest management projects exist for 100 per cent of the country's forest area, while in Western Europe, for instance, they cover 62 per cent of the forest area. Forest management projects are developed every 10 years by RUE Belgosles based on a template prepared by the Ministry of Forestry. Timber volumes to be harvested are set by the Ministry of Forestry each year in accordance with the forest management projects.

Companies and private individuals can obtain rights for forest use for a certain period of time. For wood harvesting, for instance, forests can be leased for 1–15 years. Felling tickets for standing timber, orders for standing timber or selected trees, and forest use tickets for extracting non-timber forest products are issued to authorize the use of forest resources depending on the type of forest use. On average, around 1,000 tickets are issued annually by a legal entity engaged in forestry.

About 51.8 per cent of the forests are classified as Group I, with nature protection, water protection and sanitary-hygienic roles, and the other half as Group II, for commercial exploitation. Group I forests enjoy a certain degree of protection. They can be harvested but mostly face step-by-step and selective methods of cutting. Group II forests have until now been managed for growth, production and final clear-cutting. Currently, the Ministry of Forestry is in the process of revising such designated functions in order to bring it in line with international classification of forests and to clarify the type of forest use within each group.

Certification

The national standards and technical codes of practice (TCPs) for the forest certification system are developed in accordance with the requirements of relevant international conventions, regulations for sustainable forest management and the Strategy for the Conservation and Sustainable Use of Biological Diversity and its Action Plan.

Accreditation of the national forest certification system by the Programme for the Endorsement of Forest Certification (PEFC) is to be acknowledged as an important achievement. Altogether, 94 of the 97 FEs under the Ministry of Forestry are certified according to PEFC standards, covering 99 per cent of the forest managed by the Ministry, and 47 FEs have PEFC certificates for their products. An additional five forest entities, not subordinated to the Ministry, are also certified according to PEFC standards. As a result, a total of 8.1 million ha are PEFC certified, representing more than 86 per cent of the total forest area. As of late 2015, 78 of the 97 FEs subordinated to the Ministry of Forestry had been certified to meet FSC standards.

Furthermore, the introduction of the Regulation No. 995/2010 of the European Parliament and of the Council, laying down the obligations of operators who place timber and timber products on the market (EU Timber Regulation) from March 2013, requires anyone importing to or trading timber within the EU to undertake necessary due diligence to ensure that the timber has been produced legally. The PEFC, for instance, modified their standard to ensure that all their certified operations produce all the necessary documentation required by the Regulation and, accordingly, all PEFC-certified companies are required to implement the EU Timber Regulation.

Employment in the forestry sector

In 2014, the forestry sector employed 36,200 people, many in rural areas. The wood industry (ISIC Division 6) provided 47,000 jobs and the pulp sector (ISIC Division 17) 29,000 jobs. The State Forest Protection Service has over 16,000 employees, nearly 14,000 of whom are subordinated to the Ministry of Forestry. In the last five years, the number of employees in the forest sector decreased by 7 per cent as a result of restructuring of the inefficient wood processing units of forestry enterprises, technical upgrading, reduction in the number of unskilled workers, demographic trends in rural areas and staff outflow to the associated sectors.

Education and training for forestry sector professionals is well organized (box 10.1) and the level of skills in the forestry sector is well developed: for each employee with higher education there are 1.4 employees with secondary special education, 1.7 with vocational education and 2.8 with secondary education. In terms of age, 78 per cent of employees are below 50 years and the average age of a manager is 47.3 years. All forestry sector executives have higher education. Managerial staff have either higher or secondary special education.

10.2 Role and functions of forests

Group I forests have nature protection, water protection, sanitary-hygienic, recreation and other roles. Forests of II also have these functions but they have a lower age for cuttings (by 10–20 years compared to Group I forests) and fewer restrictions for clear-cutting due to their lower role for biodiversity conservation. No significant changes are expected to intervene in the functions of forests (table 10.5), which are considered in line with the objectives and targets for forest management and use in the country.

Belarus is considered the "lungs of Europe" because vast forest and wetland ecosystems purify air masses coming predominantly from Western Europe. Its forests sequestered close to 30 million metric tons of carbon in 2012 and they therefore serve as an important carbon sink, contributing to global climate change mitigation. Despite the increase of emissions in the forestry sector, which, according to the fifth National Communication to the UNFCCC, reached 24.9 million tons CO_2-equivalent in 2007, overall, forests in the country are expected to remain a net carbon sink (based on projections up to 2020).

Forests are the most important biome for biodiversity in the country, harbouring many endemic and relic species of plants and providing habitats for globally rare and endangered animals. About 12,000 species of plants and mushrooms can be found in the forests of Belarus, which are also home to bison, brown bear, lynx, golden eagle, black stork and aquatic warbler.

Table 10.5: Forest primary designated function, thousand ha

	1990	2000	2005	2010	2015
Production	4 498	4 183	4 186	4 282	4 561
Protection of soil and water	1 691	2 342	1 475	1 520	1 591
Conservation of biodiversity	357	487	1 181	1 208	1 369
Social services	1 234	1 261	1 495	1 529	1 112
Multiple use	0	0	0	0	0
Total	**7 780**	**8 273**	**8 436**	**8 630**	**8 633**

Source: FAO Forest Resource Assessment (FRA) programme 2010/2015, 2015.

Box 10.1: Education, training and research in forestry sector

Belarus has 26 forestry-related educational institutions under the Ministry of Education: two universities with about 300 graduates per year, offering bachelor's and master's degrees in forestry; five colleges, with about 350 graduates per year; and 19 training schools, with about 350 graduates per year. The number of seats in the university programme is centrally determined by the Ministry of Forestry, which also provides students with scholarships and contracts with FEs. However, at the moment, the number of applicants is not high enough to make it a competitive university programme.

The main training institution on forestry in the country is the State Educational Institution "Republican Educational Centre for Development, Update and Advanced Training of Staff in Forestry Sector", which is under the Ministry of Forestry and provides training for over 500 forest managers and workers annually. All forest managers and workers have to undergo training every three years. The training curricula range from legal and regulatory training to business management, and more vocational-type training to forest guards and foresters. Training on international forest policies and regulatory requirements, technology for pest control, fire management, labour safety and certification for sustainable forest management is also provided, with foreign experts mainly coming from Finland, Poland and the Russian Federation. The training programmes are also open to the private sector. Priorities mainly relate to the upgrade of the Educational Centre hospitality infrastructure as well as IT and multimedia equipment (electronic boards, harvesting simulators), and are reflected in the Forestry Development Strategic Plan 2015–2030.

Currently, priority areas of basic and applied research relate to, among other matters, the development of technologies, methods and tools for sustainable forest management; reforestation, afforestation, increasing productivity and ecological sustainability of forests; protecting forests from fire, pests and diseases; assessment of forest resources, forest monitoring, and remote sensing of forests; rehabilitation of forests and forest lands and forest management in areas contaminated with radionuclides; biotechnology for industry, agriculture and medicine, and environmental protection.

In addition, forests in the country serve as a basis of unique natural landscapes, with the territory of the forest fund occupied by water bodies extending over 72,000 ha. They host springs, which are often curative. Over 67 per cent of Belarus's territory is covered with natural vegetation (forests, meadows, marshes and shrubbery), and the country has preserved unique non-reclaimed marshlands, which take up to 6 per cent of the territory of the forest fund and attract tourists as sites for ecotours, hunting and collection of berries.

10.3 Pressures from forestry

Forest rehabilitation and restoration have been successful in quantitative terms. But these practices created uneven age structure and species composition in re-established forests. As a result, Belarusian forests are relatively young and without the full genetic stock of old growth forest systems, which includes not only diverse tree species, but also microorganisms and understorey vegetation. In terms of forest composition, there is scope to increase the area of both coniferous trees and hard broadleaves and to reduce that for soft broadleaves (table 10.6). Clearing of forests also impacts on land drainage and natural erosion control, which, in turn, negatively impacts on water quality and aquatic habitats.

Table 10.6: Current and optimal distribution of forests by species groups, percentage of land area

	Current	Optimal	Difference
Conifers	67	70	3
Hard broadleaves	5	9	4
Soft broadleaves	28	19	- 9
Others	0	2	2

Source: Draft forestry development strategic plan for 2015–2030, 2015.

International good practice and experience shows that mixed age and mixed species forests, although perhaps not as productive and maybe more complex to manage, offer important advantages in terms of stronger resistance to damage from natural disasters (e.g. wind throw), pests and fire, mitigation of climate change effects and increased biodiversity, but also higher recreational and landscape benefits.

In addition, the reduction of areas of old-growth forests is one of the reasons for decline of populations of species which are used to live in climax forest communities, including the wood grouse.

10.4 Forest monitoring and inventory

Forest monitoring is part of the NEMS. It is conducted by RUE Belgosles for the Ministry of Forestry according to the State Programme for Support and Development of the NEMS for 2011–2015, and based on the national forest monitoring net. The national forest monitoring net includes 1,450 permanent registration points and 80 permanent sample plots. Permanent registration points are evenly disposed on the territory of the country. Every year, in the context of ecological forest monitoring on permanent registration points and permanent sample plots, approximately 40,000 trees are inspected according to the International Co-operative Programme (ICP) Forests methodology. The monitoring system looks into a wide range of issues, including: air pollution impact on forests, forest pathologies, radioactive contamination, ameliorated forest lands and local objectives. Reports are annually submitted to the Ministry of Natural Resources and Environmental Protection.

The Ministry of Forestry is also in charge of the State Forest Cadastre (2001 Resolution of Council of Ministers No. 1031 "On approval of the way of maintaining the State Forest Cadastre"). The Cadastre contains information on the state of the forest fund, along with an assessment of any occurring changes, and the economic valuation of forest timber and non-timber resources. According to 2013 data, the value of forest timber resources is estimated to amount to US$5.6 billion, while the total value of forest resources, including non-timber products such as mushrooms and berries, fodder and medicinal plants, amounts to US$10.5 billion.

10.5 Legal, policy and institutional framework

Legal framework

The most important legal document for the forestry sector is the 2000 Forest Code. It was updated through a number of amendments in 2011 and is currently undergoing a new round of amendments, with the new Code expected to be adopted in 2015. Substantial subsidiary legislation has been adopted during the period of the first Forestry Development Strategic Plan for 2000–2015, including 58 resolutions of the Council of Ministers and 71 resolutions of the Ministry of Forestry (standards, technical codes of practice).

The principles of sustainable forest management, multipurpose forest management, enhancement of ecosystem services provided by forests and biodiversity conservation are mainstreamed in the

Forest Code and in other forest and environmental protection legislation, for example, the 2007 Decree of the President No. 214 "On selected measures to improve operations in the forestry sector". Accordingly, annual timber logging volumes need to be defined in such manner as to ensure the environmental sustainability of forest use. Important provisions of the Forest Code are that forest management needs to be based on forest management projects (the equivalent of forest management plans) and that, for all forest management projects, as well as their amendments, SEE is required. The Forest Code also covers the transfer of forest land into other categories, forest inventory and maintenance of the State Forest Cadastre, the auction system for forest use and lease, forest use in protected areas and public participation.

The 2001 Resolution of the Council of Ministers No. 1031 describes the terms and procedures for submission by legal entities engaged in forestry of documentation for inclusion in the State Forest Cadastre, as well as procedures for verification of data by territorial bodies of the Ministry.

Since 2005, a number of new national standards and TCPs regulating forestry and forest management have been adopted. Many of them refer to observance of environmental protection requirements in forestry and the principles of sustainable forest management (e.g. TCP 026-2006 (02080) "Sustainable Forest Management and Use. Sanitary Rules in the Forests of the Republic of Belarus"; TCP 047-2009 (02080) "Sustainable Forest Management and Use. Instructions on Reforestation and Afforestation in the Republic of Belarus"; TCP 143-2008 (02080) "Rules for Forest Fellings in the Republic of Belarus"; and TCP 228-2009 (02080) "Rules for Protection of Forest from Pests and Diseases").

New standards were introduced, including STB 1708-2006 on basic provisions of sustainable forest management and use, STB 1625-2006 on secondary forest uses, STB 1627-2006 on requirements for forest roads and STB 1715-2007 on forest management in forests used for recreation.

The collection of non-timber forest products is regulated by the "Rules for harvesting secondary forest resources and secondary forest use", approved by the 2011 Resolution of the Ministry of Forestry No. 4, and "Rules of tree sap harvesting, harvesting (procurement) of wild plants and (or) their parts", approved by the 2005 Resolution of the Ministry of Natural Resources and Environmental Protection and the Ministry of Forestry No. 37/36.

The 2004 Resolution of the Chief State Sanitary Officer No. 152 approved the hygienic standard 2.6.1.8-10-2004, which refers to allowable concentration of cesium-137 in medicinal and technical row materials.

Policy framework

Forestry Development Strategic Plans

The key policy document for the forest sector is the Forestry Development Strategic Plan, which provides the guiding principles for the sector and is the basis for the drafting of relevant documents and programmes. The first Plan covered the period 2000–2015. The document is comprehensive and technically detailed; however, it is said to have been developed with limited consultation.

Although never officially adopted by the Government, its provisions have been largely followed and implemented. The Plan was implemented through five-year government programmes of forest sector development, with funding from the state budget and FEs' income from sale of forest products. Important accomplishments of the Plan include the update of the Forest Code, development and maintenance of the State Forest Cadastre and forest monitoring system, development of the national forest certification system according to PEFC and FSC requirements, introduction of competitive timber sales methods, and establishment of a centralized fund for the construction of forest roads.

Over recent years, there have been efforts to integrate environmental and biodiversity considerations in the forestry sector, which, according to experts, have to some extent been successful. However, not all measures proposed in the Plan have been fully implemented and some areas for further action include the formulation of long-term integrated strategies that clearly address forestry in relation to biodiversity and specially protected natural areas.

The second proposed Strategic Plan covers the period 2015–2030. Its main purpose is the creation of a highly productive and sustainable forestry sector and the conservation of biological and landscape diversity in forests, while contributing to the green economy and tackling climate change impacts. The plan emphasises the strategic importance of the forestry sector and promotes the principles of sustainable forest management, while giving directions for enhancing forest productivity, strengthening multipurpose forest management, improving efficiency in the use of forest resources, protecting

forests' ecological functions and mitigating climate change impacts. It also defines the long-term objectives to strengthen the resources, technology and human resource potential of the sector, the development of ecotourism, forest services and international cooperation.

The preparation of the second Forestry Development Strategic Plan was more participatory, although it involved mainly professional forestry and academic communities. According to NGOs and international organizations, it lacked active participation of the private sector, local communities, and NGOs.

Other strategic documents

The State Forestry Development Programme for 2011–2015, approved by the 2010 Resolution of the Council of Ministers No. 1626, replaces the State Forestry Development Programme for 2007–2011. The objectives of the Programme include modernization of forestry production through introduction of new equipment and new information technologies; enhanced technical equipment of the State Forest Service; development of secondary forest use, hunting tourism and ecotourism; and application of economically and environmentally efficient technologies for utilization of wood residues. The Programme includes a list of activities as well as describes the financial requirements for implementation.

The Programme of Construction of Forest Roads in 2011–2015, approved by the 2010 Resolution of the Council of Ministers No. 1046, details the lengths of roads to be constructed by each of the state forestry production associations under the Ministry of Forestry and by the Affairs Management Department of the President, and provides the amounts of financial resources allocated for these purposes. The Programme envisages that, in all, 286 billion roubles will be needed to construct 750 km of roads in 2011–2015.

The Programme for Development of Forest Nurseries in Organizations of the Ministry of Forestry in 2010–2015, approved by the Minister of Forestry in 2010, provides for the development of 15 new and reconstruction of 26 existing permanent nurseries, as well as the reduction in the number (and areas) of temporary nurseries from 98 (75.5 ha) in 2009 to 14 (28.8 ha) in 2015. It also envisages measures to increase soil fertility in nurseries, expand greenhouses for cultivation of planting stock in nurseries, increase the cultivation of ball-routed planting stock and construct irrigation systems in nurseries.

As of mid-2014, 97 ha of new irrigation systems were built, greenhouses covering an area of 8.5 ha were commissioned to produce seeds and annual investments in nursery development amounted to not less than 8 billion roubles. Revenues from nursery farming increased from 11.1 billion roubles in 2011 to 24.5 billion roubles in 2013.

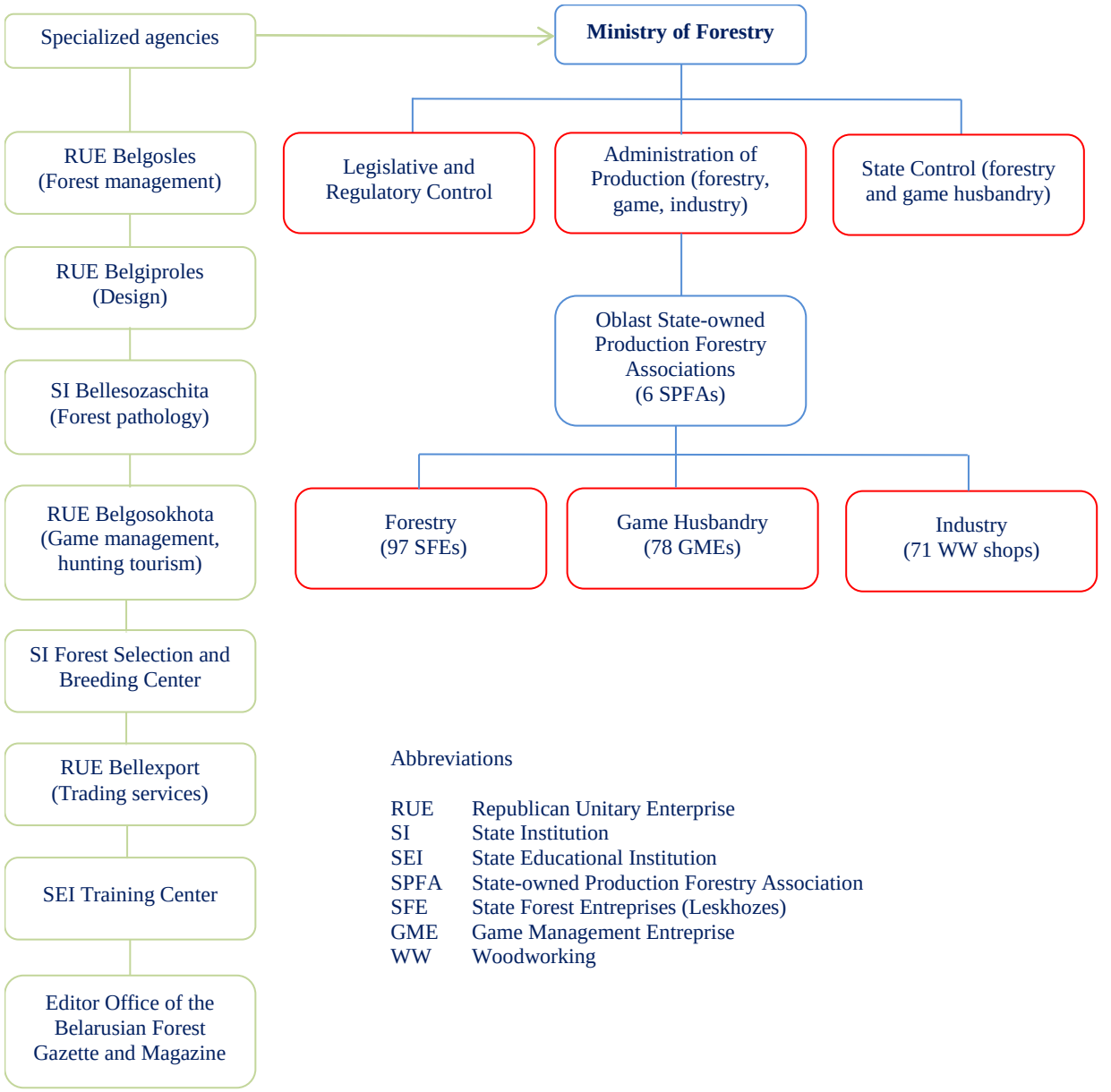
The national efforts for climate change mitigation – with a budget of 88,676 million roubles – are captured in the State Programme of Measures to Mitigate the Effects of Climate Change for 2013–2020, approved by the 2013 Resolution of the Council of Ministers No. 510. The Programme provides for energy and resource conservation, expansion of forest ecosystems and restoration of peat land swamps to act as a carbon sink. A targeted national strategy on adaptation of forestry to climate change by 2050 is currently being prepared.

Institutional framework

The forest administration presents a centralized structure. The regulatory function, leading to the formulation of forest policy and legislation; the supervisory (control) function, involving compliance assurance and enforcement; the support function to forest users in terms, for instance, of financial support and research services; and the management of state-owned forest resources, are all concentrated in the Ministry of Forestry (figure 10.5). While such a centralized structure allows for effective strategic planning for the sector as well as implementation and monitoring of such plans, there is a potential conflict of interest with the same body setting the rules, implementing them and monitoring compliance.

Some of these functions (e.g. control, financial support and management functions) are mirrored at the local level by six (one per oblast) state forestry production associations (GPLHOs) and 97 FEs, which are responsible for the allocation of forest use rights. In 2014, the State Forest Protection Service under the Ministry of Forestry employed 13,535 people. In 2014, 7,004 field checks, including 1,850 field checks jointly with other organizations, were performed by the State Forest Protection Service under the Ministry of Forestry.

Figure 10.5: Organizational chart of the Ministry of Forestry and subsidiary institutions



Source: Ministry of Forestry, 2015.

The Bellesbumprom concern – the national forest industry consortium – is a non-profit organization that reports to the Council of Ministers. The concern brings together 46 enterprises that perform wood harvesting, processing and trade. The activity of the concern can be grouped into three main sectors: the logging industry, the pulp and paper industry, and wood processing and furniture production. Nearly four million m^3 of timber are processed currently in the concern's factories and mills; it is the largest single consumer of timber in the country. Despite the effort to outsource forest products and non-forest-products harvesting, only a limited share is undertaken by private companies (e.g. 13 per cent of forest products harvesting).

The Ministry of Natural Resources and Environmental Protection is in charge of state policy, public administration and state control on environmental protection and rational use of natural resources. It organizes SEE of forest management projects. It maintains the Red Book and approves the management plans for populations of wild animals and plants included in the Red Book, as well as species covered by international agreements to which Belarus is a Party. The decisions on lease of the forest fund and on allowable cut are to be agreed with the Ministry of Natural Resources and Environmental Protection.

Regulatory and economic instruments

Timber sales at the domestic market are regulated by Decrees of the President (2007 Decree No. 214, 2012 Decree No. 504, 2014 Decree No. 329 and 2015 Decree No. 211). These decrees foresee the following timber sales methods:

- Competitive auctions on the Belarusian Universal Commodity Exchange, with an electronic auction system open to both national and international buyers;
- Stumpage fees determined by the Government, according to Resolutions of the Council of Ministers (e.g. 2013 Resolution No. 1129 "On the determination of the taxes on sales of standing timber in 2014").

The Ministry of Forestry coordinates all timber sales on the domestic market. Timber is sold at stumpage prices to FEs for subsequent sale of cut timber at auctions, to a number of other budget organizations mainly for own consumption, and to legal entities and private persons for harvesting fuel wood. Stumpage fees are based on species, quality and distance to the point of transportation. In principle, stumpage prices are set to recover the costs of resources used for timber production. In 2014, stumpage fees rose within a range of 11.5–28.8 per cent compared with fees for 2013. The highest stumpage fee per m^3 for 2014 was set for curly birch (4.111 million roubles, or some €250); oak, ash and maple trees were priced at 685,220 roubles (€42.40) and pine and larch trees were available for 198,210 roubles (€12.30). Fees have also been raised to compensate for the depreciation of the national currency on the foreign exchange markets.

In 2013, about 65 per cent of standing timber was sold through the auction system; the amount auctioned had reached about 70 per cent in 2011, 81 per cent in 2010 and 84 per cent in 2009. The rest was sold at stumpage values, mainly to FEs and Bellesbumprom concern (20 per cent in 2013) and other budget organizations (15 per cent in 2013). The price of roundwood sold by auction is, on average, 30–50 per cent higher than that of roundwood sold through contracts outside this competitive system. However, data on timber sales are not immediately and fully available. Such a system gives FEs an advantage on the private sector wood processing companies, as they are provided with a cheaper and guaranteed continuity of supply.

According to experts, such a form of subsidization may have a number of negative effects. For example, it discourages the efficient utilization of forest resources, reduces the financial resources for forest management, and can cause the misallocation of investment funds as the economic benefits of investing in forestry are reduced by lower revenues. An additional problem associated with the sale of standing timber is the incorrect evaluation of the harvested timber and poor recording and monitoring of harvesting and removals. The current timber sale methods do not give equal access to forest resources to all sectors, due to the existing competitive auction system and to the lack of availability of the results of all timber sales.

Participation in forestry-related international agreements and processes

Belarus is actively involved in international cooperation on forestry. In the context of "Forest Europe", the Ministerial Conference on the Protection of Forests in Europe, the Ministry of Forestry regularly takes part in expert meetings on the preparations for the Ministerial Conferences and contributes to the work on Pan-European Indicators for Sustainable Forest Management and the State of Europe's Forests Report.

The Ministry of Forestry is also an active participant in the United Nations Forum on Forests (UNFF) that meets every two years at United Nations Headquarters in New York. It contributes to the work of the UNFF group of experts and reports on the implementation of the International Arrangement on Forests (IAF). The Ministry of Forestry regularly reports to the UN Food and Agriculture Organization (FAO) Forest Resource Assessment (FRA) programme and to the ECE/FAO Forests in the ECE Region Report on trends and challenges in achieving the Global Objectives in Forests (GOF).

Belarus is a Party to United Nations Framework Convention on Climate Change (UNFCCC). Accordingly, its National Communications to UNFCCC, prepared under the leadership of the Ministry of Natural Resources and Environmental Protection, have to include an assessment of climate change impacts on forestry, and the assessment of forests' vulnerability and measures for forestry adaptation. In 2015, Belarus submitted its sixth National Communication.

In order to develop bilateral relations on forestry, international agreements have been concluded with the forestry authorities of the Czech Republic, Estonia, Finland, Kazakhstan, Latvia, Lithuania, Poland, the Russian Federation, Slovakia, Sweden and Ukraine.

10.6 Conclusions and recommendations

Over recent decades, forest rehabilitation and restoration have been very successful in quantitative terms. But these practices created uneven age structure and species composition in re-established forests. As a result, Belarusian forests are relatively young and without the full genetic stock of old growth forest systems. Young, low diversity forests tend to be less resistant to pests and diseases as well as climate change. To maintain the long-term resilience and biodiversity of the forest ecosystem, the ecological benefits of forests are not adequately balanced against commercial and recreation interests to achieve conservation goals, especially those related to clear-cutting patterns and the age limit of harvested species.

Recommendation 10.1:
The Ministry of Forestry should ensure a proper, science-based balancing of the ecological, economic and recreation functions of forests to achieve conservation goals, especially those related to clear-cutting patterns, the age limit of harvested species and species composition of reforested and afforested areas.

The preparation of the second Forestry Development Strategic Plan (2015–2030) and the ongoing revision of the Forest Code were characterized by a wider consultation process than in the past. Still, the formulation of these key documents for the forestry sector mainly involved institutional actors, and professional forestry and academic communities, and lacked active participation of the private sector, local communities and civil society organizations. Also, the consideration of cross-sectoral aspects such as biodiversity conservation and climate change was insufficient and a monitoring system for the Forestry Development Strategic Plan's implementation is not yet defined.

Recommendation 10.2:
When formulating policy and legal documents for the forestry sector, the Government should:

(a) Undertake a wide consultation process based on a stakeholder analysis;
(b) Take into account cross-sectoral issues, such as biodiversity conservation and climate change;
(c) Set up an effective and transparent monitoring process to ensure implementation.

At present, the economic potential of forests is not fully exploited, and there is large scope for development in terms of increased harvesting on a sustainable basis and processing for export as well as for domestic consumption. The status of the forestry industry has been at the centre of political debate in recent years, as it is considered rather underdeveloped given the vastness of the resources. Production facilities are outdated and limited investments have been undertaken to upgrade harvesting and production technology. At the same time, private sector engagement in timber and non-timber forest products harvesting and processing and other entrepreneurial activities related to reforestation and nurseries is still marginal.

Recommendation 10.3:
The Government should consider developing a road map to strengthen the economic potential of forests, enhance the role of the private sector in the management and use of forest resources, and improve framework conditions for investors.

The actual timber regulation system results in unequal access to forest resources and advantages FEs over private sector wood processing companies, as they are provided with a cheaper and guaranteed continuity of supply. According to experts, such a form of subsidization may discourage the efficient utilization of forest resources, reduce the financial resources for forest management and cause the misallocation of investment funds. An additional problem is the incorrect evaluation of the harvested timber and poor recording and monitoring of harvesting and removals.

Recommendation 10.4:
The Government should consider reforming the timber sale method in order to set up a fair, competitive and transparent system.

Low forest road density can have a negative impact on sustainable management of forests, as it can cause an overexploitation of forests close to existing roads, with associated negative environmental impacts, can reduce forest productivity in such areas, and can increase the costs of harvesting in the long term. Belarus has an average forest road density which is low compared with the European average, and it is estimated that about 80 per cent of the forest roads managed by the Ministry of Forestry require repair works.

Despite efforts in recent years, mainly related to implementation of the Programme of Construction of Forest Roads in 2011–2015, the enhancement of the forest road network still remains a priority in the country. Current efforts to enhance the forest road networks are not based on multifunctional

construction principles and do not give due consideration to soil erosion, habitat loss and natural landscape impacts.

Recommendation 10.5:
The Ministry of Forestry should enhance the country's forest road network based on multifunctional construction principles, paying due consideration to potential environmental impacts, including soil erosion, habitat loss and natural landscape impacts.

Chapter 11

TOURISM AND ENVIRONMENT

11.1 Tourism potential

Definitions

According to the 1999 Law on Tourism, a tourist is an individual who makes a tourist journey for a period exceeding 24 hours or one who has at least one overnight stay in the country in a place of temporary residence. A visitor is an individual who makes a journey without an overnight stay.

Ecotourism

Belarus has one reserve, four national parks, 96 preserves of republican importance and 267 of local significance, and 319 natural monuments of republican importance and 567 – of local importance (table I.2). The international status of a Ramsar site has been awarded to 16 specially protected territories of Belarus.

Eco-festivals have recently been gaining popularity in Belarus. They combine the beauty of nature, rich historical heritage and original folk traditions (box 11.1). The country has many interesting places that ecotourists can study and enjoy, for example:

- The biological reserve Sporovsky – Belarus' first Ramsar site and the home ground of the national scything championship;
- The landscape reserve Olmany Mires, Europe's largest one-piece forest and lowland complex that is included in the Ramsar List;
- The biological reserve Zvanets, the largest lowland with mineral islands, home to 110 bird species, including 21 from the Red Book List of Endangered Species;
- The reserve Yelnya, one of the biggest arrays of ancient glacial lakes and bogs in Central and Western Europe;
- The reserve Middle Pripyat (the flood bed of the famous Polessye River is often referred to as the European Amazonia);
- National Park "Braslav Lakes" (box 11.2);
- National Park "Narochansky" (box 11.3).

Hunting tourism

Since 2005, Belarus has become a destination for hunt lovers from abroad. Hunting companies typically offer three days of hunting for around €1,000. The price usually includes permission to bring one's own firearm, accommodation and meals, a hunting licence, transport from the airport to the hunting spot, an interpreter and accompanying support. As for animals, hunters can choose between big game, such as European bison (prices starting from €10,000), elk (€700–4,500), red deer (€700–3,500) or wild boar (€100–600). The prices depend on the animal's size, horns and other specific factors. Alternatively, one can go for small game ranging from €10 for partridge, waterfowl or woodcock, to capercaillie for €500.

Within the country, not all citizens are ready to pay these kinds of prices. Poaching remains a widespread activity for many Belarusians, especially in rural areas. In 2013, 1,000 rifles, 300 km of fishing net, and dozens of tons of meat and fish were seized from poachers.

Religious tourism

Belarus is located at the crossroads of cultures and faiths. Therefore, here one can find numerous ancient churches, convents and monasteries, synagogues, mosques and wooden temples of Old Believers. A number of religions and architectural styles have intertwined in Belarus to give rise to a unique architectural style. Many local temples are one of a kind. Some of them are included in Belarus's Tentative List, meaning that the country intends to consider them for nomination to UNESCO's World Heritage List:

- Saviour Transfiguration Church and St. Sophia Cathedral in the town of Polotsk;
- SS. Boris and Gleb (Kalozha) Church in the city of Grodno;
- Edifices for Worship of Fortress Type in Belarus;
- Worship wooden architecture (seventeenth to eighteenth centuries) in Polessye.

One of the objectives accomplished under the 2003 agreement between the State and the Church is the revival of religious tourism in the country. There are three forms of religious tourism: pilgrimage, religious tours and special tours for both pilgrims and sightseers. Religious tours include visiting religious sites, objects of worship, museums and exhibitions.

Box 11.1: Eco-festivals and feasts

Cranes and Cranberries of the Miory Region eco-festival
Every September one of Europe's biggest high moors, Yelnya in Miory Rayon (Vitebsk Oblast), is a transit stop for 5,000 to 7,000 grey cranes.

Festival of Sandpipers in Turov
The biological reserve Turov Meadow in Zhitkovichi Rayon is a unique place in terms of the number and species of birds (including those from the endangered-species list) that nest and spend the migration season on the Pripyat River. Sandpipers that gave the name to the festival and that have a bronze monument erected in their honour in Turov can be found in large quantities on the local islands.

Countryside tourism festival Zaborsky Fest
This farm and ecotourism festival is a trademark of Rossony Rayon, Vitebsk Oblast, where there is one lake per 100 residents. The festival features presentations of ecotourism farms, flower and landscape design exhibitions, excursions to the reserve Krasny Bor, boat trips and whitewater rafting.

Festival of ethnic and cultural traditions Zov Polesia
The festival is held once every two years in the agro-town of Lyaskovichi on the territory of the Pripyatsky National Park. The participants present the original culture of the Belarusian Polessye. Apart from concerts, the programme of the festival includes fishing competitions, races in traditional Polessye boats and special expos, including in the Museum of Nature.

Source: http://www.belarus.by/en/travel/ecotourism-in-belarus. Accessed on 7 April 2015.

Box 11.2: The National Park "Braslav Lakes"

The National Park "Braslav Lakes" is situated in the north-west of Belarus, 250 km from Minsk. It covers an area of 70,000 ha. The park includes 73 lakes, of which the largest group, of 31 lakes, are the Braslav Lakes. There is no entrance fee for visitors to the National Park.

The park infrastructure includes five Russian spas and 24 tourist campsites. Hunting tours, amateur fishing and about 10 thematic excursions are offered for tourists and visitors. The park can accommodate 142 tourists in its three recreation centres. During the period 2004–2014, 56,584 tourists were accommodated in the centres, including 14,998 foreigners. The total number of overnight stays was 222,407 (the average duration of stay was almost four days). More than 15,000 tourists use camping facilities on the territory of the park each year.

The National Park employs 75 staff for tourism activities. The Park Administration's Tourism, Environmental Education and Information Department offers a range of services for tourists: excursions along the environmental path "Slobodskaya Ozovaya Ridge", "Mount Mayak" and botanical park "Bel'mont"; water trips for three, five and eight days; biking trips; and excursions in the Braslav region.

Source: The National Park "Braslav Lakes" Administration, March 2015.

Box 11.3: The National Park "Narochansky"

The National Park "Narochansky" is located on the territory of the Belarusian Lakeland in the north-west of Belarus. There are 43 lakes, including the largest lake in Belarus, Lake Naroch. About 48 per cent of the park is covered with pine and birch groves. More than 1,400 species of higher plants grow in the park, of which 114 are listed in the Red Book of Belarus, including Belarus's most beautiful orchid, the lady's slipper. Having very rich fauna (more than 20 species of mammals, 218 species of birds and 35 species of fish), the park attracts many hunters and fishermen. The most popular game species include elk, deer, wild boar, roe deer, white and grey hare, fox, wolf, a raccoon-like dog, marten and beaver. Hunting for 27 species of birds is also allowed.

For tourists, the park offers about 30 itineraries, multi-day hiking, biking and water trips. Helicopter trips are available in summer for those who want to enjoy a bird's-eye view of the most beautiful places. Hunting and fishing tours, underwater fishing and diving are also organized in the park. Sixteen campsites are located on the shores of nine lakes. The most interesting eco-itineraries include the Blue Lakes and the Cherevki Peninsula.

Source: http://www.belarus.by/en/about-belarus/natural-history/narochansky-national-park. Accessed on 7 April 2015.

Photo 11.1: Touristic pass in National Park "Narochansky"

Pilgrimage is one of the oldest forms of tourism. There are about 50 pilgrimage sites in Belarus, including holy sites with wonder-working icons (46 per cent of sites), holy springs (30 per cent) and fonts by holy springs (10 per cent). The two most worshipped icons in Belarus are Zhirovichi Icon of the Mother of God (Zhirovichi village, Slonim Rayon, Grodno Oblast) and Budslav Mother of God Icon (Budslav village, Myadel Rayon, Minsk Oblast). An annual celebration of the Icon in Budslav, which takes place on 2 July, is visited by about 35,000 people, the majority of an annual inflow of approximately 50,000 people.

Military and historical tourism

Like other countries in the region, Belarus was a battlefield during the greatest wars in global history. For those who take a close interest in military history, there is a lot to see in Belarus: castles (box 11.4) and temples that held the line in the face of enemies during the Middle Ages, battlefields of the Great Northern and Napoleonic Wars, and a number of places linked to the First and Second World Wars.

Medical tourism

Belarus has been providing health-care services to foreigners for a long time. Foreigners often come to Belarus for complicated surgery or in-hospital treatment. Medical tourism is becoming increasingly popular in Belarus.

The number of foreigners receiving medical services in Belarus increased from just over 100,000 in 2010 to about 160,000 in 2013. People from over 70 countries come to Belarus for medical services. These are mainly citizens of the Russian Federation, Ukraine, Kazakhstan, Azerbaijan, the Republic of Moldova, Georgia, Syria, Germany, Israel, Italy, Cyprus and Yemen.

Gambling industry

The gambling industry started developing in Belarus in 2009 after the Russian Federation introduced a new law which resulted in the closure of most gambling businesses there. In Belarus, as of 1 April 2013, 128 businesses had a gambling licence. There are 35 casinos, 279 slot machine clubs and 156 bookmaker's shops. Gambling spots exist in over 50 localities all over the country, including several rural villages and towns. The greatest number of casinos is in Minsk City (19), Gomel (5), Brest (4), Mogilev (3) and Grodno (2).

In 2012, the gambling business accounted for 238 billion roubles in tax revenues to the budget, or 0.2 per cent of all tax revenues.

Box 11.4: "Belarus of Castles"

On March 26, 2015, the book "Belarus of Castles" was launched. This is the first large-scale book publishing project of the twenty-first century dedicated to architectural monuments in Belarus. The work on the book united leading Belarusian historians and photographers with the purpose of creating a topical chronicle of the castle culture of Belarus.

A large creative team worked on the book: 18 author-historians who chronicled the castles and more than 20 photographers. The publication includes unique authors' photos, cartographical, archival and museum data from regional and foreign sources, historical drawings and engravings. The picture album features 32 rare archival photos of Belarusian castles of the nineteenth and early twentieth centuries from the library of Vilnius University.

The book is based on the list of monuments included in the State Programme "Castles of Belarus" adopted for 2012–2018. The Programme envisages the restoration of 38 castles and palaces. However, it is impossible to specify their exact quantity. According to results of archeological and natural-historical research of the last 50 years and the generalization of data during the preparation of the publication, about 300 Belarusian castles and strongholds built in the fourteenth to eighteenth centuries are recorded. This publication is the first attempt to systematize the data on them according to their current state.

11.2 Development in tourism activities

The national statistics in Belarus does not provide full data on visitors and tourists who come to the country (table 11.1). A huge share is not accounted for as the data do not include crossings of the Russian Federation–Belarus part of the border.

While crossing the border between Belarus and the Russian Federation, the citizens of the two countries do not need to undergo any customs controls or fill in a migration card. The citizens of other countries are obliged to fill in migration cards when first entering either Belarus or the Russian Federation, but can freely cross the border between the two countries later on without any further control. Therefore, if tourists from Ukraine cross the Ukrainian–Belarusian border, they are accounted for in the statistics because they fill in and submit a migration card to the Belarusian authorities. But if they travel from Ukraine to Belarus through the territory of the Russian Federation, they are not counted as tourists in Belarus because they have already filled in and submitted a migration card to the Russian authorities.

At the end of 2014, 1,254 organizations were operating in the tourism sector in Belarus. The number of organizations that are engaged in tourism activities has increased more than threefold since 2005 (table 11.2).

In 2014, more than 934,000 organized tourists and 647,500 people taking excursions used the services provided by the companies that are engaged in tourism activities. In 2014, the number of organized tourist departures from Belarus abroad was 740,514, up 4.5 per cent compared with 2013.

In 2014, there were 79,900 people on organized travel to the CIS countries (37.4 per cent of the 2013 level), and 660,600 to non-CIS countries (33.4 per cent more than in 2013). The most frequently visited foreign countries in 2014 were the Russian Federation, Bulgaria, Greece, Egypt, Spain, Italy, Lithuania, Poland, Turkey and the Czech Republic. These countries accounted for 82.7 per cent of the total number of organized tourists travelling abroad.

The number of organized tourists travelling abroad still outstripped the number of visitors to Belarus. In 2014, five Belarusian citizens travelled abroad (six in 2005) for each visit of a foreign tourist to Belarus.

The number of organized visits was 137,444 in 2014, 0.5 per cent more than in 2013. There were 115,600 visits from the CIS countries (up 1.3 per cent over 2013). In terms of organized tourists from the CIS countries, the Russian Federation continued to lead, with 113,200 visits (up 1.7 per cent compared with 2013), followed by Ukraine, with 1,800 visits (down 10.3 per cent compared with 2013).

Among the non-CIS countries, the largest number of visitors came to Belarus from Germany, Italy, Latvia, Lithuania, Poland, the United Kingdom and Turkey. In 2014, these countries made up 48.3 per cent of all tourist arrivals from non-CIS countries (56.4 per cent in 2013). The average duration of stay of foreign tourists in Belarus in 2014, as in 2013, was four days.

Collective accommodation facilities

The total number of collective accommodation facilities increased by more than 60 per cent in the period 2005–2014 (table 11.3). Although the increase in total room capacity (35 per cent) was more modest, the number of guests who used the facilities increased during the same period by 32 per cent. This

increase was achieved due to a higher number of foreign citizens (253,000 in 2005 and 966,200 in 2013) (table 11.4).

However, the total number of overnight stays provided by collective accommodation facilities decreased slightly, from 13.647 million in 2005 to 13.475 million in 2014. This trend is explained by a shorter average stay in collective accommodation facilities per guest: seven days in 2005 and five days in 2014. Belarus is not special in this regard: there is a global trend in such tourist behaviour. Nowadays, tourists prefer to do more trips but with a shorter stay in one place.

All collective accommodation facilities can be divided into two large groups: (i) hotels and similar accommodation facilities, and (ii) sanatoria, health resorts and health improvement organizations and other specialized accommodation facilities (tables 11.5 and 11.6). Although the number of facilities in these groups in 2013 was quite comparable (481 in the first group and 464 in the second), their performance differed.

The first group had fewer rooms but accommodated more guests. The second group demonstrated the opposite: more rooms but fewer guests (tables 11.5, 11.6 and 11.7). This phenomenon has a simple explanation: people tend to stay longer in sanatoria, health resorts and health improvement organizations and other specialized accommodation facilities.

Developments in 2014

In 2014, the services of hotels and similar accommodation facilities were provided by 331 hotels, 37 hotel complexes, seven tourist and hotel complexes, four motels and 151 accommodation facilities of other types. Their capacity at the end of 2014 was 35,400 beds. The average occupancy rate of these accommodation facilities in 2014 was 34 per cent, a decline of 7 percentage points compared with 2013.

According to their quality, 54 hotels and hotel complexes (14.4 per cent of their total number) have received the 1- to 5-star categories according to GOST 28681.4-95 “Tourist and excursion service. Classification of hotels”. Of the total number of hotels and hotel complexes so categorized, 24 are located in the city of Minsk.

Table 11.1: Statistics on visitors and tourists in Belarus, 2005, 2009–2014

	Number of visits, thousand		Number of tourists *)	
	Inbound to Belarus	**Outbound from Belarus**	**Inbound to Belarus**	**Outbound from Belarus**
2005	4 737.8	6 596.3	90 811	572 398
2009	4 871.8	6 439.8	95 463	316 322
2010	5 673.8	7 464.2	120 073	414 735
2011	5 877.2	7 541.6	116 049	319 795
2012	6 127.5	8 426.7	118 749	492 846
2013	6 240.4	8 840.8	136 821	708 376
2014	..	..	137 444	740 514

Source: Tourism and Tourist Resources in the Republic of Belarus 2009–2013, Statistical book, National Statistical Committee, 2014; website of the National Statistical Committee, 2015.
Notes: Data do not include crossings of the Russian Federation–Belarus part of the border nor arrivals and departures for permanent residence.
* Only tourists who used the services of official tour operators.

Table 11.2: Organizations engaged in tourism activities, 2005, 2009–2014

	2005	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**
Organizations, total	**402**	**720**	**783**	**791**	**958**	**1 085**	**1 254**
of which operating as:							
tour operators	69	82	97	100	130	142	160
travel agents	93	145	188	225	273	387	519
tour operators and travel agents	240	493	498	466	555	556	575

Source: Tourism and Tourist Resources in the Republic of Belarus 2009–2013, Statistical book, National Statistical Committee, 2014; website of the National Statistical Committee, 2015.

Table 11.3: Main performance indicators of collective accommodation facilities, 2005, 2009–2014

	Total collective accommodation facilities	Total room capacity, rooms at year-end	Number of guests accommodated, thous.	Number of overnight stays provided by collective accommodation facilities, thous.
2005	600	28 264	1 954.7	13 647.1
2009	655	31 168	2 148.5	12 490.5
2010	693	31 905	2 342.4	13 018.2
2011	865	33 689	2 551.3	13 592.1
2012	919	33 707	2 668.9	13 798.2
2013	945	35 067	2 638.6	13 658.2
2014	996	38 127	2 586.8	13 474.5

Source: Tourism and Tourist Resources in the Republic of Belarus 2009–2013, Statistical book, National Statistical Committee, 2014; website of the National Statistical Committee, 2015.

Table 11.4: Guests accommodated in collective accommodation facilities, 2005, 2009–2014, thousand

	2005	2009	2010	2011	2012	2013	2014
Guests, total	**1 954.7**	**2 148.5**	**2 342.4**	**2 551.3**	**2 668.9**	**2 638.6**	**2 586.8**
of which:							
nationals of Belarus	1 701.7	1 636.8	1 665.9	1 768.4	1 714.0	1 672.3	1 641.0
foreign nationals	253.0	511.7	676.5	782.8	954.8	966.2	972.8
of which from:							
CIS countries	154.0	363.8	516.2	621.1	781.5	788.2	780.2
non-CIS countries	99.0	147.9	160.3	161.7	173.3	178.0	192.6

Source: Tourism and Tourist Resources in the Republic of Belarus 2009–2013, Statistical book, National Statistical Committee, 2014; website of the National Statistical Committee, 2015.

Table 11.5: Main indicators of hotels and similar accommodation facilities, 2005, 2009–2014

	Number of hotels and similar accommodation facilities	Number of rooms at year-end	Accommodation capacity at year-end, bed/ places	Number of guests accommodated, thous.	Average room occupancy, percent
2005	279	12 946	23 504	1 330.0	45.0
2009	331	14 591	25 689	1 482.4	46.0
2010	359	15 200	26 673	1 631.8	45.0
2011	444	15 907	28 957	1 738.0	41.0
2012	471	15 786	28 452	1 824.4	43.0
2013	481	16 613	29 908	1 805.1	41.0
2014	530	19 545	35 424	1 739.4	34.0

Source: Tourism and Tourist Resources in the Republic of Belarus 2009–2013, Statistical book, National Statistical Committee, 2014; website of the National Statistical Committee, 2015.

In 2014, 1,739,400 guests were accommodated in hotels and similar accommodation facilities, 3.6 per cent fewer than in 2013. Of total guests, 997,900 were citizens of Belarus (6.3 per cent fewer than in 2013), and 741,500 were foreign citizens (0.2 per cent more), including 559,800 guests from the CIS countries (down by 1.9 per cent).

Among the CIS citizens who used the services of hotels and similar accommodation facilities in Belarus, the majority were from the Russian Federation and Ukraine. Their share in the total number of foreign guests accommodated was 71.7 per cent. Among the guests from non-CIS countries, 52.9 per cent were from China, Georgia, Germany, Italy, Latvia, Lithuania and Poland.

Table 11.6: Sanatoria, health resorts and health improvement organizations and other specialized accommodation facilities by type, 2005, 2009–2014

	2005	2009	2010	2011	2012	2013	2014
Total organisations	**321**	**324**	**334**	**421**	**448**	**464**	**466**
of which:							
Sanatoria	39	67	67	73	74	74	74
Children's rehabilitation and health-improvement centres	10	13	13	13	13	13	12
Recreation camps, recreation houses and holiday hotels	100	92	89	97	100	103	97
Tourist and health-improvement complexes	8	6	6	6	5	5	5
Tourist camps	7	8	12	19	17	18	20
Other specialized accommodation facilities	157	138	147	213	239	251	258

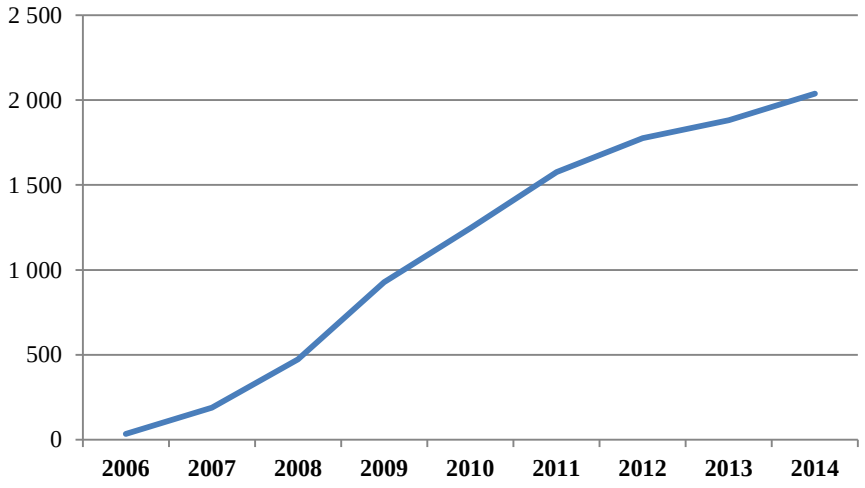
Source: Tourism and Tourist Resources in the Republic of Belarus 2009–2013, Statistical book, National Statistical Committee, 2014; website of the National Statistical Committee, 2015.

Table 11.7: Guests accommodated in sanatorium, health resort and health-improvement organizations and other specialized accommodation facilities, 2005, 2009–2013, thousand

	2005	2009	2010	2011	2012	2013
Total organisations	**624.7**	**666.1**	**710.6**	**813.3**	**844.4**	**833.4**
of which:						
Sanatoria	206.7	352.7	380.3	406.4	426.5	420.2
Children's rehabilitation and health-improvement centres	44.7	72.3	76.7	74.9	75.8	71.7
Recreation camps, recreation houses and holiday hotels	72.6	86.4	94.8	101.6	109.3	94.8
Tourist and health-improvement complexes	31.1	31.8	27.1	23.6	17.5	17.1
Tourist camps	9.5	18.1	18.0	22.3	21.5	24.4
Other specialized accommodation facilities	260.1	104.8	113.7	184.5	193.8	205.4

Source: Tourism and Tourist Resources in the Republic of Belarus 2009–2013, Statistical book, National Statistical Committee, 2014.

Figure 11.1: Number of agri-ecotourism entities, 2006–2014



Source: Tourism and Tourist Resources in the Republic of Belarus 2009–2013, Statistical book, National Statistical Committee, 2014; website of the National Statistical Committee, 2015.

In 2014, 466 sanatoria, health resorts and health improvement facilities were functioning in Belarus, including 74 sanatoria, 94 recreation camps, 20 tourist camps, 19 health improvement centres (complexes), 12 children's rehabilitation and health improvement centres, five tourism and health improvement complexes, two vacation houses and one boarding house (table 11.6). In 2014, 847,400

guests were accommodated in sanatoria, health resorts and health improvement facilities, 13,900 more than in 2013. Foreign citizens made up 27.3 per cent of guests (2.2 per cent more than in 2013) (table 11.7).

Agri-ecotourism facilities

At the end of 2014, there were 2,037 agri-ecotourism entities in Belarus (figure 11.1), including 541 in Minsk Oblast, 502 in Vitebsk Oblast, 296 in Brest Oblast, 281 in Grodno Oblast, 228 in Gomel Oblast and 189 in Mogilev Oblast (table 11.8). The overall growth of agri-ecotourism entities looks impressive: from 34 entities in 2006 to 2,037 in 2014 (a sixty-times increase).

However, Gomel Oblast was the only one in the country that has experienced a negative dynamic, with 61 fewer entities in 2014 than in 2013. In 2014, 1,424 of 2,037 registered agri-ecotourism facilities carried out activities.

Table 11.8: Number of agri-ecotourism entities by oblast, 2013–2014

Oblast	2013	2014	Change
Brest	253	296	43
Gomel	289	228	- 61
Grodno	246	281	35
Minsk	482	541	59
Mogilev	162	189	27
Vitebsk	449	502	53
Total	**1 881**	**2 037**	**156**

Source: Ministry of Sport and Tourism, 2015.

The number of tourists who used agri-ecotourism services in 2014 was 318,842 (table 11.9), 17.3 per cent more than in 2013. Residents of Belarus made up 86.9 per cent of total agri-ecotourists. The average duration of a tourist stay in an agri-ecotourism facility was four days.

The shortest duration of stay is observed in Grodno and Gomel Oblasts (2.2 and 2.7 days respectively). The longest duration of stay is observed in Mogilev and Brest Oblasts (4.9 and 4.5 days).

Economy and employment of the travel and tourism sector

Contribution of the travel and tourism sector to GDP

The direct contribution of travel and tourism to GDP in 2013 was 1.8 per cent of GDP (10,876.7 billion roubles or US$1.219 billion). In 2014, it reached 14,239.3 billion roubles or US$1,376 billion (1.9 per cent of GDP). It is expected to rise by 1.1 per cent to 14,394.8 billion roubles in 2015. This primarily reflects the economic activity generated by industries such as hotels, travel agents, airlines and other passenger transportation services (excluding commuter services). But it also includes, for example, the activities of the restaurant and leisure industries directly supported by tourists.

The total contribution of travel and tourism to GDP (including wider effects from investment, the supply chain and induced income impacts) was 34,686.4 billion roubles in 2013 (5.9 per cent of GDP). In 2014, it reached 45,905.9 billion roubles (6.0 per cent of GDP) and is expected to grow by 1.1 per cent to 46,399.5 billion roubles (6.0 per cent of GDP) in 2015.

The share of the export of tourism services in the total export of services was 3.5 per cent in 2014. The total export of services amounted to US$7,112.9 million. In 2014, the balance of external trade in tourism services amounted to US$199.0 million (in 2010, it was US$105.2 million).

Contribution to employment

Travel and tourism generated 74,500 jobs directly in 2013 and 77,000 in 2014. These figures correspond to 1.7 per cent of total employment. The number is forecast to fall by 0.3 per cent in 2015 to 76,500. This includes employment by hotels, travel agents, airlines and other passenger transportation services (excluding commuter services). It also includes, for example, the activities of the restaurant and leisure industries directly supported by tourists.

The total contribution of travel and tourism to employment (including wider effects from investment, the supply chain and induced income impacts) was 235,500 jobs in 2013 (5.1 per cent of total employment) and 245,000 jobs in 2014 (5.4 per cent of total employment). This is forecast to fall by 0.5 per cent in 2015 to 243,500 jobs (5.4 per cent of total employment).

Tourism promotion

Every year, there is a certain leading focus in tourism development in Belarus. For example, 2012 was nominated as the Year of Cultural Tourism, 2013 the Year of Green Tourism, 2014 the Year of the World Hockey Championship and 2015 the Year of Youth Tourism.

Photo 11.2: Agrofarm "Bee World", Volozhinskiy rayon, Minsk Oblast

Table 11.9: Main indicators of agri-ecotourism entities, 2009–2014

	2009	2010	2011	2012	2013	2014
Number of rural ecotourism entities	927	1 247	1 576	1 775	1 881	2 037
Tourists accommodated by rural ecotourism entities	70 001	119 214	144 851	222 566	271 716	318 842
of which:						
residents of Belarus	65 256	108 528	123 435	184 093	234 532	276 995
non-residents	4 745	10 686	21 416	38 473	37 184	41 847
Average duration of stay, days	3	3	7	4	5	4

Source: Tourism and Tourist Resources in the Republic of Belarus 2009–2013, Statistical book, National Statistical Committee, 2014; website of the National Statistical Committee, 2015.

The 2014 World Hockey Championship played an important role in tourism development in the country. In May 2014, in Minsk alone, the volume of excursion services and museum attendance increased threefold. The average hotel room occupancy rate reached 82 per cent (96 per cent in the peak period).

11.3 Pressures from tourism

There is no information available on pressures from tourism and tourist infrastructure on the environment in Belarus. There are no data or estimates of energy and resource use in tourism in the country. Most (about 90 per cent) of the energy consumption related to tourism is required for travel to and from destinations, while the rest occurs at the destination itself. A close look at energy consumption at destination reveals that the largest share of energy demand is related to accommodation, that is, the hotel industry. The dominant energy form used by hotels is electricity (for heating/cooling, lighting, refrigerators and coolers, lifts, escalators), followed by a much smaller share of liquid fuels and natural gas or coal (for cooking and water heating).

There are no estimates of the volume of GHG emissions from the tourism sector and there are no data or estimates of pressures from tourism on water resources in Belarus. Data on water consumption by tourists are not collected.

Table 11.10 contains rough estimates of the direct and total water consumption, CO_2 emission and solid waste generation in the tourist sector in Belarus. The

following indicators were used to form these estimates:

- Average daily water consumption by a tourist – 150 l;
- Direct and indirect water use per tourist – 2 m^3 per day;
- Solid waste generation per tourist – 2 kg per day;
- Average daily CO_2 emission caused by a tourist – 15.6 kg;
- Average daily direct and indirect electricity consumption per tourist – 10 kWh.

However, table 11.10 does not reveal the full picture, as it includes only data on overnight stays by tourists that is covered by the official statistics.

All major potential environmental risks from tourism are listed in table 11.11.

In order to correctly assess the impact of foreign tourists on the environment in Belarus (water used and wastewater discharged, electricity used, waste generated, etc.) it is necessary to subtract the number of overnight stays of Belarusian citizens abroad from the number of overnight stays of foreigners in Belarus. The reason for this is that, when a Belarusian citizen spends time abroad as a tourist, he or she does not consume resources in Belarus and put pressure on its environment.

Although the recreation potential of preserves (zakazniki) is used at only one third of its full capacity, some areas face exceedances of the allowable recreational pressure by 1.5 to three times. This issue is particularly acute in Svitiazanskyi and Ozery preserves.

11.4 Legal, policy and institutional framework

Legal framework

Law on Tourism

The 1999 Law on Tourism has some environmental provisions, namely:

- The tourist resources protection regime and its use, taking into account the norms of allowable anthropogenic pressure on the environment, is defined in accordance with legislation;
- The Ministry of Natural Resources and Environmental Protection takes part in decision-making on establishment of new touristic zones;
- Tourists and visitors are obliged to take good care of the environment;
- Touristic trips shall not impose impact on the environment.

Law on Environmental Protection

The 1992 Law on Environmental Protection (chapter 1) allows for agri-ecotourism development within the transitional zone of biosphere reserves (articles 63–64). Article 77 assigns responsibilities for informal environmental education to tourist organizations, among others.

Law on Specially Protected Natural Areas

The 1994 Law on Specially Protected Natural Areas, substantially revised in 2000, states that national parks can be used for carrying out touristic activities. Article 16-1 was added to the Law in 2008 to specify the environmental protection requirements for touristic and recreational activities within specially protected nature conservation areas.

These activities shall be carried out according to the regime of their protection and use, while taking into account the norms of allowable pressure on specially protected nature conservation areas. Income from touristic activities is one of the sources of financing for specially protected nature conservation areas (Article 17).

Administrations of specially protected natural areas are responsible for organizing touristic and recreational activities on their territories. The structure of national parks includes recreational zones designated for touristic activities (article 27). Camping within national parks is not allowed beyond the specially designated areas.

Decrees of the President

The 2006 Decree of the President No. 372 “On measures to develop agri-ecotourism in the Republic of Belarus” defined the legal basis for tourism service on rural homesteads. The Decree allowed people living in rural areas to provide agri-ecotourism services without being registered as individual entrepreneurs. All they need to do is to inform the local council of deputies of the lowest territorial level and pay an annual fee. The Decree also envisaged tax credits for a period of five years. A new version of the Decree, which was adopted in 2010, preserved the existing benefits to entities engaged in this kind of activity as well as offered some new opportunities.

Table 11.10: Tourism and the environment in Belarus, 2009–2014

	2009	2010	2011	2012	2013	2014
Tourist nights, thousands	12 490.5	13 018.2	13 592.1	13 798.2	13 658.2	13 474.5
Direct water consumption, million m^3	1.9	2.0	2.0	2.1	2.0	2.0
Total water consumption, million m^3	25.0	26.0	27.2	27.6	27.3	26.9
CO_2 emission, tons	194 851.8	203 083.9	212 036.8	215 251.9	213 067.9	210 202.2
Solid waste generation, thousand tons	25.0	26.0	27.2	27.6	27.3	26.9
Direct and indirect electricity consumption, thousand kWh	124 905.0	130 182.0	135 921.0	137 982.0	136 582.0	134 745.0

*Sourc*e: ECE Secretariat calculations based on Tourism and Tourist Resources in the Republic of Belarus 2009–2013, Statistical book, National Statistical Committee, 2014, and website of the National Statistical Committee, 2015.

Table 11.11: General potential environmental risks from tourism

Element	Examples of risk from tourism activities
Ecosystems	The construction of accommodation, visitor centres, infrastructure, and other services has a direct impact on the environment, from vegetation removal, animal disturbance and elimination of habitats to impacts on drainage. Wildlife habitat may be significantly changed (travel routes, hunting areas, breeding areas, etc.) by all kinds of tourist development and use.
Soils	Soil compaction can occur in certain well-used areas. Soil removal and erosion also occurs, and may continue after the disturbance is gone.
Vegetation	Concentrated use around facilities has a negative effect on vegetation. Transportation may have direct negative impacts on the environment (e.g. vegetation removal, weed transmission, animal disturbance). Fire frequency may change due to tourists and park tourism management.
Water	Increased demands for fresh water. Disposal of sewage or litter in rivers, lakes. Propeller-driven watercraft may affect certain aquatic plants and species.
Air	Motorised transportation may cause pollution from emissions (from plane, train, or automobile).
Wildlife	Hunting and fishing may change population dynamics. Hunters and fishers may demand the introduction of foreign species, and increased populations of target animals. Impacts occur on insects and small invertebrates, from effects of transportation, introduced species, etc. Disturbance by visitors can occur for all species, including those that are not attracting visitors. Disturbance can be of several kinds: noise, visual or harassing behaviour. The impact can last beyond the time of initial contact (e.g. before heart-rate returns to normal, or before birds alight, or mammals resume breeding or eating). Habituation to humans can cause changed wildlife behaviour, such as approaching people for food.

Other legal acts

The Rules on providing touristic services were approved by the 2014 Resolution of the Council of Ministers No. 1064. Basically, they repeat two environmental provisions from the 1999 Law on Tourism, namely:

- Tourists and visitors are obliged to take good care of the environment;
- Touristic trips shall not impose impact on the environment.

In 2014, the Technical Code of Practice TCP 45-3.02-191-2014 "Buildings and premises of the recreational and touristic organizations. Designing rules" replaced the previous TCP 45-3.02-191-2010. The current one has a dedicated chapter for agri-ecotourism facilities. It also recommends guidance values for pressures on recreational landscapes. The recreational pressure is measured by the number of people (tourists/visitors) per hectare. Among other rules, the Code sets requirements for water supply, sanitation and waste management for the respective buildings and premises.

Classification of hotels and other accommodation facilities follows GOST 28681.4-95 "Tourist and excursion service. Classification of hotels". Item 4.3.3 of this GOST states that a hotel has to be located in favourable environmental conditions.

Policy framework

National Strategy for Sustainable Socioeconomic Development until 2030

The NSSD-2030 has a subsection dedicated to tourism. Although most of the goals of the Strategy are economically oriented, it states ecotourism development as one of its priorities. Another long-term tourism development priority is wise use of natural resources and limited anthropogenic and technogenic impact on natural ecosystems.

National Strategy for Development of the System of Specially Protected Natural Areas until 2030

The 2014 National Strategy for Development of the System of Specially Protected Nature Conservation Areas until 2030 includes a list of specially protected nature conservation areas that are promising for tourism development (annex 2). The norms of allowable recreation pressure were calculated and approved for 29 specially protected nature conservation areas.

National Environmental Action Plan 2006–2010

The implementation of the NEAP's task on recreation and ecotourism development resulted in the development of databases on the natural resources potential of two rayons of Vitebsk Oblast and nine rayons of Mogilev Oblast. This information was included in the State Cadastre of Tourist Resources. The work was financed from the state budget in the amount of 92.9 million roubles. The guidelines for recreational development on water bodies and water protected territories were also developed.

National Tourism Development Programme for 2006–2010/2008–2010

The ultimate goal of the National Tourism Development Programme for 2006–2010, revised in 2007 as the National Tourism Development Programme for 2008–2010, was tourism sector development in the country. It did not have any explicit environmental goals.

National Tourism Development Programme for 2011–2015

Under the National Tourism Development Programme for 2011–2015, 177 measures have been planned for 2011–2015 under the subprogramme "Development of tourism industry infrastructure". Six measures support ecotourism infrastructure development and 17 support agritourism development.

All measures planned under the subprogramme "Tourist services marketing" have been implemented.

The subprogramme "Human resources, scientific and methodological support in the field of tourism" included a number of measures to develop agri- and ecotourism in the country. In particular, the programme supported development of new routes for ecotourism. All measures planned under the subprogramme "Human resources, scientific and methodological support in the field of tourism" have been implemented.

State Programme for the Development of the Resort Area of the Narochansky Region for 2011–2015

The State Programme for Development of the Resort Area of the Narochansky Region for 2011–2015, approved by 2010 Decree of the President No. 514, envisages construction of the largest Belarusian

centre for health improvement, tourism and entertainment.

Six new tourist routes have been created in accordance with the State Programme. They include Architecture of Naroch Region, Myadel Region in Flame of War, Myadel – Town with Great History, and Legends of Naroch Region. In 2014, two more routes were opened, namely Naroch–Komarovo–Svir and Uzla–Krivichi–Budslav. Almost 200 million roubles have been allocated for their creation since 2011.

In 2014, sanatoria and resorts in Naroch welcomed 81,193 people, 15 per cent more than in 2013. Some 40 per cent of the vacationers were foreign citizens.

As much as 599.3 billion roubles have been provided for the implementation of the Programme since 2011. A number of local sanatoria underwent renovation. The bus station in Myadel was upgraded. In the Narochansky National Park, a park of exotic plants and a safari park were created.

Draft concept of the national tourism development programme for 2016–2020

The concept of the national tourism development programme for 2016–2020 was drafted by the Ministry of Sport and Tourism in 2014. It is based on sustainable tourism principles and the recommendations and approaches of the World Tourism Organization.

According to the concept, by 2020 Belarus plans to:

- Receive 5.1 million tourists annually;
- Generate US$460 million income from the tourism sector;
- Increase the capacity of hotels and similar accommodation facilities by 1.2 times, to 38,000 beds.

Institutional framework

Ministry of Sport and Tourism

The Department of Tourism is a legal body in the Ministry of Sport and Tourism. The Department has 10 staff.

The National Tourism Agency was created in 2001 with the purpose of promotion of tourism and participation in the realization of state policy in the tourism sphere. It is subordinated to the Ministry of Sport and Tourism. Since 2011, the Agency has been financed from the state budget. In 2011–2012, the Agency had 18 staff, and in 2013–2014, 16 staff. The main work direction of the Agency is the realization of activities according to the National Tourism Development Programme.

The Ministry of Sport and Tourism, together with the National Tourism Agency, Belarusian public association of guides and guide-interpreters, and representatives of the Ministry of Education and Ministry of Culture, organizes the professional attestation of guides and guide-interpreters. In Belarus, there are 1,495 certified specialists, including 1,251 guides and 244 guide-interpreters.

Affairs Management Department of the President

The Affairs Management Department of the President is responsible for the management of four national parks and Berezinski Biosphere Reserve (chapter 1). Administration of each protected area has some dedicated staff for tourism, for example, the Braslav Lakes National Park Administration has a Tourism, Environmental Education and Information Department.

National Statistical Committee

The National Statistical Committee (Belstat) regularly publishes the statistical book “Tourism and Tourist Resources in the Republic of Belarus”.

Interagency Expert and Coordination Council on Tourism under the Council of Ministers

The Interagency Expert and Coordination Council on Tourism under the Council of Ministers was established according to the 2000 Resolution of the Council of Ministers No. 1186 to guide the development of tourism policies. Representatives of ministries, other central and local government bodies, and tourist companies are part of the Council.

Education

Twenty-two higher education facilities and eight special secondary facilities provide education for specialists for the tourism industry. Their curricula reflect environmental topics, for example, the compulsory subject “Environmental protection and energy saving” (40 hours) (chapter 12). According to data of the Ministry of Education, in 2014, 1,111 people received a bachelor’s degree and 200 people a vocational training diploma. In 2014/2015, 62 people are pursuing a master’s degree.

Other institutions

In June 2011, the Republican Public Coordination Council on Agri-ecotourism was established under the Department of Tourism of the Ministry of Sports and Tourism. There are public councils on agri-ecotourism at oblast, city and rayon levels. All chairs of the oblast public councils are members of the Republican Council.

The first agri- and ecotourism business incubator, the Centre of Agri- and Ecotourism Development in Belarus, was opened in December 2013. This initiative was implemented with support from the Organization for Security and Co-operation in Europe (OSCE) office in Minsk under the project "Agro and ecotourism business incubator as a tool of sustainable development in rural areas of Belarus".

This Centre is an innovative model of provision of consultation, training and other services in this sphere. It works in two formats, traditional and virtual, and provides its clients with such services – consulting, training, inspection of farmsteads, monitoring and assistance in the preparation of printing materials.

11.5 Projects

Local Entrepreneurship and Economic Development

The USAID "Local Entrepreneurship and Economic Development" Project was implemented by UNDP from August 2012 until February 2015 with a total budget of US$1,946,000. The project supported development of micro-, small and medium-sized enterprises (MSMEs), organizations and other business entities in the sphere of ecotourism in Brest and Grodno Oblasts. The results of the project include, but are not limited to:

- Recommendations to improve the legal framework in the ecotourism sector and methods of statistical accounting of business entities' ecotourism activities and assessment of their contribution to the economic development of the territory;
- Ecotourism development strategies for 17 pilot tourism destinations;
- A manual on ecotourism business and catalogue of supporting organizations for MSMEs;
- Education of business trainers on ecotourism;
- Educational programmes for MSMEs;
- Training and press tours for journalists, promotional tours for travel companies, and organization of international conferences for cross-boundary partnership promotion;
- An informational and educational campaign to raise public awareness about proposals in the field of ecotourism;
- Promotional materials and the use of marketing tools to advertise the pilot tourism destinations, and facilitation of their inclusion in electronic databases and GPS.

Support to Local Development in the Republic of Belarus

The project "Support to Local Development in the Republic of Belarus" was commenced on 15 February 2014 and will be implemented until the end of September 2016.

The total project budget is €5,420,500 (including €5 million from the EU and the rest covered by UNDP Belarus). In particular, the project supports agri-ecotourism development initiatives at the local level.

Support to the Development of a Comprehensive Framework for International Environmental Cooperation in the Republic of Belarus

This EU/UNDP project was implemented in 2011–2014 with a total budget of €5,079,760 (€5 million from the EU and the rest covered by UNDP).

In particular, the project was aimed at improvement of the technical legal framework in the area of ecological certification. A draft technical code of practice was developed (but is not yet adopted) within the project, to be used during voluntary ecological certification of services for guests/visitors.

Other projects

Some other projects have been, or are being, implemented in Belarus that indirectly support the ecotourism potential of the country, namely:

- Mainstreaming Biodiversity Conservation into Territorial Planning Policies and Practices (31 December 2009–31 December 2013);
- Landscape approach to management of peatlands aiming at multiple ecological benefits (March 2013–October 2017).

11.6 Conclusions and recommendations

Information is not available on the pressures that tourism puts on the environment in Belarus. Neither data nor estimates are available of the pressures that tourism puts on water resources and air in Belarus. Data on municipal waste generated by the tourism sector are hidden within the total data on municipal solid waste generated in the country. The impact of the tourism sector on the environment is not regularly assessed by the competent authorities.

Recommendation 11.1:
The Government should:

(a) *Study international experience in assessing the impact of the tourism sector on the environment;*

(b) *Consider whether it is possible to collect environment-related data on the tourism sector and to undertake an assessment of the impact of the tourism sector on the environment.*

Chapter 12

ENVIRONMENTAL EDUCATION AND EDUCATION FOR SUSTAINABLE DEVELOPMENT

12.1 Introduction to the educational system

The education system in Belarus is subdivided into formal, non-formal (additional) and special education:

- Formal education: preschool, general secondary, vocational training, secondary specialized, higher and postgraduate;
- Non-formal (additional) education;
- Special education for people with physical and mental disabilities.

Preschool education is provided to children aged from two months to five years and ten months until children enter general secondary or special educational institutions. Preschool education can be increased by one year. Preschool education facilities include nurseries, nursery-kindergartens, kindergartens, nursery-sanatoria, kindergarten-sanatoria and preschool centres for children's development.

General secondary education starts at six to seven years old and includes three levels: (1) primary/elementary education (grades I–IV); (2) basic secondary education (grades V–IX); (3) secondary education (grades X–XI; in evening schools, grades X–XII). Levels 1 and 2 constitute basic education. After basic education, graduates can complete their secondary education (two years) in secondary schools and lyceums. Alternatively, students can enter technical-vocational or secondary special educational institutions, where they receive secondary education and a professional qualification.

Vocational training aims to develop a pupil's personality and professional formation, provide them with a special theoretical and practical educational background, and produce workers with a technical and vocational education. A certificate of completed general secondary or secondary specialized education is the basic document entitling pupils to enrol in higher educational institutions.

Higher educational institutions include colleges, institutes, academies and universities. The duration of programmes leading to a specialist diploma (higher education diploma) or bachelor's degree is generally four to five years. At the subsequent level, students acquire a master's degree, which takes one to two years.

Postgraduate education consists of two stages: post-graduate studies as first stage and doctorate studies as the second one.

In Belarus, the adult literacy rate is 99.7 per cent (box 12.1). Ninety-eight per cent of the employed population have basic, general secondary or vocational education. Based on the intake of children to primary and secondary schools, and the number of students in higher educational institutions, Belarus is on the same level of educational coverage as developed countries in Europe and the world. Every third citizen of the country is attending one of the country's educational institutions.

12.2 Preschool education

Belarus has a well-developed system of preschool education. In preschools, children are introduced to the language, culture and traditions of the Belarusian people and to the culture of people of other nationalities living in the country. In addition to public preschools, there are 10 private preschools. In the 2014/2015 academic year, 410,564 children (in 2013/2014, 407,049) were attending 3,972 institutions of preschool education, including 89 sanatoria, 124 children's preschool development centres and 929 training-pedagogical complexes (kindergarten-school).

The overall attendance rate of children in preschool institutions is 74.42 per cent (50.4 per cent in rural areas). The Government has a target to ensure 100 per cent attendance of five-year-old children in preschool institutions. New forms of preschool education are being implemented: playgrounds, walking groups, evening groups, weekend groups, adaptive groups, groups to prepare for school, family kindergartens, school and parent, and other education and training at home under the programme of preschool education.

Box 12.1: Millennium Development Goals on education and elimination of gender disparity in primary and secondary education

Goal 2: Achieve universal primary education
Target 2.A: Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling

Implementation in Belarus:
2.1. Net enrolment ratio in primary education: Total enrolment ratio of 95.7 per cent as of 2009. Full enrolment of boys and girls in primary education (grades I-IV) has also been sustained.
2.2. Proportion of pupils starting grade 1 who reach last grade of primary: 100 per cent of pupils entering the 1st class reach the last grade of primary school (grade IV) and continue the second stage of secondary education (grades V-IX).
2.3. Literacy rate of 15- to 24-year-olds, women and men: Belarus has maintained a high literacy rate in the 15–24 age group (99.8 per cent).

Goal 3: Promote gender equality and empower women
Target 3.A: Eliminate gender disparity in primary and secondary education, preferably by 2005, and in all levels of education no later than 2015

Implementation in Belarus:
3.1. Ratios of girls to boys in primary, secondary and tertiary education: In Belarus, boys and girls have equal right to receive any level of education. In the 2014/2015 academic year, the total number of pupils in the secondary educational institutions, in the age group 15–18 years and older, is 114,468, of which 62,710 are girls (54.8 per cent) and 51,758 boys (45.2 per cent); the ratio of girls to boys is around 1.21. In the vocational-technical institutions, there are 72,823 students, of whom 23,543 are female (32.3 per cent) and 49,280 male (67.7 per cent); the ratio of females to males is 0.48. In the secondary specialized institutions, there are 128,975 students, of whom 64,844 are female (50.3 per cent) and 64,131 male (49.7 per cent); the ratio of females to males is 1.01. In the higher educational institutions, including both state-owned and private universities, there are 362,907 students, of whom 207,966 are female (57.3 per cent) and 154,941 male (42.7 per cent); the ratio of females to males is 1.34.

Source: Education in the Republic of Belarus, Statistical book, National Statistical Committee, 2015. National Statistical Committee website.

Photo 12.1: Display of plants in kindergarten No. 24 in Polotsk City

Upon requests from parents, some lessons are offered on a paid basis. In the 2014/2015 academic year, 164,119 children attended special interest groups, of which 143,456 children – on a paid basis, including groups on specific themes such as aesthetics, sports and physical education, ecological orientation and foreign language learning.

In 2014, the education and upbringing of children in preschool institutions were provided by 54,010 educators (in 2013, 53,531). The number of teachers with the higher education diploma is increasing. In 2014, 56.9 per cent of all teachers in preschool institutions held a higher education diploma. Measures are taken to provide and maintain a high percentage of coverage of 1- to 6-year-olds in preschool educational institutions, in order to provide 100 per cent of 5-year-olds with preparation for school.

Curricula

The curriculum, textbooks and manuals for the preschools are developed by the National Institute of Education in consultation with stakeholders from scientific and other organizations, including educational institutions, oblast institutes of education development, and research and methodological institutions. The latest curriculum for preschools was approved in 2012 by the Ministry of Education.

Among seven educational areas, ecological orientation and the basics of education for sustainable development (ESD) is provided under the areas "Child and nature", which covers themes on environment, plants, animals and the relationship between humans and nature, and "Child and society", which covers broader areas of human development, including health, nutrition, safety, interaction with adults and peers, adaptive social behaviour and understanding of the native land and attitude towards it. At least 20 per cent of the curriculum is devoted to these two educational areas.

The educational area "Child and nature" is implemented through the main forms of preschool education, which are play and exercise. Formation of environmental knowledge in the preschool institutions is organized by developing the object-spatial environment, which is represented by the display of natural objects and environmental pathways.

The content of the educational area "Child and nature" is different for each age group. For early ages, the main objective is to develop children's interest in the environment, and to develop a sense of the joy of communicating with animals and plants and the ability to interact with natural objects. The subject is offered in the form of play (box 12.2), to see the different shapes and colours of plants and animals, their appearance and names.

In the later stage of preschool education, children get to know the structure of plants (leaf, flower, stem and root), and different species of animals and their body parts. Subsequently, they are introduced to the diversity of the natural environment, the distinctive characteristics of plants and animals and the necessity of caring for the natural world. The main aim of the subject at this level is to develop children's skills in interacting with nature, active participation in nature conservation, and awareness of their responsibility for the conditions of the natural world and environment around them.

Manuals and textbooks

More than 30 illustrative training manuals have been developed and published for two thematic series, "World of childhood" and "Become smarter", to help teachers to carry out their training activities in the educational area "Child and nature".

The content of manuals includes thematic planning, summaries of different forms of exercises, play, and play tasks that are aimed at developing children's systematic knowledge about nature and ideas on how to interact with and behave in the natural world and to develop interest in the world around them.

Box 12.2: Environmental education in kindergarten No. 24 in Polotsk city

Though there is no explicit reference to sustainable development in the curriculum and study plan, teachers in kindergartens are taking a proactive approach and integrating sustainability issues while teaching different subjects. In kindergarten No. 24 in Polotsk city, teachers develop a scenario for a children's performance/play on a specific theme. For instance, children are given a task to build a new house. In order to build a bigger house they have to save/earn money and each child contributes to this by having different tasks, including recycling and initiating a small business. Through the preparation for this performance/play, children learn to work together for a better future, reflect on their actions in order to avoid negative impact on the environment, find solutions and participate in collective decision-making.

Photo 12.2: Children at play: Assigning tasks to everyone

Further manuals are expected to be used as of school year 2015/2016, including "Learning about the world: Animals: Guide for teachers", "Nature in the development and education of preschool children", "The wonderful world of nature" and "Environmental education of preschool-aged children".

Every August, directors and vice directors of preschool institutions are invited to annual workshops, which are organized by the oblast education department to discuss current issues in the preschool education system, which include, amongst other things, the quality of training materials, manuals and pedagogical aids, and to propose ways to improve preschool education by incorporating the opinions of and suggestions from teachers.

Teachers' training

Teachers and methodologists undergo regular capacity building in-service training programmes. Teachers of preschool institutions attend a mandatory one-week training programme every three years, organized by the Minsk City and oblast institutes for education development.

The institutes for education development prepare training programmes; provide scientific, methodological and professional support to teachers; analyse and disseminate best teaching practices and experiences; and publish scientific and methodical materials, training manuals and guidelines for preschool teachers.

Teachers' training on environmental education is carried out at Polotsk College, Vitebsk State University and Soligorsk State Pedagogical University.

12.3 School education

In the 2014/2015 academic year, 946,100 children are studying in 3,293 institutions of general secondary education. Among these institutions there are 216 gymnasiums, 29 lyceums and six training and educational complexes (gymnasium-college).

Curricula

Environmental education (EE) and education for sustainable development (ESD) are integrated into the curricula of most of the taught subjects. The most relevant subjects that integrate EE and ESD are the following.

Grades I–V: Subject: Man and the world

This subject area covers topics on the elements of basic ecological knowledge; the relationship of objects and phenomena of living and non-living organisms; humans as an integral part of nature and society; nature conservation; basic information on air, flora and fauna; the importance of air and water

for human health; human attitudes towards nature; the forms of earth's surface, water bodies and minerals; measures to protect nature; participation in environmental protection activities; and plants and animals listed in the Red Books.

Grades I–IV: Subject: Practical training

The curriculum of this subject for grades I to IV contains lessons to provide practical training on maintaining indoor plants and using materials from nature (leaves, pine cones, straw) for producing souvenirs and things useful for everyday life. These exercises help pupils appreciate nature and understand the relationship between humans and nature.

Grades VI–XI: Subject: Biology

In biology, pupils learn about the general characteristics of ecosystems, habitats of living organisms, freshwater and forest ecosystems and their value on human well-being, the relationship between humans and nature, positive and negative aspects of human activities on nature, rational use of natural resources, nature conservation, conservation of different biodiversity species, environmental issues and balancing environmental and economic challenges.

Grades VII–XI: Subject: Chemistry

The subject of chemistry considers the impact of chemical substances on human health, quality of life and environment. The topics include air and water pollution, environmental problems caused by mining and the processing of salt, air pollution, pollution created by the processing of raw hydrocarbons, chemistry and environmental protection, chemical (hydrogen) bonds and their use for natural objects, the use of hydrogen as a clean fuel and raw material for the chemicals industry, and protection of the environment from contamination caused by the processing of raw hydrocarbons and the use of refined petroleum products.

Grades VI–XI: Subject: Geography

Education in geography provides knowledge about the essence of processes and phenomena taking place in the natural and socioeconomic systems. Students are introduced to the principles of rational use and conservation of natural resources and effective environmental management. They study the interaction between nature and society and acquire understanding of the social, environmental, economic and political aspects of contemporary issues.

In grades VIII–IX, pupils study the geography of continents and countries, which explains the diversity of countries and their interdependence, particularly in relation to global environmental problems, including air and water pollution, ozone depletion and climate change. Pupils are also introduced to the concept of sustainable development.

In grade X, pupils learn the geography of Belarus. The topics include, among others, the anthropogenic impact on the environment in Belarus: contamination with radionuclides due to the Chernobyl NPP accident, and local problems of air and soil pollution and surface and groundwater contamination as a result of economic activities. In grade XI, pupils are given a scientific understanding of the environment within the context of development.

Grades VI–XI: Subject: Physics

As part of the curriculum, pupils acquire skills in solving practical tasks, including using physical knowledge in the rational use of natural resources. Topics include heat savings in residential houses, the use of alternative sources of energy (wind and hydro), and environmental problems caused by production, transmission and use of electricity.

Grades VI–IX: Subject: Foreign languages

When teaching a foreign language, the teacher selects themes on the environment and sustainable development, such as nature conservation, differences between urban and rural life, the relationship between climate and human activities, environmental problems and proposed solutions in the particular country (where the language is spoken), and natural disasters in different regions of the world and their impact.

Elective subjects

Elective subjects is a form of organization of study sessions before/after school hours aimed at expanding and deepening pupils' knowledge on subjects. The duration of the classes is limited by the hours specified in the model study plan. Secondary educational institutions may hold classes on natural sciences, humanity, social science, environment, music and the arts. The classes are organized for grades I-XI.

The following elective subjects are most relevant for EE and ESD:

- Grade I: Seven "I" units on "Me and nature": The content of the unit promotes better knowledge of

nature, and develops respect for nature and understanding of the beauty, originality and wealth of nature;
- Grades II–IV: Native land and environment: The purpose of the programme is to raise awareness on nature protection and create a feeling of responsibility for the environment and in particular to the child's native land;
- Grades II–IV: Beregosha's alphabet: The aim of the course is to educate pupils in rational use of energy;
- Grades VII–VIII: Wild nature of Belarus, and Biology: Nature conservation;
- Grade IX: Physiological and hygiene aspects of human health: healthy lifestyle;
- Grade IX: Green schools: biodiversity, energy efficiency, surface water and groundwater conservation, waste management, environmental awareness raising;
- Grade X: Introduction to biotechnology.

In Grades V–IX, in the framework of elective subject "Basics of life safety", students learn topics such as ecology as a science, environmental problems, radioecology, radiological contamination, natural and artificial sources of radiation, radionuclides and radiation, emissions and the effect of radiation, soil contamination by radioactive substances, general information about radiation, use of radiation sources in the economy, the Chernobyl NPP accident and its impact on the environment, measures to reduce the impact of radiation, and security measures in the area contaminated by radiation.

In Grade IX, students also learn rules and responsibilities for fire safety in forests and resort areas, fire prevention, and administrative and criminal liability for breaching legal acts. They are also introduced to the following topics: technogenic emergencies and their impact on the environment, consequences of natural disasters, ecology and human activities, environmental degradation and pollution.

Manuals and textbooks

In the 2014/2015 academic year, 95 textbooks and manuals were published. Among these, the following training materials cover the subject of EE and ESD: "Man and the world" grades I–IV textbook; "Basics of life safety", grades VII–IX; "Basics of radiology (radiological contamination) and safety", grades V–VI training manuals for teachers; "Extreme situations and rules of behaviour when they occur", grade IX guide for teachers; Biology, grades VI–XI; Chemistry, grades VII–XI; Geography, grades VI–XI; Physics, grades VI–XI.

The content of the manuals and textbooks provides a significant amount of environmental knowledge and information for pupils. School teachers are involved in the development of manuals and textbooks by providing their comments and suggestions to the oblast institutes of education development. Furthermore, each year, the best teacher manual on EE and ESD is selected and shared among the teachers in the oblasts as supplementary teaching materials. In addition, school libraries are taking a proactive approach in increasing their library resources to have more literature on EE and ESD.

The content of the manuals and textbooks could be further improved by incorporating broader themes of ESD: climate change, sustainable consumption and production, human rights and democracy. Furthermore, the content could be enriched by including more practical guidance.

Manuals and textbooks, which are approved by the Ministry of Education, are also used for carrying out the elective subjects (table 12.1).

Teachers' training

Teachers and methodologists undergo regular training programmes. Teachers attend a mandatory one-week training programme every three years, organized by the Minsk City and oblast institutes for education development. The elements of EE and ESD are integrated into the training programme.

The Academy of Post-Diploma Education has prepared content, teaching and didactic training guidelines for pedagogical personnel in the secondary schools. Model curricula have been prepared for teachers' training and in-service training to improve teachers' skills and competencies in the areas of ESD, innovative technologies in the education process, energy and resource efficiency and healthy lifestyle.

12.4 Vocational training and secondary specialized education

Upon completion of Grade IX of secondary school, pupils can enter vocational training institutions and secondary specialized education institutions. Vocational-technical education prepares individuals to acquire professional knowledge and a trade-specific qualification.

There are 213 vocational-technical institutions, which offer one- to three-year programmes leading to a certificate of professional qualification and a diploma of vocational training.

Table 12.1: Educational materials for teaching elective subjects on EE and ESD topics

Elective subject	Grade	Type of training materials
Beregosha's alphabet: Learning to save and care	II-IV	Curricula and teaching guidelines
Beregosha's school	V	Manual for teachers
Learning to save and care: Energy efficiency and modern energy production	VIII	Manual for teachers
Learning to save and care: Industrial and household energy saving	IX	Manual for teachers
Learning to save and care: Energy use and environment	X	Manual for teachers
Energy, environment and I	II-IV	Manuals for teachers
Energy and environment	V-VIII	Educational toolkit (curriculum, teaching materials for students and methodological recommendations for teachers)
Green schools	I-IX	Curricula

Source: National Institute of Education, 2015.

Secondary specialized education is the level of basic education that equips pupils with specialized theoretical and practical knowledge and awards a secondary specialized diploma for specialists and professional workers. There are 231 institutions offering programmes for secondary specialized education, including 12 private institutions.

There was an intake of new students in 2014 of 34,500 for vocational training and 40,900 at the level of secondary specialized education. In 2014, 33,800 young professionals graduated from vocational training institutions and 41,400 students from secondary specialized vocational training institutions received a diploma. These numbers correspond to the overall demand for workers in the economy.

Curricula

Among other requirements for professional knowledge and skills, it is envisaged that in accordance with educational standards students will be trained in basic knowledge on ecology and environmental protection (table 12.2). Accordingly, the curricula for all specializations reflect environmental topics. The subject "Environmental protection and energy saving" (40 hours) is compulsory for all specializations of secondary special education. Pupils learn about major environmental problems and possible ways to solve them, aspects of interaction between humans and the environment in the production process, reduction of energy consumption and environmental hazards caused by production, measures to improve the quality of the environment and possibilities to improve energy efficiency. Such training is aimed at developing pupils' competencies on sustainable management of resources and the formation of social responsibility.

In addition to the professional disciplines (table 12.2), similarly to secondary schools, during the teaching of secondary education subjects such as physics, chemistry and biology, students analyse examples of environmental problems and sustainable development issues.

In recent years, for the development of new curricula, extensive attention has been given to energy and resource saving and efficiency, and environmental protection measures. For instance, to enter the profession of floor layer, students learn ecologically sound technologies and materials, energy efficient equipment and non-waste technologies in construction. Similar development is observed in the profession of hunting specialist, which is prepared by the Polotsk State Forestry College. Future hunting specialists learn sustainable hunting practices.

Students can also take elective courses and do internships on environmental topics. Elective courses may include access to environmental information based on the materials on the Aarhus Convention and on healthy lifestyle. Themes on environment and sustainable development can also be chosen for students' research and thesis work.

Manuals and textbooks

Manuals and textbooks on EE and ESD for vocational-technical and secondary specialized education are developed by several institutions.

Table 12.2: List of disciplines (subjects) of the vocational training education and secondary specialized education specializations which include EE and ESD topics

Disciplines (subjects)	Topics
Chemical industry	Fundamentals of industrial ecology
Special technology	Fundamentals of ecology
Industrial training	Environment-related issues in the performance of different types of work in professional activity
Chemical technology of inorganic compounds, materials and products	Recycling and waste management in the chemicals industry
Technology of silicate and refractory nonmetallic materials and products	Fundamentals of industrial ecology, practical training on analysis and quality control
Chemical technology in light industry	Fundamentals of industrial ecology
Mineral processing	Fundamentals of industrial ecology, practical training on the control of raw materials and ready products
Oil and gas processing	Fundamentals of industrial ecology, practical training on the control of raw materials and ready products
Forestry	Technology for forest utilization: technology for using wood waste for energy production Forest protection Hunting (sustainable hunting practices, rational use of natural resources) Garden and landscape design
Machinery and equipment in forestry and wood industry	Basic technology of wood harvesting: processing of low quality wood and wood waste

Source: Republican Institute of Vocational Education, 2015.
Note: Industrial ecology is an applied science, which studies the interaction of industry and the environment, and vice versa, the impact of environmental conditions on the functioning of enterprises.

Table 12.3: Number of graduates in environmental protection and use of natural resources by specialty, 2005, 2009–2014

	2005	2009	2010	2011	2012	2013	2014
Bioecology (biologist-ecologist, teacher of biology and ecology)	64	157	175	250	246	277	293
Geoecology	47	108	95	63	64	76	88
Radioecology	59	31	25	18	19	..	..
Ecological monitoring, management and audit	..	51	50	56	39	21	22
Medical ecology	66	85	73	73	61	107	114
Agricultural ecology	29	39	39	95	75	82	138
Geology and mineral exploration	41	40	51	48	48	45	98
Environmental protection and rational use of natural resources	77	72	79	89	76	78	78
Environmental management and audit in industries	24	41	49	40	37	47	44
Bioecology (ecological engineer)	24	19	25	22	22	17	13
Heat and gas supply, ventilation and air protection	209	234	222	256	263	284	351
Water supply, water disposal and protection of water resources	193	279	264	254	241	275	267
Forestry	193	265	289	292	230	222	223
Total	**1 026**	**1 421**	**1 436**	**1 556**	**1 421**	**1 531**	**1 729**

Source: Environmental Protection in the Republic of Belarus 2010–2014, Statistical book, National Statistical Committee, 2015.

The Academy of Post-Diploma Education has developed a compendium of scientific and methodological materials and recommendations, "Partners' network of schools for sustainable development: Interregional cooperation and sustainable changes".

The project on "Learning region: Education for all generations" has compiled scientific and research works dedicated to non-formal education, which have components on EE and ESD.

In the 2011/2012 academic year, the Republican Institute of Vocational Education published a manual for students of secondary specialized education institutions on the subject "Environmental protection and energy saving".

Teachers' training

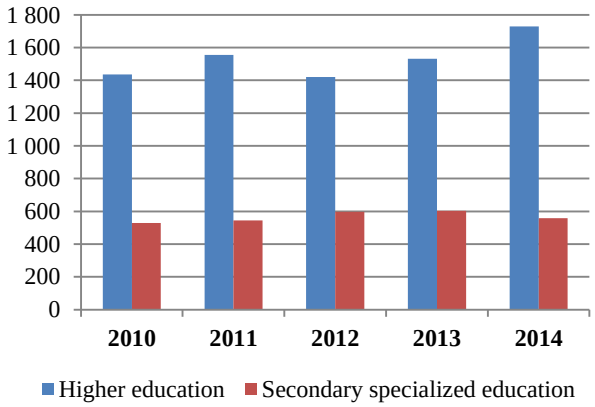
Teachers are trained in the following disciplines, which include topics related to the environment and sustainable development:

- Occupational Health and Environmental Safety, Industrial Training;
- Anthropology, Applied Psychology;
- Pedagogical Anthropology, Social Pedagogy;
- Healthy Lifestyle.

12.5 Universities

In 2014/2015 academic year, 362,900 students (in 2013, 395,200) were attending institutions of higher education. Among them, 138,700 students were trained at the expense of the republican budget and the remainder at their own expense. There are 45 state-owned and 9 private universities in Belarus. The number of graduates specifically educated in environmental protection and use of natural resources (table 12.3) has been steadily increasing in recent years (figure 12.1).

Figure 12.1: Number of high education and secondary specialized education graduates on environmental protection and use of natural resources, 2010–2014



Source: Environmental Protection in the Republic of Belarus 2010–2014, Statistical book, National Statistical Committee, 2015.

Photo 12.3: Dedicated section on literature on ESD at the library of Gymnasium No. 19 in Minsk

Disciplines on environment and sustainable development topics are taught in several universities.

The International Sakharov Environmental University (ISEU) is the leading higher education establishment in training specialists in ecology. The Faculty of Environmental Monitoring and Management offers bachelor's programmes on nature conservation (environmental management and monitoring), energy efficient technologies and energy management, and nuclear and radiation safety; and a master's programme on ecology and renewable energy resources management. The Faculty of Environmental Medicine offers bachelor's programmes on medical ecology, medical and biological science, and ecology.

The Belarusian National Technical University has integrated sustainable development topics into the academic discipline of Philosophy (6 hours), Fundamentals of ecology (34 hours), and Protection of the population in emergencies (190 hours). Radiation safety (66 hours) is taught for all specialities/academic majors. Students who are majoring in "Economy and enterprise management" and "Management", take a course on "Sustainable development concept: National strategy on sustainable development". For all energy-related majors, the curricula contain lectures and practical learning activities in disciplines such as "Alternative and renewable energy sources" (190 hours) and "Energy audits and management" (189 hours). The Department of Environmental Management and Audit in Industry of the Faculty of Mining, Engineering and Engineering Ecology offers courses on environmental management, energy efficient technology and energy management.

In the Belarusian State Economic University, curricula of the specialties/academic majors "Environmental economics" and "Political science and management" contain the discipline "Sustainable development" (140 hours). The master's programme on "Economics and management of natural and energy resources" includes a course on "Sustainable development economics". In following these courses, students acquire knowledge on the concept of sustainable development and skills to conduct scientific analysis of sustainable development components. Furthermore, students learn particular aspects of the economic value of natural resources, the economic dimension of EIA, eco-efficiency and indicators of environmental sustainability.

At the Belarusian State University, in the Faculty of Biology and Geography, the curricula for specialist programmes on biology, biochemistry, bioecology, microbiology, geoecology, geography and hydrometeorology integrate environment and sustainable development topics, such as sustainable agricultural technology, rational use of natural resources, urban environmental management, landscape and spatial planning, socioeconomic geography, regional economic integration, family demographics and gender policy. The Faculty of Chemistry integrates the key concepts of sustainable development, cleaner production and "green" chemistry in the teaching programmes.

The Belarusian State Pedagogical University named after Maxim Tank works with the non-governmental association "Education for Sustainable Development" to implement joint projects involving university students and lecturers, as well as other stakeholders such as educational institutions and foreign organizations. They are actively engaged in research on the teaching of ESD. ESD is an integral part of the discipline "Education philosophy" taught for the training of education managers. The University is using ESD and sustainable development indicators in its own quality self-assessment.

Eight Belarusian universities participate in the University Twinning and Networking/UNESCO Chairs Programme, which promotes international inter-university cooperation and networking to enhance institutional capacities through knowledge sharing and collaborative work in education, the natural and social sciences, culture and communication.

Twenty-seven Belarusian universities participate in the Baltic University Programme, which involves 225 universities in the Baltic region. The programme focuses on questions of sustainable development, environmental protection and democracy. Networked universities work together on developing university courses with common course materials and curricula and participate in joint projects that promote democratic and sustainable regional development.

Teachers' training

The Republican Institute for Higher Education carries out in-service training and advanced training of teachers at all levels of education. The Institute is actively involved in the development of new learning technologies and teaching methods for the programmes that include EE and ESD issues. It provides training and professional development of teachers of philosophical, historical, economic, social, political, cultural, psychological, pedagogical and philological disciplines in higher, secondary special and vocational education.

12.6 In-service training schemes for professionals

Schemes for civil servants

Training and in-service training of civil servants on the environment and sustainable development are carried out by the Republican Centre for Advanced Training of Managers and Specialists of the Ministry of Natural Resources and Environmental Protection, which was established in 2004 (table 12.4). The Centre organizes training on environmental protection and rational use of natural resources, ecological certification, environmental audit, environmental education and non-formal (additional) environmental education. Professionals and specialists from territorial bodies of the Ministry attend training courses on "Environmental protection", "Environmental monitoring" and "Organization and operation of hydrometeorological observations".

For managers and specialists in different sectors of the economy, training is offered on environmental protection, conservation of water resources, waste management, handling of ODS, environmental monitoring, environmental monitoring for industries, environmental management system ISO 14001, industrial safety and tourism activities in protected areas. Training to update qualifications is offered for one or two weeks (40 or 80 hours). Training seminars of four to eight hours are offered, dedicated to a particular theme.

The Academy of Public Administration under the President carries out training, in-service training and on-the-job training of managerial personnel from state authorities and organizations. Among the 34 disciplines taught at its Institute of Civil Service, a number cover environmental and sustainable development topics, including:

- Sustainable Development Strategy;
- Sustainable Development Strategy of the Society;
- Management of Food and Environmental Safety in the Agricultural Sector;
- Management of Regional Development;
- Socioeconomic Development of the Region;
- Management of Ecological Safety.

In Belarus, all civil servants attend regular in-service training every five years. Five-day (36-hour) training includes four hours dedicated to the theme of sustainable development.

Schemes for private sector professionals

There is no information available on schemes for private sector professionals.

12.7 Informal and non-formal education

Informal education

For informal environmental education, NGOs, mass media, museums, libraries, natural parks, reserves and botanical gardens play a significant role.

Environmental awareness-raising campaigns, activities and events take place extensively, at both national and local levels. It has become a tradition to celebrate World Biodiversity Day, World Car-Free Day and the Earth Hour. In schools, pupils actively take part in eco-theatre, school tree nurseries, ecological gatherings, forums and eco-marathons. The Education Committee of Minsk City and the education departments of the oblast executive committees regularly hold urban ecological festivals, city contests on the improvement and greening of school territories and competitions on students' environmental projects and research work.

Schools are engaged in recycling, collecting paper and metal waste. They participate in actions such as "Save trees – Paper recycling", "Use and reuse of different materials" and "Let's give a second life to waste".

Table 12.4: Training and in-service training of civil servants at the Republican Centre for Advanced Training of Managers and Specialists, 2008–2014, number of trainees

	2008	2009	2010	2011	2012	2013	2014
Civil servants who attended in-service training							
Total	1 181	968	1 207	1 178	1 007	830	1 080
of which: Ministry	182	155	74	133	146	97	84
Civil servants who attended training seminars	679	1 561	447	1 163	1 280	988	1 069
Total trainees	**1 860**	**2 529**	**1 654**	**2 341**	**2 287**	**1 818**	**2 149**

Source: Ministry of Natural Resources and Environmental Protection, 2015.

The Republican Scientific and Technical Library and its branches at the oblast level make an important contribution to informal environmental education. In 2004, libraries on sustainable development were opened at the republican and oblast levels. Their objectives are to popularize sustainable development and raise public awareness of the environmental, economic and social problems of society. An electronic database on sustainable development contains resources that cover a broad range of topics, such as environmental issues, environmental education, environmental security, economics of natural resources use, resource and energy saving, climate change, biodiversity and new emerging technologies for environmental management.

Environmental essay contests have been organized annually since 2006 among school children, and amateur and professional journalists/writers at both oblast and national levels. The republican contest "Youth for clean cities and villages" is organized every year and chooses the best volunteer teams/groups among school pupils, students and young workers. Children's drawing competitions are also organized.

In 2014, there were three categories for the award of best "public ecologist" (chapter 2).

Non-formal (additional) education

In early 2015, 32,053 students are taking classes and courses organized by non-formal educational institutions. These institutions organize their activities in 625 ecological education trails,[7] 467 school arboreta, 33 school mini-reserves, 17 greenhouses, 18 biology classrooms (terrarium, aquarium, etc.), 21 nature museums, and other classrooms and laboratories that are used to conduct non-formal education classes. Twenty-four institutions of ecological and biological profile have ecological certificates, nurseries, ecological trails and flora collections with different species of indoor and outdoor plants. Their activities are oriented towards developing education technologies, organizing different forms of educational events – actions, festivals and contests, supporting students' research projects, carrying out distance training and publishing research and methodological works on non-formal environmental education.

In 2012, the Ministry of Education approved the Programme on Non-formal Education with Ecological and Biological Profiles for Children and Youth. Topics include: social ecology, ecology for natural resource use, biology, ecology and "man", ethnography and ecology, ecological local study, agrobiology, bioethics, environment (energy saving, energy efficiency), healthy lifestyle and artisanal handcrafting.[8]

The educational institution "Republican Centre of Ecology and Local Study" offers a range of educational programmes and projects on energy saving, energy efficiency, renewable sources of energy and environmental protection. It also compiles research works and best practices on school projects on energy saving, and methodological recommendations on the inclusion of energy saving topics into the education process. These compilations are further disseminated among the non-formal educational institutions.

At the oblast level, institutes of education development are actively involved in the organization of an annual energy marathon and exhibitions of methodological works/materials and experiences of energy saving.

12.8 Research and development

ESD requires participatory teaching and learning methods that motivate and empower learners to change their behaviour and take action for sustainable development. Consequently, it promotes competencies such as critical thinking, imagining future scenarios and making decisions in a collaborative way. In Belarus, research for curricula development on ESD is carried out by different universities, research organizations and projects.

The International Sakharov Environmental University (ISEU) has conducted theoretical and methodological analysis of continuing education and defined the structure and principles of continuing education, which should take into account social, economic and environmental considerations and the global and local contexts. ISEU holds the annual International Scientific Conference "Sakharov Readings: Environmental Problems of the XXI Century". Research papers developed for the conference are compiled and published and used by universities and other institutions as reference literature for teaching EE and ESD courses.

The UNESCO-funded project "Environmental ethics in the system of bioethical education of the Republic

[7] An ecological education trail is a path designed to promote walking and sightseeing tours for the purpose of environmental education of the population.

[8] Creation of souvenirs and handcrafts by reusing old materials and natural products.

of Belarus" (2009–2010) has developed conceptual models of environmental ethics in environmental management to improve the environmental education of specialists in different fields and to raise public awareness. The project has developed the curriculum and teaching materials on environmental ethics and bioethics for the system of higher and postgraduate education with a specialization in environment, biomedicine, agriculture or forestry. The project has also developed a methodology for informal education of the population on environmental ethics and bioethics, with the involvement of mass media and civil society.

Within the EU-funded TEMPUS project "Environmental Governance for Environmental Curricula" (2012–2014), a new curriculum for a two-year Master of Science programme in "Environmental management" was developed and approved by the Ministry of Education. Current bachelor's and PhD programmes were revised and updated to include the elements of environmental governance. Textbooks on environmental governance were developed and a web portal was set up to support an interactive platform for educators on which they can exchange expertise.

The Belarusian State University of Culture and Arts has conducted research on sociocultural aspects of environmental education, which covered theory and methodology of the formation of ecological culture and responsibility among children and adolescents. The monitoring system developed in 2011 to measure the level of formation of ecological culture showed that the responsibility of children and adolescents in environmental protection has been increased and the quality of the various environmental components within the framework of sociocultural activities has been improved.

In 2014, the Belarusian State Pedagogical University, together with the national Partner Network of Schools for Sustainable Development, published a compilation of research materials, positive experiences and recommendations on ESD and, in particular, on the role of school network as a mechanism to implement ESD ideas in practice to promote the local sustainable development agenda.

The Belarusian National Technical University has produced teaching materials on energy efficiency, energy efficient technology, renewable energy and environmental economics. Training materials, textbooks and scientific publications have been developed on the subjects of sustainable development in enterprises, the region and society, and green economy.

Since 2014, the Association of Education for Sustainable Development has brought together universities, institutions of non-formal education, colleges and schools to work on theoretical research and practical experience on ESD. The Association is working on various research topics, including the impact of ESD on resolving environmental, social and economic issues; revision of education targets to include continuing education for ESD; development of a methodology for continuing education based on ideas of interdisciplinary integration; and the formation and development of critical thinking in pupils and students.

In addition to the above projects and initiatives taken by the universities and other institutions, since 2010, the Ministry of Education has issued grants from the state budget for research studies and projects on ESD. Project proposals prepared by educational institutions are linked to the implementation of the ECE Strategy for ESD.

It has been observed that, despite good progress in advancing research and development of methodologies and curricula on ESD, it is still unclear which organization and/or institution is taking a lead in assessing the outcomes of individual projects and sharing them as good practice to improve the quality of ESD. Furthermore, no criteria or indicators have been developed to assess the progress of implementation of EE and ESD and their impact.

12.9 Legal, policy and institutional framework

Legal framework

EE and ESD per se are not defined in any law or other legal document in Belarus.

The 2011 Education Code defines the main principles of the education system in Belarus, including ecological orientation. ESD is not mentioned in the Education Code.

The 1992 Law on Environmental Protection includes Chapter 13, "Education, Informal Education and Research on Environmental Protection". The Law stipulates that the education of citizens on environmental protection and use of natural resources is to be carried out through inclusion of basic knowledge on environmental protection and use of natural resources in the teaching and programme documentation of educational programmes. The Law also regulates informal education on the environment and requirements for employees whose activities are

connected to use of natural resources and environmental impact.

Educational programmes are implemented based on the educational standards. The curriculum and model study plan are developed following the educational standards and the Education Code.

The educational standards are set by technical regulatory legal acts and define the main requirements for education, including duration of studies, types of educational institutions, mandatory content of education at the basic level of study subjects, mandatory and maximum loads of studies for pupils and students, level of training of graduates and final certification. There are no specific references to EE and ESD in the educational standards, but some elements of ESD are captured in the objectives of education, such as formation of knowledge on the interconnectedness of human society, valuing of the biosphere, rational use of natural resources, sustainable consumption and healthy lifestyle.

Policy framework

The National Strategy for Sustainable Socioeconomic Development until 2020 had a chapter on EE and informal education, training of professionals and dissemination of information to citizens. It included measures to improve the legislative and regulatory framework for environmental education, training and public awareness, and to include environmental education and informal education issues in regional and local programmes of socioeconomic development (chapter 1). The Strategy set time-bound tasks in two phases (2006–2010 and 2010–2020) and the objectives to be achieved by 2010, including:

- Strengthening the role of civil society, mass media and citizens in decision-making and implementation of measures in EE;
- Including aspects of sustainable development in all programmes of basic training of teachers and update and advanced training programmes;
- Setting up a coordination mechanism for all those involved in continuous environmental education, including NGOs, and the development of a national plan for informal education taking into account sustainable development priorities.

While there has been progress in achieving these objectives, no evaluation of progress has been made. There is no official report on the Strategy's implementation.

The National Strategy for Sustainable Socioeconomic Development until 2030, adopted in 2015, includes a chapter on ESD. For the phase up to 2020, the following measures are foreseen, among others:

- Improving the proximity of preschool educational institutions, supporting public-private partnerships and improving the scientific and methodological basis for preschool education;
- Introducing principles of sustainable development into the educational standards of general secondary education;
- Improving the quality of the educational process, taking into account the principles of sustainable development, including training of civil servants on the issues of environmental security and sustainable regional development.

The Concept on continuing education of children and students was approved by the 2006 Resolution of the Ministry of Education No. 125. Its chapter 4 on Ecological Education, Education on Life Safety and Promotion of Healthy Lifestyle in Individuals describes the content of environmental education, including the natural and social processes and phenomena, and introduction to environmental value orientations. Furthermore, the Concept indicates the following conditions for developing the environmental values in individuals:

- Combination of different forms, tools and methods in developing environmental values;
- Raising the environmental culture of teachers;
- Practical activities on nature protection;
- Cooperation of educational institutions with industrial and agricultural enterprises, scientific organizations and public associations as subjects of nature protection activities.

It also underlines the need to take into account the specifics of different age groups in environmental education.

The Programme for continuous upbringing of children and youth in the Republic of Belarus for the period 2011–2015, approved by the 2011 Resolution of the Ministry of Education No. 16, defines the main directions of education including, among others, gender education, healthy lifestyle, environmental education and life safety. An action plan has been developed to implement education activities for pupils and students.

The 2011 Environmental Protection Strategy for the period until 2025 specifies the main directions for

education and training activities on environmental protection:

- Updating the study plans and curricula for specialists on environmental protection;
- Improving the system of periodic (at least once every three years) in-service training of teaching staff involved in the process of continuous education and training on environmental protection;
- Creation of environmental departments at public organizations;
- In-service training for managers and specialists of state authorities to improve their qualifications on environmental protection;
- Strengthening the system of staff training with consideration of international good practices and exchange of experts in the framework of cooperation with international organizations and partner countries.

Institutional framework

The Ministry of Education is the main institution in charge of state policy on education in Belarus. The coordination of ESD, training and in-service training of teachers and pedagogical workers at all education levels falls under the responsibility of the Ministry of Education. Under the Ministry of Education, a number of organizations participate in the development of curricula on EE and ESD (figure 12.2).

The curricula for formal education for secondary schools are developed by the National Institute of Education with the involvement of the oblast and Minsk City institutes of education development. In the course of curricula development, the Institute also involves representatives of pre-school, general secondary and special educational institutions.

For the curricula of vocational technical and secondary specialized education, the Republican Centre for Vocational Training, and, for higher education, the Republican Centre of Higher Education, are developing their respective curricula. Draft or amended curricula from these three institutions are presented to the Presidium of the Scientific and Methodological Council at the Ministry of Education which, in its turn, reviews and approves them.

For non-formal education, several institutions can initiate curricula development, including the Ministry of Natural Resources and Environmental Protection, Coordination Council on ESD at the Ministry of Education, Republican Center of Ecology and Local Study and Academy of Post-Diploma Education. Curricula development can also be initiated in the framework of individual projects and local initiatives. The draft curricula and proposals for amendments are consequently presented to the Presidium of the Scientific and Methodological Council for non-formal education, for approval. Based on need, the Ministry of Education can also request the Ministry of Natural Resources and Environmental Protection and Coordination Council on ESD to develop proposals on curricula development.

Following formal approval of curricula by the Ministry of Education, each educational institution develops its individual education programme according to its need, capacity and local specificities.

Informal environmental education is carried out by the Ministry of Natural Resources and Environmental Protection and its territorial bodies, local governments, health-care institutions, public associations, media, museums, libraries and other cultural institutions and organizations of sport and tourism.

One of the main tasks of the Ministry of Natural Resources and Environmental Protection is to contribute to development of system of informal and formal education on environmental protection.

ESD issues are also discussed by the Public Coordination Environmental Council under the Ministry of Natural Resources and Environmental Protection (chapter 1).

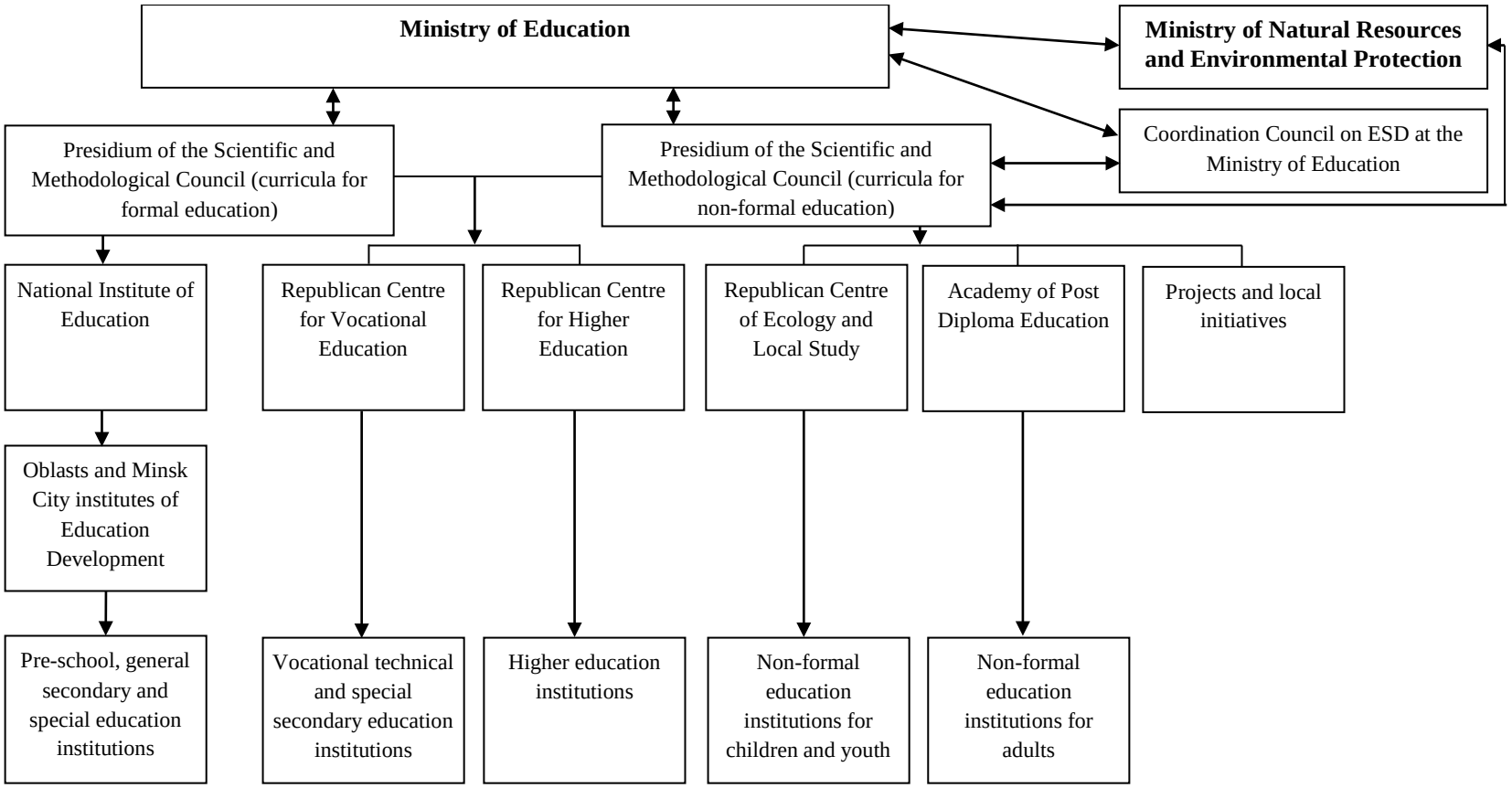
Coordination Centre “Education for Sustainable Development”

A step in promoting ESD in the education system was the establishment of the Coordination Centre “Education for Sustainable Development” in 2007 by the decision of the interministerial Coordination Council. The aim of the Coordination Centre is to carry out scientific research and implementation of the ECE Strategy for ESD, and to develop the national action plans.

The main activities of the Coordination Centre “Education for Sustainable Development” include:

- Supporting activities of the interministerial Coordination Council on ESD at the Ministry of Education;

Figure 12.2: Process of developing curricula that integrate EE and ESD



Source: Ministry of Education, 2015.

- Conducting research, and compilation and dissemination of Belarusian and international experience in ESD;
- Introducing new forms and methods of ESD in the education process;
- Organizing consultations, round tables, seminars and conferences on ESD and related topics, involving all stakeholders.

The Coordination Centre is financed neither by the Government nor by the ISEU, where it is based. As of early 2015, financial support is provided by the School Project for Application of Resources and Energy (SPARE) for office rent and salaries of the professional and support staff.

Interministerial Coordination Council on ESD

To ensure the successful realization of the ECE Strategy for ESD and the National Action Plan on Rational Use of Natural Resources and Environmental Protection for 2006–2010, and with the aim of coordinating the functions of different institutions on ESD, the interministerial Coordination Council was established by the 2006 Order of the Ministry of Education No. 807. The Council is composed of representatives of the Ministry of Education, Ministry of Natural Resources and Environmental Protection, Ministry of Culture, universities, schools, national educational institutions, civil society and mass media. Its composition was changed twice, on 8 April 2011 and 15 April 2014, following structural changes in the ministries and changes of the ministers/deputy ministers. The Council is chaired by the Deputy Minister of Education and is to be convened twice a year. The decisions of the Council are of recommendatory character.

The main functions of the Council are to:

- Provide guidance and proposals to define the main directions of ESD in the national education system;
- Participate in the preparation of national programmes, legal acts and other documents that involve issues concerning the realization of ESD and EE, and propose amendments to the documents;
- Analyse the content of EE and prepare proposals to incorporate elements of ESD into the education system at all levels;
- Define themes for research and methodological work on ESD;
- Study and summarize best experiences on ESD and facilitate the dissemination of best practices throughout the country.

Since its establishment, the Council has convened only two times and it is not known what topics were discussed at the meetings and how outcomes and decisions of the meeting have been followed up. No meeting report or action plan of the Council was available as of early 2015.

Financing

The 2011 Resolution of the Council of Ministers No. 26 established the list of actions for environmental protection and restoration of natural resources to be financed from republican and local budgets, including:

- Organization of training and education on environmental protection and the formation of ecological culture among citizens in educational institutions, in-service training of managers and specialists, including material and technical support to education institutions and organizations;
- Preparation and publication of national reports, statistical bulletins, brochures, training manuals and other materials for the organization of education and informal education activities on environmental protection, rational use of natural resources and sustainable development.

For implementation of the above activities on informal environmental education and public awareness-raising, 1.026 billion roubles (US$195,017) was allocated from the republican budget in 2011, 1.334 billion roubles (US$160,144) in 2012, 1.326 billion roubles (US$148,701) in 2013 and 1.548 billion roubles (US$149,591) in 2014. Most of the financing is used for organization of the Republican Ecological Forum, competitions, “Native Environment” magazine and the annex “Eco environment” to the “National newspaper”.

International cooperation

In 2010, Belarus submitted its national implementation report for Phase II of the ECE Strategy for ESD and in the framework of the UN Decade of ESD. The report covered the period 2005–2010. The main responsible body for the preparation of the report was the Coordination Centre “Education for Sustainable Development” at the International Sakharov Environmental University.

Following submission of the national report, the national action plan on the implementation of the ECE Strategy for ESD was developed and approved by the Vice-Ministers of Natural Resources and Environmental Protection and of Education in

January 2012. The action plan contains specific activities targeted to strengthen the implementation of the Strategy, in particular through improving the institutional, legal and regulatory framework for ESD, advancing research and methodological work on ESD, training and in-service training of educators on ESD, and dissemination of information and raising public awareness and the involvement of civil organizations in the implementation of the Strategy.

Belarus has not submitted the national implementation report for Phase III of the ECE Strategy for ESD, which covers the period 2011–2015.

Projects

With regard to ESD, the state budget is not currently the main source of financing. ESD projects are financed by international and bilateral cooperation organizations, including UNDP, the European Commission, OSCE, and the Governments of Germany, the Netherlands, Norway and Sweden.

Under the project "Following the Strategy on conservation and sustainable use of biological diversity for 2011–2020", the Ministry of Education and Ministry of Natural Resources and Environmental Protection have started the national environmental educational project "Green schools". The objective of the project is to introduce an efficient environment-oriented educational model, with the active involvement of teachers, schoolchildren, parents and local authorities. Within the framework of the EU/UNDP project "Support to the development of a comprehensive framework for international environmental cooperation in Belarus", an elective course has been developed by the Academy of Post-Diploma Education in partnership with school teachers, and officially included on the list of elective courses for all Belarusian schoolchildren.

Another element of the project is to award schools a "Green School" diploma. Each school applying for the award has to meet certain requirements, which include (i) study biodiversity (plant and animal species) around the school and adjacent area and propose protection measures, (ii) study energy and water consumption patterns at home and school and propose ways of reducing it, (iii) analyse sources of waste and identify ways to minimize them, reuse and recycle, and (iv) conduct awareness-raising campaigns in local communities. A school that seeks Green School status should implement and report on a package of activities in the above areas. As of early 2015, 34 educational institutions have received a Green School diploma and 250 schools are participating in the project.

Intensive work on Green Schools network expansion within the EU/UNDP project framework has been carried out in Kobryn (Brest Oblast), Mosty (Grodno Oblast) and Miory and Sharkauschyna (Vitebsk Oblast). Training aids for working with children have been procured, methodological materials have been developed, training workshops for teachers have been conducted and environmental campaigns with schoolchildren's participation have been held.

The objective of the School Project for Application of Resources and Energy (SPARE) is to integrate knowledge on environmental protection, resource and energy efficiency and climate change into the school curriculum. The project is supported by the Norwegian Society for the Conservation of Nature and INFORSE Europe (European Network of Sustainable Energy). Within the scope of the project, annual republican school competitions "Energy and Environment" and "Energy Marathon" are organized (box 12.3). In 2014, 862 pupils' works and 180 teachers' works, from different educational institutions, were presented.

Under the project, energy resource centres were set up in the Republican Centre of Ecology and Local Studies and in the five oblasts, to promote energy conservation by providing educational materials, demonstration sites for the use of solar energy, and classrooms with energy efficient and renewable energy equipment. During the period 2010–2014, a total of 23,250 copies of training materials and manuals were published.

Box 12.3: Energy Marathon in Vitebsk Oblast

It has become a tradition since 2011 to hold an Energy Marathon competition in every oblast. In Vitebsk Oblast, the Energy Marathon is organized with the participation of multiple stakeholders, including local government, public associations, educational institutions, the private sector and participants from abroad who share their experiences of energy efficient technology. On the margins of this event, Vitebsk Institute of Education Development organizes an exhibition of teaching and methodology materials on EE and ESD. At the end of the Energy Marathon, an award is given for the best teaching material, which is then used for elective subjects in secondary schools.

From 2010–2014, 87 seminars and practical training sessions for 1,786 teachers were held in the classroom and at the demonstration site, on waste management, recycling, solar and wind energy and other RES. In 2011, seminars on introducing energy efficiency topics into the teaching process were held for 57 biology teachers. Through these training sessions and seminars, participants were introduced to practical measures that could be implemented in schools to reduce energy consumption. According to questionnaire responses, 546 teachers expressed their interest in conducting elective courses using SPARE materials.

12.10 Conclusions and recommendations

Belarus has progressed in its efforts to integrate environmental education (EE) and education for sustainable development (ESD) elements in formal, non-formal and informal education. Belarus is also putting in place legal and institutional frameworks that support EE and ESD. Significant efforts have been made to integrate ESD into formal education. Research and methodological work on ESD is also advanced in universities and education institutions, and educators are actively involved in discussions on improving teaching methodology.

To a certain extent, ESD has become an integral part of the curricula and teaching materials in the education system at all levels. Sustainable development issues are increasingly covered by mass media, and the activities of civil society and their involvement in raising public awareness have increased. However, no evaluation of progress in development of EE and ESD, and no assessment of their effectiveness, has been undertaken.

Recommendation 12.1:
The Ministry of Education should develop criteria and indicators to assess the progress of implementation of environmental education and education for sustainable development and their effectiveness.

Key sustainable development themes addressed in formal, non-formal and informal education include environmental protection, sustainable use and management of natural resources, environmental ethics, biological and landscape diversity, environmental security, and so on. Although an environmental component largely prevails, there is a noticeable move observed in shifting from environmental to sustainable development topics in the education system. This shift needs to be further strengthened to cover a broader spectrum of sustainable development topics.

Recommendation 12.2:
The Ministry of Education should consider including key sustainable development themes that are currently not prominently covered (e.g., democracy and governance; peace and human security; sustainable consumption and production; and sustainable urbanization) in the curricula and teaching practices on education for sustainable development.

Current in-service training programmes on environmental and sustainable development issues are targeted at civil servants. However, there are no specific in-service training programmes that are tailored to private sector professionals.

Recommendation 12.3:
The Government should consider involving private sector professionals in training and in-service training programmes on sustainable consumption and production, sustainable investment, green procurement and sustainable forestry.

The institutional framework that supports EE and ESD at the national level is weak. The Coordination Centre "Education for Sustainable Development" is not financed by the Government and has to rely on project funding. The interministerial Coordination Council on ESD at the Ministry of Education, established in 2006, has met only two times. Its membership is name based so there have been frequent changes in the composition of the Council.

Recommendation 12.4:
The Government should:

(a) Consider institutionalizing the Coordination Centre "Education for Sustainable Development" under the Ministry of Education;
(b) Review the activities and membership of the interministerial Coordination Council on Education for Sustainable Development so that membership is based on functional titles and regular meetings of the Council are ensured.

Chapter 13

HUMAN SETTLEMENTS AND ENVIRONMENT

13.1 Overview

Population and urbanization

Between 2005 and 2015 the population of Belarus decreased from 9,697,475 to 9,480,868 (by some 2 per cent). The urban population constituted 77.3 per cent. Over the period from the beginning of 2005 to the beginning of 2014, the urban population had increased by 4.4 per cent (from 6,965,365 to 7,274,775). The greatest population increase was in the capital city, Minsk, with 177,209 people, or 10 per cent, having been added in the last decade. The population growth was also marked in five cities that are oblast capitals (Brest, Gomel, Grodno, Mogilev and Vitebsk) and in almost all cities of regional significance (≥ 50,000 people).

Gomel has had the second largest population increase, with 39,274 more people (8 per cent) added over the period from the beginning of 2005 to the beginning of 2014. Cities with ≥ 100,000 residents accommodate about 70 per cent of the country's population, including Minsk and all oblast capitals, as well as Bobruisk, Baranovichi, Borisov, Mozyr, Novopolotsk, Orsha, Pinsk and Soligorsk. At the same time, these settlements account for only 7 per cent of all urban settlements in the country.

The distribution of the urban population within the country's territory is rather uneven, which is reflected at the oblast level. The centre of the country (Minsk Oblast) is the most urbanized part, while the western part (Brest and Grodno oblasts) has the lowest urbanization (69 and 73 per cent, respectively).

The areas comprising the Minsk agglomeration concentrate 37.2 per cent of the country's urban population, most of which is accommodated in the capital city. Grodno Oblast has the lowest share in total urban population (10.6 per cent). Mogilev, Brest and Vitebsk oblasts have almost equal shares in the oblast structure of the country's urban settlements (12–13 per cent).

The population growth in major cities has largely been fuelled by internal migration. Many small and medium-sized cities and rural settlements have experienced population decline, along with the economic decline. In the period 1991–2006, population decline had been noticed in 121 of the 183 small and medium-sized urban settlements of Belarus.

Urban development

Belarus's urban settlement system is represented by 203 settlements, including 113 cities and 90 urban-type settlements. The primary feature of Belarus's urban settlement system is that it is largely (81 per cent) represented by small settlements (≤ 20,000 residents). All in all, these settlements accommodate 17 per cent of the urban population (in 1956, 35.9 per cent).

The national hierarchy of urban settlements has three levels (based on such criteria as population size, level of industrial and social infrastructure development, and state functions realized within the settlement's territory), which is established by the 1998 Law on Administrative–Territorial Division of the Republic of Belarus.

The first level of settlement is the capital city, Minsk. The second-level settlements are cities of oblast subordination (≥ 50,000 residents) functioning as administrative, large economic and cultural centres, and having well-developed industrial and social infrastructure (or those with ≤ 50,000 residents representing administrative, large economic and cultural centres of significant industrial and historical value and potential for future development and population growth).

The third-level settlements include:

- Settlements of rayon significance (≥ 6,000 residents) that have industrial enterprises and a network of sociocultural and housekeeping services (or those with ≤ 6,000 residents with a potential for future development and population growth, industrial enterprises and sociocultural and housekeeping services);
- Urban-type settlements represented by (i) settlements with ≥ 2,000 residents that have industrial, public utilities and sociocultural enterprises as well as retail, public catering and housekeeping enterprises; (ii) resort settlements with ≥ 2,000 residents with health, retail, public catering and housekeeping services, and cultural

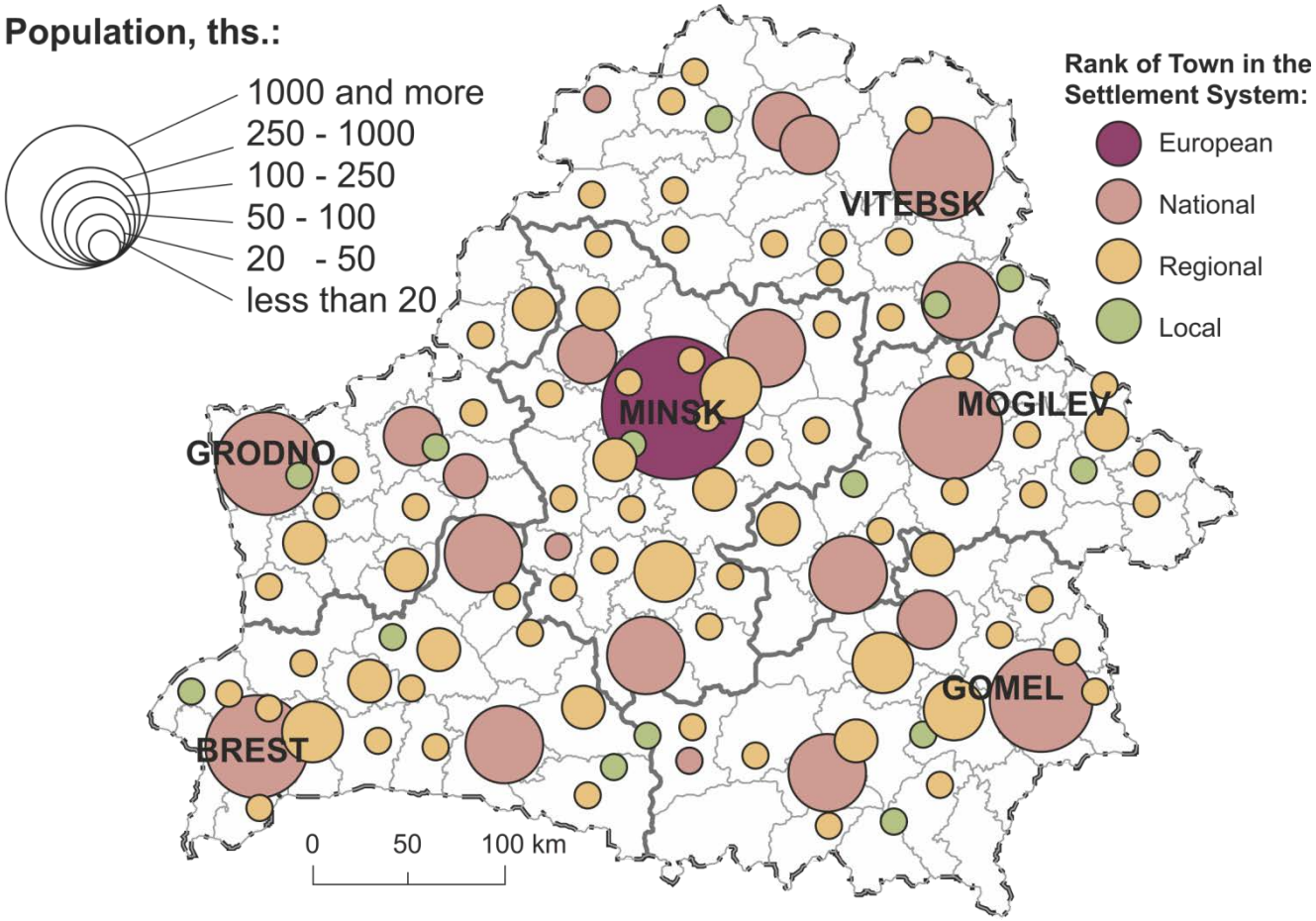
organizations (or those with ≤ 2,000 residents with a potential for future development and population growth and locating the same level of amenities and services); and (iii) townships with ≥ 500 residents linked to nearby industrial enterprises, power stations, construction sites, railway stations and other premises.

The trend in socioeconomic and spatial development over the past decade has been on identifying and realizing the settlements' development potential, with greater attention paid to such factors as the settlement's place in the national settlement hierarchy, functional land use patterns, and interrelationships with the surrounding territories, historical–cultural, tourist–recreational and environmental potential. To reflect this new approach, and on the basis of administrative–territorial division of settlements, an urban settlement typology to support strategic territorial planning and development was developed (map 13.1).

The map establishes:

- 26 settlements of European and national significance, including: one largest European multifunctional settlement (> 1,000,000 residents), the capital city, Minsk; 5 large (250,000–1,000,000) multifunctional settlements (Brest, Vitebsk, Gomel, Grodno, Mogilev); 11 big and 1 medium-sized (100,000–250,000) industrial settlements; 1 medium-sized (20,000–50,000) and 1 smallest (< 5,000) scientific settlements; and 1 medium-sized (20,000–50,000), 2 small (10,000–20,000) and 3 smallest (< 5,000) tourist–recreational and nature protection settlements;
- 89 settlements of regional significance, including: 19 medium-sized (20,000–100,000) and 12 small (5,000–20,000) industrial settlements; 45 small (5,000–20,000) agro-industrial settlements; and 11 small (5,000–20,000) and 2 smallest (> 5,000) tourist–recreational and nature protection settlements;

Map 13.1: Types of urban settlements by population size and role in the urban settlement system



Source: Antipova, E. and Fakeyeva, L. (2012). "Settlement system of Belarus. Spatial and temporal trends at the end of 20th and the beginning of the 21st centuries." *Journal of Settlements and Spatial Planning* 3(2):129–39.
Note: The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.

- 95 settlements of local significance, including: 9 small (5,000–20,000) and 2 smallest (< 5,000) industrial settlements; 18 small (5,000–10,000) and 8 smallest (< 5,000) agro–industrial settlements; 47 smallest (< 5,000) agricultural settlements; and 3 small (5,000–10,000) and 8 smallest (< 5,000) tourist–recreational and nature protection settlements.

Environmental situation by types of urban settlements

The overall environmental situation and specificity of environmental pollution in Belarus's urban settlements is defined by particularities in the distribution and density of objects of anthropogenic impact, differences in functional land use and natural resource consumption.

For example, large and big cities in Belarus have high levels of chemicals in their surface water and groundwater bodies (chapter 5) and air pollution (chapter 4), which is directly related to the high concentration of industrial enterprises, inadequate technical condition of transport and increasing levels of personal car use, and 85 per cent of industrial and municipal waste going to landfills (chapter 6). Other problems involve the extensive territories occupied by industrial enterprises and inadequate territorial organization of transit transport flows, a shortage of green spaces (1.5–2 times less than the legal norm) and of social infrastructure within walking distance of residential areas.

Medium-sized cities are characterized by low-density industrial land use; the high physical depreciation and technological backwardness of industrial enterprises; underused, abandoned areas within the city boundaries; a high level of transport-related air pollution in some of these cities; the lack of accessible sociocultural infrastructure and insufficient development of local road networks; higher levels of physical depreciation of utility systems in contrast to large and big cities; overloaded and inefficient wastewater treatment facilities; and poor utilization of industrial wastes.

Small cities are characterized by technological backwardness and a significant depreciation of their industrial enterprises; the disappearance of locally specific, indigenous production based on the use of local resources; population decline; poor land use management (up to 50 per cent of underdeveloped land within the city boundaries); undeveloped public amenities and utilities; poor sanitary-technical conditions of water intake structures; and low quality housing.

The past decade has seen substantial public investment in small and medium-sized cities to modernize and develop their socioeconomic infrastructure, and thereby improve the material conditions of living and demographic situation in these cities. There are 180 small and medium-sized cities (with ≤ 50,000 residents), which make up 88.7 per cent of the total urban settlements in the country and accommodate 22.6 per cent of the country's urban population.

Vitebsk and Minsk Oblasts have the largest number of these settlements (39 and 37 respectively), while Mogilev and Brest Oblasts have the smallest (21 and 25 respectively). This investment has been framed within specific state programmes. It has provided the basis for other local initiatives aiming to improve the cleanliness of residential and public territories and restore the natural environment.

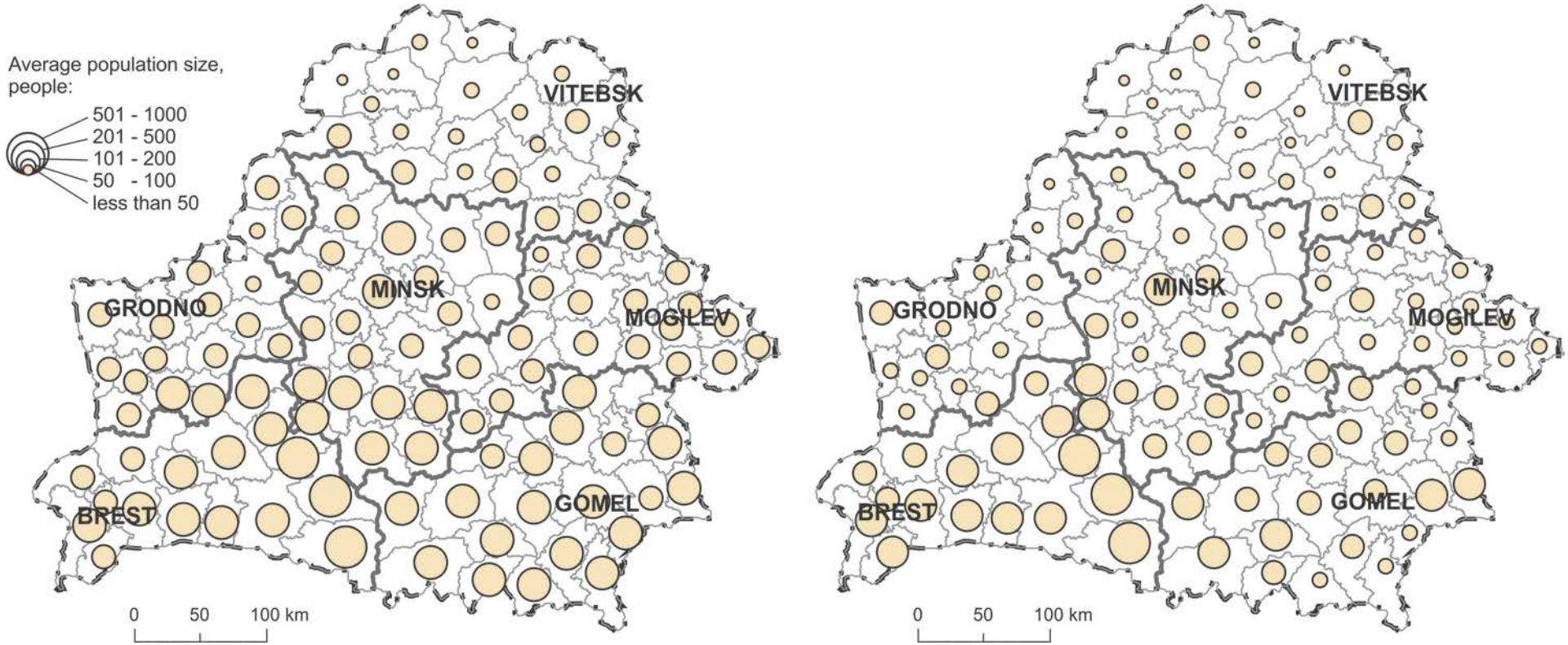
Rural development

In the national settlement system, rural settlements are inextricably intertwined with urban settlements. Rural settlements form groups interlinked with each other and with urban settlements – centres of administrative rayons – through administrative, economic and sociocultural ties and transport networks. There are 23,251 rural localities that, as of early 2014, accommodated 23.2 per cent of Belarus's population.

The rural settlement system is largely comprised of small rural communities. The largest number of small villages with ≤ 100 residents is found in the north, in Vitebsk Oblast, where they constitute 83 per cent of all the oblast's rural settlements. The largest rural settlements are found in Brest and Gomel Oblasts. These settlements have 200–1,000 residents and constitute 36 and 31 per cent, respectively, of all the oblast's rural settlements.

Over the past decade, many rural areas have seen a decrease in their population and have even become abandoned. Map 13.2 demonstrates the extent of the rural settlements' shrinkage in the period 1979–2009. The 2009 census showed that 1,394 rural settlements had lost population. Statistics for the period from the beginning of 2005 to the beginning of 2014 show a decrease in the rural population of 19.7 per cent (from 2,732,110 to 2,193,379). The northern and eastern parts of the country are the most sparsely populated: Vitebsk Oblast has a rural population density of 8.3 people per km^2 and Mogilev Oblast has a rural population density of 9.2 people per km^2 (the average in the country is 12 people per km^2).

Map 13.2: Average population size of the rural localities by rayon, 1979, 2009



Source: Antipova, E., and Fakeyeva, L. (2012). "Settlement system of Belarus. Spatial and temporal trends at the end of 20th and the beginning of the 21st centuries." *Journal of Settlements and Spatial Planning* 3(2):129–39.

Note: The boundaries and names shown on this map do not imply official endorsement or acceptance by the United Nations.

Photo 13: Beautification of urban area, Minsk

The most densely populated oblast is Minsk Oblast (16 people per km^2).

The national rural settlement system is organized at two levels, reflecting the recent transformation of its backbone settlements. The first level is thus represented by new centres of the rural settlement system – large (> 1,000 people), big (500–1,000) and medium-sized (100–500) agro-towns that offer a statutory minimum of industrial and social infrastructure and amenities for their population and for the population of the surrounding territories. The second order involves regular large (> 1,000 people), big (500–1,000), medium-sized (100–500) and small (< 100) rural communities (townships, villages and homesteads).

The optimization of rural settlements and upgrading of infrastructure in central rural communities have been pursued since 2005 through specific state programmes. These efforts have resulted in the formation of more than 1,500 agro-towns, based on the selection of and funding support for existing, more or less economically viable, central settlements of rural councils and homesteads of agricultural organizations. Each agro-town enjoys amenities characteristic of an urban settlement, including clubs, a library, an art school for children, internet cafes, entertainment centres, upper secondary and vocational schools, pre-university training centres and primary education schools.

Agro-towns are considered to provide the residents of the surrounding villages with the required social services within accessible distance. Intensive public investment in these settlements in the period 2007–2010 has helped to address some critical problems and develop important social and business processes and infrastructure.

Spatial planning and housing development

Settlement development in Belarus is organized based on legally binding spatial (territorial) planning documentation. This involves a hierarchy of spatial (territorial) plans developed at national, oblast and local levels in accordance with the Main Directions of the State Urban Development Policy for 2011–2015 and environmental requirements.

These plans include, at the national level, the State Scheme of Comprehensive Territorial Organization (the current one was approved by 2007 Decree of the President No. 19 “On some issues of state urban development policy”); at the regional level, comprehensive territorial organization schemes for oblasts, administrative rayons and special territories; and, at the local level, general plans and detailed development plans. At the beginning of 2015, the comprehensive territorial organization schemes were developed for all six oblasts and more than 20 administrative rayons. More than 150 urban settlements had their general plans updated.

Box 13.1: Development of Minsk agglomeration

The Concept of Development of Satellite Towns of the Minsk City in accordance with Specifics of their Socio-Economic Development was agreed by the Minsk City Council of Deputies and approved by the Minsk Oblast Council of Deputies in March 2015. The document considers the development of several satellite towns of Minsk City. Each satellite town (i.e. Rudensk, Smolevichi, Dzerzhinsk, Fanipol, Zaslavl, Logoysk) will be developed based on its specific socioeconomic potential and comprehensive approach to territorial organization. They are expected to increase their population through the redirection of migration flows from Minsk. It is estimated they could accommodate up to 120,000 residents of the capital city.

The towns are planned to develop a sustainable industrial basis, new affordable housing, engineering and transport infrastructure and a network of social facilities and services. Housing is suggested as a key mechanism and incentive to support the development of Minsk agglomeration. In particular, the current level of housing construction in Minsk will be limited to 500,000 m^2. Concessional lending will be used as an incentive to move to the new towns.

The implementation of spatial planning is ensured through annual sectoral, regional and local plans that are developed by national state administration bodies and local governments within their competences; the development of different guidance notes and urban development procedures; and the compulsory development and approval of planning documentation for construction and investment projects in accordance with spatial plans.

The territorial (spatial) planning of settlement development operates to solve a number of specific challenges, including: (i) development disparities in the urban and rural settlement system (the rapid growth of Minsk City and large cities with 250,000–500,000 residents contrasts with a decline in small cities and rural settlements), (ii) increased demand for green areas, parking spaces and social infrastructure, given increased levels of housing construction in Minsk and large and big cities, (iii) improper development of multi-storey housing in the built-up environment of small cities (≤ 20,000 residents), (iv) increased levels of private car use, requiring extension of the street and road network and transport infrastructure, and development of public transport and parking spaces, and (v) the monotonous built environment constructed in the period 1960–1980 and its inconsistency in the formation of the contemporary built environment, and the disharmony of new construction with the surrounding natural environment. Principles and pathways to respond to the identified problems are considered in the relevant policy documents.

In practice, the territorial planning of settlement development has mainly focused on the development of settlements that have special development conditions as they represent so-called growth points, as well as settlements located in the area of radioactive contamination. The former include (i) urban settlements located on a key axis of land transport for industrial and commercial goods (trans-European transport corridor, and (ii) settlements defined as axes of urbanization (Baranovichi, Borisov, Brest, Orsha, Minsk, settlements of regional and local significance within the transport corridor) or settlements of metropolitan agglomeration (i.e. Minsk agglomeration). The latter category considers settlements in the special region affected by the Chernobyl NPP accident.

Since 2007, activities in the axes of urbanization have involved major technological modernization of industrial–economic complexes, development of the service economy, development of transport distribution hubs, environmental protection initiatives, and the upgrading of industrial, research, sport, recreational and other facilities (for small cities of the axes).

The Concept of Development of Satellite Towns of the Minsk City in accordance with Specifics of their Socio-Economic Development has been approved in March 2015 as a follow-up to the 2014 Decree of the President No. 214 “On development of satellite towns” (box 13.1). The settlements of the special region are expected to undergo ecological-technological modernization of their industries; they can develop industries for recycling of industrial, military and other special waste, build research centres to monitor and develop measures on environmental rehabilitation and special social infrastructure, as well as introduce compact development of settlements on underused land that is free from pollution.

A particular emphasis in spatial planning is given to improving the quality of the living environment in the country. This has been pursued through improvements in the territorial organization of housing, including more efficient use of existing territories, new energy- and resource-efficient architectural, planning and engineering solutions, reconstruction of old housing to energy efficient standards, development of modern quality midrise dwellings, new housing construction, reconstruction

and maintenance; territorial organization of social infrastructure through development of standard social infrastructure complexes, with progress especially noticeable in agro-towns; reconstruction and extension of transport networks; reconstruction of existing and construction of alternative energy sources, reconstruction of electricity supply lines, increasing the energy efficiency of energy supply and consumption systems; organization of regional systems of municipal waste collection, systems of collection of recyclable materials, organization of systematic control over mini-dumpsites in rural settlements; and development of complementary stationary and mobile communications systems.

The development and implementation of spatial (territorial) planning initiatives remains a challenging task, however, as reflected in the persistence of the identified problems in the territorial organization of settlements. The existing territorial planning approaches do not sufficiently reflect the internationally accepted principles of territorial planning[9] as a bottom-up exercise mainly driven at city level, and of planning as a dynamic and integrative decision-making process that addresses competing interests and is linked to a shared vision and an overall development strategy elaborated at both national and local levels.

At the level of the territorial organization of Belarus, a growth-oriented or "polarized territorial development" (rather than sustainability) approach persists, as reflected in the selection and development of economically viable territories. Planning approaches, measures and specifics in the sustainability transition of small and medium-sized cities, which represent the backbone of the national settlement system, remain unclear.

Challenges also remain in achieving the efficient territorial organization of cities and rural settlements, including the existence of underused brownfields, abandoned sites, allocation of green spaces for construction, transport congestion and shortages of transport infrastructure, shortages of social infrastructure, etc. There is a problem with comprehensive development of new residential areas as well as improper use of public/green spaces within existing residential areas. Cases also exist of urban plans being corrected *post factum* to accommodate projects developed "in excess" of the planning regulations. Furthermore, the process of planning remains monopolized by specialized planning institutions, with inadequate engagement of local communities. In fact, the process of spatial planning is seen as requiring professional rather than local community judgement.

Many interesting concepts for improving the territorial organization of cities are now being developed in the country (box 13.2). In recent years, some cities in Belarus have become pioneers in integrating some elements of a green city approach into their urban planning and development practices to address some of the problems they face in a more systematic, integrated way (box 13.3.).

Housing stock

By 2015, Belarus's national housing stock amounted to 247.7 million m^2, of which 172.3 million m^2 was urban and 75.5 million m^2 was rural. Multifamily housing constitutes about 140 million m^2, or 60 per cent of the total. Private dwellings made up 89.5 per cent of the total housing. By the end of 2013, the country had 4.1 million dwellings (residential units), including 2.9 million dwellings in urban settlements, and 1.2 million in rural settlements.

The housing sector is the biggest energy consumer in the country, with about a 32 per cent share. This share is constantly increasing, which is associated with increased levels of new housing construction. This is reflected in the Integrated programme for design, construction and reconstruction of energy efficient residential buildings in the Republic of Belarus for 2009–2010 and until 2020, approved by the 2009 Resolution of the Council of Ministers No. 706.

About 60 per cent of the existing dwellings were built in the period 1961–1991; they are largely prefabricated panel dwellings with high thermal energy consumption (about 150–200 kWh/m^2). Thermal modernization of housing has been an established practice in Belarus since at least 2003.

The cost of the reconstruction is estimated to be 60 per cent of the construction cost of new energy efficient housing. In the period 2006–2014, 7 million m^2 of the total floor area of residential buildings have been modernized to the new thermal standards, leading, on average, to a reduction in thermal energy use to 80 kWh/m^2.

[9] The approaches to urban planning are outlined in the International Guidelines on Urban and Territorial Planning, adopted by Resolution 25/6 of the UN-Habitat Governing Council in April 2015 (http://unhabitat.org/development-of-international-guidelines-on-urban-and-territorial-planning/).

Box 13.2: Adjusting the Soviet micro-rayon approach in Belarus

The contemporary development of residential space has been associated with a number of problems, including overscaled housing, functional and psychological discomfort, insufficient greening, underused curtilage and underground spaces, a lack of variety in dwelling design, ecological problems (air pollution by transport), a lack of cultural and leisure facilities, a lack of a comprehensive approach to housing development (parallel provision of social infrastructure and site beautification) and dependence of buildings on centralized, extensive utility networks, etc.

In response to this situation, a multifunctional module approach to mass housing has been suggested for practical implementation in Belarus, since 2013. This approach represents the product of collaborative work of many national and international experts working in different fields (transport, ecology, engineering, energy efficiency, spatial planning, etc.). It combines new and old Soviet-era "micro-rayon" solutions, including territory of a smaller size (15–20 ha vs 50 ha), housing with a reduced number of storeys (≤ 5), more compact development, underground parking to provide more space for common areas, job opportunities within walking distance in ecologically friendly industries, energy efficient buildings, and a choice of centralized or decentralized utility systems. Emphasis is given to the development of intimate spaces with good quality infrastructure and amenities. As in previous practice, each block in the module is planned to have green spaces for recreation, inbuilt groundfloor spaces for social–household services and educational and operational premises, and inground parking.

Box 13.3: Green city approach to urban development for small and medium-sized cities

Since 2014, with international support, Belarus has been developing the Project on Green Cities of Belarus – Supporting "Green" Urban Development in Belarus's Small and Medium-sized Cities. This project is expected to last five years and involves three cities (Novogrudok, Novopolotsk and Polotsk) as pilot projects for realizing some elements of a "green city" approach to urban development.

The planned activities will include promotion and introduction of sustainable transport in Novopolotsk and Polotsk, and assistance with increasing energy efficiency in Novogrudok. The results of these projects are expected to provide best practices that will be adopted in at least five other cities in Belarus. The project will also include a proposal for a national plan of green urban development that would consider all aspects in the development of cities resilient to climate change. These aspects include increased energy efficiency, renewable energy and sustainable transport.

The technical and structural solutions that are used involve the overhaul and modernization of internal and external engineering systems, overhaul and electricity works, landscaping, interior work, roof repair with heat insulation and thermal modernization. About 70 per cent of the required funding comes from both the national and local budgets, while the rest is covered by the residents.

However, the "old" dwellings have structural limits for further thermal energy reduction, that is, it is not possible to install heat recovery ventilation or individual heat meters (box 13.4). Despite these repairs, a large number of "khrushevki" still require urgent repairs. In 2013, it was estimated that only 36 per cent of the housing stock that required major repairs had actually undergone major repairs.

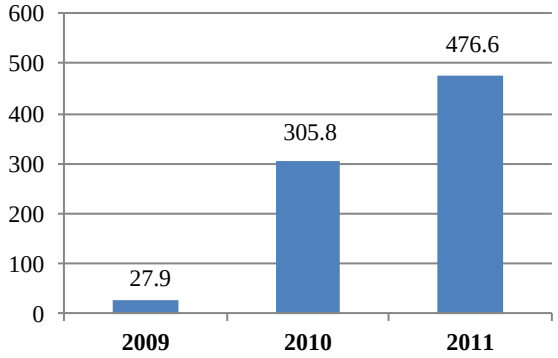
Recent years have seen annual new and rehabilitated housing output of 3.5–4.0 million m^2. In respect of MDG Target 7.D: By 2020, to have achieved a significant improvement in the lives of at least 100 million slum dwellers, Belarus's indicator has increased from 22.9 m^2 of residential floor area per capita in 2005 to 26.1 m^2 in 2014.

Figure 13.1 demonstrates actual energy efficient housing output in the period 2009–2011. The new energy efficient housing output in 2009 and 2010 followed the planned volumes of the Integrated programme for design, construction and reconstruction of energy efficient residential buildings in the Republic of Belarus for 2009–2010 and until 2020. However, in 2011, it was 20 per cent less than the planned 600,000 m^2.

The statutory requirements for heat are provided in TCP 45–2.04–196–2010 "Thermal Protection of Buildings. Heat and Energy Characteristics. Rules and Definitions". These norms depend on the type of residential building and structural solutions used (i.e. heat recovery ventilation). For residential buildings, these norms are 48–96 kWh/m^2/year or 38–44 kWh/m^2/year if heat recovery ventilation is used. The norm in both cases depends on the number of floors.

The above programme on energy efficient housing aspires to a reduction in heat consumption to 60 kWh/m^2/year. Energy efficient practice over the period 2007–2014 has resulted in 9 per cent of the national housing stock, or 1.6 million m^2, having been built to the thermal energy standard of less than 90 kWh/m^2.

Figure 13.1: Energy efficient housing built in Belarus in 2009–2011, thousand m^2



Source: Energy efficiency in residential housing: Country dossier Belarus, ARCEE, 2013.

Belarus's energy efficient practice is still evolving and may be improved through systematic introduction of integrated solutions that would optimize the different elements of a building to maximize energy efficiency and through the use of instructions for practitioners and education materials for the residents of the energy efficient dwellings.

There are problems with air circulation in renovated housing. Moreover, low utility tariffs discourage energy saving.

There is a predominant focus in energy efficient practice on improving the thermal resistance of walls and other structures, with yet limited application of other possible structural and technical solutions (architectural–spatial solutions, installation of heat recovery ventilation, or use of the thermal potential of sewerage, soil and sun).

There is a shortage of technical norms, standards and manuals to advance such comprehensive energy efficient solutions.

Life-cycle assessment and the development of a national data base to support it have not yet been considered in Belarus's energy efficient practice and integrated into energy efficiency regulations for the construction of new buildings and maintenance, refurbishment and replacement of existing buildings. Life-cycle assessment provides a comprehensive approach to accurate evaluation of the overall energy and carbon status of an energy efficient building and of cost effective solutions, by taking into account the building's complete life cycle.

The lack of practical guidance for practitioners and education materials for residents have been reflected in poor quality installation of energy efficient technologies in dwellings and construction works – there is a mismatch between project design and implementation. Cases of improper use of energy efficient technologies by residents have also been reported.

In 2012–2016, the UNDP/GEF international assistance project "Improving Energy Efficiency in Residential Buildings in the Republic of Belarus" focuses on development and effective implementation of new methods in design and construction norms for residential buildings as well as issues on energy efficiency certification of buildings.

Infrastructure

Electricity and heat

The heat and electricity infrastructure of settlements is defined by master plans in accordance with schemes and programmes for modernization and development of national electricity systems, general schemes for location of electricity generation facilities, and interregional and regional schemes for heat supply.

According to the 2009 population census, central heating was provided for 80.9 per cent of households living in urban settlements and 13.9 per cent of households in rural settlements. Central heating supply for urban housing increased from 88 per cent in 2005 to 89.8 per cent in 2013. In the same period, central heating for rural housing increased from 26.5 per cent in 2005 to 38.3 per cent in 2013. Central heating provision is uneven; even in major cities, it varies between about 86 per cent and almost 100 per cent. As shown in the census, in urban areas, stove heating is used by 7.7 per cent of the population, in contrast to 62.3 per cent in rural settlements. There are no data on individual households' gas and electricity heating.

While their capacity is sufficient to meet energy needs, electricity and heat supply systems are significantly technologically backward and are physically depreciated (up to 80 per cent in some settlements), which puts them at high risk of technological failure and accident. Most of the existing heat supply systems are designed and run as dependent systems, with heat supply equally divided between the CHP sources and local boiler facilities.

Box 13.4: Further possibilities for thermal energy reduction in Belarus

Research conducted in the country over the period 2006–2014 considers the possibility of thermal energy reduction in dwellings to 30 kWh/m^2. This shift, however, requires improvement in energy efficient engineering systems, including heat recovery ventilation, energy efficient glazing, heating systems with horizontal distribution, autonomous heat use metering, individual temperature and ventilation control systems and building management systems.

Some studies also consider the possibility of passive housing in Belarus, allowing a reduction in thermal energy use to 15 kWh/m^2. This requires further solutions, that is, heat recovery ventilation and use of renewable energy.

In some places, heat supply facilities have surplus capacity and extensive inefficient heat transmission networks. The weakest component in the electricity system remains the 0.4–10 kV electricity distribution networks, which are substantially physically depreciated. About 45 per cent of these networks have not seen repairs for 30 years. However, these networks play a paramount role in the reliability of energy supply.

The heat and electricity systems are also fuel resource intensive; the boiler-burner fuel used in heat supply systems accounts for more than 40 per cent of the fuel balance in the country. The main fuel used in electricity and heat supply is natural gas (92 per cent), with a small share of fuel oil, biomass and secondary heat resources.

The past decade has seen consistent government efforts to improve the capacity, reliability and energy efficiency of heat and electricity systems in the country. At the settlement level, these initiatives have been largely pursued within the relevant national programmes and the programmes and actions of the housing and utilities sector, as well as through activities of other sector organizations located in settlements (e.g. agricultural, social services).

The following actions have been implemented to raise reliability and efficiency of heat and electricity supply systems: replacement (using advanced technologies) and removal of old heat supply lines; decentralization of heat and electricity supply by development of mini-CHP stations in small cites; development of individual heating for individual and multifamily housing; the limitation of construction of new and renovation of existing boilers that use gas, coal and residual oil; conversion of boilers to mini-CHP stations; increasing the share of local fuels in local energy systems; construction of biogas, hydro and wind energy generating facilities; replacement of pumping equipment in water–sewerage and heat supply systems to improve their energy efficiency; development of small-scale low carbon and renewable electricity generating sources linked to the national power systems; reconstruction of the 0.4–10 kV distribution networks; equipping the electricity backbone and distribution lines with smart emergency and performance control systems; development and modernization of electricity grid facilities and reduction of electricity loses in the electricity network by 2 per cent; and the installation of energy efficient lighting (streets, buildings).

Between 2007 and 2013, actions in the housing and utilities sector have achieved the replacement of heat distribution lines at the required annual 4 per cent, with 23 per cent of the heat distribution lines overall having been improved in this period. However, heat transportation losses remain at about 19 per cent, which necessitates further action in this field. In the same period, reduction in the wear and tear of the electricity systems by 13 per cent (from 61 per cent in 2007 to 48 per cent in 2013) has been achieved.

The concept of the long-term development of the 0.4–10 kV electricity distribution network is currently being prepared in the country. This concept is a response to the lack of consistent technological policy and a technical-normative basis defining standards for the distribution network. In the current conditions of changing electricity demand in different settlements, this concept reflects the need for transformation of the scheme and parameters of the electricity distribution systems and their efficient management.

The development of local RES remains rather limited. In 2013, there were 277 operating facilities, including 199 wood and other type of biomass energy, 40 hydro energy, 14 biogas, 14 solar energy, seven wind energy and three geothermal energy facilities. By 2014, 17 automated mini-CHP stations utilizing domestic fuels had been built. A number of incentives have been used to promote these initiatives. These include “green tariffs”, also known as feed-in tariffs (a multiplier of 1.3 to the tariff for green electricity production for a 10 year period (chapter 3)) and tax concessions for investors. Work is underway on the replacement of 35 kV by 110 kV power networks, which is expected to reduce energy loses and capital investments. Other measures have included the introduction in 2013 of a differentiated tariff to stimulate electricity saving based on the

volume of consumption and to shift consumption to the period of minimal electricity demand.

The installation of group and individual heat meters (mainly in new buildings) and automated heat use control systems has been undertaken for many years. Today, the heat tariffs charged to the population recover between 11–25 per cent of the utility costs, depending on the heat provider and technologies used. To stimulate energy saving, the country's tariff policy considers a gradual transition to the full coverage of utility costs by the population.

All modernization activities on the electricity and heat supply systems are considered based on the settlements' energy supply schemes, which have being developed throughout the country since at least 2011. The development of heat supply systems is now based on TCP 45–4.02–204–2010 "Heat Supply Schemes of Settlements. Design Rules", which considers the development of these schemes based on actual heat consumption data. All cities in Belarus now have their heating system modernization programmes based on their heat supply schemes.

Water supply, sewerage and wastewater treatment

Water utilities are the main users of water resources; in 2013, water consumed by the population accounted for 35 per cent of all the water used in the country. Over the last 15 years, Belarus has undertaken systematic improvements in its water and wastewater systems, based in part on environmental considerations. The country plans to extend centralized water supply to up to 98 per cent of the population in urban settlements and 80 per cent in agro-villages, reduce water consumption by universal installation of individual water meters, reduce water transport losses by 5 per cent by 2016 through replacement/repair of water transmission networks, localize industrial wastewater treatment facilities to ensure wastewater is purified before discharge into a municipal sewerage system, and better control and perform local monitoring of water supply and wastewater treatment systems.

In the period 2005–2013, an additional 2 per cent of urban housing and 11 per cent of rural housing was connected to a centralized water and wastewater system, with total coverage at 88 per cent for urban housing and 40–44 per cent for rural housing. The installation of water meters helped to halve water use for the period 2000–2011. In 2010, water consumption in Belarus, at 140–150 l/person/day, was already close to the European level of 130–180 l/person/day.

The quality of drinking water has been improved in many urban and rural settlements, through the construction of artesian wells. However, these systems remain energy intensive (i.e. for water intake only, 0.8–1.8 kWh/m^3). Furthermore, many rural and urban settlements (e.g. Nesvizh and Snov) have modernized their iron removal stations. Wastewater treatment is implemented in all large cities and in the majority of medium-sized cities.

Despite the positive changes in settlements' water and wastewater systems over the last decade, a number of issues remain, including:

- Existing wastewater treatment facilities have limited capacity for dealing with industrial wastewater discharges, particularly biogenic substances, nitrogen and phosphorus, but also casein, which comes from milk processing plants;
- Collection and disposal of surface runoff have largely been provided in major industrial cities, cities of regional and oblast significance and new settlements. In big cities and cities–industrial centres, surface runoff contains high volumes of polluted wastewater that runs into water bodies without any treatment;
- Water and sewerage systems are, in general, characterized by high wear and tear (59–64 per cent) and poor carrying capacity, which increases water transmission loses. While medium-sized and large cities generally enjoy good quality sewerage treatment facilities, their wastewater collection networks are often in a poor physical state. Wastewater systems of small cities normally require substantial repair and technical and technological modernization, which means the quality of sewerage treatment is low, leading to insufficiently purified wastewater being discharged into water bodies.

There is low provision of centralized water and sewerage systems in small urban and rural settlements. Only 40–44 per cent of rural housing is connected to centralized systems.

Waste collection and separation

About 19 million m^3 of solid and 1.6 million m^3 of liquid municipal waste are removed from Belarus's settlements each year (table 6.1). Statistics show that the volume of such waste is constantly increasing. The leading position in waste generation is taken by Minsk City and Minsk Oblast. About 67 per cent of the removed municipal waste is generated by the population (waste from consumption). The bulk of municipal waste (about 90 per cent) goes to MSW

landfills, while liquid waste is neutralized together with wastewater.

There are 170 MSW landfills in Belarus, which serve oblast and rayon centres as well as large urban settlements (table 6.3). Each administrative rayon has one or, rarely, two or three such landfills (chapter 6). The centralized removal of municipal waste is also available to rural settlements.

Despite the construction of landfills and creation of waste deposits with simplified control, illegal waste dumping around cities, rural settlements and gardening cooperatives is still in place. In 2010, special inspections of about 15,000 waste dumpsites were conducted throughout the country, which revealed 1,121 cases of illegal dumping.

In recent years, there has been strong emphasis on the extraction of secondary materials from municipal waste mostly for environmental reasons. More efficient sorting and transfer stations are now being built, allowing the sorting of 100 per cent of MSW. More than 70,000 tons of secondary resources (paper, cardboard and textiles) are collected annually through the receiving centres of municipal utilities. There are now 88 waste recycling plants, which operate in all large and medium-sized cities, including Brest, Baranovichi, Gomel, Mogilev and Novopolotsk. There is a positive dynamic reflected in the increase in the share of secondary resource extraction (more than 30 per cent). The separate collection of municipal waste is now available for 74 per cent of the population and involves reception centres and special containers. At the same time, collection has not been very efficient. The population recycles waste voluntarily, since no economic incentives exist. A waste separation culture has not yet been entrenched. The numbers of special containers do not often match the housing density.

Public transport and mobility

Since 2005, significant investments have been made towards improving the comfort, accessibility, efficiency and choice of public transport in and between settlements. The actions have largely involved the upgrading of settlements' bus, trolleybus and tram fleets, which were characterized by high wear and tear. For example, about 70 per cent of the bus fleets in 2003 needed major repairs or scrapping. As a result of government actions, the number of buses in operation for up to three years has increased, accounting for 44 per cent of the fleet in 2014 (compared with 18 per cent a decade ago). Buses in operation for more than 10 years accounted for 25 per cent of the fleet in 2014 (about 62 per cent in 2004).

These measures have also been accompanied by an annual reduction of vehicles with Euro 0, 1, and 2 environmental standards. Furthermore, modern automated control systems for municipal and regional public transport routes have also being installed, including passenger counting, payment control, and fuel and lubricant usage control systems.

Since 2010, there has been some increase in passenger transportation by public transport. In 2011, three in every four journeys were made using public transport – on average, 240 journeys per person per year. The economically active population, who primarily reside in cities, used public transport even more intensively, making about 750–800 journeys per person per year. Minsk City stands out as it offers a wider public transportation choice, including the metro.

Furthermore, in recent years, the popularity of cycling in major cities has increased, while it has long been a popular type of mobility in small urban and rural settlements (chapter 4). Some large and big cities are now giving greater attention to building cycling infrastructure, including cycle paths and parking, allocation of a separate line on sidewalks, and cycling signs, marking and pictograms. New residential areas of Minsk and some other cities now have cycle paths. Some parts of the main intercity routes have cycle paths.

Plans for cycling infrastructure are normally developed at the local level in accordance with general plans. Some aspects of cycling infrastructure have been briefly reflected at the national level, for instance, the 2014 Decree of the President No. 483 provides for road marking for cyclists.

Initiatives in developing cycling infrastructure in Belarus's settlements have also been taken by local NGOs and individual organizations, for example, the large-scale programme "Velocity" has being realized by Velcom since 2013 in Brest, Gomel, Minsk and Mogilev. The NGO fund "Ecological Transport" suggests independent programmes that jointly consider the organization of cycling and solutions for parking problems in major cities, to provide space for cycling.

Perhaps, today's major environmental challenge in the context of mobility organization in Belarus's settlements is an increasing use of personal cars. In 2013, there were 282 cars per 1,000 people – every fourth resident of the Republic had a personal car.

The highest level of personal car use is registered in Minsk City; in 2013, there were 310 cars per 1,000 residents. While high car use reflects the growing economic well-being, it adds to air and noise pollution in settlements (as confirmed by air quality monitoring in cities and regions). Furthermore, it leads to traffic congestion and a shortage of parking spaces and garages.

The organization of parking is a serious problem in large and big cities, as reflected in widespread violation of parking rules in these cities by car owners, including encroaching on public spaces and the curtilages of buildings. This problem is also complemented by the overpriced and inefficient private parking spaces that exist. For example, in Minsk alone there are now 712,000 private cars but only 642 parking places, which can accommodate 91,000 cars. There are also 15,000 temporary parking places that can accommodate 191,500 cars.

In this context, there is growing interest among local authorities in Belarus in developing their local mobility plans. For example, Polotsk city's mobility plan, currently under development, envisages the integrated development of different urban mobility modes and the optimization of transport routes (box 13.5).

Social services

While cities of national and regional importance have well-developed social infrastructure, it is not always the case for small urban settlements. There are significant differences in social service provision between urban and rural settlements. The latter have experienced a deterioration of social services and infrastructure. Statistics on the commissioning of healthcare facilities reveal that, in general, there has been a substantial increase in the provision of new hospital beds in Belarus (from 210 in 2005 to 1,027 in 2012) but, for rural settlements, there were 25 new hospital beds provided in 2005, 162 in 2010 and only 6 in 2012.

In 2005, the provision of preschool education facilities for 1- to 5-year-olds in urban settlements was 913 places per 1,000 pupils, while rural settlements had only 617 places per 1,000 pupils. In 2013, there were 736 places per 1,000 pupils in urban settlements and 537 places per 1,000 pupils in rural settlements.

The period from 2005–2013 also saw a reduction in cultural facilities in both urban and rural settlements. This included a reduction in the number of libraries from 974 in 2005 to 705 in 2013 (or by 28 per cent) in urban settlements and from 3,610 in 2005 to 2,753 (or by 24 per cent) in rural areas (which may, however, be related to improved access to the Internet); while the number of clubs had remained approximately the same in urban settlements, it had been reduced in rural settlements from 3,548 in 2005 to 2,742 in 2013 (or by 23 per cent). There are no separate statistics for urban and rural settlements regarding theatres, concert halls, museums, zoos and circuses but, in general, they have been maintained at the same or slightly higher levels.

This situation has been noticeably changing over recent years, given the Government's commitment to improving social infrastructure, specifically for medium-sized, small and rural settlements. Much effort has also been put into developing an integrated infrastructure for the elderly, disabled and other vulnerable groups. These specific services include advisory and information services, material and financial support, temporary shelter, social welfare institutions and housekeeping services.

The newly formed agro-towns have experienced a massive transformation in the quality of their social infrastructure, through upgrading the living conditions to the standards of urban settlements. More than 1,500 agro-towns now enjoy a new range of services, including a swimming pool, art school for children, fitness centre, upgraded medical services and laundry.

Belarus's large and big cities have experienced increased levels and pace of mass housing construction (especially Minsk), which has not been matched with the provision of the required social infrastructure. In 2013, amendments were made to ensure the integrated development of multifamily housing in accordance with the 2006 Decree of the President No. 72 "On measures for the state regulation of location and organisation of the construction of residential buildings, utilities, transport and social infrastructure". According to the Decree, a minimum set of social facilities must now be ensured at the project design stage or provided with the construction of the first dwelling.

In recent years, to support Belarus's sustainability transition, new services have emerged at the local level to advance environmental issues. These services involve the establishment in urban and rural communities of info-rooms (info-points) to popularize and mobilize local stakeholders for the adoption and realization of sustainable development practices (including Local Agenda 21) and to raise the environmental and sustainability literacy of local residents.

Box 13.5: Sustainable Urban Mobility Plan, Polotsk

Polotsk is the first among 11 cities in Belarus to join the EU initiative of the Covenant of Mayors, a network of local and regional authorities that commit to sustainable energy policies to reduce their energy consumption and CO_2 emissions by 20 per cent by 2020. Polotsk had seen the doubling of personal car use in just six years – from 158 cars per 1,000 residents in 2004 to 320 cars in 2010, while the number of municipal buses had been reduced by one third (from 1,500 to 1,000) in the same period. At the same time, cycling had gained in popularity. However, the city's master plan did not accommodate these trends. Car traffic intensity caused significant environmental, safety and economic consequences and required effective solutions.

Since 2014, with EU funding, a local NGO (Foundation "Interakcia") has been working with the Polotsk authorities, experts and residents on optimization of the city's transport system. The aim is to strengthen the capacity of local authorities, NGOs and other stakeholders in planning for sustainable urban mobility in Polotsk, and to increase the role of the public and NGOs in adoption, implementation and evaluation of collaborative decisions on urban mobility planning in the city. These activities are to be integrated into the city's master plan. The development of a "sustainable urban mobility plan" considers specifically the launch of light rail transit to Novopolotsk, and the development of cycle lanes, pedestrian paths, parking and transport interchanges.

The following achievements have been made on this project: (i) establishment of a working group to guide work on the plan, which includes representatives of Polotsk rayon executive committee, public utilities, NGOs, leaders of online cycle communities of Polotsk and Novopolotsk, and students of Polotsk State University, (ii) appointment of specific organizations to prepare the text and technical solutions for the plan, and (iii) awareness-raising through local news media and online media.

A substantial contribution to the development of such info-points has been made within the project "Leveraging Partnerships for Sustainable Development in Rural Belarus", supported by the EU and Eurasia Foundation. This project has led to the establishment of info-rooms in six locations, namely, Vileyka city, the urban-type settlements Zelva and Zhelyudok, and agro-towns Motole, Rakov and Vidonlya. These info-rooms provide a positive example of self-organization at the local level, which can be integrated into the organizational structure of the local administration to ensure effective implementation of sustainable development at this immediate level.

In 2014, the first public advisory centre on energy efficiency and renewable energy was established in Minsk by the Centre for Environmental Solutions to provide free advice and services (e.g. energy audit) to households and businesses.

Green spaces (recreation zones/landscape-recreational territories)

The notion of "green spaces" is reflected in the legislation of Belarus by the terms "recreation zones" (as in the 2004 Law on Architectural, Urban Planning and Construction Activities) and "landscape-recreational territories" (as in the 2003 Decree of the President No.165 and TCP 45-3.01-116-2008).

The development of green spaces in Belarus's settlements is regulated by technical regulatory legal acts which cover the overall level of green spaces in a settlement, the level of green spaces in residential areas, the level of communal green areas, the ratio of different elements of green spaces (lawns, trees, bushes) in different functional zones, distances between tree and bush plantings and buildings, roads, structures and utilities, etc.

Green spaces should constitute 30 per cent of the settlement's territory and no less than 25 per cent in residential areas and micro-rayons. The improvement/extension of green spaces is normally reflected in a settlement's master plan and plan for green spaces, which consider the existing green spaces and required actions.

Green spaces of settlements include forested areas, parks and mini-parks, avenue trees and green zones (green belts). The major categories are (i) spaces for communal use, (ii) spaces of schools, universities, enterprises and other administrative buildings, (iii) special spaces with research, conservation and sanitary functions, and (iv) planted vegetation in streets and squares. All other green spaces within a settlement's boundary are defined as "reserved areas" for expansion of the main categories.

In practice, the availability and quality of green spaces differ across settlements. While some settlements may meet or even exceed the legal norm, many cities lag behind considerably. For example, Gomel Oblast has only two cities with green spaces above the statutory level (Mozyr, 52.7 per cent and Rechitsa, 46.2 per cent) and a substantial number of cities that fall below this norm (e.g. Petrikov, 4.4 per cent; Chechersk, 8.7 per cent; Dobrush, 8.8 per cent; and Gomel, 17.5 per cent).

Furthermore, settlements' green spaces do not often meet the quality standards, including, for example, for stand structure, species range and tree age. Green spaces in major cities have also come under specific pressure from increased construction, including the curtilages of multifamily houses. Intensified economic and recreational activities within the green belts or zones of cities, especially in peak summer seasons, have certain environmental consequences, including illegal waste dumping, new construction, forest landgrabbing for gardening, growing numbers of feral pets, and synanthropic birds and rodents. These problems are related to insufficient regulation of the recreational use of green belts, which is only provided at the level of technical regulatory legal acts, for example, TCP 45–3.01–116–2008 "Urban Development. Settlements. Design and Construction Norms"; GOST 17.6.3.01–78 "Nature Protection. Flora. Protection and Rational Use of the Forest of the Green Zones. General Requirements"; and Industry-Specific Construction Code 3–84/Gosgrazhdanstroy "The Scope, Development Procedures, Coordination, and Approval of Construction Documentation for the Green Belts of Cities".

While the Law on Architectural, Urban Planning and Construction Activities considers the use of green belts for recreation, it does not provide for the legal regime of different types of natural recreation in the city's green belts. There are gaps in the legislation to ensure better protection and rational use of cities' green zones. There is a need for specific rules for forestry management and agricultural production, penalties for breaking nature protection rules and, importantly, strict public control of the implementation of the existing nature protection rules by the relevant authorities.

The environmental benefits of settlements' "reserved areas" (those unsuitable for development) and areas for settlement expansion are not given proper attention. These are often areas nurturing natural vegetation communities. Such areas have a soil-stabilizing, water and nature protection function and are therefore important for the conservation of biodiversity and landscape diversity. This potential has not usually been assessed before integrating these areas into urban development plans.

13.2 Environmental pressures from human settlements

Water

The existing water and sewerage systems in Belarus's settlements were mainly constructed in the 1970s–1980s. The intensive operation of these systems for the last 20–30 years, together with limited funding for their repair, have led to their poor technical condition, which poses certain ecological risks. During the last decade, activities in the sector have particularly focused on improvements of technical conditions of the water supply systems and increasing water use efficiency. More than half of the water intake is abstracted from groundwater.

Available data on water use show a substantial reduction in water intake for household use, from 750 million m^3 in 2005 to 477 million m^3 in 2013 (table 5.1), which is often attributed to the installation of water meters and the introduction of tariffs based on the volume of water consumption.

Water transmission losses have been reduced by 20 per cent over the last decade, which can be associated with the replacement of old water supply lines. The share of water losses in relation to the overall water intake remains at 5 per cent. Leading the country's overall water losses is Minsk (30 per cent). The cities that demonstrated a reduction in water losses over the last five years include Gomel and Mogilev.

About 92 per cent of the total wastewater has been discharged into water bodies over the last decade. There has been a 16 per cent reduction in the amount of wastewater discharged into water bodies over this period. The bulk of wastewater discharge (about 70 per cent) constitutes effluent treated to standard quality. The share of wastewater discharged without treatment in the period 2005–2013 has varied between 0.4 and 1 per cent of overall discharged wastewater.

The main pollutants discharged with wastewater involve iron and surfactants, as well as sulphate and chloride ions. A substantial share of wastewater discharge containing pollutants (about 69 per cent) comes from local sources (i.e. settlements and settlement-based industries). Minsk City is responsible for 37 per cent of the nitrate nitrogen, 30 per cent of the petroleum products, 27 per cent of the nitrite nitrogen, 24 per cent of the ammonium nitrogen, 24 per cent of the suspended solids and 21 per cent of the organic substances that make their way into the country's rivers.

In the course of the last decade, environmental measures have led to a reduction in domestic water use to 137 litres/person/day in 2014. Work has been done on the extension of centralized sewerage systems and surface runoff treatment in various settlements, especially those with ≥ 50,000 people. In situ treatment of industrial wastewater has been

installed by settlement-based industries. Local biological treatment systems for wastewater are being installed. Still, the pollution of surface water and groundwater that comes with industrial wastewater discharge remains a problem.

Air

Air quality in many of Belarus's settlements remains within the statutory norm, with only 0.3–1.6 per cent of non-standard cases normally registered. Air quality remains satisfactory in cities with heavy industries and high traffic concentration (i.e. Minsk, Mogilev, Novopolotsk and Soligorsk), although there are problem areas within these cities.

In 2014, as in previous years, the largest amount of pollutants from stationary sources was registered in Novopolotsk (52,000 tons), Minsk City (23,500 tons) and Grodno (10,000 tons). More than half of the major cities monitored in the period 2005–2013 have reduced emissions from stationary sources, while Zhlobin city (Gomel Oblast) and Novopolotsk (Vitebsk Oblast) have remained the major contributors of pollutants from stationary sources. Almost all cities have reduced CO emissions.

The main sources of emissions in cities are industrial enterprises (including CHP stations and machinery, construction, electrical and consumer goods manufacturing industries), and housing and utilities; in general, these sources constitute 70 and 14 per cent respectively of total emissions. Industrial enterprises contribute more than half of each of the emitted substances, with the exception of hydrocarbon, half of which comes from the housing and utilities sector. The housing and utilities sector is also a major contributor to CO (20 per cent).

Mobile sources contribute about 71 per cent of the gross emissions into the air. The largest share (up to 85 per cent) of emissions from mobile sources is registered in Minsk City and Minsk Oblast, and the smallest is in Mogilev Oblast. Between 2009 and 2013, there was a reduction in emissions from mobile sources.

Measures towards air quality improvement in settlements are defined in the settlements' strategic development plans and normally include the installation of gas and dust treatment facilities for settlement-based industries, improvements in the environmental characteristics of transport fuel, increasing the share and environmental characteristics of public transport and the use of electric transport, optimization of road traffic and the road and street network, relocation of industries beyond settlement boundaries and improvement of air quality monitoring.

Land and soil

Built-up land accounts for 1.7 per cent of the overall land of Belarus, while land for streets, squares and other public spaces accounts for 0.7 per cent. In the period 2005–2013, there has been a steady increase in the amount of land in these categories, including about an 8 per cent (25,800 ha) increase in built-up land and 2.3 per cent (3,400 ha) increase in land for streets, squares and other public spaces. The annual land uptake for building amounts to 2 per cent.

Soil degradation in Belarus's settlements is caused directly by construction activities, industrial production (which produce toxic substances and waste), fuel combustion by stationary and mobile sources, and utilities. The impact on soil comes from levelling (flattening of slopes, filling of gullies, enclosing shallow rivers into pipes, etc.), chemical contamination through absorption of toxic substances, and sealing with asphalt, causing the loss of the soil's ecological function (i.e. gas exchange with the atmosphere, temperature regulation in settlements).

The main soil pollutants include petroleum products, heavy metals (particularly cadmium, zinc and lead) and, to a lesser extent, sulphates. For example, soil monitoring in the period 2006–2010 revealed that 50 per cent of the 44 monitored cities had high concentrations (5–15 times the statutory norm) of petroleum in their soil. Cadmium was noted in eight cities (twice the allowed concentration), zinc in 14 cities, and lead in nine cities. The concentration of pollutants depends on an area's function, with industrial zones, transport and communications areas, and special purpose territories (i.e. military purpose) having the highest contaminations.

In 2013, soil samples taken from six cities (Baranovichi, Beloozersk, Berezovka, Soligorsk, Minsk and Mozyr) revealed exceedance of the general pollution limit for all observed chemicals: zinc, lead, cooper, nickel, cadmium, manganese, sulphates and nitrates. The predominant pollutants remain petroleum products and a number of heavy metals (especially zinc and lead), the highest concentrations of petroleum products being in Minsk and Soligorsk.

Climate change

Some studies on the effect of urbanization on climate change have been carried out in Belarus. In the

period 1989–2005, data was collected by urban weather stations located in the south of the country (Brest, Gomel, Mozyr and Pinsk). The results showed that the average air temperature in large cities in the south of Belarus was 0.24–0.29ºC higher than in towns and rural settlements.

13.3 Poverty and socio–spatial divide

Since 2005, Belarus has demonstrated a substantial reduction in poverty (from 12.7 per cent of the population in 2005 to 5.5 per cent in 2013), which is linked to extensive state social support for vulnerable people (including those temporarily in a difficult life situation), as well as to the State's actions on increasing the minimum wage and employment rate. However, significant disparities among Belarus's settlements remain, in terms of the development of their living conditions (including the level of social infrastructure provision, access to education and health services, etc.), especially between large cities on the one hand and small and medium-sized cities and rural settlements on the other.

Another factor that aggravates socio–spatial inequalities involves the different ecological situation in settlements, depending on their socioeconomic profile. For example, industrial and mono-industrial cities are worse off than other cities. Rural settlements have different ecological conditions, depending on the level of ecological modernization of a settlement-forming agricultural enterprise (e.g. an agricultural enterprise in Snov has now realized three ecological projects to reduce the enterprise's effect on the environment). A specific factor in the ecological inequalities among settlements is the consequences of the Chernobyl NPP.

Furthermore, socio-spatial divide is determined by excessive concentration of public functions in a few cities with high socioeconomic profile (i.e. 14 large cities) and their uneven distribution across the country's territory. This creates an uneven playing field for small and medium-sized cities in the realization of their socioeconomic and sociocultural potential.

In recent years, a so-called "poverty belt" has also been identified – settlements between Minsk agglomeration and oblast cities, which demonstrate a range of common problems: negative demographic trends, the absence of higher education and consequently a brain drain, an underdeveloped cultural sphere, lower business activity, deteriorated infrastructure, weak environmental and safety protection, and the availability of numerous industrial and military brownfields.

As discussed above, since 2005, the Government has been implementing measures to improve the living conditions and job opportunities in small and medium-sized cities and rural settlements, including the development of housing and infrastructure as well as credit and tax support for the population in these settlements. Nevertheless, these initiatives have not had a substantial effect on the existing socio–spatial disparities. They have mainly focused on more or less economically vital settlements and involved infrastructure projects rather than strategies to address systemic problems in small and medium-sized cities and rural settlements.

13.4 Adaptation to and mitigation of climate change

Belarus has been implementing specific activities on adaptation to and mitigation of climate change, guided by the national goal that GHG emissions must be 8 per cent lower in 2020 than in 1990. The key framework documents are the National Programme of Measures to Mitigate the Effects of Climate Change for 2008–2012, the State Programme of Measures to Mitigate the Effects of Climate Change for 2013–2020, the 2010 Decree of the President No. 625 "On selected issues related to reduction of greenhouse gas emissions", and 2011 Environmental Protection Strategy until 2025.

Besides these, there are other strategies and programmes that do not directly deal with the country's commitments on climate change but have measures leading to a reduction in CO_2 emissions (e.g. programmes on energy saving and RES, etc.). While the need for climate change mitigation is well accepted in the country and various measures are now being implemented in practice, the identification and realization of practical measures in climate change adaptation has been in the process of research (although programmes are being introduced in some sectors, e.g. in the forestry sector in 2009). Climate change mitigation and adaptation measures have been mainly implemented within the framework of national, sectoral and regional strategies and programmes.

At the settlement level, these measures are reflected in specific projects. These include the construction of RES installations, fuel and energy resource saving in the energy sector, energy efficiency measures in different settlement-forming sectors, the conversion of boilers into mini-CHP stations based on renewable fuels, modernization of settlement-based industrial enterprises, stabilization of GHG emissions through resource saving technologies in energy intensive industries, improvement of green spaces and the

introduction of biogas technologies in waste and sewerage utilization.

Eleven cities in Belarus now participate in the EU Covenant of Mayors initiative and are being currently supported by the EU in the preparation of their Sustainable Energy Action Plans to reduce CO_2 emissions. These plans represent a voluntary initiative for reduction in energy use and development of RES. These plans include the evaluation of specific local problems and potential (including developing a local cadastre of emissions), development of local priority pathways in CO_2 reduction and a set of concrete measures, and envisage active engagement of the public and other stakeholders. These initiatives are seen to provide good examples for Belarus's other cities.

Similar climate-related strategic local initiatives have been implemented in other cities within the framework of other projects supported by international organizations, such as the project "Engaging Citizens in Sustainable Energy to Improve Environment and Local Economy" supported by the EU and Swedish International Development Cooperation Agency (SIDA).

13.5 Legal, policy and institutional framework

Legal framework

The 2008 Land Code establishes the category of land under settlement, with corresponding land types (built-up land, land under streets, squares, roads, etc.); procedures for land conversion and for a land redistribution fund to support the development of settlements; forms of, limitations on and changes to land title; responsibilities of city and rural executive committees in land use and protection; land fees; rights and duties of land users and protection of land users' rights (including when their land is taken for settlement development); scope and procedures for land management on settlements' territory and for land monitoring and cadastre; land protection and state control over land use and land protection; land disputes and liability for violation of land legislation.

The 2004 Law on Architectural, Urban Planning and Construction Activities establishes the procedure for territorial planning and development. It defines relations and processes in the development of engineering systems, transport infrastructure systems, site improvement, recreational facilities and infrastructure for physically handicapped persons, along with specific requirements for the formation of the living environment. It describes the responsibilities of national and local authorities in territorial planning and development; types of design and construction permits; and procedures for state control over architectural, urban planning and construction activities and for suspension and conservation of construction, and demolition of buildings.

The 1992 Law on Environmental Protection specifies environmental requirements for the location, design, construction and redevelopment of settlements, including the location of economic and other facilities in settlements according to environmental, sanitary, fire protection and construction requirements. It provides for consideration of environmental protection/rehabilitation measures in design and construction projects implemented in settlements, including measures for sewerage treatment, sanitary cleaning, collection, transportation and utilization/detoxification of waste, land reclamation and site improvements, and development of settlements' green zones. The Law includes a prohibition of removal and destruction of plants without special permission. It describes environmental requirements for the sources of harmful physical effects, including protection from noise, vibration, electricity and electromagnetic hazards.

The 1999 Law on Drinking Water Supply establishes procedures for the development and maintenance of local water systems, including the preparation and implementation of the relevant programmes and action plans in accordance with settlements' general plans and ecological requirements; improving water quality and rational water use; protection of local water sources from pollution and water systems from damage; establishment of water limits and tariffs; establishment and control over sanitary protection zones; and use of water supply systems in an emergency situation.

The 2003 Law on Plant World defines the responsibilities of local authorities in dealing with flora and vegetation, including the development and realization of local programmes and measures for the rational management of flora, granting/termination of rights to use flora and measures to ensure land considered for planting is not built up and is used for planting. The Law also regulates compensatory planting.

The 2015 Law on Energy Saving defines responsibilities of local authorities for implementing subnational energy efficiency programmes and measures (chapter 8).

The 2007 Law on Waste Management (chapter 6) defines specific requirements for dealing with municipal waste in settlements, including waste collection and disposal in accordance with local waste management schemes developed and approved by local authorities in coordination with territorial environmental and sanitary protection bodies. It also establishes the requirements for master plans and a settlement's beautification projects to comply with waste management legislation and provide waste management measures. It includes a provision on the prohibition of location of waste storage and disposal facilities on lands of settlements.

The 2007 Law on Wildlife defines the relevant local authorities' responsibilities, including development and approval of local programmes for wildlife use and protection, authorization of wild animal harvesting and purchase within the locality's territory and decisions on renting out hunting and fishing areas. It also establishes requirements for wildlife protection in urban planning and development of settlements.

The 2008 Law on Atmospheric Air Protection defines responsibilities of local authorities in the relevant field, including the development and approval of local air protection programmes, decisions on temporary prohibition/limitation of the movement of motor vehicles of certain ecological classes in the event of exceeding air quality standards, and decisions on suspension of activities of organizations that have harmful effects on the air, etc.

Environmental improvement in settlements is also regulated by different technical regulatory legal acts, including those specifically on territorial planning (e.g. TCP 45-3.01-116-2008 "Urban Development. Settlements. Design and Construction Norms"; TCP 45-3.01-117-2008 "Town Planning. Individual Housing Areas. Design and Construction Norms"; TCP 45-3.01-286-2014 "Town Planning. Town Planning Project of General Planning. General Plan of Settlements. The Scope and Development Procedure"). Other relevant technical acts are those related to energy efficient housing, atmospheric air protection, utility and social infrastructure, provision of green spaces, etc.

Policy framework

The National Strategy for Sustainable Socioeconomic Development to the Year 2020 (NSSD-20) included coordinated actions on identified sustainability challenges posed by existing material conditions of life in Belarus's settlements. It provided a framework to integrate solutions across specific sector policies. These processes have also been considered in the recently adopted National Strategy for Sustainable Socioeconomic Development until 2030 (NSSD-30).

Settlements' programmes for socioeconomic development have been implemented as part of national socioeconomic development programmes for 2006–2010 and 2011–2015, which represent mechanisms to advance the NSSD in practice. The settlements' programmes have identified specific local issues and short- and mid-term actions.

The State Comprehensive Programme for the Development of Regions, Small and Medium-sized Settlements for 2007–2010, approved by the 2007 Decree of the President No. 265, has helped to coordinate actions and implement a set of measures for improving the socioeconomic and material conditions of life in small and medium-sized settlements, including modernization of settlement-forming industries and utility systems, improvement of transport and communication networks, development of service industries, realization of settlement beautification projects, development of tourist infrastructure and local arts and crafts, renovation of historical buildings and realization of environmental projects.

The State Programme on Sustainable Rural Development for 2011–2015, approved by the 2011 Decree of the President No. 342, succeeds the State Programme on Revival and Development of Rural Settlements for 2005–2010, approved by the 2005 Decree of the President No. 150. These programmes have been the key documents in coordinating the formation of and positive improvements in the living conditions of 1,500 agro-towns. The latter programme has largely focused on the technical–technological modernization and economic efficiency of settlement-forming agricultural enterprises, as well as on creating jobs, further development of social, utility and transport infrastructure, housing and other facilities.

Sustainability approaches to town planning have been advanced in the Main Directions of the State Urban Development Policy for 2007–2010 (approved by the 2007 Decree of the President No. 19) and Main Directions of the State Urban Development Policy for 2011–2015 (approved by the 2011 Decree of the President No. 385), as well as in spatial (territorial) plans that provide key strategic documents on territorial planning. These documents have helped to implement national, sectoral and administrative–territorial programmes and actions. The Main Directions of the State Urban Development Policy

for 2011–2015 recognize the so-called "multifunctional module" approach to housing development.

The 2011 Environmental Protection Strategy until 2025 defines actions on ecological improvements in Belarus's settlements, including rehabilitation of green areas and water bodies in settlements of different size and type; development of the recreational potential of settlements' green areas; development of drainage systems in settlements with ≥ 50,000 people and of centralized wastewater systems in settlements ≥ 5,000 people; relocation of settlement-based industrial enterprises beyond the settlements' existing/prospective residential areas; and preservation of settlements' nature complexes for the development of ecotourism.

The Integrated programme for design, construction and reconstruction of energy efficient residential buildings in the Republic of Belarus for 2009–2010 and until 2020, approved by the 2009 Resolution of the Council of Ministers No. 706, sets ambitious plans for both the total annual housing output over this period and a share of energy efficient housing in this output (from just 0.5 per cent of the overall housing output in 2009 to 60 per cent in 2015).

Other strategic documents relevant for energy efficiency, housing, public transport and mobility include:

- State Scheme for Integrated Territorial Organization, approved by the 2007 Decree of the President No. 19;
- Programme for the Development of Passenger Transportation by Motor Vehicles in 2005–2010, approved by the 2005 Resolution of the Council of Ministers No. 675;
- State Programme for Motor Transport Development in 2011–2015, approved by the 2010 Resolution of the Council of Ministers No. 1886.

Institutional framework

The Ministry of Architecture and Construction is in charge of architecture, town planning and construction activities, including the relevant state policy and programmes, town planning documentation at the national level (State Scheme for Comprehensive Territorial Organization) and the State Urban Development Cadastre. It establishes technical regulations and standards for architectural, urban planning and construction activities. It provides scientific–methodological and information support for design, planning and construction activities in all administrative territorial units; approves standard design for housing and public buildings, standard building structures, products and components; and recommends the reapplication of the developed design and construction documentation of housing and social infrastructure projects.

The Ministry of Housing and Utilities develops and implements the state policy on housing and utilities and coordinates activities of other state bodies and organizations in this field. It enforces the state regulation of housing management and maintenance, and realizes technical policy on the development and operation of housing and utility systems and on the construction, reconstruction, maintenance and repair of settlements' roads. It ensures the provision of housing and utility services, and develops proposals on payments for housing and utility services. It manages the country's housing and utility systems, providing methodological support, and coordination of and technical control over the relevant maintenance organizations through its structural territorial units.

The National Agency for Cadastre of the State Property Committee maintains the unified state register of real estate, and real estate rights and transactions, including registers of the State Land Cadastre. It implements cadastral and expert evaluation of real estate and state registration and technical inventory of real estate; develops automated information systems, and relevant technologies and software; and provides legal and technical services related to the state registration of real estate.

Regulatory and information instruments

The State Expertise of Construction (Gosstroyexpertiza) is conducted by RUE "Glavstroyekspertiza" and its daughter organizations to ensure the compliance of territorial planning and project documentation with legislation. More specifically, this procedure verifies compliance of territorial planning documentation with the legislation, national and local development programmes, technical regulatory legal acts and higher level territorial planning documentation. For design and construction project documentation, the State Expertise of Construction verifies compliance with urban development and architectural rules, sectoral development schemes, safety, fire protection, sanitary norms, integration of best practices in energy, material, and natural resources saving and prevention of environmental pollution and emergency situations.

The State Expertise of Construction is conducted in parallel or on the basis of positive decisions of the State Ecological Expertise and State Energy Efficiency Expertise and the conclusions of the State Sanitary Supervision Authorities. The State Ecological Expertise is conducted by the system of the Ministry of Natural Resources and Environmental Protection (chapter 2) and, in some cases, by Glavstroyekspertiza. It ensures that development activities in settlements comply with environmental requirements.

The State Energy Efficiency Expertise is conducted by the Department of Energy Efficiency of the State Committee on Standardization, and, in some cases, by Glavstroyekspertiza and other institutions. The State Energy Efficiency Expertise ensures that project documentation complies with legislation on energy saving, including technical regulatory legal acts.

Public participation

Belarus's spatial planning system provides for public participation. Decisions of local councils of deputies and local executive and administrative bodies on settlement planning and development and housing construction must be approved after holding public consultation.

Public participation is conducted in accordance with the 2011 Resolution of the Council of Ministers No. 687 "On approval of the Regulation on public consultations in architectural, urban planning and construction activities" as revised by the 2014 Resolution of the Council of Ministers No. 109. Public consultations are conducted in the form of informing individuals and legal entities followed by analysis of public opinion, and in the form of a commission on public consultation.

State Urban Development Cadastre

The State Urban Development Cadastre provides data to support national urban development policy, rational land use organization, development of territorial planning and design and construction project documentation, and development of strategies and programmes for the socioeconomic development of territories.

Urban development monitoring involves systematic observation of the urban planning and development situation and living conditions, to control territorial development and project the outcomes of the realization of urban development projects. The monitoring system uses data from the State Urban Development Cadastre, statistics and specific research reports.

13.6 Conclusions and recommendations

There is a strong tradition of territorial planning in Belarus and a comprehensive system of territorial plans for the national, oblast and local levels. The existing territorial planning approaches, however, do not sufficiently reflect modern, internationally accepted principles of urban planning as an integrative and strategic decision-making process that addresses competing interests and is linked to a shared vision and an overall development strategy, elaborated in close coordination between governments at both national and local levels and involving all relevant stakeholders. Such principles have recently adopted in 2015 by UN-Habitat Governing Council.

Recommendation 13.1:
The Government should:

(a) Develop a pilot project jointly with international organizations such as ECE and UN-Habitat to test possible implementation of the 2015 International Guidelines on Urban and Territorial Planning adopted by the UN-Habitat Governing Council;
(b) Based on the outcomes of such a pilot project, elaborate national guidelines for territorial planning.

The current policy on the satellite towns of Minsk is largely concerned with large-scale housing developments outside Minsk and with relocation of some industrial enterprises from Minsk. However, there is not sufficient detail on how these towns will be developed to provide functional complementarity and accessibility to infrastructure, services, jobs and other advantages that can be found in Minsk. Also, the social, economic and environmental sustainability effects of this policy have not been well articulated.

While the processes of Minsk agglomeration will continue and a more comprehensive approach to manage these processes is needed, such policy should go hand-in-hand with the polycentric arrangement of Belarus's territory. In this regard, the mobilization of the diverse potential of small and medium-sized cities and their surrounding territories is important, since small and medium-sized cities make up 94 per cent of the country's urban settlements and are more evenly distributed throughout the country's territory in contrast to the more peripheral location of oblast cities. They represent a backbone of the country's urban settlement system. The development of small

and medium-sized cities should consider the requirements of environmental sustainability. The State Comprehensive Programme for the Development of Regions, Small and Medium-sized Settlements for 2007–2010 only allowed for addressing some of the multiple problems of these cities.

Recommendation 13.2:
The Government should:

(a) Further develop a polycentric approach to the development of the country's settlements that supports environmental sustainability;
(b) Ensure that the satellite towns of Minsk are developed in a comprehensive, environmentally friendly way as interconnected, self-sufficient administrative–territorial units, and that this initiative is balanced with further actions on improving the country's small and medium-sized cities as sustainable, self-sufficient cities.

The current statutory requirement for thermal energy use is 40 kWh/m^2 for dwellings of four or more storeys, and 90 kWh/m^2 for individual dwellings. However, not all possibilities for energy saving have been used in the country. The existing practice has mainly focused on improving thermal resistance of walls and other structures. Extensive research conducted in the country over the last decade demonstrates the possibility of further reduction in thermal energy consumption in Belarus's housing sector through more comprehensive solutions. However, the practical implementation of such measures is constrained by a shortage of the technical norms and standards that would support optimization of integrated energy efficiency of dwellings. Furthermore, the old housing stock that has undergone thermal modernization in the past decade has revealed various problems, especially as relates to air circulation and the microclimate of the buildings.

Recommendation 13.3:
The Government should:

(a) Advance the application of integrated solutions to further increase the energy efficiency of housing, including building envelopes, heat recovery ventilation, the use of renewable energy and other solutions, based on progressive international practices;
(b) Support studies on experiences and problems regarding the thermal modernization of the old housing stock.

The notion of green spaces is reflected in the legislation of Belarus through the terms "recreation zones" and "landscape-recreational territories". The provision of green spaces in Belarus settlements is regulated by specific technical regulatory legal acts, yet, in practice, the availability of high quality green spaces differs significantly among the settlements. Further possibilities for enhancing green spaces should be considered as part of settlements' development programmes, including improving the existing parks and underused/abandoned land, converting the curtilages of residential buildings into recreational green spaces, and road planting.

The building up of green spaces, including, specifically, the curtilages of multifamily housing, should not be allowed without an assessment of how these activities would impact on the compliance with norms for green spaces of the relevant residential area/settlement.

Recommendation 13.4:
The Government should ensure that settlements' territorial development plans include actions to enhance and protect settlements' green spaces and landscape-recreational territories.

In the past decade, Belarus has optimized its rural settlement system by establishing new rural centres – 1,500 agro-towns with improved social services and public amenities. At the same time, many other rural settlements have not yet managed to achieve positive changes and have retained significant multifaceted problems.

In this context, some rural settlements have recently been engaged in the development of their integrated local sustainability plans (including Local Agenda 21) and info-rooms have also been established in these settlements to provide advice on sustainable development and coordinate actions of different local stakeholders including, in particular, local residents. These initiatives should be supported on a wider scale to provide an instrument for mobilizing the diverse local knowledge and potential of rural settlements and to mediate uneven rural development.

Recommendation 13.5:
The Government should maintain the diversity and integrated development of all rural communities by building on already existing experiences of some rural settlements in the development and implementation of their local sustainability strategies and plans.

Chapter 14

HEALTH AND ENVIRONMENT

14.1 Status of human health

Population trends

The population of Belarus was estimated to be 9,697,475 in the beginning of 2005; it has since decreased, to 9,500,000 in the beginning of 2010 and 9,468,154 in the beginning of 2015. This evolution is marked by an increase in the population living in urban areas: 6.965 million (71.8 per cent) in the beginning of 2005 and 7.274 million (76.8 per cent) in the beginning of 2014. Conversely, the population living in rural areas has decreased, from 2.732 million (28.2 per cent) in the beginning of 2005 to 2.193 million (23.2 per cent) in the beginning of 2014.

In 2014, the female population constituted 53.5 per cent of the total and males 46.5 per cent.

The share of young people 0–14 years of age reached 15.7 per cent in the beginning of 2014, compared with 14.8 per cent in the beginning of 2010. The share of people over 65 years old represented 13.9 per cent of the population in the beginning of 2014.

The birth rate increased from 9.4 (per 1,000 population) in 2005 to 11.4 in 2010 and 12.5 in 2013. Most live births (85.4 per cent) were delivered by women 20–34 years of age; the proportion of live births delivered by mothers aged under 20 decreased from 9.1 per cent in 2005 to 4.5 per cent in 2013. In 2013, the total fertility rate was 1.668 (live births per 1,000 women), compared with 1.252 in 2005 and 1.494 in 2010.

A person born in Belarus in 2013 can expect to live for 72.6 years, on average – 77.9 years if female and 67.3 years if male. Life expectancy has increased since 2005 (68.8 years in 2005 and 70.4 years in 2010).

Mortality and cause of death

Mortality rates were 14.7 and 14.4 per 1,000 population in 2005 and 2010 respectively, and decreased to 13.2 in 2013. In 2013, 49.7 per cent of the deceased were females and 50.3 per cent males; 60.1 per cent of the deceased were of the urban population.

In 2013, the major causes of death were circulatory system diseases (52.8 per cent) and neoplasms (13.8 per cent) (table 14.1). Ischaemic heart disease was the leading cause of death, killing 47,532 people in 2012 (37.6 per cent of deaths). External causes (suicide, transport-related accidents, accidental poisoning with alcohol) represented 8.3 per cent of deaths. Children under 15 constituted 0.6 per cent of the total number of deaths in 2013.

Table 14.1: Cause-specific mortality for total population, 2013, percentage

	per cent
Certain infections and parasitic diseases	0.8
Neoplasm	13.8
Diseases of the circulatory system	52.8
Diseases of the respiratory system	3.3
Diseases of the digestive system	1.7
External causes	8.3
Other	19.3

Source: Statistical Yearbook, 2014.

Maternal and child mortality ratio

Under MDG Goal 4, Target 4.A was to reduce by two-thirds, between 1990 and 2015, the under-five mortality rate. In Belarus, the under-5-year-old mortality rate per 1,000 live births has been declining since 2000. It was 9.3 (per 1,000 live births) in 2005, 5.4 in 2010 and 4.6 in 2013. The under-5-year-old mortality rate in Belarus is almost the same as that in the EU (where it is 5 per 1,000 live births). Belarus has succeeded in reducing the under-5-year-old mortality rate (table 14.2).

The infant (under-1-year-old), mortality rate decreased from 7.1 (per 1,000 live births) in 2005 to 4 in 2010 and 3.5 in 2013. The major causes of infant (under-1-year-old) death were due to certain conditions originating in the perinatal period (45 per cent in 2013), congenital malformations, deformations and chromosomal abnormalities (22.4 per cent in 2013) and certain infectious and parasitic diseases (6.4 per cent in 2013) (table 14.3).

Table 14.2: MDG health-related indicators

Indicators	Baseline		Latest	
	Value	**Year**	**Value**	**Year**
Under-five mortality rate (per 1 000 live births)	15.20	1990	4.60	2013
Maternal mortality ratio (per 100,000 live births)	21.80	1990	0.00	2013
Deaths due to HIV/AIDS (per 100 000 population)	0.00	2000	2.70	2012
Deaths due to malaria (per 100 000 population)	0.00	2000	0.00	2012
Deaths due to tuberculosis among HIV-negative people (per 100 000 population)	8.10	2000	9.10	2012

Source: Belarus WHO statistical profile, 2014.

Table 14.3: Cause-specific mortality for infants under 1 year, 2013, percentage

	per cent
Certain infections and parasitic diseases	6.4
Diseases of the nervous system and sense organs	4.4
Diseases of the respiratory system	2.2
Diseases of the digestive system	1.2
Congenital malformations, deformations and chromosomal abnormalities	22.4
Certains conditions originating in the perinatal period	45.0
External causes	8.8

Source: Statistical Yearbook, 2014.

The reduction in infant mortality is related to improvement of the health-care system. In Belarus, immunization is available and free for the entire population. Coverage of children aged 0–1 with immunization against measles reached 99 per cent in 2005, 98.5 per cent in 2010 and 98.1 per cent in 2013.

Under MDG Goal 5, Target 5.A was to reduce by three quarters, the maternal mortality ratio, and Target 5.B was to achieve, by 2015, universal access to reproductive health.

A strong decline in the maternal mortality ratio was observed, from 10 per 100,000 live births in 2005 to 1 per 100,000 live births in 2010 and 0 per 100,000 live births in 2013. Improvements in the Belarusian health system, such as qualitative prenatal care, and adequate care during delivery, childbirth and the neonatal period have been key factors in the national policies to reduce maternal deaths.

In Belarus, 99.9 per cent of all births are attended by skilled personnel and 99.7 per cent of pregnant women have at least four antenatal care visits, including 94.4 per cent in the first 12 weeks of pregnancy. The birth rate to adolescent mothers was 22.5 per 1,000 mothers in 2006 and decreased to 20.7 per 1,000 in 2010; however, teenage pregnancy and abortions remained high in 2009, at 30.1 pregnancies and 10 abortions per 1,000 women aged 15–19. In 2014, there were 6.9 abortions per 1,000 women aged 15-19.

Trends in morbidity

The number of hospital discharges reached 2,802,240 in 2014. In 2014, the major causes of hospitalization were linked to diseases of the circulatory system (20.6 per cent of the total discharged), diseases of the respiratory system (14 per cent), diseases of the digestive system (8.9 per cent), complications of pregnancy (9 per cent), childbirth and the puerperium (9.2 per cent) and neoplasm (8.5 per cent).

Non-communicable diseases

Non-communicable diseases are estimated, in 2014, to account for 89 per cent of total deaths, with cardiovascular diseases prevailing (55.5 per cent). Cancers constituted 14.3 per cent of all deaths in 2014, being the cause of death of 10,156 males and 7,171 females.

In 2014, diseases of the respiratory system constituted 51.3 per cent of all registered cases of disease, while diseases of the circulatory system represented 3.1 – 3.2 per cent of all registered cases of disease. These values have remained steady since 2010.

Photo 14: Children playground, Minsk

During the last decade, the incidence of respiratory system diseases in children aged 0–17 years increased. Diseases of the respiratory system constitute 75.2 per cent of all registered cases of disease in children. Tobacco smoke is the main cause of chronic pulmonary diseases; 50 per cent of all males and 11 per cent of females were smokers in 2011. Air contamination in buildings, atmosphere air pollution, occupational dust and chemicals also constitute risk factors.

Raised blood pressure was registered in 45 per cent of males and 39 per cent of females in 2008.

According to the World Health Organization (WHO), estimates from 2008 showed that 57.4 per cent of the adult population (> 20 years old) were overweight and 24.3 per cent were obese; 20 per cent of all males and 28 per cent of all females suffered from obesity in 2008.

In 2014, according to official statistics, 24.3 per cent of the Belarusian population aged 16 and over were overweight (body mass index 30 kg/m^2 or more), including 28.6 per cent of the rural and 22.8 per cent of the urban population. The population aged 16 and over who were engaged in physical training and sports increased from 22.9 per cent in 2010 to 25.6 per cent in 2014. Statistics show that the caloric value of consumed food at home has tended to increase; it was 2,429 kcal daily average per household member in 2010 and increased to 2,567 kcal daily average per household member in 2013, with an increase in consumption of fats (116 g in 2010 and 120 g in 2013), proteins (78.3 g in 2010 and 84.5 g in 2013) and carbohydrates (278.8 g in 2010 and 288.3 g in 2013).

Of all registered cases of disease, diseases of the musculosketal system and connective tissue constituted 5 per cent, diseases of the skin and subcutaneous system 4.9 per cent and diseases of the digestive system 2.6 per cent.

Neoplasms are registered in the Belarusian cancer register. In 2013, 464.9 new cases of cancer per 100,000 population were registered in the country. The major causes of cancer mortality for males were cancers of the trachea, bronchus and lung (26.1 per cent) and stomach malignant neoplasm (12.8 per cent), whereas breast cancer (15.8 per cent) was the main cause for women.

The Belarusian population who suffered from the Chernobyl NPP accident is subject to specific medical supervision and preventive care and treatment. Children and adolescents received highest doses of radiation in the first days after the accident.

Intense medical monitoring for thyroid disease among the population allows the detection of thyroid cancer at early stage. Treatment has been effective

and the general prognosis is not bad, but the patients need to take hormone substituting therapy for the rest of their lives. The outcomes of some research studies suggest an increase in the incidence of leukaemia, but this issue requires further research.

The Chernobyl accident induced low dose exposure over a long time for population in contaminated areas. The estimation of radiation doses received by people, and other factors such as different lifestyle and nutrition, cause uncertainties when evaluating future cancer deaths related to environmental factors. Cataracts are known to result from radiation in effective doses of about 2 Sv.

Communicable diseases

Infectious and parasitic diseases are not the major cause of mortality but remain a significant morbidity burden (table 14.4). The incidence of infectious and parasitic diseases has decreased slightly since 2005. These diseases constitute 3 per cent of all registered cases of disease in children and 3.6 per cent of all registered cases of disease in the total population.

HIV/AIDS

Combating HIV/AIDS is part of MDG Goal 6. Target 6.A was to have halted by 2015 and begun to reverse the spread of HIV/AIDS. During the last decade, an increase in HIV incidence was observed in Belarus (table 14.2). In 2005, there were 7.8 newly diagnosed cases of HIV infection per 100,000 population registered; this incidence rate increased to 11.3 new cases per 100,000 population in 2009 and to 16.2 new cases per 100,000 population in 2013. While the number of newly diagnosed cases of HIV infection (per 100,000 population) remains steady in the 20–29 years age group (26.5 in 2005, 26 in 2010 and 27.7 in 2013), it has increased strongly during the last 10 years for the 30–39 years age group (16.6 in 2005, 31.4 in 2010 and 45.8 in 2013).

HIV infection morbidity is highest in Gomel Oblast (42.9 per cent of the total HIV-infected population) followed by Minsk City (14.5 per cent) and Minsk Oblast (13.7 per cent). The lowest rate is observed for Grodno Oblast (4.8 per cent). Sexual contact is the predominant route of HIV transmission in men and women; in 2009, 90.2 per cent of all new cases in women and 66.2 per cent of all new cases in men were sexually transmitted. Injection drug use plays a part in spreading the HIV epidemic, due to the rising incidence of drug use. In 2010, in Minsk City, 13.7 per cent of injection drug users were HIV positive.

Tuberculosis

Combating tuberculosis (TB) is another part of MDG Goal 6. Target 6C aims to reduce the incidence, prevalence and death rates associated with tuberculosis (Indicator 6.9).

Table 14.4: Selective infectious and parasitic diseases, 2005, 2010, 2013, number of cases per 100,000 population

	2005	2010	2013
Salmonella infection	36.3	58.3	39.7
Acute intestinal infections	129.9	136.8	125.6
of which, bacterial disentery	17.4	1.1	0.4
Diarrhoeal diseases	129.9	136.8	125.6
All viral hepatitis	12.9	4.6	3.0
Viral hepatitis A	6.9	1.8	1.1
Viral hepatitis B	4.1	1.6	1.1
Tuberculosis	54.9	45.8	38.3
Scarlatina	34.4	14.2	15.2
Pertussis	0.8	1.2	2.0
Measles	0.0	0.0	0.2
Flu and acute upper respiratory tract infection	33 362.1	37 210.1	38 086.0
Malaria	0.1	0.1	0.1
Tick-borne encephalitis	0.0	1.0	1.2
Lyme borreliosis	5.4	9.0	10.9
Tularemia	0.0	0.0	0.0

Source: Public Health in the Republic of Belarus, 2009–2013, Statistical book, 2014.

In Belarus, TB remains highly prevalent and constitutes a major threat to public health. Overall mortality rates from TB have remained steady since 2009 (8.1 cases per 100,000 population). However, the death rate due to TB among HIV-negative people reached 9.1 cases per 100,000 population in 2013 (table 14.2). The number of reported HIV-positive TB patients is tending to increase, with 250 cases in 2013 (compared with 183 cases in 2010).

The mean annual indicator of TB incidence during the period 2003–2009 was 52.1 cases per 100,000 population, and decreased to 40.56 per 100,000 population during the period 2010–2014. Morbidity rates from active TB decreased from 45.8 newly diagnosed patients per 100,000 population in 2010 to 38.3 in 2013.

In 2013, morbidity from TB remained highest in Gomel Oblast (50 new cases per 100,000 population) and Mogilev Oblast (47.9 new cases per 100,000 population) and lowest in Minsk City (21.7 new cases per 100,000 population). Child (0–17 years old) morbidity from active TB decreased from 8.1 new cases per 100,000 children in 2005 to 4 new cases in 2010 and 2.2 new cases in 2013. These signs of improvement could be attributable to consistent state policies on TB prevention and treatment.

Belarus implemented an electronic register for drug-susceptible TB cases countrywide in 2009 and a module for multidrug-resistant tuberculosis (MDR-TB) cases in January 2012. MDR-TB cases made up 32 per cent of all new TB cases in Belarus, and 75 per cent of cases among people previously treated for TB.

Measles

In 2013, child morbidity from measles reached 0.1 of registered cases per 100,000 children (2 registered cases). Around 98–99 per cent of 1-year-old children are immunized against measles.

Waterborne infections and bacterial foodborne intoxications

In 2013, the incidence of diarrhoeal diseases reached 125.6 cases per 100,000 population, and salmonella infection 39.7 cases per 100,000 population.

No group cases of waterborne disease were registered during the last 10 years. The last case of waterborne disease occurred in 2001 in Vitebsk when 44 people were infected with enterovirus due to use of drinking water.

Since 2003 there were no outbreaks of diseases connected with use of products from milk processing industries. Since 2007, there were no group cases of intestinal infections connected with food processing industries.

In the period 2008–2014, the number of outbreaks of intestinal infections has fallen by 5 times and the number of affected population – by 9 times, compared to the period 2003–2007.

Viral hepatitis

The incidence of all hepatitis decreased from 12.9 cases per 100,000 population in 2005 to 4.6 in 2010 and 3 in 2013. At the same time, the incidence of viral hepatitis A also decreased from 6.9 cases per 100,000 population in 2005 to 1.1 in 2013. This decrease could be explained by the preventive actions performed in relation to personal hygiene and local vaccination campaigns.

Morbidity from Hepatitis B decreased from 4.1 cases per 100,000 population in 2005 to 1.6 in 2010 and 1.1 in 2013. Child morbidity from Hepatitis B remains steady at around 0.3 registered cases per 100,000 children since 2005. Hepatitis B is a part of the national vaccination plan.

Vector-borne diseases

Malaria

The mean annual indicator of malaria incidence during the period 2003–2009 was 0.1 cases per 100,000 population; during the period 2010–2014, incidence was 0.08 cases per 100,000 population. All recorded cases were imported cases, i.e. infection was received outside the country. Recommendations are formulated for travellers to other countries.

Tick-borne diseases

The mean of the annual incidence of tick-borne encephalitis during the period 2003–2009 was 0.2 cases per 100,000 population; during the period 2010–2014 incidence increased to 1.18 cases per 100,000 population, so an increase by 5.9 times is noted. According to laboratory analyses, about 7–15 per cent of ticks are infected by the encephalitis virus. In order to prevent tick-borne encephalitis, a vaccination programme is performed for people living in the forest zone in the western part of Belarus.

The mean annual indicator for the incidence of Lyme disease during the period 2003–2009 was 6.7 cases per 100,000 population; incidence increased to 11.14 cases per 100,000 population during the period 2010–2014, showing an increase by 1.6 times. Thirty per cent of all ticks are infected by borellia. It is also to be noted that 41 per cent of ticks are infected by rickettsia.

14.2 Health risks associated with environmental factors and environmental causes of morbidity and mortality

Outdoor air pollution

Air quality monitoring is carried out in 20 cities of Belarus by 65 stations (chapter 4). State Sanitary Supervision Authorities accounted for 78,300 samples in 2014, compared with 81,600 samples in 2010, while the number of stationary sources of air polluting emissions increased (128,523 units in 2010 and 136,441 units in 2013). Among the 78,300 tested samples in 2013, 700 samples showed exceedances of maximum single allowable concentrations, compared with 900 in 2010.

In 2014, 0.86 per cent of tests of atmospheric air exceeded the MAC of harmful substances (in 2013, 0.73 per cent). Test samples in excess of MACs were distributed as follows: Brest Oblast, 0.25 per cent (in 2013, 0.23 per cent), Gomel Oblast, 0.13 per cent (in 2013, 0.12 per cent), Grodno Oblast, 0 per cent (in 2013, 0.03 per cent), Minsk City, 2.14 per cent (in 2013, 2.18 per cent), Minsk Oblast, 0.22 per cent (in 2013, 0.26 per cent) and Mogilev Oblast, 0.73 per cent (in 2013, 0.26 per cent). Most of the emissions exceeding the MAC are PM_{10}, formaldehyde, carbon monoxide or nitrogen dioxide.

In 2014, the percentage of days (22.1 per cent) in Minsk with average daily concentrations of PM_{10} above the MAC increased, compared with 2013 (11.6 per cent) and 2012 (15.8 per cent), but was reduced compared with 2010 (26.3 per cent). When limit values are exceeded, the hygiene and epidemiology centres are informed and they communicate with the population. Information is also sent to schools in order that they can take preventive actions. Public information on the level of pollution and its influence on health is delivered through mass media, the Internet, lectures, discussions and the distribution of instructions and booklets.

According to WHO, mortality in Belarus in 2010 due to ambient particulate matter pollution (APMP) and household air pollution (HAP) from solid fuels was 8,236 and 1,659 (premature deaths) respectively. The estimates of the economic cost of premature deaths from APMP and APMP+HAP in Belarus, in 2010 were US$16.534 million and US$19.865 million respectively.

There are no studies on the impact of air pollution from transport or stationary sources on the health of the Belarusian population.

Pollen

Seasonal fluctuations and dispersion in the air of pollen were analysed for the period 2004–2006, and a pollen calendar was built in order to develop preventive measures against allergy in the population. A system of notification of the public and medical institutions about an allergenic situation was established. However, there is no pollen monitoring in the country.

Indoor air pollution

There are no specific data on the impact of the different pollutant sources (e.g. building materials, mould, heating and cooking technologies, outdoor air quality) on indoor air quality in Belarus and on their impacts on public health.

Indoor air quality in schools is regulated by strict construction rules with regard to ventilation and standards for furniture materials. Indoor air quality is controlled by State Sanitary Supervision Authorities before the opening of a new school and after repair works in existing schools.

The SEARCH II (School Environment and Respiratory Health of Children) study carried out in 10 schools (with 625 children) in Minsk City showed that different compounds (formaldehydes, PM_{10}, benzene, toluene, ethylbenzene, xylenes, NO_2) were present in indoor and outdoor air at the schools. Measured concentrations in Belarusian schools were among the lowest in the schools studied in nine countries.

Tobacco smoke

The prevalence of tobacco smoking in 2014 was 25.1 per cent of the total population, compared with 27 per cent in 2010. It was much higher for men (48 per cent) than women (8.9 per cent). In last years, there is a decreasing trend in tobacco smoking both among men (50.4 per cent in 2012, 48.6 per cent in 2013, 48.0 per cent in 2014) and women (10.2 per cent in 2012, 9.7 per cent in 2013, 8.9 per cent in 2014). Compared to 2013, the largest decrease of smoking population was in the population aged 20–29. Among

young people (aged 13–15) smokers were 3.1 per cent in 2013. Smoking is forbidden in public spaces, except for designated areas.

Carbon monoxide

In 2014, 95 per cent of apartments/houses in urban areas were equipped with central heating, while only 66 per cent of apartments/houses in rural areas were equipped with central heating. Gas heaters and other heating systems with a combustion process can be responsible for carbon monoxide emission in the indoor air. Carbon monoxide gas has no odour and consequently humans cannot detect it. Carbon monoxide intoxication can lead to death.

Poisoning by carbon monoxide accounted for 10 per cent of accidental deaths among children, as reported in 2008. For all ages, in 2007, poisoning by carbon monoxide caused 1,034 deaths (8 per cent of accidental deaths) Carbon monoxide intoxications are not registered, so there are no data available on carbon monoxide intoxications for the last five years.

Drinking water and sanitation

In 2014, the coverage of the urban population served by a centralized water supply system reached 97.7 per cent, while centralized sewerage coverage in urban areas was 92 per cent. However, in rural areas, 29 per cent of the population lack access to centralized water supply systems and 62 per cent are not connected to centralized sewerage (chapter 5).

The main source of drinking water used by the water distribution system is groundwater. Only Minsk City uses surface water to produce one third of the distributed drinking water.

Zones of sanitary protection are organized for surface and groundwater sources and as a part of the “three belts” system (high security for the first belt and restrictions for the second and third belts). Sanitary and protective zones of the centralized system of water supply are regulated by sanitary standards and rules. The main problem in artesian groundwater sources is naturally occurring high iron content, up to 5.0 mg/l, caused by hydrogeological features.

Every day, the chlorine value at different points of the drinking water network is analysed. Bacteriological and chemical analyses are performed by state laboratories every day on drinking water samples taken from different places in the network. Analyses are also performed on the source and beyond the treatment plants. Drinking water suppliers also perform their own water quality control.

Some of the population living in rural areas consumes water from small systems such as shallow wells, which are often polluted with chemical and bacteriological contaminants. The main shallow well contaminants are nitrates and coliform bacteria. In 2014, on the test performed on the sources of decentralized water supply, 11.5 per cent did not meet the requirements of bacteriological standards and 15.1 per cent did not meet the requirements of sanitary and chemical standards; the percentages obtained in 2010 were 12.9 per cent and 17.3 per cent respectively.

Mineral water supplied to the market has to comply with the national legislation on epidemiological control and to requirements of the 2011 Technical Regulations of the Customs Union 021/2011 “On safety of food products”.

The quality of mineral water is verified during the annual checks performed by the State Sanitary Supervision Authorities. Also, the producer has to perform its own quality control. On the request of local authorities, bottled water in supermarkets may be checked by local State Sanitary Supervision Authorities (centres of hygiene and epidemiology) and analysed to control the quality. Data on non-compliance with quality standards of bottled mineral water are not reported.

Monitoring

Monitoring and quality control of drinking water is carried out by the Ministry of Health, in particular by establishments of the Sanitary Epidemiological Service in accordance with parameters fixed by the 1999 Resolution No. 46 of the Chief State Sanitary Officer (SanPiN 10-124 RB 99).

Monitoring is done in accordance with the annual programme of drinking water monitoring. The frequency of sampling on water sources and on distributed drinking water is defined by the legislation. For groundwater sources, at least four samplings a year have to be performed for microbiological, parasite and organoleptic analysis, and one sampling a year for inorganic and organic substances and radioactivity analysis. For surface water sources, the frequency is increased to 12 samplings a year (monthly) for microbiological, parasite and organoleptic analysis, four samplings a year for inorganic and organic substances analysis, and one sampling a year for radioactivity analysis. The drinking water sampling programme is elaborated by taking into account the number of persons serviced by the water supply system.

Previous results are also taken into account to elaborate the sampling programme.

More drinking water samples (i.e. 9,700 more) were tested by sanitary and chemical parameters in 2013 than in 2010. About 135,800 drinking water samples were tested by sanitary and chemical parameters in 2013. Among them, 26,200 samples were not in conformity with the hygiene standards, representing 19 per cent non-compliance. The rate of non-compliance declined between 2005 and 2010 by 32 per cent and between 2010 and 2013 by 13.5 per cent. In 2013, the highest levels of non-compliance were observed for Gomel Oblast (31 per cent non-compliance) and Brest Oblast (30 per cent non-compliance), while the lowest non-compliance rate was obtained for Minsk City (3.3 per cent non-compliance). The major reason for chemical non-compliance is iron concentrations.

About 170,000 water samples were tested by microbiological parameters in 2013. Among them, 1,400 samples were not in conformity with the hygiene standards, representing 1.4 per cent non-compliance (table 14.5). The average non-compliance rate declined by 44 per cent between the period 2005–2010 and the period 2010–2013. In 2013, the highest level of microbiological non-compliance was observed for Gomel Oblast (3.6 per cent non-compliance) while the lowest non-compliance rate was obtained for Brest Oblast (0.5 per cent non-compliance). The rate of microbiological non-compliance is very low.

The number of water samples tested increased during the last 10 years and the rate of non-compliance declined strongly. However, the rate of non-compliance observed for samples tested by sanitary and chemical parameters remains high.

If results do not correspond with requirements of SanPiN 10-124 RB 99, the authorities give corresponding instructions and recommendations to address non-compliance, such as carrying out washing and disinfection of networks, and control their implementation. Other measures of administrative enforcement are also applied. The results from the state monitoring of drinking water are collected in a dedicated database managed by the Ministry of Health.

Bathing water

Inland

Since 2010, an improvement in bathing water quality is observed. In 2010, among the tested samples, 8.4 per cent did not meet the required bacteriological standards, and 19.1 per cent noncompliance with sanitary and chemical standards was recorded. In 2014, the obtained values were 6.8 per cent and 9.8 per cent respectively.

If the quality of bathing water does not correspond with hygiene requirements, the following measures are undertaken: a ban on bathing is imposed for the purpose of preventing infection, or bathing is not recommended; the reasons for a decline in the quality of waters (e.g., discharge of undertreated sewage, or failure of treatment facilities) are identified; measures for prevention, reduction and elimination of pollution are undertaken; and the public is widely informed of the measures undertaken.

Swimming pools

There are 312 swimming pools in Belarus; 58 are located in Minsk City. In accordance with the legislation, the pool administration should ensure that laboratory analysis of water quality is carried out in order to assess its compliance with hygiene standards. The water quality of swimming pools is monitored by the following indicators and frequency rate of sampling: organoleptic indicators (turbidity) – once a day, either during the day or in the evening; residual content of disinfecting reagents and water temperature – before the opening of the pool and every subsequent two hours; the main microbiological indicators (coliform bacteria, thermotolerant bacteria and staphylococcus) – once a month; nitrogen, ammonia, chlorides content – once a month; parasite indicators – once a quarter.

Table 14.5: Domestic and drinking water supply: non-compliance rate of water samples, 2005, 2010–2014

	2005	2010	2011	2012	2013	2014
Sanitary and chemical parameters						
Samples (1 000)	82.3	126.1	128.0	128.2	135.8	130.4
Non-compliant (%)	32.9	22.3	22.0	20.7	19.3	21.7
Microbiological parameters						
Samples (1 000)	138.3	166.7	170.5	196.9	170.0	164.9
Non-compliant (%)	4.5	2.5	2.0	1.6	1.4	1.9

Source: National Statistical Committee, 2015.

Swimming pool monitoring is performed by the pool administration. Water quality results are not reported. No data are available in the Ministry of Health. State inspection of pools can be organized no more frequently than once every three years.

Legionelosis prevention

Legionelosis incidence is not registered in Belarus. Nevertheless, in 2014, the Republican Research and Practical Centre for Epidemiology and Microbiology started a study on legionella detection: in 50 serums of patients with pulmonary diseases, 10 serums contained legionella antibodies. The study is ongoing and rules for the prevention of legionelosis and registration of cases are in preparation.

Radiation

Radiation monitoring

The atmospheric radiation monitoring network consists of 55 observation points located on meteorological stations and meteoposts for the measurement of gamma dose rates, 27 observation points located on meteorological stations and meteoposts for control of radioactive precipitation from the atmosphere using horizontal tablets, and seven observation points located in the cities of Braslav, Gomel, Minsk, Mogilev, Mozyr, Mstislavl and Pinsk for control of radioactive aerosols in the air using aerosol samplers. Measurements of gamma dose are carried out daily. Samples of radioactive aerosols and precipitation are analyzed for 137Cs and 90Sr. Exposure gamma dose rates constantly decline due to the process of natural radioactive decay.

Radiation monitoring of surface water is carried out on the rivers that have been exposed to radioactive pollution as a result of the Chernobyl NPP accident. According to data collected on the Pripyat River (the observation point is on a boundary line between Belarus and Ukraine), transboundary transfer of caesium-137 was diminished; the annual fluxes of caesium-137 were 8 TBq in 1987 compared with 0.5 TBq in 2006. Radiation monitoring is carried out on eight transboundary rivers.

In Belarus, as in the European countries, traces of iodine-131, dispersed from the emergency reactors of the Japanese atomic power station Fukushima-1, were found for the first time on 22 March 2011, in Braslav, Vitebsk Oblast. In the same month, iodine-131 was identified at other six observation points (Gomel, Minsk, Mogilev, Mozyr, Mstislavl and Pinsk).

Chernobyl Nuclear Power Plant Accident

Observations of radiation levels are conducted to identify the level of radioactive pollution of air, water and soil in areas that were contaminated after the Chernobyl NPP accident.

Control of radionuclides in foodstuffs is carried out for industrial processing and farm production. Radiation control of the foodstuffs produced on private farms is carried out by the hygiene and epidemiology centres, and is performed in accordance with the 2010 State Programme on Overcoming of Consequences of the Chernobyl NPP Disaster for the period 2011–2015 and until 2020 (2010 Resolution of the Council of Ministers No. 1922). Each case in excess of admissible levels of radionuclides in foodstuffs is subject to investigation.

The hygiene and epidemiology centres annually carry out planned radiation control in accordance with the established procedure, plans and schedules for the sampling of foodstuffs, drinking water and other substances consumed in personal habitations. The frequency of radiation control of enterprises making and processing foodstuffs, and of farms, is defined in accordance with territorial zoning established in the 2012 Law on Legal Regime of Territories Exposed to Radioactive Contamination as a Result of the Chernobyl NPP Disaster.

Radiation control of caesium-137 and strontium-90 in drinking water is carried out on centralized and decentralized water supply sources and also on mineral water sources. The Belarusian population who suffered from the Chernobyl accident is subject to special prophylactic medical examination for selected diseases.

Belarusian Nuclear Power Plant

Belarus has started to build an NPP near Ostrovets in Grodno Oblast. Radiation and environmental monitoring in the observation zone of the NPP covers the monitoring of water, air and soil contamination with radionuclides, measurement of the exposure dose rate, and monitoring of chemical pollution of air, water and soil.

The network will eventually comprise 26 automatic measurement points installed in the observation zone of the NPP, and automatic sensors for measuring exposure dose rate and meteorological parameters installed in the automatic measurement point. Currently, the basic automatic system for radiation control is in trial operation.

Medical radiation

Radiation safety of medical personnel and patients is provided with observance of the basic principles of radiation safety (rationing, justification and optimization) and the requirements established by the 1998 Law on Radiation Safety of the Population.

Doses of radiation delivered to a patient are registered in the State Dosimetry Register.

The total dose of radiation received by patients and personnel is related to the use of sources of ionizing radiation in health-care organizations. Several actions have been developed to reduce the dose delivered to patients and personnel, such as decreasing the number of diagnostic procedures that apply sources of ionizing radiation in favour of alternative methods (e.g. ultrasonic methods, magnetic and resonant tomography), the transition to digital scanning technologies and timely replacement of radiation equipment on expiry of its operational life.

Electromagnetic fields and ultraviolet radiation

Several actions have been developed to reduce population exposure to ultraviolet (UV) radiation. Basic information on the dangers and risks of UV radiation is delivered to the population, generally through mass media. Preventive actions include media campaigns and dissemination of information on the effects on health of UV exposure and the dangers of UV radiation in sunbeds. Results of scientific research on the influence of UV radiation on health are published in scientific publications.

Systematic control of levels of UV radiation in production processes, including the observance of hygiene standards, is carried out.

Since 2006, mapping and UV Index forecasts have been generated for specific regions. A map and short-term UV Index forecast for the whole country are released on a daily basis and published in newspapers and websites.

Noise

Since 2002, the level of noise has increased in Minsk City by 2–5 dBA and in other towns by 3–4 dBA. Noise levels are measured by enterprises.

Studies were performed at national level in order to determine national standards, identify the main sources of noise and their contribution to environmental pollution, and develop recommendations to reduce noise levels. However, noise maps are not available and there is no study on health status in relation to noise pollution.

Sanitary rules focusing on noise levels are applied for school construction. Noise levels are checked in schools when construction is finished.

Sanitary standards and rules and hygiene standards for noise at workplaces, in vehicles, in residential and public buildings and on housing estates are fixed by the 2011 Resolution No. 115 of the Ministry of Health.

Sanitary standards and rules for noise, as well as the noise measurement method for sound-reproducing and sound-intensifying devices, are regulated by the 2012 Resolution No. 191 of the Ministry of Health. The maximum admissible level for concerts, halls, night clubs and open-air concerts is fixed at 90 dB. There are no data on public complaints or inspection actions performed related to noise pollution.

Food safety

Control and inspections of food products are performed on raw materials, foodstuffs, and other food materials.

In 2014, the State Sanitary Supervision Authorities controled 43,209 food-related facilities (including markets, places of trade, public catering facilities and roadside food services). Among them, 37,174 facilities (86 per cent) had violated sanitary standards and rules. The main violations concerned non-compliance with a temperature mode during sale of foodstuffs (16.1 per cent), selling expired foodstuffs (16 per cent), unsatisfactory sanitary condition of rooms, trading and processing equipment (16 per cent), failure of workers to pass medical examinations and hygiene training on time (5.4 per cent) and absence of documentation confirming the quality and safety of foodstuffs (5.1 per cent). Measures taken as a result of non-compliance with requirements include fines, prohibition on the sale of foodstuffs and suspension of a facility's operation. In 2014, the average fine imposed by officials was 1,550,000 roubles.

Foodstuff analysis is performed in 51 state laboratories, on microbiological and chemical indicators. Workers whose activity is connected with the production, storage, transportation and sale of foodstuffs are obliged to pass hygiene training.

The application of mineral fertilizers is regulated by sanitary standards. The use of pesticides (as a means of protection of plants), agrochemicals and mineral

fertilizers is regulated by hygiene standards related to the content of active ingredients of pesticides in environmental elements, food raw materials and foodstuffs.

Specific control is dedicated to harmful products in live animals and animal products, including of pigs, horses, poultry, aquaculture fish, rabbits, meat, milk, eggs and honey.

Housing and human settlements

No survey has been conducted in Belarus to assess the extent of indoor environmental problems in homes. Collecting data on housing and other environmental exposure when specific symptoms (lead poisoning, respiratory diseases and mesothelioma) are diagnosed would help in understanding and finding the causes of the symptoms.

The SEARCH II study carried out in 10 Minsk City schools also conducted analysis in the homes of the children involved in the study. Results showed that water resistant paints are frequently used in homes (37 per cent), and can contribute to a higher risk of respiratory diseases. They also showed that 51.4 per cent of the children involved in the study lived near busy roads and therefore were exposed to air pollution.

Asbestos

Air monitoring is performed at the production of asbestos and during the industrial use of asbestos-containing products.

Asbestos exposure and related cancers are not monitored in Belarus. People working in the construction industry or with asbestos-containing materials (e.g. in cars, ships and planes) are the most exposed to asbestos. However, as asbestos is also in buildings and domestic materials, the entire population can be exposed.

Belarus reported high levels of asbestos use, with an average of 0.85 kg/capita/year for the period 1971–2000 and 1.86 kg/capita/year for the period 2001–2012.

Asbestos-containing products are still produced in Belarus, such as corrugated sheets using asbestos (asbestos cement board), which are used in roofing and may also be used as a wall covering in residential, public and agricultural buildings and constructions. Six hundred workers are employed in the two enterprises that produce asbestos-containing materials.

Asbestos exposure occurs when asbestos is released by material deterioration, or building degradation or destruction. There are several sites dedicated for construction waste; however, there are no specific data on asbestos storage and management.

No monitoring on the presence of asbestos fibre is carried out in public buildings such as schools or medical centres.

Radon

Exposure of the population to radon is a cause of lung cancer and there is an enhanced effect with tobacco smoke. The geological characteristics of Belarus favour radon emissions into the air. There is no overall study on radon epidemiology in regard to lung cancer development. The map of radon zones is under development but no health risk assessment has been done in high risk regions. The level of radon is monitored in several places, including Minsk City. Specific studies in buildings have recorded radon emissions, especially on the ground floor. Measurements are performed on air, within the soil and also on air at the soil surface. In Minsk City, radon concentration can reach 40,000 Bq/m^3.

Actions to reduce radon risk, such as ventilation, have been developed and construction rules take into account the presence of radon.

Radiation control is carried out at all stages of construction, reconstruction, major maintenance and operation of houses and social buildings in order to meet sanitary standards and rules. Where exceedance of standard values is detected, the causes are identified and the necessary protective measures to decrease the content of radon in the indoor air are carried out. Inspection of the implementation of requirements for ensuring radiation safety in houses and social buildings during their construction, reconstruction, commissioning and operation is carried out by territorial bodies of the State Sanitary Supervision Authorities.

Lead

Young children are particularly vulnerable to the toxic effects of lead and can suffer profound and permanent adverse health effects, particularly affecting the development of the brain and nervous system. No data on lead concentration in children's blood are available. In the period 2013–2014, the Belarusian Medical Academy of Post-Diploma

Education and the RUE "Scientific and Practical Centre of Hygiene" performed a study on lead detection in children's hair, which showed the absence of lead. As major parts of some cities were rebuilt after the Second World War, it is supposed by the authorities that paint containing lead was not used in buildings. Legislation on toys and imported products bans products containing lead.

Mould

In houses that do not have adequate humidity control and ventilation, cooking and heating habits can lead to mould development. This often occurs in old houses. Exposure to airborne mould spores can lead to health problems such as allergy symptoms, including runny nose, scratchy throat, itchy eyes, sneezing and, in more severe cases, wheezing and coughing. There are no reported data in Belarus on allergy symptoms in relation to mould.

The SEARCH II study of 625 Belarusian school children showed that several suffered from medically diagnosed allergies, namely, to foodstuffs (12.5 per cent), pollen (5.8 per cent), house dust mites (4 per cent), animal fur and feathers (2.6 per cent) and mould (1.6 per cent).

Waste and polluted soil

In the framework of the National System of Environmental Monitoring, monitoring of chemical pollution of land is carried out once every three years for rural territories (at 108 observation points) and once every four years for settlements (in 45 towns). The majority of the collected samples conform with MACs; however, some measurements of heavy metals in soils in urban areas exceed the allowed level.

Comparison of the actual concentration of polluting substances and MACs is often applied in the assessment of soil condition.

Persistent organic pollutants

Belarus never produced POPs and discontinued their import and use in the 1980s. However, thousands of tons were used in the past and some are still being stored (chapter 6).

Stockpiles of obsolete pesticides remain a significant source of risk to human health and the environment. Between 2010 and 2013, about 3,000 tons of stockpiled POPs and waste were recovered and packaged. About 1,800 tons have already been destroyed and about 1,000 tons of the remaining stockpiles have been stored at a secure location, eliminating POP-associated health risks for 116,000 people.

Some stockpiles are close to villages. Soils, vegetables, mushrooms and water can be polluted and expose the population to hazardous chemicals.

Medical waste

Medical waste from health organizations is divided into four groups according to epidemiological and toxicological hazards (chapter 6). Non-hazardous waste is disposed in landfills for household waste. Waste requiring special attention is treated through different decontamination methods with subsequent disposal or incineration. Waste containing cytostatic pharmaceuticals is disposed by pyrolytic incineration at specialized facilities. Since 2014, an incineration facility for medical waste with 370 tons/y capacity operates in Minsk. Medical waste from households is not collected.

Occupational health and safety

With a view to improving working conditions, prevention of occupational diseases is being addressed and inspections by State Sanitary Supervision Authorities are carried out. During inspections, checks are made regarding the observance of legal requirements (e.g. on noise levels; vibration; electrostatic, electric and magnetic fields; content of harmful substances; microorganisms in the air of a working zone; microclimate parameters; and illumination).

Occupational diseases occurring at enterprises are registered. Data are processed and analysis undertaken to determine the reasons why and circumstances in which disease has developed, and to increase the efficiency of preventive action.

According to the 1999 Labour Code, the employer is obliged to ensure the protection of workers, including development and implementation of an occupational health management system providing for identification of dangers, assessment of professional risks, identification of professional risk management measures and analysis of their efficiency, and development and implementation of actions to improve the protection of workers.

Measures to protect health-care workers while they are performing their professional duties have been incorporated into legislation on the prevention of hospital-acquired infections.

The main reasons for the emergence of occupational diseases are malfunction of technological processes (73.6 per cent of cases), design shortcomings of machines, equipment and tools, and imperfect individual protection tools (20.9 per cent each), malfunction and shortcomings of sanitary-technical devices (6.6 per cent), inadequacy of workplaces (18.7 per cent) and violation of the safety rules (2.1 per cent). Analysis of occupational diseases shows that they arose from the influence of industrial aerosols (38.5 per cent), physical factors (38.5 per cent), chemical factors (11 per cent), biological factors (9.9 per cent), and in connection with physical overload or overstrain (2.2 per cent).

About 2,001 persons suffered an occupational injury in 2013; 75.7 per cent were men and 24.3 per cent women. This represented 86,200 person-days of disability. Seven per cent of the injuries were fatal.

According to the Labour Code, an employment agreement can be concluded with a person who has reached the age of 16. With the written consent of one of their parents, an employment agreement can be concluded with a person who has reached the age of 14, for the performance of light work or for occupation in professional sport, provided this is not harmful to the health and development of the young person and does not impede their general secondary, professional or secondary vocational education.

As noted by WHO, asbestos is responsible for about 50 per cent of all deaths from occupational cancers. The 2014 Resolution of the Ministry of Health No. 120 deals with the requirements for asbestos-cement production. There is no statistics on occupational asbestos-related cancer in the country.

14.3 Legal, policy and institutional framework

Legal framework

Several laws are dedicated to environmental and health issues. This includes general laws, such as the 2012 Law on the Sanitary and Epidemiological Well-being of the Population and the 1992 Law on Environmental Protection, and specific laws dedicated to particular media or issues (e.g. 2008 Law on Atmospheric Air Protection, 1999 Law on Drinking Water Supply, 2003 Law on the Quality and Safety of Food Raw Materials and Foodstuffs for Human Life and Health, 2008 Law on the Use of Atomic Energy, 1998 Law on Radiation Safety of the Population, 2009 Law on Social Protection of Citizens Affected by the Chernobyl NPP Disaster and other Radiological Accidents, and 2012 Law on Legal Regime of Territories Exposed to Radioactive Contamination as a Result of the Chernobyl NPP Disaster).

The Law on the Sanitary and Epidemiological Well-being of the Population established the legal and organizational basis for preventing environmental factors from having an adverse impact on the human body in order to protect the sanitary and epidemiological welfare of the population.

Atmospheric air

The Law on Atmospheric Air Protection is directed towards the preservation and improvement of the quality of atmospheric air to provide for the ecological health and safety of the population and also to prevent harmful effects on the environment. This Law provides for the right of citizens to information about the condition of atmospheric air.

The 2009 Resolution No. 77 of the Ministry of Health established sanitary and hygiene requirements to ensure the quality of atmospheric air in settlements and recreation areas. It defines hygiene requirements for the placement, design, construction and reconstruction of industrial facilities in order to limit emissions of pollutants and population exposure to them. The establishment of sanitary and protective zones, use of the BAT for emissions reduction, and control of quantitative and qualitative emissions by the legal entities of industrial facilities are also regulated by this Resolution.

Noise

The 2012 Resolution No. 191 of the Ministry of Health defines sanitary and hygiene standards and rules for sound-reproducing and sound-intensifying devices in closed rooms and open areas. The 2012 Resolution No. 199 of the Ministry of Health approves the criterion for assessment of the degree of risk of an adverse health effect on a person from acoustic pressure. The 2011 Resolution No. 115 of the Ministry of Health establishes noise classification and maximum permissible noise levels at workplaces, and in vehicles, residential and public buildings and housing estates.

Water

The 1999 Law on Drinking Water Supply regulates relationships in the field of drinking water supply and establishes state guarantees on providing consumers with drinking water. It also establishes the requirement to protect the sources and systems of drinking water supply and the zones of sanitary protection of sources of drinking water supply.

Drinking water is regulated by the 1999 Resolution No. 46 of the Chief State Sanitary Officer, "On the approval of sanitary rules and standards 2.1.4. Drinking water and water supply of human settlements. Drinking water. Hygienic requirements to quality of water of the centralised systems of drinking water supply. Quality control. Sanitary standards and norms SanPiN 10-124 RB 99". This Resolution addresses non-compliance management and conditions for the state authorities to restrict or prohibit drinking water use. Hygiene requirements, quality standards (chemical and microbiological parameters and radioactivity) and quality control of drinking water are described by this Resolution.

The 1999 Resolution No. 1 of the Chief State Sanitary Officer "On the approval of sanitary rules and standards 2.1.4. Drinking water and water supply in human settlements. Zones of sanitary protection of sources of water supply and water supply systems for household needs. Sanitary rules and standards SanPiN-10-113 RB 99" defined the establishment of zones of sanitary protection around drinking water sources.

Health regulations and norms for bottled water are provided by the 2007 Resolution No. 59 of the Ministry of Health on the approval of hygiene requirements for packaged drinking water. This Resolution established hygiene requirements for the safety of drinking water packaged in large bottles, bottles, containers, packages and other vessels, and also the requirements for the organization of control. Mineral water is released onto the market when compliant with the Law on the Sanitary and Epidemiological Well-being of the Population and Technical Regulation of the Customs Union 021/2011 "On safety of food products".

The 2005 Resolution No. 198 of the Chief State Sanitary Officer approved the hygiene requirements for protection of surface water from pollution (SanPiN 2.1.2.12-33-2005). It established hygiene requirements for equipment (in sewage and industrial discharge, reservoir construction) and fixed sanitary and hygiene standards and rules for water bodies such as recreational water bodies. Water quality monitoring focuses on chemical and microbiological indicators. Sampling of recreational water bodies has to be performed prior the beginning of the swimming season and not less than two times a month during the swimming season. This Resolution underlines the obligation of the local executive and administrative authorities to take measures to restrict or prohibit the use of a water body when it represents a public health hazard.

The quality of water in swimming pools and aquaparks is regulated by sanitary standards, rules and hygiene standards approved by the 2009 Resolution of the Ministry of Health No. 105, with additions and amendments introduced by 2010 Resolution No. 76 and 2011 Resolution No. 111. It establishes sanitary and hygiene and anti-epidemic requirements for equipment and operation of covered and open swimming pools.

Legislation also fixes the Rules for Protection of Life of People on Waters (approved by the 2009 Resolution of the Council of Ministers No. 1623 as amended by 2011 Resolution No. 1049 and 2013 Resolution No. 1149). Such protection is ensured by lifeboat stations and posts established through the decisions of oblast (and Minsk City) executive committees upon request of the rayon executive committees and the Belarusian Republican Society for Saving on Waters.

Radiation

Radiation safety is regulated by the 1998 Law on Radiation Safety of the Population and 2012 Law on Legal Regime of Territories Exposed to Radioactive Contamination as a Result of the Chernobyl NPP Disaster, reinforced by sanitary standards and rules "Requirements to radiation safety" (2012 Resolution No. 213 of the Ministry of Health), "Requirements to ensuring radiation safety of the personnel and the population during implementation of activities on use of nuclear energy and ionizing radiation sources" (2013 Resolution No. 137 of the Ministry of Health) and other technical regulatory legal acts.

Sanitary norms and rules on radiation safety are in place, including the criteria for assigning waste to radioactive waste and the volume of emissions and discharges from NPPs.

Control of the radionuclides caesium-137 and strontium-90 in foodstuff and drinking water is carried out through radiation-hygiene monitoring and sanitary-hygiene examination, according to the Instruction "The organization of work of organizations carrying out the state sanitary supervision on minimization of consequences of the Chernobyl NPP accident" (No. 11-8-1-2003) approved by the Chief State Sanitary Officer in 2003 and the Scheme of radiation control of foodstuff from household farms by sanitary-epidemiological authorities, approved by the Chief State Sanitary Officer and in force since 1999.

Radiation doses delivered to medical staff and patients, as well as the population residing in the

zone of radioactive contamination are assessed and included in the State Radiation Monitoring Register. The Ministry of Health is responsible for the Register which is maintained by the Gomel-based State Institution "Republican Scientific and Practical Centre of Radiation Medicine and Ecology". The Ministry of Health assesses radiation dozes delivered to the population and publishes every five years a catalogue of radiation dozes for all settlements located in the zone of radioactive contamination.

Food

Food quality is regulated by the 2003 Law on the Quality and Safety of Food Raw Materials and Foodstuffs for Human Life and Health. Application of mineral fertilizers is regulated by sanitary standards and rules "Requirements to use, conditions of transportation and storage of pesticides (means of plant protection), agrochemicals and mineral fertilizers" and of Hygienic Standard "Hygienic standards of the content of active substances of pesticides (means of plant protection) in environment, food raw material and foodstuff", approved by the 2012 Resolution No. 149 of the Ministry of Health.

Medical waste

Medical waste management is regulated by the sanitary rules and norms 2.1.7.14-20-2005 "Medical waste management rules", approved by the 2005 Resolution No. 147 of the Chief State Sanitary Officer.

Occupational health

The 2014 Resolution of the Ministry of Health No. 120 approves the sanitary standards and rules "Requirements to organizations involved in construction activities and organizations producing construction materials, devices and blocks". It includes the requirements on the placement of production facilities, technological processes and equipment, construction materials, ventilation and light, as well as specific requirements pertaining to certain types of production processes.

Policy framework

No national environment and health action plan exists.

The State Programme on Overcoming of Consequences of the Chernobyl NPP Disaster for the period 2011–2015 and until 2020, approved by the 2010 Resolution of the Council of Ministers No. 1922, and implemented under coordination by the Ministry of Emergency Situations, focuses on the transition from the rehabilitation of the territories to their sustainable social and economic development.

The State Programme "Tuberculosis" for 2010–2014, approved by the 2010 Resolution of the Council of Ministers No. 11, was the third programme on TB in Belarus. It contributed to the reduction of morbidity from active TB from 45.8 newly diagnosed cases per 100,000 population in 2010 to 38.3 in 2013. An external review of the programme by international and national experts was conducted in 2011.

The State Programme of HIV-Infection Prevention for 2010–2015 was approved by the 2011 Resolution of the Council of Ministers No. 269 and implemented by the Department of Hygiene, Epidemiology and Prevention of the Ministry of Health. The Programme deals with the containment of HIV transmission in Belarus and decreasing mortality associated with AIDS.

The State Integrated Programme on Cancer Prevention, Diagnosis and Treatment for 2010–2014, approved by the 2010 Resolution of the Council of Ministers No. 141, facilitated an integrated intersectorial approach to cancer prevention, diagnosis, treatment and rehabilitation.

The State Programme "Cardiology" for 2011–2015, approved by the 2011 Resolution of the Council of Ministers No. 268, was aimed at efficient prevention, a decrease in morbidity, mortality and disability from cardiovascular diseases, and improvement in the quality and accessibility of medical care for patients with cardiovascular diseases.

Institutional framework

Ministry of Health

The Ministry of Health is responsible for the implementation of state policy on public health; the provision of medical care in the country, and of the state-guaranteed free medical care at the state health-care institutions; preventive activities; the formation of healthy lifestyles; public health education; the provision of favourable sanitary and epidemiological conditions for the population; and continuous improvement of the quality of medical care as well as increasing its efficacy.

The Ministry of Health supervises water quality monitoring. Various laboratories perform analysis (bacteriological and microbiological) and research activities on environmental factors and health. The

Ministry is responsible for the determination of standards and MACs of chemical, physical, microbiological factors, in order to promote public health. There is no department or service specifically dedicated to environmental health in the Ministry's structure.

The Ministry of Health has a number of subordinated organizations. The RUE "Scientific and Practical Centre of Hygiene" carries out applied and fundamental research in the areas of occupational hygiene and medicine, occupational pathology, environmental hygiene, physical factors, nutrition hygiene, hygiene of children and adolescents, preventive and ecological toxicology, and environmental chemistry. It also develops pesticide detection methods and analysis.

The SI "Republican Research and Practical Centre for Epidemiology and Microbiology" is the national R&D centre, where a wide range of fundamental studies in the areas of epidemiology, medical virology, microbiology, immunology and parasitology are conducted.

The activities of the SI "Republican Scientific and Practical Centre for Radiation Medicine and Human Ecology" aim at improving the health of the population exposed to multi-component and prolonged radiation effects following the Chernobyl NPP accident, including other negative anthropogenic environmental factors, through implementation of research measures on decreasing morbidity and mortality rates.

The "Republic Scientific and Practical Centre of Pulmonology and Tuberculosis" is responsible for the monitoring and evaluation of tuberculosis cases.

The system of State Sanitary Supervision Authorities (also known as the State Sanitary Service) is led by the Chief State Sanitary Officer who is also a Deputy Minister of Health. The system includes a Republican Centre of Hygiene, Epidemiology and Public Health, and six oblast centres of hygiene, epidemiology and public health, as well as town, rayon and zonal centres of hygiene and epidemiology.

Ministry of Natural Resources and Environmental Protection

The Ministry of Natural Resources and Environmental Protection cooperates with the Ministry of Health on health-related issues. The Republican Centre for Hydrometeorology, Radiation Control and Environmental Monitoring is in charge of air and surface water monitoring, chemical pollution of land and radiation monitoring (chapter 1).

Ministry of Agriculture and Food

The Department of Veterinary and Food Control of the Ministry of Agriculture and Food exercises control and supervision in the field of animal health, the quality of food raw materials and food products, seeds and plant protection. The Ministry cooperates with the Ministry of Health on health-related issues.

Preventive and information measures

In the event of adverse meteorological conditions, the major contributors to air pollution are informed and, depending on the atmospheric air pollution and risk level (level 1, 2 or 3), the authorities can ask the enterprise to reduce or suspend its activities.

In order to limit the impact on public health of industrial pollutant emissions, sanitary protection zones of up to 5 km around industrial areas have been established, and it is not allowed to build a residential or public building in this area. Depending on the concentration of substance emissions, the protection zone can be reduced or increased by the authorities.

In accordance with the National Immunization Schedule, vaccination of the population is carried out. In 2013, the global immunization coverage of children varied between 95.9 per cent and 98.1 per cent, depending on the disease (table 14.6).

The prophylactic vaccination of infants under 1 year old (as a percentage of children subject to vaccination) has remained steady since 2010, while a small decline (by 1–4 per cent) in vaccination rates was observed between 2005 and 2010.

Preventive examinations of children are available in Belarus. In 2013, preventive examinations were performed on 1,807,923 children (0–17 years old), resulting in the detection of reduced visual acuity in 9.3 per cent, posture disorders (5.7 per cent), speech defects (3.7 per cent), scoliosis (2.3 per cent) and reduced auditory acuity (0.2 per cent). These values have remained steady since 2010.

Disabled persons and patients with TB, AIDS, systemic diseases of connective tissue, cancer and hematologic diseases, diabetes mellitus, epilepsy and some other serious diseases are provided with free medicines. Children and pregnant women with phenylketonuria are provided with free medicinal nutrition mixtures.

Table 14.6: Prophylactic vaccination of children, 2013

	Vaccination		Revaccination	
	Age (years)	**percent**	**Age (years)**	**percent**
Children vaccinated against				
tuberculosis	0	98.0	7	99.6
diphtheria	0	95.9	2	98.3
whooping cough	0	96.1	2	98.4
poliomyelitis	0	96.1	2	98.9
measles	1	98.1	6	98.7
mumps	1	98.1	6	98.7

Source: Public Health in the Republic of Belarus, 2009–2013, Statistical book, 2014.
Note: Children vaccinated at the indicated age as a percentage of children subject to vaccination/revaccination.

There is a multilevel monitoring system for the incidence of infectious diseases in Belarus. It includes systematized accounting and incidence reporting by health-care organizations, accounting and incidence analysis by the State Sanitary Supervision Authorities, and monitoring and analysis of activators among patients and in the environment. Diagnostics and statistical supervision are carried out for each case of infectious disease in the separate nosocomial forms classified according to the International statistical classification of diseases and problems. On identification of a case of an infectious disease, a medical employee of the health-care organization concerned sends information on a form approved by Ministry of Health to the territorial centre of hygiene and epidemiology.

Sanitary, anti-epidemic, treatment and prophylactic events directed towards the prevention of communicable infection and disease are held annually. The number of events and list of actions are regulated by technical regulatory legal acts (sanitary standards and rules).

To limit the spread of infectious diseases, preventive actions are taken constantly. Travellers receive individual instruction on the risk of infection, depending on their destination. Public information and education is delivered through lectures, performances on national and regional radio and television, mass media publications, information on epidemic and preventive measures on the websites of the territorial sanitary and epidemiologic organizations, and the distribution of booklets, instructions and other materials.

National programmes have been developed to prevent diseases related to health determinants such as the environment, lifestyle and addictions. About 30 days are dedicated to specific preventive actions (e.g. World Tuberculosis Day, World Asthma Day, World No Tobacco Day, World Hepatitis Day, World Diabetes Day, World AIDS Day, etc.). Specific information campaigns and nation-wide events are run to raise awareness of healthy lifestyle, disease prevention measures and drug and alcohol addictions.

The annual report "On sanitary and epidemiologic situation in Republic of Belarus" is publicly available on the websites of the Ministry of Health (www.minzdrav.gov.by) and the Republican Centre of Hygiene, Epidemiology and Public Health (www.rcheph.by).

Environmental health-related global and regional agreements and processes

In 2005, Belarus ratified the 2003 WHO Framework Convention on Tobacco Control.

In 2009, Belarus acceded to the 1999 Protocol on Water and Health to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes. Belarus has set targets in conformity with its obligations under the Protocol.

Belarus acceded to the 2001 Stockholm Convention on Persistent Organic Pollutants in 2003. It signed the 2013 Minamata Convention on Mercury in September 2014 (chapter 6).

Since 1968, Belarus has been a Party to the 1960 Convention concerning the Protection of Workers against Ionising Radiation (ILO No. 115). Since 2000, it has been a Party to the 1981 Convention concerning Occupational Safety and Health and the Working Environment (ILO No. 155).

The country does not participate in five other International Labour Organization (ILO) environmental health conventions: the 1971 Convention concerning Protection against Hazards of Poisoning Arising from Benzene (ILO No. 136), 1974 Convention concerning Prevention and Control of Occupational Hazards caused by Carcinogenic Substances and Agents (ILO No. 139), 1977

Convention concerning the Protection of Workers against Occupational Hazards in the Working Environment Due to Air Pollution, Noise and Vibration (ILO No. 148), 1986 Convention concerning Safety in the Use of Asbestos (ILO No. 162) and 1990 Convention concerning Safety in the use of Chemicals at Work (ILO No. 170).

Belarus regularly participates in the meetings and activities under the European Environment and Health Process.

Projects

In the periods 2004–2006 and 2008–2009, the Ministry of Natural Resources and Environmental Protection, in partnership with the World Bank, realized the international project GEF TF 053865 "Priority activities related to the implementation of the Stockholm Convention on Persistent Organic Pollutants in the Republic of Belarus". An inventory of POPs was carried out; the current legislation and institutional potential of the country in this sphere was evaluated; the negative impact of POPs on public health and the environment was assessed; and a number of other measures to ensure implementation of the Stockholm Convention by Belarus were undertaken. The main result of the project was development of the first National Plan of Implementation of the Republic of Belarus under the Stockholm Convention on Persistent Organic Pollutants in 2007–2010 and for the period until 2028. The plan was endorsed by the 2007 Decree of the President No. 271 as the main policy document on the treatment of POPs.

The second National Plan of Implementation of the Republic of Belarus under the Stockholm Convention on Persistent Organic Pollutants in 2011–2015 was approved in 2011 (and revised in 2012). The NIP is aimed at protecting human health and the environment from the impact of POPs.

A UNDP project, "Introducing the Stop TB Strategy in Belarus with a particular focus on taking measures to combat multidrug resistant tuberculosis" (2011–2015) focuses on taking measures to reduce the prevalence of TB by scaling up measures to combat multidrug resistant TB, as well as the TB incidence and associated mortality rates.

In the period 2011–2012, Belarus participated in the SEARCH II (School Environment and Respiratory Health of Children) project, an environment and health research project implemented within the international frameworks of the Children's Environment and Health Action Plan for Europe and the EU Action Plan on Environment and Health. Between December 2011 and April 2012, the project undertook environmental monitoring as well as health, energy consumption and health comfort assessments in several European schools. Ten Belarusian schools were involved in the project. The outcomes demonstrate children's exposure to indoor air pollution and the resulting health impacts. The project's conclusions and recommendations aim to support the development of environmental and health policies (http://search.rec.org/).

14.4 Conclusions and recommendations

Various ministries take the environment and health into account in their areas of competence. However, there is no agency or department specifically dedicated to the coordination of health and the environment and to strategy development in this field. There is no National Environmental Health Action Plan and no strategic targets on environment and health are defined.

The legislation defines the monitoring programmes for several environmental health factors such as air quality, food, drinking water and recreational water quality, and also for radiation. In cases of non-compliance, several technical and administrative measures are pronounced to manage the causes of non-compliance and to protect public health. This monitoring is performed by different ministries and all data are collected by the National Statistical Committee and published in statistical year books available on government websites. However, only raw data are presented, without any analysis. It would be more relevant to perform statistical analysis of the results to extract significant tendencies and cross-links between environmental and health results, in order to underline environmental impact on health. Such comparison and diagnostics would also help in the setting of targets and indicators to guide the planning of specific activities. Comparison between results and targets would help strengthen actions to improve conditions related to the environment and public health.

Recommendation 14.1:
The Ministry of Health, in cooperation with the Ministry of Natural Resources and Environmental Protection, should:

(a) Assess the impact of environmental factors on health based on internationally recognized methodologies and define strategic targets and actions to be performed in the area of environment and health;

(b) Improve communication of the results and deliver user-friendly messages regarding prevention to the public.

Indoor air quality is an important health determinant, as the time spent at home is not negligible and fragile persons (babies, children and the elderly) are the most exposed to health risks. No data are available on indoor air pollution in houses, while several factors (asbestos, radon, carbon monoxide emission, mould) can be presumed to be present in buildings and have an impact on public health.

Recommendation 14.2:
The Ministry of Health should carry out assessment of indoor air quality and its impact on health by conducting a survey on radon, lead and asbestos exposure, and more especially by:

(a) Taking action to diagnose and register cases of carbon monoxide intoxication and lead and asbestos-related diseases;
(b) Collecting reliable information on the use and distribution of asbestos, lead and radon to prevent related diseases;
(c) Raising awareness on asbestos-, lead- and carbon monoxide-related diseases and on preventive actions.

Two enterprises that produce asbestos-containing materials are located in the country but no data on asbestos concentrations in the environment (air and soil) of the surrounding areas are available. Asbestos is still used in building construction and no data on asbestos in houses are available. Thus, specific diseases related to asbestos (asbestosis and mesothelomia) are not registered. Moreover there is a lack of comprehensive approach to the reduction of the use of asbestos in the country.

Recommendation 14.3
The Government should develop and implement measures to reduce the use of asbestos using WHO guidelines, such as a national asbestos programme.

A nuclear power plant is now under construction in Belarus. There is understanding of the necessity to enhance radiation monitoring and to strengthen a new radiation monitoring programme dedicated to the Belarusian NPP. The authorities have to bear the associated costs of the installation such as radiation monitoring, development of safety programmes and emergency action plans, and ensuring the availability of medication (iodine pills).

Recommendation 14.4:
The Government should ensure that the radiation monitoring at the Belarus NPP is carried out according to international standards and that safety programmes and emergency action plans are in place and adequately financed.

The major industrial sectors of Belarus include mechanical and chemical manufacturing, such as production of artificial fibres, plastics and mineral fertilizers. These industries use hazardous chemicals. Special attention has to be given to the protection from exposure to hazardous chemicals of workers and of the population living in the vicinity of industrial facilities. Information on the population's exposure to hazardous chemicals in industrial areas and in soil-contaminated areas, for example, in the vicinity of stockpiles of obsolete pesticides, is not available. Biomonitoring is performed for workers but only occasionally for the population living in industrial areas.

Recommendation 14.5:
The Ministry of Health, together with the Ministry of Natural Resources and Environmental Protection and the Ministry of Labour and Social Protection, should perform biomonitoring of human health in industrial areas in order to assess the impact of hazardous chemicals on health.

Belarus is a Party to only two of seven conventions of the International Labour Organization (ILO) dealing with occupational health and the environment.

Recommendation 14.6:
The Government should initiate accession to the following ILO conventions dedicated to prevention and control of occupational hazards caused by hazardous substances:

(a) 1971 Convention concerning Protection against Hazards of Poisoning Arising from Benzene (ILO No. 136),
(b) 1974 Convention concerning Prevention and Control of Occupational Hazards caused by Carcinogenic Substances and Agents (ILO No. 139),
(c) 1977 Convention concerning the Protection of Workers against Occupational Hazards in the Working Environment Due to Air Pollution, Noise and Vibration (ILO No. 148),
(d) 1986 Convention concerning Safety in the Use of Asbestos (ILO No. 162);
(e) 1990 Convention concerning Safety in the use of Chemicals at Work (ILO No. 170).

ANNEXES

Annex I: Implementation of the recommendations in the second Environmental Performance Review

Annex II: Participation of Belarus in multilateral environmental agreements

Annex III: Key data and indicators available for the review

Annex IV: Millennium Development Goals indicators, 2005–2014

Annex V: List of major environment-related legislation

Annex VI: Results of the For Future Inland Transport Systems (ForFITS) tool

Annex I

IMPLEMENTATION OF THE RECOMMENDATIONS IN THE SECOND ENVIRONMENTAL PERFORMANCE REVIEW[10]

PART I: POLICY MAKING, PLANNING AND IMPLEMENTATION

Chapter 1: Legal and policymaking framework and sectoral integration mechanisms

Recommendation 1.1:
The Government should reconsider the competencies of governmental bodies responsible for natural resources use and environmental protection in forestry and protected areas, including fishing and hunting. The Ministry of Natural Resources and Environmental Protection should have overall responsibility for controlling the use of natural resources. The activities of the Affairs Management Department of the President related to the use of natural resources should be made transpa rent and subject to oversight by the Ministry of Natural Resources and Environmental Protection and to public scrutiny.

The recommendation has not been implemented. The 2009 Decree of the President No. 510 "On enhancement of control (surveillance) activities in the Republic of Belarus" did not eliminate the overlaps in the control functions on environmental protection of the Ministry of Forestry ("control over the state, use and protection of forest fund" and "over the hunting sector and hunting"), Ministry of Natural Resources and Environmental Protection ("control in the area of environmental protection and rational use of natural resources"), State Inspectorate on Fauna and Flora Protection under the President ("control over the protection and use of wild animals which may be hunted or fished, …, forest fund") and the Affairs Management Department of the President (which performs, in the territories under its jurisdiction, "control of hunting, fishing, use and protection of forest fund, and other control functions with regard to protection of wildlife and plant resources"). At the same time, in practice, these institutions have found ways to run their respective enforcement activities in a complementary manner. The activities of the Affairs Management Department of the President related to the use of natural resources are not transparent – no reports on these activities are publicly available. Such activities are not subject to oversight by the Ministry of Natural Resources and Environmental Protection and to public scrutiny.

Recommendation 1.2:
The Ministry of Natural Resources and Environmental Protection should adapt its structure to current needs taking account internationally accepted principles. In particular, policy development and decision-making on natural resources use should be separated from monitoring and control. The Ministry should consider establishing relevant departments and assigning the policy development and decision-making functions currently performed by specialized inspectorates to them. It should also consider separating the tasks of issuing permits and enforcement, currently performed by specialized inspectorates. See also Recommendation 2.2.

The recommendation has been implemented. Policy development and decision-making on natural resources use are separated from monitoring and control. Relevant departments in the Ministry of Natural Resources and Environmental Protection were established and assigned with the policy development and decision-making functions that were previously performed by specialized inspectorates. The tasks of issuing permits and enforcement are not separated.

[10] The second review of Belarus was carried out in 2005. During the third review, progress in the implementation of the recommendations in the second review was assessed by the EPR Team based on information provided by Belarus.

Recommendation 1.3:
The Ministry of Natural Resources and Environmental Protection as well as other relevant ministries and institutions, when developing policy documents, such as strategies, plans and programmes, on environmental protection and natural resources use should always include a section on their funding. This section should clearly identify the necessary financing to achieve each objective and the sources of the financing.

The recommendation has been implemented. The 2009 Resolution of the Council of Ministers No. 404 provides clear rules on financing of state, regional and sectoral programmes. Usually, programmes state only the overall estimated amount of financing per group of programme activities with details on the volumes and sources of financing for specific activities being settled in the process of budgetary planning for the upcoming year.

Strategies typically do not include provisions on financing. Implementation of strategies takes place through development and implementation of programmes.

Recommendation 1.4:
The Ministry of Natural Resources and Environmental Protection should initiate the introduction of modern and effective tools for environmental management and the protection of natural resources, such as integrated permits, taking into account the application of best available techniques (BAT); eco-labelling; and environmental management and audit scheme (EMAS) into environmental legislation.

The recommendation has been implemented. Belarus enabled the integrated permitting of large enterprises and started its practical use through the National Strategy for Implementation of Integrated Environmental Permitting for 2009–2020. The policy and legal framework for integrated permitting was created in the period 2009–2011. The competences of the state authorities were established and the national BAT Centre was created. Some preparatory work was done for competent authorities and those subject to regulation. A preliminary list of some 300 installations subject to integrated permitting was established. No listed installation would be allowed to operate without an integrated permit, as of 2016. As of early 2015, there were eight large installations that had already obtained their permits. Work remains to be done on building capacity on preparing applications and issuing permits, translating and adapting BATs, developing the control system and enhancing the public participation component. The integrated permits cover only air, water and waste issues. Other issues, such as energy efficiency, noise or soil protection, can be included in the permit but are not mandatory and are regulated by respective legal acts and technical regulations.

Voluntary approaches to environmental management are emerging, especially among enterprises that work in markets where environmental management systems are largely applied. There are 343 enterprises certified according to the national environmental management system of certification, as compared with 72 holders of ISO 14000 certificates. Tax abatement is foreseen for enterprises implementing the national STB ISO 14001 system.

The legal framework for eco-labelling is broadly based on international (ISO 14024) and EU requirements. A few standards have been established so far for non-food products. However, the practical implementation of product eco-labelling is lagging. No independent body for environmental certification of products is in place. There is no public pressure on producers and no incentives created by the Government (e.g. public procurement) to support eco-labelling. The established environmental criteria are perceived as unfeasible by many producers; consequently, many of them are not motivated or interested in receiving the eco-label.

Chapter 2: Compliance and enforcement mechanisms

Recommendation 2.1:
The Ministry of Natural Resources and Environmental Protection should optimize the human and other resources of the institutions responsible for permitting, supervision and enforcement by separating the authority to issue permits from that to enforce compliance. For this purpose, it may set up a department independent from the specialized inspectorates to deal with environmental permitting. MNREP should also reassess the role of the specialized inspectorates in order to strengthen their supervisory capacities and enforcement functions.

The recommendation has been implemented. The institutional set-up was modified. The separation of policy- and law-making from permitting and enforcement was put into practice, though not completely. Specialized

inspectorates were abolished in 2010. The inspection and permitting functions were transferred to the territorial bodies. The Ministry kept some functions on issuing permits and carrying out environmental assessment.

At the subnational level, issuing permits is mostly concentrated in the oblast committees while enforcement of regulations and permit requirements is mainly performed by the rayon/town inspection units. However, overlap remains between the issuing of permits and inspection activities. Rayon/town inspectors are still entrusted to issue permits for small installations (e.g. on industrial waste management or air emissions). On the other hand, oblast staff from permitting units often support the rayon inspection units with checking compliance with permit requirements. According to the 2007 Resolution of the Ministry of Natural Resources and Environmental Protection No. 17 as amended by the 2010 Resolution No. 25, the staff of the Ministry of Natural Resources and Environmental Protection at national and oblast levels still have full inspection powers. The Ministry is in an advanced stage of finalizing the complete separation of those functions.

Recommendation 2.2:

The Ministry of Natural Resources and Environmental Protection should consider introducing integrated environmental permits and draft appropriate legislation, including the necessary by-laws. The changes should ensure that permits contain requirements for a high level of protection of the environment as a whole and a reduction in emissions based on the comparison with the best available techniques.

This recommendation was implemented. See the implementation of Recommendation 1.4.

Recommendation 2.3:

(a) The Ministry of Natural Resources and Environmental Protection should develop the necessary legislation to regulate the rights and obligations of environmental inspectors and the enforcement of self-monitoring requirements;

(b) The Ministry of Natural Resources and Environmental Protection should ensure that self-monitoring requirements are included in the permits, data obtained from self-monitoring are used as part of the general monitoring system, and uniform quality assurance requirements apply to both governmental monitoring and self-monitoring systems.

This recommendation was implemented.

The system of inspection has seen improvements. The 2009 Decree of the President No. 510 created a unified legal framework for enforcement agencies' activities. Due to changes in the legal basis, inspections have become more coordinated across various competent authorities, within the environmental sector and outside it. Mandates of various inspection authorities are now better differentiated, and powers of inspectors clearer. Detailed mandatory checklists were introduced for preparing site visits, and also as a measure for strictly framing the inspection.

Self-monitoring requirements are included in the permits and are enforced by environmental inspectors. They are part of mandatory inspection checklists. The Code on Misdemeanours foresees sanctions for not providing information on environmental pollution in due terms.

Sampling and laboratory analysis within the enterprise self-monitoring system must be done by accredited laboratories. Quality assurance mechanisms are established. Methodological guidance for measurements is assigned to the Republican Centre for Analytical Control in the Field of Environmental Protection under the Ministry of Natural Resources and Environmental Protection.

Self-monitoring data reported by the largest polluters (through the system of local monitoring) are part of the National Environmental Monitoring System. The issue is now to achieve a level of data processing that would allow integrating pollutant emission data into environmental quality forecasts.

Chapter 3: Information, public participation and education

Recommendation 3.1:
The Ministry of Natural Resources and Environmental Protection should:

(a) Transform its local monitoring programme, step by step, into a full-fledged national PRTR which, among other things, should cover releases and transfers of the main pollutants from major point sources, accommodate available data on releases from diffuse sources (e.g. transport and agriculture), present standardized, timely data on a structured, computerized database, and be publicly accessible through the Internet, free of charge;
(b) In cooperation with the Committee on Land, Geodesy and Cartography under the Council of Ministers and within the framework of the National System of Environmental Monitoring, take the necessary measures to establish and develop land monitoring; and
(c) Speed up the accession of Belarus to the PRTR Protocol to the Aarhus Convention.

(a) This part of the recommendation is not yet implemented. In 2013, a pilot project on a national PRTR was carried out. The draft PRTR database comprises data on seven enterprises from Grodno Oblast. The enterprises voluntarily provided data on releases and transfers of the main pollutants from major point sources and on releases from diffuse sources. So far, enterprises have not agreed to make data publicly available. PRTR is technically feasible in the country but the appropriate national legislation and regulations to support it are not yet in place. It is also necessary to convince enterprises to submit the data directly to an entity responsible for management of the national PRTR. At present, work is continuing on the further development and improvement of the technical and legal basis for the national PRTR.

(b) This part of the recommendation has been implemented. In 2007, as part of environmental monitoring, land monitoring was established based on the 2007 Resolution of the Council of Ministers No. 386, which approved the Regulations on the procedure for conducting land monitoring as part of the National Environmental Monitoring System in the Republic of Belarus and using its data. Land monitoring is also regulated by the 2009 Resolution of the State Property Committee No. 68, which approved the Instruction on the organization of land monitoring, and TCP 17.13-02-2008 "Environmental protection and use of nature. Environmental monitoring. Procedure of carrying out observations on chemical pollution of lands". Land monitoring is carried out through a system of ongoing observations of the state and changes in composition, structure and state of land resources, and distribution of lands according to the categories of land uses and types, e.g. agricultural lands, and urban areas and road networks.

(c) This part of the recommendation is not yet implemented. Belarus is working on accession to the PRTR Protocol but is not yet a Party.

Recommendation 3.2:
The Ministry of Health, jointly with the Ministry of Natural Resources and Environmental Protection, should review the national ambient environmental quality standards to:

(a) Make the standards consistent, to the maximum extent possible, with international air- and water-quality standards and monitoring guidelines, and set time schedules to phase in monitoring of the standards that are currently not measured, as well as the revised or new standards that cannot be introduced immediately;
(b) Upgrade monitoring stations, equipment and devices, and analytical laboratories, and retrain staff to measure environmental quality against the revised list of standards.

This recommendation is implemented.

(a) Belarus has made progress in revising and updating its extensive set of ambient environmental standards to make them compatible with international air and water quality standards. This relates, above all, to a trend of making the Belarusian environmental regulatory framework on air and water quality consistent with international standards. The air and water quality regulations are based on

limiting the maximum acceptable concentration (MAC) of a hazardous substance into air or water. As of 1 January 2015, there were 654 MACs for air pollutants and 1,324 MACs for pollutants in the water bodies designated for water supply of the population and bathing waters, which were set up by the Ministry of Health. In general, these norms are consistent with relevant norms recommended by the WHO and stipulated in the EU directives. In addition, many technical regulations, rules and procedures for monitoring air and water quality have been formulated or revised. The harmonization of national environmental standards with international standards intensified recently. Over the last few years, seven national standards on the procedures for water quality sampling and testing and a standard on monitoring small particles in air, which are identical to ISO standards, were approved.

(b) Monitoring stations for observations of air and water quality, which have been operating under the National Environmental Monitoring System, were upgraded. Up-to-date equipment, including 16 automated gauges, has been used for air quality monitoring; the level of groundwater tables is measured in 126 observation wells with automated gauges, also. Laboratory equipment for testing of air and water samples has been upgraded in order to measure concentrations of a wider range of substances. The requirements for analytical laboratories carrying out water sampling and testing for hydrochemical monitoring of surface water have been specified in the recently approved technical regulation TCP 17.13-12-2013.

Recommendation 3.3:

(a) The Council of Ministers should streamline the natural resource cadastres to oblige the responsible ministries and institutions that have not done so yet to establish databases that:

- *Present standardized, timely and computerized data;*
- *Are searchable according to key parameters;*
- *Are user-friendly in their structure and provide links to other relevant databases;*
- *Are publicly accessible through the Internet, free of charge; and*
- *Have only limited confidentiality provisions.*

(b) The Ministry of Natural Resources and Environmental Protection, jointly with the Ministry of Statistics and Analysis, should update the national system of environmental indicators to make it consistent with indicators used in Europe and worldwide, and to facilitate international comparisons.

Implementation of the recommendation is ongoing.

(a) State cadastres are standardized. As of March 2015, while cadastres for air, flora, fauna and waste are not yet publicly accessible, but available upon request, the others are already publicly accessible and free of charge, and do not have limited confidentiality provisions. They are not connected to other relevant databases. This feature will be implemented through a web portal with GIS features, which is currently under development within the Ministry of Natural Resources and Environmental Protection. More detailed information can be found in the register of information resources (http://infores.mpt.gov.by/).

(b) In 2010, the National Statistical Committee (Belstat), together with the Ministry of Natural Resources and Environmental Protection, Ministry of Housing and Utilities, and State Committee on Property, developed the "System of core environmental indicators of the Republic of Belarus" based on Guidelines for the Application of Environmental Indicators in Eastern Europe, Caucasus and Central Asia (now referred to as Online Guidelines for the Application of Environmental Indicators, ECE). The system is currently available on Belstat's website (http://belstat.gov.by). In 2014, Belstat started implementing on its website a set of core indicators based on the Shared Environmental Indicators System (SEIS). Indicators are comparable at the international level and available in Russian and English. As of 2015, they cover statistics of air protection, ozone layer depletion, climate change, water, biodiversity, waste, application of fertilizers, passenger turnover and energy. Since 2015, Belstat, in cooperation with relevant bodies, is expanding access to other environmental indicators.

Recommendation 3.4:

(a) The Ministry of Natural Resources and Environmental Protection should initiate the revision of:

- *The Law on Environmental Protection to include detailed procedures ensuring public participation in decision-making regarding environmental permitting, standard-setting, environmental fund expenditures and development of laws, regulations, strategies, plans and programmes affecting the environment; and*
- *The Law on State Ecological Expertise and relevant regulations to include such important issues as: how to inform the public about the possibilities for receiving and commenting on EIA documentation, deadlines for submitting comments, modalities of public hearings, how the proponent should handle the public's comments and inform both the public and the State ecological expertise authorities how comments have been taken into account, and how to inform the public about the final decision taken by the State ecological expertise authorities.*

(b) The Ministry of Justice, in consultation with the Ministry of Natural Resources and Environmental Protection, should draft proposals to make the legislation consistent with the Aarhus Convention regarding public access to justice, in particular the right to challenge acts and omissions by private persons and public authorities that contravene national environmental legislation.

(a) The recommendation has been partially implemented.

- The draft amendments to the Law on Environmental Protection and several other laws, which are in the parliamentary procedure as of April 2015, aim to provide for public participation in decision-making regarding development of legislation and strategic documents affecting the environment. As the standard-setting process takes place through the approval of standards by regulatory legal acts, standard-setting will be covered by public participation requirements when public participation in decision-making regarding regulatory legal acts is ensured. No procedures for public participation in decision-making regarding single-media permits exist. There are procedures for public participation in decision-making regarding integrated permits.

- The 2009 Law on State Ecological Expertise, adopted in place of the 1993 Law, was followed by the 2010 Resolution No. 755 of the Council of Ministers which approved the Regulations on state ecological expertise and the Regulations on environmental impact assessment. The majority of issues mentioned in the recommendation were taken into account in the Regulations on environmental impact assessment. However, the Regulations do not provide for the obligation of the proponent to inform the public on how the public's comments have been taken into account.

(b) The recommendation has been partially implemented. Some changes to the legislation were introduced but inconsistencies regarding access to justice remain. These have been analysed in two studies conducted under the auspices of the Aarhus Convention's Task Force on Access to Justice in 2012 and 2014. They include: limited standing of environmental NGOs (public associations, institutions and other organizations); high costs of litigation (including court fees, payments to experts and lawyers, and the requirement that the losing party recovers the costs of the winning party); lack of opportunities to receive qualified legal aid; restricted opportunities of citizens and environmental public associations with regard to the right to challenge acts and omissions by private persons and public authorities that contravene national environmental legislation (Article 9, paragraph 3, of the Aarhus Convention); refusals of courts to accept environmental cases on the basis of lack of jurisdiction; and poor awareness and capacity of judges and prosecutors to handle environmental cases initiated by citizens and environmental public associations.

Recommendation 3.5:

The Council of Ministers should review the current legislation and regulations regarding the registration and operation of public associations and initiate the adoption of amendments that would create a supportive framework for such associations, including environmental NGOs, and enable Belarus to comply with its obligations under the Aarhus Convention. It should include NGO representatives on the National Commission on Sustainable Development.

The recommendation has been partially implemented. However, the framework for the activities of environmental NGOs is not yet supportive. The number of environmental NGOs registered in the country remains very low.

The 2013 amendments to the 1994 Law on Public Associations eased the requirements for territorial representation of founders of republican and local public associations. At least 50 founders coming from the majority of oblasts and Minsk City are now required for the registration of a republican public association, contrary to the pre-amendments requirement for 10 founders from each of the majority of oblasts and Minsk City. At least 10 founders coming from two or more administrative and territorial units of the territory to be covered by the activities of the local public association are now required for the registration of a local public association, contrary to the pre-amendments requirement of having at least 10 founders from the majority of administrative territorial units of the territory to be covered by the activities of the local public association. The 2013 amendments also lifted the requirement to present in graphics the organizational structure of a public association.

However, the requirement for a public association to have an official seat in non-residential premises, the high number of founders needed, together with remaining requirements for the territorial representation of founders, continue to be obstacles for registration of environmental public associations. Although the legal requirements for registration of environmental public associations are the same as for other associations, environmental NGOs report that registering a public association on environmental protection is more difficult than in some other areas (e.g. education). Under these conditions, some environmental groups operate unregistered or register in the form of "institutions" or in other forms, as this is easier than registration in the form of public associations.

Difficulties in access to financing represent another obstacle for the activities of environmental NGOs. The opportunities to receive national funding are limited. Assistance arriving from abroad (not only for NGOs but also for projects implemented by international organizations and governmental bodies) needs to go through procedures of governmental approval and registration.

The National Commission on Sustainable Development was dissolved in 2009.

Recommendation 3.6:
The Ministry of Education should speed up the establishment, in close cooperation with the Ministry of Natural Resources and Environmental Protection, of the inter-agency coordinating council on education for sustainable development with the participation of all stakeholders, including NGOs and the mass media. The council should support and monitor the implementation of the national multilevel integrated programme for environmental education and awareness raising for 2005-2010, once adopted by the Council of Ministers, and initiate other actions to promote and facilitate the implementation of the ECE Strategy for Education for Sustainable Development.

The recommendation has been partly implemented. The interministerial Coordination Council on ESD was established by the 2006 Order of Ministry of Education No. 807. The Council is composed of representatives from the Ministries of Education, Natural Resources and Environmental Protection, and Culture; universities, schools and national educational institutions; civil society and the mass media. It is chaired by the Deputy Minister of Education and should convene twice a year. However, since its establishment, the Council has convened only two times. No meeting reports or action plan of the Council were available at the time of writing the current review.

Chapter 4: International agreements and commitments

Recommendation 4.1:
The Ministry of Natural Resources and Environmental Protection should continue to introduce proposals to develop new and revise existing legislation according to Belarus's obligations under international agreements. The recommendations, contained in the National Sustainable Socio-Economic Development Strategy for the period to 2020, to harmonize national environmental legislation with the principles and norms of international environmental legislation should serve as guidelines. Speedy adoption and development of mechanisms for

implementation of the law on environmental information in accordance with the Aarhus Convention should be a priority.

The implementation of the recommendation is ongoing. The Ministry of Natural Resources and Environmental Protection continues to introduce proposals to update existing legislation according to the country's international obligations. Most of the legal provisions stemming from the international environmental agreements were transposed into the country's legislation. In 2007, provisions on access to environmental information were introduced in the Law on Environmental Protection but a part of environmental information remains outside the scope of this Law.

Recommendation 4.2:
The Council of Ministers should take measures to change the rules and procedures for the approval of international technical assistance for environmental protection so as to significantly simplify and expedite the process.

The recommendation was partially implemented, though as of early 2015 the procedures for the approval of international technical assistance for environmental protection remained still far from being simple and expeditious.

There are two main procedures for approval of international funding: the procedure for "international technical assistance" and the procedure for "foreign grant aid". NGOs report the lack of clear criteria for differentiation between the two procedures. There are cases when, due to delays or the impossibility of receiving governmental approval, NGOs had to return funding to the donor.

The first procedure, for "international technical assistance", is through the Ministry of Economy and applies to assistance arriving from international organizations, foreign governments and their administrative and territorial units. This procedure culminates in the approval given through a resolution of the Council of Ministers or, in some cases, by the Commission on International Technical Assistance under the Council of Ministers. In 2010, this procedure was eased as the possibility of approval by the Commission on International Technical Assistance (instead of a resolution of the Council of Ministers) was introduced for two categories of projects: (i) national implementation projects where all funding is received by one national recipient; and (ii) mini-projects with overall funding of no more than 3,000 basic units and an implementation period not exceeding one year. Moreover, projects developed on the basis of the 2012 National Programme of International Technical Cooperation for 2012–2016 do not require the approval, but only registration. Despite these efforts to ease the procedure for "international technical assistance", environmental NGOs characterize it as difficult and lengthy, whereas governmental authorities stress the need to raise the quality of documentation submitted for approval. The average time to get approval differs in the estimates given by NGOs and by the governmental authorities.

In July 2015, the Resolution of the Council of Ministers No. 590 (enters into force in October 2015) introduced changes in the procedure for international technical assistance. In particular, the number of documents to be submitted for approval and registration of assistance was reduced. The Resolution provides for establishment of a Coordination Council on international technical cooperation with participation of governmental authorities, donors and NGOs under the Commission on International Technical Assistance.

The second procedure, for "foreign grant aid", is through the Department of Humanitarian Activity under the Affairs Management Department of the President. In this procedure, until 2015, NGOs were requested to present a letter of support from a governmental body as part of the procedure, contrary to the absence of such a requirement in the legislation. The Edict of the President No. 5 "On foreign grant aid" was adopted in August 2015 and comes into force in March 2016. The Edict widens the list of goals for which foreign grant aid can be used, including the goals of "development of specially protected natural areas, environmental protection and rational use of natural resources". For the first time ever, the Edict introduces the minimal amount of foreign grant aid that does not require registration; however this threshold applies only to goods (property) and does not apply to monetary contributions. The Edict introduces an obligation of recipients to report about use of foreign grant aid to the Department of Humanitarian Activity and in general tightens the control over use of foreign grant aid.

Recommendation 4.3:
The Ministry of Natural Resources and Environmental Protection should:

(a) Finalize the necessary documents for the ratification of the Espoo Convention and the Copenhagen, Montreal and Beijing Amendments to the Montreal Protocol;
(b) Prepare necessary documentation to proceed with ratification of the Protocol on SEA to the Espoo Convention, the Protocol on Volatile Organic Compounds to the LRTAP Convention, and the Protocol on PRTRs to the Aarhus Convention; and
(c) Continue preparing national strategies and action plans for the implementation of conventions where such documents are lacking. MNREP may wish to continue applying for external funding to build up its capacity.

(a) This part of the recommendation was implemented. Belarus became a Party to the Espoo Convention in 2005 and to the Copenhagen, Montreal and Beijing Amendments to the Montreal Protocol in 2007.

(b) This part of the recommendation is not yet implemented. The Ministry of Natural Resources and Environmental Protection is working first to harmonize the legislation with the legal requirements of the SEA Protocol of the Espoo Convention and build capacity for implementation. In particular, the following activities were implemented:

- Projects on establishment and development of administrative and institutional capacity with a view to effective application of SEA and its integration into planning process;
- Analysis of the current legislation and law-enforcement practice;
- Development of methodological recommendations and an information guide on SEA;
- Pilot SEAs of the National Tourism Development Programme for 2011–2015, Programme for Development of Inland Water and Maritime Transport in the Republic of Belarus for 2011–2015, and Scheme of the Complex Territorial Organization of the Myadelsky Rayon;
- Two training trips to the Czech Republic for exchange of experience of SEA application, several training sessions on SEA at national and local levels, and a subregional conference on exchange of experience and appropriate practice of application of the Espoo Convention and its Protocol.

The country has started preparatory work to join the Gothenburg Protocol to Abate Acidification, Eutrophication and Ground-level Ozone, which contains provisions of the VOC Protocol.

For the PRTR Protocol, see implementation of the recommendation 3.1(c).

(c) The implementation of this part of the recommendation is an ongoing process. The Ministry of Natural Resources and Environmental Protection is responsible for 21 multilateral environmental agreements and develops related national strategies and action plans. Examples include the 2011 National Plan of Implementation of the Republic of Belarus under the Stockholm Convention on Persistent Organic Pollutants in 2011–2015, approved by the 2011 Decree of the President No. 271; 2015 Strategy on Implementation of the United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa, approved by the 2015 Resolution of the Council of Ministers No. 361; and 2009 Strategy on Implementation of the Convention on Wetlands of International Importance, especially as Waterfowl Habitat, approved by the 2009 Resolution of the Council of Ministers No. 177. In 2015, a strategy on preservation of bogs and rational use of peat fields is under development. The strategy for the conservation and sustainable use of biological diversity was updated.

Recommendation 4.4:
(a) The Ministry of Natural Resources and Environmental Protection should analyse the results of implementation of bilateral and multilateral agreements and other forms of bilateral cooperation. Based on this analysis, it should identify the priorities for cooperation and concentrate its resources on them. It should integrate this analysis in its annual reports to the Ministry of Foreign Affairs;

(b) The Ministry of Natural Resources and Environmental Protection should finalize preparations for signing intergovernmental agreements with neighbouring countries on the use and protection of water

resources of the Daugava/Zapadnaya Dvina, Neman/Nyamunas, Dnepr and Zapadnyi Bug river basins and other bilateral agreements currently being negotiated. Once the agreements come into force, it should, as a matter of priority, develop practical steps to make them fully operational.

(a) This part of the recommendation is implemented. The Ministry of Natural Resources and Environmental Protection has to report on the implementation of bilateral and multilateral environmental agreements and memoranda of understanding. These reports have to be accompanied by analysis of the implementation and results of implementation. Priorities for cooperation are drawn from these reports.

(b) The recommendation is in the process of implementation for bilateral transboundary water agreements but has not been implemented for basin agreements. Bilateral transboundary water agreements of Belarus with the Russian Federation and Ukraine continue to function. In late 2014, Belarus submitted to Poland a proposal for a draft agreement on transboundary waters. As of early 2015, Belarus and Lithuania are working on a draft interministerial technical protocol on cooperation in the protection and use of water resources of the transboundary Neman river basin. There has been no progress on finalization and signing of basin agreements for the Daugava/Zapadnaya Dvina, Neman/Nyamunas, Dnepr and Zapadnyi Bug river basins.

Recommendation 4.5:

(a) The National Commission on Sustainable Development should prepare, by 2010, an analysis of the achievement of the medium-term goals and progress in the long-term goals of NSSD-2020. Based on this analysis, the Commission should consider revising the Strategy;

(b) The Ministry of Natural Resources and Environmental Protection should be involved in all stages of the preparation of the national progress report on the millennium development goals, particularly with regard to goal 7. Based on the conclusions of the report, the Government should consider, where appropriate, setting higher targets than those in the millennium development goals to be achieved by 2015 to maintain the spirit of the Millennium Declaration.

(a) This recommendation was not implemented. The National Commission on Sustainable Development was dissolved in 2009. No implementation report for NSSD-2020 was prepared, though some assessment of implementation is found in NSSD-2030. NSSD-2030 was approved by the presidium of the Council of Ministers in February 2015.

(b) This recommendation has been implemented. Official reports on MDGs implementation were prepared in 2005 and 2010. In 2012, a statistical book was issued with MDG-related data. The Ministry of Natural Resources and Environmental Protection was fully involved in the preparation of official reports. No higher targets were set. A new MDG implementation report is expected to be released by the Government in late 2015.

PART II: MOBILIZING FINANCIAL RESOURCES FOR ENVIRONMENTAL PROTECTION

Chapter 5: Financing for environmental protection

Recommendation 5.1:

The Council of Ministers should aim to improve the data collection system on environmental expenditures. It should coordinate efforts to improve the quality of these data. Particular focus should be placed on improving the definition and scope of environmental expenditure in line with international standards. Transfers between the public sector and enterprises should be rigorously reported and a distinction between enterprise and public resources made to avoid double-counting.

This recommendation has been implemented. Belstat publishes detailed statistics on annual environmental protection expenditures for the aggregate of the total economy. Data distinguish between (i) current and capital expenditures, and (ii) expenditures by main environmental domain. These expenditure data are not itemized for the main economic sectors, and they do not distinguish between the real sector and the government sector.

Information on aggregate environmental expenditures financed from the government budget (central government, local government, general government) is published separately.

Recommendation 5.2:
The Council of Ministers should improve the mechanism for the use of resources of the environment protection funds. The improved mechanism should include:

(a) Identifying priorities where resources can make a significant difference;
(b) Developing clear procedures for selection of the projects for financing. The cost-effectiveness of the projects should become an important appraisal and performance evaluation criterion;
(c) Establishing specialized unit responsible for funds management within the framework of the Ministry of Natural Resources and Environmental Protection, in accordance with accepted standards of good governance for such institutions; and
(d) Improving the reporting of the results achieved with the support from environment protection funds.

This recommendation is not relevant. Effective 1 January 2012, the environmental funds (nature protection funds) were abolished together with the earmarking of revenues from various taxes and fees (environmental tax, fines and compensation for environmental damage) for financing environmental protection measures. Government environmental expenditures are now financed out of total revenue of the budgets of central government and local governments.

Recommendation 5.3:
The Ministry of Natural Resources and Environmental Protection, in coordination with the Ministry of Finance, Ministry of the Economy, Ministry of Taxes and Duties and other relevant governmental bodies should:

(a) Revise the number of pollution charges in order to make the system more efficient and cost-effective. The focus should be on those pollution charges that correspond to the environmental priorities, can be monitored at a reasonable cost and generate significant revenue;
(b) Consider introducing charges on environmentally damaging products or transactions (e.g. on used batteries and tyres), which can ensure a more stable and predictable revenue stream for environmental purposes; and
(c) Establish a transparent procedure that involves stakeholders for regularly revising and adjusting the rates. The primary objective of the system of charges should be pollution reduction rather than revenue raising.

This recommendation has been implemented.
(a) The number of environmental taxes was significantly reduced and now comprises only the air pollution tax, tax on wastewater discharge, tax on disposal and storage of enterprise waste, and tax on import of ozone-depleting substances. A problem remains the large number (more than 50) of air pollutants that are subject to payment of emission taxes.
(b) A system for dealing with special waste streams became operational in 2013.
(c) Since 2011, rates for environmental taxes are established in the Tax Code. Tax rates have been adjusted annually, mainly to prevent the erosion of revenues and incentive effects due to high inflation.

Recommendation 5.4:
The Ministry of Natural Resources and Environmental Protection, in cooperation with the Ministry of Economy and relevant sectoral ministries, should aim to identify priority environmental investment projects, which could be included in donor cooperation programmes. Cooperation programmes should evolve into more long-term multi-year strategic partnerships rather than individual ad hoc activities.

This recommendation is implemented. The 2012 National Programme of International Technical Cooperation for 2012–2016 includes a cluster with priority environmental projects. However, foreign financial assistance (loans, grants, etc.) in Belarus remains rather small, not only in the field of environmental protection.

PART III: INTEGRATION OF ENVIRONMENTAL CONCERNS INTO ECONOMIC SECTORS AND PROMOTION OF SUSTAINABLE DEVELOPMENT

Chapter 6: Environmental management in industry, energy and transport

Recommendation 6.1:
The Council of Ministers should develop a law on energy covering all aspects of the energy sector, including production, transport, distribution and consumption. The Law on Energy Saving and other energy-related legislation should become part of the law on energy with the necessary amendments.

This recommendation has not been implemented. A law on energy covering all aspects of the energy sector, including production, transport, distribution and consumption to transform the sector into a well-functioning competitive market has not been developed.

Recommendation 6.2:
The Council of Ministers should consider reforming the current energy tariff-setting policy and improve the entire energy chain with a purpose of creating a competitive energy market to make it more attractive to investments.

The recommendation has been partially implemented. Since 2015, active measures have been taken to address the problem of cross-subsidies. The 2010 Strategy for Development of the Energy Potential of the Republic of Belarus sets out the gradual 100 per cent elimination of cross-subsidies in tariffs for energy resources. The plan is to phase out preferential tariffs for natural gas and energy for certain legal entities and individual entrepreneurs and provide for household energy tariffs, which would cover at least 60 per cent of costs by 2015. There is no competitive energy market to make the energy sector more attractive to investments.

Recommendation 6.3:

(a) The Ministry of Transport and Infrastructure, the Ministry of Natural Resources and Environmental Protection and other relevant governmental bodies, when finalizing the national programme to mitigate the environmental impact of transport, should give particular attention to:

- *Updating the standards on exhaust emissions from mobile sources in line with those in force in the European Union;*
- *Setting specific targets for public transport, including targets for emission reductions and energy consumption for each transport mode.*
- *Setting regulations for the environmental impact assessment of new transport infrastructure and traffic restrictions for freight transit in environmentally sensitive areas.*

(b) In connection with the implementation of this programme, the Government should establish a national coordinating centre to promote policies for sustainable development of the transport sector

The recommendation has been partially implemented. Since 2005, air pollutant emissions from vehicles have declined as a share of total air pollution, despite the fact that the number of vehicles has increased dramatically. The transport sector remains a major source of air pollution, with the bulk of emissions of nitrogen oxides, carbon monoxide and VOCs. The number of motor vehicles has doubled in 10 years. Many of the vehicles are old and not equipped with catalytic converters.

Regular technical inspections of all motor vehicles at properly licensed diagnostic stations are mandatory. Half of the diagnostic stations are equipped with modern control equipment, while the other half need re-equipping. However, GOST standards on exhaust emissions (such as carbon monoxide, hydrocarbons and smoke) are outdated and have not been revised.

The 2013 Strategy for Reduction of Adverse Impacts of Transport on Atmospheric Air for the Period until 2020 was developed through joint efforts of the environment and transport sectors and approved by the Deputy Prime Minister. The Strategy covers all types of transport. The Strategy is accompanied by an action plan. One of the goals of the Strategy is to increase by 2020 the share of public transport with improved environmental performance and electric transport in settlements with a population over 100,000 inhabitants to 50 per cent.

EIA of new transport infrastructure is covered by TCP 17.02-08-2012 and TCP 480-2013 (specifically for roads).

A national coordination centre to promote policies for sustainable development of the transport sector has not been established. However intersectoral cooperation between the national transport and environmental authorities takes place.

Chapter 7: Environmental management in agriculture and forestry

Recommendation 7.1:

(a) The Council of Ministers should initiate the drawing-up of a comprehensive strategy document for the development of agriculture, which would integrate environmental aspects.

(b) The Ministry of Agriculture and Food, in cooperation with the Ministry of Natural Resources and Environmental Protection, should analyse the environmental and agricultural aspects of the European Union's Nitrate Directive and Water Framework Directive and use their provisions as guidelines when improving national legislation and practice where applicable.

The recommendation is implemented.

(a) The State Programme on Sustainable Rural Development for 2011–2015, approved by the 2011 Decree of the President No. 342, makes an attempt to integrate environmental measures. It covers prevention of land degradation, conservation and restoration of reclaimed land, and reducing wastewater coming from the cattle-breeding complexes and farms. The Ministry of Natural Resources and Environmental Protection was involved in the preparation of the programme with regard to environmental issues.

(b) The use of nitrates is regulated by the 2014 Water Code and reflected in the technical regulation TCP 17.06-08-2012 "Environmental protection and nature use. Hydrosphere. Procedure for setting emission limit values for chemicals and other substances in wastewater".

Recommendation 7.2:

The Ministry of Agriculture and Food should initiate the creation of extension (advisory) services in agricultural committees in oblasts and rayons. Advisory services of other organizations and private consultants should also be encouraged in order to improve the level of agriculture in general and to be instrumental in integrating environmental aspects and good agricultural practices in production.

The recommendation is implemented. Coordination and advisory services at the regional level are carried out by regional associations (unions) of farms, committees on agriculture and food of the oblast executive committees, the Ministry of Agriculture and Food, and other agencies and organizations. The Ministry of Agriculture and Food's Council supports development of entrepreneurship in agriculture, discusses the draft regulations and supports farmers. The Council consists of two representatives from each regional association of farmers. Environmental issues are coordinated with the Ministry of Natural Resources and Environmental Protection and its territorial bodies.

Recommendation 7.3:

The Ministry of Agriculture and Food should promote organic production by creating a regulatory framework, a certification system and through extension (advisory) services. Among the first steps that it might consider are the development of a strategy, awareness raising seminars, education and training.

The implementation of the recommendation is ongoing. Belarus is at an early stage of development of organic farming. Currently, the Ministry of Agriculture and Food, in accordance with the 2015 Decree of the President No. 55, is developing the concept of the draft law on organic production. As of March 2015, organic production involves about 400 ha of agricultural land. The Ministry is promoting the development of technologies for the production of organic products based on the experience of other countries. To promote the products to the markets of western countries, accredited certification bodies in the EU are invited to certify domestic products.

Recommendation 7.4:
The Ministry of Agriculture and Food, the Ministry of Natural Resources and Environmental Protection, the Committee on Land Resources, Geodesy and Cartography, Ministry of Forestry, and other relevant bodies should give high priority to saving and restoring valuable wetlands when developing plans to rehabilitate ameliorated areas.

The implementation of the recommendation is ongoing. The Ministry of Natural Resources and Environmental Protection is responsible for implementing this recommendation. Preservation and restoration of valuable wetlands are considered as priorities when developing plans on rehabilitation of the reclaimed territories. Technical regulation TCP 17.12-02-2008 "Environmental protection and nature use. Territories. Procedure and rules for rehabilitation of developed peat lands and other disturbed wetlands and prevention of disturbance of hydrological regime of natural ecosystems during land reclamation" aims to ensure that environmental considerations are taken into account during rehabilitation of developed peat lands and other disturbed wetlands. Repeated bogging has been carried out on an area of about 50,000 ha of the developed peat fields and other disturbed wetlands.

The 2012 UNDP project "Landscape approach to management of peat lands aiming at multiple ecological benefits" launched activities to convert degraded peat lands, formerly managed for intensive agriculture, to meadows that will be further used for mowing and pasture in the Bereza rayon of Brest Oblast. During the first stage of the project's activities, around 200 ha of former arable lands were restored to grassland at two pilot sites.

The Yelnya Bog is 232 km^2. The Yelnya Bog is a home to 98 bird species and 11 plant species, all listed in the National Red Data Book. However, the bog was drying up for years. The problem arose from the construction of irrigation canals early in the 20th century, which caused a significant drop in Yelnya's groundwater table, leading to annual fires. During the period 2007–2010, 40 cascade dams were constructed and the three main canals were blocked. Four dams were entirely funded from staff contributions. As a result, since 2008, there has been a 1 m increase in Yelnya's groundwater level. The increase in the bird populations and original vegetation levels showed that the efforts provide sustainable progress. Since the project began, Yelnya Bog has faced no fire attacks.

Chapter 8: Ecotourism and biodiversity

Recommendation 8.1:
The Ministry of Sport and Tourism, in cooperation with the Ministry of Natural Resources and Environmental Protection, the Affairs Management Department of the President, tour operators and non-governmental organizations, should:

- *Develop an action plan for the new national programme for tourism development, to set clear priorities, identify sources of financing, and specify actions for the development of infrastructure and conditions in rural areas for the promotion of ecotourism.*
- *Adopt a set of tourism standards for certification based on international standards;*
- *Develop indicators based on international standards to monitor and review the development of tourism; and*
- *Develop and apply a certification scheme for ecotourism.*

The implementation of the recommendation is ongoing. Since 2005, two programmes have been implemented: National Tourism Development Programme for 2006–2010, revised in 2007 as the National Tourism Development Programme for 2008–2010, and the National Tourism Development Programme for 2011–2015.

As a result of the EU/UNDP project "Support to the development of a comprehensive framework for international environmental cooperation in the Republic of Belarus", Belarus prepared proposals to harmonize its ecological certification with the EU legislation on ecological certification. A draft technical code of practice was developed (but is not yet adopted) within the project, to be used during voluntary ecological certification of services for guests/visitors.

Belarus applies international indicators to monitor and review the development of tourism. Tourism statistics consist of two main components: (i) statistics relating to capacity and occupancy (supply-side tourism statistics), and (ii) statistics relating to tourism demand. The former are collected via surveys filled in by accommodation establishments. Statistics on tourism demand refers to visits incorporating at least one overnight stay.

Recommendation 8.2:
The Ministry of Natural Resources and Environmental Protection should:

- *Draw up specific programmes and projects for those parts of the National Strategy and Action Plan on Biodiversity that have not been implemented and identify sources of financing for them; and*
- *Integrate those important bird areas and important plant areas, which are not yet part of the network of the specially protected natural areas, into this network.*

The implementation of this recommendation is ongoing. The Strategy for the Conservation and Sustainable Use of Biological Diversity for 2011–2020, approved by the 2010 Resolution of the Council of Ministers No. 1707 (revised by 2015 Resolution of the Council of Ministers No. 743), includes activities from the previous Strategy that were not implemented due to lack of funding. Funding for biodiversity conservation comes through the following plans and programmes:

- State Programme on the Development of Hunting for 2006–2015 (2005 Decree of the President No. 580);
- Republican Programme for Development of Fisheries for 2006–2010 (2006 Resolution of the Council of Ministers No. 535);
- State Programme on Development of Fisheries for 2011–2015 (2010 Resolution of the Council of Ministers, No. 1453);
- State Programme for Development of the System of Specially Protected Natural Areas for 2008–2014 (2008 Decree of the President No. 146);
- State Programme for Development of the System of Specially Protected Natural Areas for 2015–2019 (2014 Decree of the President No. 367);
- Action Plan on Conservation and Rational Use of European Bison for 2010-2014, approved by the Deputy Prime Minister on 28 November 2009;
- Action Plan on Conservation and Rational Use of European Bison for 2015-2019, approved by the Deputy Prime Minister on 12 June 2014.

Important Bird Areas and Important Plant Areas which meet the criteria of specially protected natural areas, are either already proclaimed as specially protected natural areas or will be proclaimed as specially protected natural areas in accordance with the 2007 Resolution of the Council of Ministers No. 1919 “On the scheme of rational siting of specially protected natural areas of national significance until 1 January 2015” and in accordance with the regional schemes of rational siting of specially protected natural areas of local significance which are approved by the oblast councils of deputies.

Recommendation 8.3:
The Affairs Management Department of the President, the Ministry of Natural Resources and Environmental Protection, and the State Committee on Border Guards should promote the creation of corridors for migratory species, particularly mammals, in specially protected natural territories, especially in the Belovezhskaya Pushcha National Park.

The implementation of the recommendation is ongoing. Corridors are provided for migratory species, especially mammals in protected areas: channels for bison migration through melioration channels (National Park “Bialowieza Forest”); passages for amphibians at the intersection of migration corridors and roads (Berezinsky Biosphere Reserve, National Park “Bialowieza Forest”); and corresponding road signs at the intersection of migratory corridors of wild animals with highways. Some projects are developed with Poland to create migratory channels for big mammals, between the two countries in Bialowieza Forest. Creating conditions for the safe crossing of wild animals of roads in protected areas is carried out in the framework of the establishment of the national ecological network.

Annex II

PARTICIPATION OF BELARUS IN MULTILATERAL ENVIRONMENTAL AGREEMENTS

Worldwide agreements		Belarus	
Year		**Year**	**Status**
1958	(GENEVA) Convention on the Continental Shelf	1961	Ra
1958	(GENEVA) Convention on Fishing and Conservation of the Living Resources of the High Seas		
1958	(GENEVA) Convention on the Territorial Sea and the Contiguous Zone	1961	Ra
1958	(GENEVA) Convention on the High Seas	1961	Ra
1960	(GENEVA) Convention concerning the Protection of Workers against Ionising Radiations (ILO 115)	1968	Ra
1961	(PARIS) International Convention for the Protection of New Varieties of Plants	2003	Ac
1963	(VIENNA) Convention on Civil Liability for Nuclear Damage	1998	Ra
	1997 (VIENNA) Protocol to Amend the 1963 Vienna Convention on Civil Liability for Nuclear Damage	1998	Si
1968	(LONDON, MOSCOW, WASHINGTON) Treaty on the Non-Proliferation of Nuclear Weapons (NPT)	1993	Ac
1969	(BRUSSELS) Convention relating to Intervention on the High Seas in Cases of Oil Pollution Casualties		
1971	(RAMSAR) Convention on Wetlands of International Importance Especially as Waterfowl Habitat	1999	Su
	1982 (PARIS) Amendment		
	1987 (REGINA) Amendments		
1971	(GENEVA) Convention on Protection against Hazards from Benzene (ILO 136)		
1971	(LONDON, MOSCOW, WASHINGTON) Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Sea-bed and the Ocean Floor and in the Subsoil thereof	1971	Ra
1972	(PARIS) Convention concerning the Protection of the World Cultural and Natural Heritage	1988	Ra
1972	(LONDON) Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter	1976	Ra
	1996 (LONDON) Protocol		
1972	(LONDON, MOSCOW, WASHINGTON) Convention on the Prohibition of the Development, Production and Stockpiling of Bacteriological (Biological) and Toxin Weapons, and on their Destruction	1975	Ra
1972	(LONDON) International Convention on the International Regulations for Preventing Collisions at Sea	1994	Ac
1972	(GENEVA) International Convention for Safe Containers	1981	Ac
1973	(WASHINGTON) Convention on International Trade in Endangered Species of Wild Fauna and Flora	1995	Ac
	1979 (BONN) Amendment	1995	At
	1983 (GABORONE) Amendment	1995	At
1973	(LONDON) Convention for the Prevention of Pollution from Ships (MARPOL)		
	1978 (LONDON) Protocol relating to the International Convention for the Prevention of Pollution from Ships	1994	Ac
	1997 (LONDON) Protocol to Amend the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocol of 1978 relating thereto		
1974	(GENEVA) Convention concerning Prevention and Control of Occupational Hazards caused by Carcinogenic Substances and Agents (ILO 139)		
1977	(GENEVA) Convention on Protection of Workers against Occupational Hazards from Air Pollution, Noise and Vibration (ILO 148)		

1979	(BONN) Convention on the Conservation of Migratory Species of Wild Animals	2003	Ra
	1991 (LONDON) Agreement Conservation of Bats in Europe		
	1992 (NEW YORK) Agreement on the Conservation of Small Cetaceans of the Baltic and North Seas (ASCOBANS)		
	1995 (THE HAGUE) African/Eurasian Migratory Waterbird Agreement (AEWA)		
	1996 (MONACO) Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS)		
1980	(NEW YORK, VIENNA) Convention on the Physical Protection of Nuclear Material	1993	Su
1981	(GENEVA) Convention Concerning Occupational Safety and Health and the Working Environment (ILO 155)	2000	Ra
1982	(MONTEGO BAY) Convention on the Law of the Sea	2006	Ra
	1994 (NEW YORK) Agreement related to the Implementation of Part XI of the Convention	2006	Ac
	1995 (NEW YORK) Agreement for the Implementation of the Provisions of the United Nations Convention on the Law of the Sea of 10 December1982 relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks		
1985	(GENEVA) Convention Concerning Occupational Health Services (ILO 161)		
1985	(VIENNA) Convention for the Protection of the Ozone Layer	1986	At
	1987 (MONTREAL) Protocol on Substances that Deplete the Ozone Layer	1988	At
	1990 (LONDON) Amendment to Protocol	1996	Ra
	1992 (COPENHAGEN) Amendment to Protocol	2007	At
	1997 (MONTREAL) Amendment to Protocol	2007	At
	1999 (BEIJING) Amendment to Protocol	2007	At
1986	(GENEVA) Convention Concerning Safety in the Use of Asbestos (ILO 162)		
1986	(VIENNA) Convention on Early Notification of a Nuclear Accident	1987	Ra
1986	(VIENNA) Convention on Assistance in the Case of a Nuclear Accident or Radiological Emergency	1987	Ra
1989	(BASEL) Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal	1999	Ac
	1995 Ban Amendment		
	1999 (BASEL) Protocol on Liability and Compensation		
1990	(GENEVA) Convention concerning Safety in the use of Chemicals at Work (ILO 170)		
1990	(LONDON) Convention on Oil Pollution Preparedness, Response and Cooperation		
1992	(RIO DE JANEIRO) Convention on Biological Diversity	1993	Ra
	2000 (MONTREAL) Cartagena Protocol on Biosafety	2002	Ac
	2010 (NAGOYA) Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization	2014	Ac
	2010 (NAGOYA - KUALA LUMPUR) Supplementary Protocol on Liability and Redress to the Cartagena Protocol on Biosafety		
1992	(NEW YORK) United Nations Framework Convention on Climate Change	2000	Ap
	1997 (KYOTO) Protocol	2005	Ac
1993	(ROME) Agreement to Promote Compliance with International Conservation and Management Measures by Fishing Vessels on the High Seas		
1993	(PARIS) Convention on the Prohibition of the Development, Production, Stockpiling and Use of Chemical Weapons and on Their Destruction	1996	Ra
1994	(VIENNA) Convention on Nuclear Safety	1998	Ac
1994	(PARIS) United Nations Convention to Combat Desertification	2001	Ac
1997	(VIENNA) Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management	2002	Ra
1997	(NEW YORK) Convention on the Law of Non-navigational Uses of International Watercourses		
1997	(VIENNA) Convention on Supplementary Compensation for Nuclear Damage		
1998	(ROTTERDAM) Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade		
2001	(STOCKHOLM) Convention on Persistent Organic Pollutants	2004	Ac
2001	(LONDON) Convention on Civil Liability for Bunker Oil Pollution Damage		
2003	(GENEVA) WHO Framework Convention on Tobacco Control	2005	Ra
2004	(LONDON) Convention for the Control and Management of Ships' Ballast Water and Sediments		
2013	(KUMAMOTO) Minamata Convention on Mercury	2014	Si

Ac = Accession; Ad = Adherence; Ap = Approval; At = Acceptance; De = Denounced; Si = Signature; Su = Succession; Ra = Ratification.

Regional and subregional agreements		Belarus	
Year		**Year**	**Status**
1957	(GENEVA) European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR)	1993	Ac
1958	(GENEVA) Agreement - Adoption of Uniform Conditions of Approval and Reciprocal Recognition of Approval for Motor Vehicle Equipment and Parts	1995	Ac
1968	(PARIS) European Convention - Protection of Animals during International Transport (revised in 2003) 1979 (STRASBOURG) Additional Protocol		
1969	(LONDON) European Convention on the Protection of the Archaeological Heritage (revised in 1992)		
1976	(STRASBOURG) European Convention for the Protection of Animals Kept for Farming Purposes		
1979	(BERN) Convention on the Conservation of European Wildlife and Natural Habitats	2013	Ac
1979	(GENEVA) Convention on Long-range Trans-boundary Air Pollution 1984 (GENEVA) Protocol - Financing of Co-operative Programme (EMEP) 1985 (HELSINKI) Protocol - Reduction of Sulphur Emissions by 30% 1988 (SOFIA) Protocol - Control of Emissions of Nitrogen Oxides 1991 (GENEVA) Protocol - Volatile Organic Compounds 1994 (OSLO) Protocol - Further Reduction of Sulphur Emissions 1998 (AARHUS) Protocol on Heavy Metals 1998 (AARHUS) Protocol on Persistent Organic Pollutants 1999 (GOTHENBURG) Protocol to Abate Acidification, Eutrophication and Ground-level Ozone	1980 1985 1986 1989	Ra At At At
1991	(ESPOO) Convention on Environmental Impact Assessment in a Transboundary Context 2001 (SOFIA) First Amendment 2003 (KIEV) Protocol on Strategic Environmental Assessment 2004 (CAVTAT) Second Amendment	2005 2011	At At
1992	(HELSINKI) Convention on the Protection and Use of Transboundary Watercourses and International Lakes 1999 (LONDON) Protocol on Water and Health 2003 (MADRID) Amendments to Articles 25 and 26	2003 2009 2013	Ac Ac At
1992	(HELSINKI) Convention on the Transboundary Effects of Industrial Accidents 2003 (KIEV) Protocol on Civil Liability and Compensation for Damage Caused by the Transboundary Effects of Industrial Accidents on Transboundary Waters	2003	Ac
1993	(OSLO and LUGANO) Convention - Civil Liability for Damage from Activities Dangerous for the Environment		
1994	(LISBON) Energy Charter Treaty 1994 (LISBON) Protocol on Energy Efficiency and Related Environmental Aspects 1998 Amendment to the Trade-Related Provisions of the Energy Charter Treaty	1994 1994	Si Si
1998	(AARHUS) Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters 2003 (KIEV) Protocol on Pollutant Release and Transfer Register 2005 (ALMATY) Amendment on GMOs	2000	Ap
1998	(STRASBOURG) Convention on the Protection of Environment through Criminal Law		
2000	(FLORENCE) Convention on European Landscape		

Ac = Accession; Ad = Adherence; Ap = Approval; At = Acceptance; De = Denounced; Si = Signature; Su = Succession; Ra = Ratification.

Annex III

KEY DATA AND INDICATORS AVAILABLE FOR THE REVIEW

Economic indicators

	2008	2009	2010	2011	2012	2013	2014
Total area (thousand sq. km)	207.6	207.6	207.6	207.6	207.6	207.6	207.6
Population							
Population (at the beginning of the year), thousand pers.	9 542.4 *	9 513.6 *	9 500.0	9 481.2 *	9 465.2 *	9 463.8 *	9 468.2 *
Natural increase, decrease (-) population, thousand pers.	-26.0	-25.8	-29.1	-25.9	-10.6	-7.3	-3.0 *
Employed population, million people.	4.6 *	4.6	4.7	4.7	4.6	4.6 *	4.6 *
Registered unemployment rate (% of economically active population)	0.8 *	0.9	0.7	0.6	0.5	0.5	0.5 *
Gross domestic product GDP							
at current prices, billion roubles.	129 791.0	137 442.0	164 476.0	297 158.0	530 356.0	649 111.0	778 456.0
at constant prices, as a percentage of the previous year	110.2	100.2	107.7	105.5	101.7	101.0	101.6
GDP per capita, thousand roubles	13 622.0	14 457.0	17 330.0	31 368.0	56 036.0	68 573.0	82 163.0
Industry							
Index of industrial production, in % by 2005	134.5	130.3	145.5	158.7	167.9	159.7	..
Agriculture							
The index of agricultural production, in % by 2005	120.0	121.2	124.2	132.4	141.1	135.2	..
Production (extraction) of fuel and energy resources							
Peat fuel, thousand tons	2 361.0	2 216.0	2 352.0	2 704.0	2 679.0	2 269.0	1 433.0 *
Oil, including gas condensate, thousand tons	1 740.0	1 720.0	1 700.0	1 681.0	1 660.0	1 645.0	1 645.0 *
Combustible associated gas, million cubic meters	203.0	205.0	213.0	222.0	218.0	228.0	222.0 *
Biogas, thousand tons of fuel equivalent	..	..	3.1	4.3	6.2	13.1	12.7 *
Firewood, thousand steres (equal to m^3)	5 508.0	5 010.0	5 437.0	6 292.0	6 173.0	6 150.0	5 896.0 *
Other fossil fuels, thousand tons of fuel equivalent	476.0	456.0	495.0	528.0	539.0	526.0	569.0 *
Wind and hydro power, million kWh	40.0	46.0	46.0	46.0	76.0	146.0	134.0 *
Transportation							
Number of passenger cars per 1,000 population, units	..	257.0	274.0	291.0	290.0	..	..
Transport volumes							
Transported by all modes of transport (thousand tons)	435 431.0	420 055.0	455 978.0	493 275.0	484 371.0	471 210.0	..
Passengers carried by all modes of transport (million people).	2 278.4	2 209.7	2 395.8	2 438.5	2 453.2	2 451.2	..

Environmental indicators

	2008	2009	2010	2011	2012	2013	2014
Total expenditure on environmental protection (in current prices, billion roubles)	1 519.0	1 744.0	2 002.0	3 467.0	6 117.0	7 134.0	..
Land							
Total land th. ha	20 759.8 *	20 759.8 *	20 759.8 *	20 760.0	20 760.0	20 760.0	20 760.0
including:							
agricultural land, thousand ha	8 968.0 *	8 944.7	8 926.9	8 897.5	8 874.0	8 817.3	8 726.4
Percentage of the total area	43.4 *	43.1	43.0	42.9 *	42.7	42.5	42.0
forest land, thousand ha	8 490.5 *	8 511.8	8 538.7	8 566.7	8 584.7	8 588.5	8 630.7
Percentage of the total area	40.4 *	41.0	41.1	41.2	41.4	41.4	41.6
land for bogs and water bodies, thousand ha	1 364.5 *	1 363.9	1 359.8	1 342.8	1 338.0	1 329.7	1 328.4
Percentage of the total area	6.7 *	6.6	6.6	6.5	6.4	6.4	6.4
other lands, thousand ha	1 936.8 *	1 939.4	1 934.4	1 953.0	1 963.3	2 024.5	2 074.5
Percentage of the total area	9.5 *	9.3	9.3	9.4	9.5	9.7	10.0
Mineral fertilizers used by agricultural organizations, thousand tons	1 309.6 *	1 558.5 *	1 497.0	1 680.1 *	1 498.6 *	1 452.2 *	1 218.6 *
Organic fertilizers used by agricultural organizations, million tons	38.1	42.3	43.2	49.5	47.7	45.8 *	52.3 *
Air							
Emissions of pollutants into the air, thousand tons	1 598.0	1 594.0	1 319.0	1 315.0	1 389.0	1 374.0	1344.0 *
including:							
from stationary sources, thousand tons	397.0	457.2	377.1	371.1	433.2	445.3	462.8
including:							
solids	47.6	46.2	44.3	39.9	37.4	36.1	34.9
Gaseous and liquid substances	349.4	411.0	332.8	331.2 *	395.8	409.2	427.9
of them:							
sulfur dioxide	63.8	139.5	51.7	44.4	63.7	48.5	50.3
carbon monoxide	86.7	74.6	75.1	73.9	78.6	81.9	80.9
Nitrogen dioxide NO_2	54.1	55.7	57.1	52.8	52.8	55.7	54.3
hydrocarbons (VOC-free)	38.0	38.7	53.6	63.8	99.9	125.8	149.1
non-methane volatile organic compounds	75.5	71.4	63.0	66.9	70.0	60.9	55.5
from mobile sources, thousand tons	1 201.0	1 137.0	942.0	944.0	956.0	928.0	881.0 *
Captured and disposed of pollutants from stationary sources, thousand tons	2 540.5	2 041.4	2 862.6	2 799.7	2 691.0	2 886.7	3 645.7
% to the total amount of substance emitted from stationary sources	87.0	82.0	88.0	88.0	86.0	87.0	89.0
Used (recycled) pollutants trapped gas purification units, thousand tons	2 262.8	1 796.4	2 636.6	2 573.9	2 379.3	2 639.8	3 386.0
Forest							
Wooded area, %	38.7	38.8	39.0	39.1	39.1	39.4	39.6

	2008	2009	2010	2011	2012	2013	2014
Water							
Extraction (removal) of water from natural sources for use, million m^3	1 566.0	1 507.0	1 548.0	1 592.0	1 593.0	1 514.0	1 510.0 *
The use of water, million m^3	1 410.0	1 337.0	1 359.0	1 406.0	1 442.0	1 373.0	1 371.0 *
including:							
production needs	723.0	721.0	750.0	806.0	830.0	779.0	738.0 *
household needs	574.0	501.0	495.0	486.0	492.0	477.0	473.0 *
irrigation and agricultural water supply	113.0	115.0	114.0	114.0	120.0	117.0	115.0 *
The index of the use of surface water,%	1.1	1.0	1.0	1.2	1.2	0.9 *	..
Index of groundwater resources,%	36.7	32.4	32.9	33.6	33.8	32.8 *	..
Wastewater disposal, million cubic meters	1 065.0	1 060.0	1 052.0	1 066.0	1 078.0	1 034.0	1011.0 *
including water bodies	966.0	974.0	967.0	979.0	993.0	951.0	931.0 *
of them:							
not requiring treatment	246.0	286.0	290.0	311.0	323.0	294.0	293.0 *
regulatory and treated	709.0	685.0	671.0	662.0	666.0	654.0	635.0 *
insufficiently treated	11.0	3.0	6.0	6.0	3.0	3.0	3.0 *
As part of wastewater discharged:							
sulfate ions, thousand tons	61.0	63.0	56.0	60.0	61.0	58.0	47.0 *
chloride ions, thousand tons	73.0	73.0	65.0	71.0	75.0	72.0	72.0 *
ammonium ions (calculated as nitrogen), thousand tons	6.0	5.0	5.0	6.0	6.0	5.0	5.0 *
fluoride ions; tons	5.0	7.0	8.0	14.0	8.0	11.0	11.0 *
synthetic surfactants, etc. tons	146.0	148.0	135.0	137.0	125.0	101.0	105.0 *
copper, tons	8.0	7.0	5.0	6.0	7.0	6.0	5.0 *
chromium, tons	6.0	5.0	5.0	4.0	3.0	3.0	4.0 *
nickel, tons	6.0	4.0	4.0	4.0	5.0	6.0	3.0 *
Waste generation							
Formed of waste products, thousand tons	39 768.0	27 277.0	43 775.0	44 307.0	40 847.0	40 305.0	52 529.0 *
of these hazardous wastes	522.0	731.0	918.0	943.0	1 323.0	1 415.0	1 724.0 *
Used waste production, thousand tons	9 427.0	11 690.0	13 647.0	12 671.0	13 066.0	20 059.0	16 654.0 *
of these hazardous wastes	437.0	675.0	775.0	828.0	1 323.0	1 091.7	1 242.2 *
Removed waste production (partially used or disposed of previously accumulated waste)	30 959.0	16 097.0	30 802.0	32 115.0	28 527.0	25 277.0	39 037.0 *
are cleared of hazardous waste	40.0	35.0	46.0	57.0	29.0	21.0	59.3 *

Source: Ministry of Natural Resources and Environmental Protection, 2015. National Statistical Committee, 2015.
Note: * Data provided by the National Statistical Committee.

Annex IV

MILLENNIUM DEVELOPMENT GOALS INDICATORS, 2005–2014

Belarus	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Target 1.A: Halve, between 1990 and 2015, the proportion of people whose income is less than one dollar a day										
1.1Proportion of population below $1.25 (PPP) per day										
Population below $1.25 (PPP) per day, percentage	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0 *	0.0 *	0.0 *
Population below national poverty line, total, percentage	12.7	11.1	7.7	6.1	5.4	5.2	7.3	6.3	5.5	4.8 *
Population below national poverty line, urban, percentage	10.9	9.1	5.6	4.4	4.0	3.8	5.8	5.2	4.2	3.7 *
Population below national poverty line, rural, percentage	16.7	15.5	12.4	9.7	9.5	8.9	11.5	9.4	9.0	7.9 *
Purchasing power parities (PPP) conversion factor, local currency unit to international dollar	759.6	787.6	830.3	918.2	1 040.8	1 103.2	1 638.7	2 556.3		
1.2 Poverty gap ratio										
Poverty gap ratio at $1.25 a day (PPP), percentage	0.1	0.1	0.1	0.1	0.2	0.1	0.1			
1.3 Share of poorest quintile in national consumption										
Poorest quintile's share in national income or consumption, percentage	9.6 *	9.5 *	9.3 *	9.2	9.6 *	9.4 *	9.2 *	9.1 *	9.2 *	9.4 *
Target 1.B: Achieve full and productive employment and decent work for all, including women and young people										
1.4 Growth rate of GDP per person employed										
Growth rate of GDP per person employed, percentage	8.6	8.7	7.5	5.6	0.7					
1.5 Employment-to-population ratio										
Employment-to-population ratio, both sexes, percentage	45.7 *	46.5 *	47.3 *	48.4 *	48.8 1) *	49.6 *	49.5 *	48.7 *	48.4 *	48.0 *
Employment-to-population ratio, men, percentage	46.5 *	47.5 *	48.3 *	49.2 *	49.8 *	51.5 *	52.6 *	51.4 *	51.3 *	52.0 *
Employment-to-population ratio, women, percentage	45.0 *	45.7 *	46.3 *	47.7 *	48.0 *	47.9 *	46.9 *	46.4 *	45.8 *	44.6 *
1.6 Proportion of employed people living below $1.25 (PPP) per day										
Proportion of employed people living below $1 (PPP) per day, percentage	0.1	0.1	0.1	0.1						
1.7 Proportion of own-account and contributing family workers in total employment										
Proportion of own-account and contributing family workers in total employment, both sexes, percentage					2.1					
Proportion of own-account and contributing family workers in total employment, women, percentage					1.7					
Proportion of own-account and contributing family workers in total employment, men, percentage					2.5					

Belarus	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Target 1.C: Halve, between 1990 and 2015, the proportion of people who suffer from hunger										
1.8 Prevalence of underweight children under-five years of age										
Children under 5 moderately or severely underweight, percentage	1.3									
Children under 5 severely underweight, percentage	0.5									
1.9 Proportion of population below minimum level of dietary energy consumption										
Population undernourished, percentage	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Population undernourished, millions										
Target 2.A: Ensure that, by 2015, children everywhere, boys and girls alike, will be able to complete a full course of primary schooling										
2.1 Net enrolment ratio in primary education										
Total net enrolment ratio in primary education, both sexes	90.2	90.2	90.0		92.0	91.4	91.0	94.3	93.1	
Total net enrolment ratio in primary education, boys					92.2	91.5	91.1	94.2	92.2	
Total net enrolment ratio in primary education, girls					91.7	91.3	91.0	94.3	94.0	
2.2 Proportion of pupils starting grade 1 who reach last grade of primary										
Percentage of pupils starting grade 1 who reach last grade of primary, both sexes	99.2	99.2	98.0	99.5	99.7	98.2	99.1	98.7		
Percentage of pupils starting grade 1 who reach last grade of primary, boys	98.5	99.1	96.2			96.9	98.8	99.1		
Percentage of pupils starting grade 1 who reach last grade of primary, girls	100.0	99.3	100.0			99.6	99.3	98.3		
Primary completion rate, both sexes	97.9	96.7	95.3	98.1	104.8	105.9	106.9	103.3	99.8	
Primary completion rate, boys	100.2	98.3	96.1	98.3			107.3	103.5	99.9	
Primary completion rate, girls	95.5	94.9	94.5	97.9			106.4	103.1	99.6	
2.3 Literacy rate of 15-24 year-olds, women and men										
Literacy rates of 15-24 years old, both sexes, percentage					99.8					
Literacy rates of 15-24 years old, men, percentage					99.8					
Literacy rates of 15-24 years old, women, percentage					99.8					
Women to men parity index, as ratio of literacy rates, 15-24 years old					1.0					
Target 3.A: Eliminate gender disparity in primary and secondary education, preferably by 2005, and in all levels of education no later than 2015										
3.1 Ratio of girls to boys in primary, secondary and tertiary education										
Gender Parity Index in primary level enrolment	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Gender Parity Index in secondary level enrolment				1.0	1.0	1.0	1.0	1.0	1.0	
Gender Parity Index in tertiary level enrolment	1.4	1.4	1.4	1.5	1.5	1.5	1.4	1.4	1.4	
3.2 Share of women in wage employment in the non-agricultural sector										
Share of women in wage employment in the non-agricultural sector	52.9	52.8	52.8	52.8		52.1	51.1	52.2	51.1	
3.3 Proportion of seats held by women in national parliament										
Seats held by women in national parliament, percentage	29.4	29.1	29.1	29.1	31.8	31.8	31.8	31.8	26.6	26.6
Total number of seats in national parliament	109.0	110.0	110.0	110.0	110.0	110.0	110.0	110.0	109.0	109.0
Seats held by men in national parliament	77.0	78.0	78.0	78.0	75.0	75.0	75.0	75.0	80.0	80.0
Seats held by women in national parliament	32.0	32.0	32.0	32.0	35.0	35.0	35.0	35.0	29.0	29.0

Belarus	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Target 4.A: Reduce by two-thirds, between 1990 and 2015, the under-five mortality rate										
4.1 Under-five mortality rate										
Children under five mortality rate per 1,000 live births	9.3 *	8.3 *	7.0 *	6.0 *	6.2 *	5.4 *	5.1 *	4.5 *	4.6 *	4.4 *
4.2 Infant mortality rate										
Infant mortality rate (0-1 year) per 1,000 live births	7.1 *	6.1 *	5.2 *	4.5 *	4.7 *	4.0 *	3.9 *	3.4 *	3.5 *	3.5 *
4.3 Proportion of 1 year-old children immunized against measles										
Children 1 year old immunized against measles, percentage	99.0	84.3 *	87.6 *	92.1 *	98.2 *	98.5 *	98.8 *	98.4 *	98.1 *	98.4 *
Target 5.A: Reduce by three quarters, between 1990 and 2015, the maternal mortality ratio										
5.1 Maternal mortality ratio										
Maternal mortality ratio per 100,000 live births	10.0 *	12.0 *	6.0 *	3.0 *	1.0 *	1.0 *	1.0 *	1.0 *	0.0 *	1.0 *
5.2 Proportion of births attended by skilled health personnel										
Births attended by skilled health personnel, percentage	99.9 *	99.9 *	99.9 *	99.9	99.9	99.9	99.9 *	99.9 *	99.9 *	99.9 *
Target 5.B: Achieve, by 2015, universal access to reproductive health										
5.3 Contraceptive prevalence rate										
Current contraceptive use among married women 15-49 years old, any method, percentage	72.6 *							63.1 *		
Current contraceptive use among married women 15-49 years old, modern methods, percentage	56.5 *							51.2 *		
Current contraceptive use among married women 15-49 years old, condom, percentage	17.5 *							22.4 *		
5.4 Adolescent birth rate										
Adolescent birth rate, per 1,000 women	21.7	22.5 *	22.1	22.3 *	22.4	20.7	20.9	22.4	22.1	20.1
5.5 Antenatal care coverage (at least one visit and at least four visits)										
Antenatal care coverage, at least one visit, percentage	99.4							99.7		
Antenatal care coverage, at least four visits, percentage								99.7		
5.6 Unmet need for family planning										
Unmet need for family planning, total, percentage								7.0		
Unmet need for family planning, spacing, percentage								3.8		
Unmet need for family planning, limiting, percentage								3.2		
Target 6.A: Have halted by 2015 and begun to reverse the spread of HIV/AIDS										
6.1 HIV prevalence among population aged 15-24 years										
People living with HIV, 15-49 years old, percentage (lower bound)										
People living with HIV, 15-49 years old, percentage	0.01 *	0.01 *	0.02 *	0.02 *	0.02 *	0.02 *	0.02 *	0.02 *	0.03 *	0.04 *
People living with HIV, 15-49 years old, percentage (upper bound)										
HIV prevalence rate, women 15-49 years old, in national based surveys										
HIV prevalence rate, men 15-49 years old, in national based surveys										
AIDS deaths (lower bound)	384.0	433.0	399.0	517.0	624.0	682.0	674.0	722.0	768.0	
AIDS deaths	521.0	583.0	551.0	671.0	794.0	852.0	848.0	902.0	952.0	
AIDS deaths (upper bound)	689.0	758.0	743.0	874.0	1 004.0	1 072.0	1 085.0	1 147.0	1 200.0	
HIV incidence rate, 15-49 years old, percentage (lower bound)	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	
HIV incidence rate, 15-49 years old, percentage (mid-point)	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	
HIV incidence rate, 15-49 years old, percentage (upper bound)	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	

Belarus	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
6.2 Condom use at the last high-risk sex										
Condom use at last high-risk sex, 15-24 years old, women, percentage								68.5		
Condom use at last high-risk sex, 15-24 years old, men, percentage								82.1		
Condom use to overall contraceptive use among currently married women 15-49 years old, percentage	24.1							35.3		
6.3 Proportion of population aged 15-24 years with comprehensive correct knowledge of HIV/AIDS										
Men 15-24 years old with comprehensive correct knowledge of HIV/AIDS, percentage								50.9		
Women 15-24 years old with comprehensive correct knowledge of HIV/AIDS, percentage	33.5							56.1		
6.4 Ratio of school attendance of orphans to school attendance of non-orphans aged 10-14 years										
Ratio of school attendance rate of orphans to school attendance rate of non orphans										
School attendance rate of orphans aged 10-14										
School attendance rate of children aged 10-14 both of whose parents are alive and who live with at least one parent	99.8									
AIDS orphans (one or both parents)										
Target 6.B: Achieve, by 2010, universal access to treatment for HIV/AIDS for all those who need it										
6.5 Proportion of population with advanced HIV infection with access to antiretroviral drugs										
Antiretroviral therapy coverage among people with advanced HIV infection, percentage (lower bound)										
Antiretroviral therapy coverage among people with advanced HIV infection, percentage					36.7	48.2	53.7			
Antiretroviral therapy coverage among people with advanced HIV infection, percentage (upper bound)										
Percentage of HIV-infected pregnant women who received antiretroviral drugs to reduce the risk for mother-to-child transmission (lower bound)										
Percentage of HIV-infected pregnant women who received antiretroviral drugs to reduce the risk for mother-to-child transmission (Mid point)										
Percentage of HIV-infected pregnant women who received antiretroviral drugs to reduce the risk for mother-to-child transmission (upper bound)										
Target 6.C: Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases										
6.6 Incidence and death rates associated with malaria										
Notified cases of malaria per 100,000 population										
Malaria death rate per 100,000 population, all ages										
Malaria death rate per 100,000 population, ages 0-4										
6.7 Proportion of children under 5 sleeping under insecticide-treated bednets										
Children under 5 sleeping under insecticide-treated bed nets, percentage										
6.8 Proportion of children under 5 with fever who are treated with appropriate anti-malarial drugs										
Children under 5 with fever being treated with anti-malarial drugs, percentage										

Belarus	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
6.9 Incidence, prevalence and death rates associated with tuberculosis										
Tuberculosis prevalence rate per 100,000 population (mid-point)	99.0	97.0	97.0	98.0	100.0	102.0	103.0	102.0	102.0	
Tuberculosis prevalence rate per 100,000 population (lower bound)	47.0	46.0	46.0	48.0	50.0	51.0	52.0	52.0	52.0	
Tuberculosis prevalence rate per 100,000 population (upper bound)	169.0	166.0	165.0	166.0	168.0	170.0	171.0	170.0	168.0	
Tuberculosis death rate per year per 100,000 population (mid-point)	12.3 *	10.2 *	9.4 *	8.7 *	8.0 *	8.2 *	7.8 *	6.9 *	5.8 *	4.7 *
Tuberculosis death rate per year per 100,000 population (lower bound)	10.0	10.0	9.8	9.3	8.5	8.5	8.5	8.5	8.5	
Tuberculosis death rate per year per 100,000 population (upper bound)	12.0	12.0	11.0	11.0	9.6	9.8	9.8	9.8	9.8	
Tuberculosis incidence rate per year per 100,000 population (mid-point)	71.0	70.0	70.0	70.0	71.0	71.0	71.0	70.0	70.0	
Tuberculosis incidence rate per year per 100,000 population (lower bound)	66.0	65.0	64.0	64.0	65.0	64.0	64.0	63.0	62.0	
Tuberculosis incidence rate per year per 100,000 population (upper bound)	79.0	76.0	76.0	76.0	76.0	77.0	77.0	79.0	80.0	
Tuberculosis detection rate under DOTS, percentage (lower bound)	70.0	70.0	74.0	71.0	72.0	70.0	64.0	65.0	59.0	
Tuberculosis detection rate under DOTS, percentage (upper bound)	84.0	83.0	87.0	84.0	85.0	84.0	77.0	81.0	77.0	
6.10 Proportion of tuberculosis cases detected and cured under directly observed treatment short course										
Tuberculosis detection rate under DOTS, percentage (mid-point)	77.0	76.0	80.0	77.0	78.0	76.0	70.0	72.0	68.0	
Tuberculosis treatment success rate under DOTS, percentage	93.0	80.0	82.0	80.0	77.0	78.0	71.0	85.0		
Target 7.A: Integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources										
7.1 Proportion of land area covered by forest										
Proportion of land area covered by forest, percentage	38.3 *	38.6 *	38.6 *	38.7 *	38.8 *	39.0 *	39.1 *	39.1 *	39.4 *	39.6 *
7.2 Carbon dioxide emissions, total, per capita and per $1 GDP (PPP)										
Carbon dioxide emissions (CO2), thousand metric tons of CO2 (CDIAC)	59 064.4	61 829.3	60 281.8	62 815.7	60 292.8	62 221.7	63 303.4			
Carbon dioxide emissions (CO2), thousand metric tons of CO2 (UNFCCC)	56 669.8	59 128.5	58 280.0	60 328.7	56 808.6	58 298.0	55 380.9	57 490.7		
Carbon dioxide emissions (CO2), metric tons of CO2 per capita (CDIAC)	6.1	6.4	6.3	6.6	6.3	6.6	6.7			
Carbon dioxide emissions (CO2), metric tons of CO2 per capita (UNFCCC)	5.9	6.1	6.1	6.3	6.0	6.1	5.9	6.1		
Carbon dioxide emissions (CO2), kg CO2 per $1 GDP (PPP) (CDIAC)	0.6	0.5	0.5	0.5	0.4	0.4	0.4			
Carbon dioxide emissions (CO2), kg CO2 per $1 GDP (PPP) (UNFCCC)	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.4		
Energy use (kg oil equivalent) per $1,000 GDP (Constant 2005 PPP $)	256.0	248.0	224.0	204.0	193.0	186.0	188.0			
7.3 Consumption of ozone-depleting substances										
Consumption of all Ozone-Depleting Substances in ODP metric tons	0.6	1.3	0.8	0.4	10.4	10.0	9.0	8.1	7.0	
Consumption of ozone-depleting CFCs in ODP metric tons	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	
7.4 Proportion of fish stocks within safe biological limits										
Proportion of fish stocks within safe biological limits										
Target 7.B: Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss										
7.5 Proportion of total water resources used										
Proportion of total water resources used, percentage										
7.6 Proportion of terrestrial and marine areas protected										
Terrestrial and marine areas protected to total territorial area, percentage						22.0		22.0		
Terrestrial and marine areas protected, sq. km.						47 000.0		17 154.0		
Terrestrial areas protected to total surface area, percentage						22.0		22.0		
Terrestrial areas protected, sq. km.						47 000.0		17 154.0		
Marine areas protected to territorial waters, percentage										
Marine areas protected, sq. km.										

Belarus	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
7.7 Proportion of species threatened with extinction										
Proportion of species threatened with extinction										
Target 7.C: Halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation										
7.8 Proportion of population using an improved drinking water source										
Proportion of the population using improved drinking water sources, total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Proportion of the population using improved drinking water sources, urban	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Proportion of the population using improved drinking water sources, rural	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0	99.0
7.9 Proportion of population using an improved sanitation facility										
Proportion of the population using improved sanitation facilities, total	95.0	95.0	95.0	95.0	95.0	95.0	94.0	94.0	94.0	94.0
Proportion of the population using improved sanitation facilities, urban	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0	94.0
Proportion of the population using improved sanitation facilities, rural	96.0	96.0	96.0	96.0	96.0	96.0	96.0	96.0	95.0	95.0
7.10 Proportion of urban population living in slums										
Slum population as percentage of urban, percentage										
Slum population in urban areas										
Target 8.A: Develop further an open, rule-based, predictable, non-discriminatory trading and financial system										
8.12 Debt service as a percentage of exports of goods and services										
Debt service as percentage of exports of goods and services and net income	1.3	1.1	1.2	1.0	2.3	2.2	3.9	7.4	7.5	
Target 8.E: In cooperation with pharmaceutical companies, provide access to affordable essential drugs in developing countries										
8.13 Proportion of population with access to affordable essential drugs on a sustainable basis										
Population with access to essential drugs, percentage										
Target 8.F: In cooperation with the private sector, make available the benefits of new technologies, especially information and communications										
8.14 Fixed-telephone subscriptions per 100 inhabitants										
Fixed-telephone subscriptions per 100 inhabitants	34.0	35.0	38.3	38.9	41.8	43.6	44.5	46.9	47.8	48.5
Fixed-telephone subscriptions	3 284 272	3 367 950	3 671 850	3 718 094	3 983 178	4 138 600	4 207 978	4 407 040	4 468 600	4 514 315
8.15 Mobile-cellular subscriptions per 100 inhabitants										
Mobile-cellular subscriptions per 100 inhabitants	42.4	62.0	72.6	85.1	101.7	108.9	113.2	113.5	118.8	122.5
Mobile-cellular subscriptions	4 099 500	5 960 000	6 960 000	8 128 000	9 686 200	10 332 900	10 694 900	10 676 471	11 114 440	11 401 927
8.16 Internet users per 100 inhabitants										
Internet users per 100 inhabitants		16.2	19.7	23.0	27.4	31.8	39.6 *	46.9	54.2	59.0
Internet users										
Personal computers per 100 inhabitants										
Personal computers										

Source: National Statistical Committee, 2015. United Nations site for the MDG Indicators, 2015.
Note: * Data provided by the National Statistical Committee.

Annex V

LIST OF MAJOR ENVIRONMENT-RELATED LEGISLATION

The Constitution of the Republic of Belarus of 15 March 1994, with amendments and additions adopted at the national referendum on 24 November 1996 and 17 October 2004

Decrees, Directives and Edicts of the President of the Republic of Belarus

Decree of the President of the Republic of Belarus No. 348 dated 24 June 2008 "On the rates to determine the amount of compensation for harm caused to the environment"

Decree of the President of the Republic of Belarus No. 349 dated 24 June 2008 "On the criteria for classifying economic and other activities which have a detrimental effect on the environment as environmentally hazardous activities"

Decree of the President of the Republic of Belarus No. 528 dated 17 November 2011 "On integrated environmental permits"

Decree of the President of the Republic of Belarus No. 625 dated 8 December 2010 "On selected issues related to reduction of greenhouse gas emissions"

Decree of the President of the Republic of Belarus No. 580 dated 8 December 2005 "On selected measures to improve the efficiency of game and fisheries management and improve public management thereof"

Decree of the President of the Republic of Belarus No. 143 dated 9 March 2010 "On selected issues of taxation"

Decree of the President of the Republic of Belarus No. 588 dated 11 November 2000 "On measures to regulate tariffs for wastewater treatment services rendered by legal entities that are members of the Belarusian State Concern for Oil and Chemistry, to other legal entities"

Decree of the President of the Republic of Belarus No. 756 dated 29 December 2006 "On selected issues related to the Ministry of Emergency Situations"

Decree of the President of the Republic of Belarus No. 667 dated 27 December 2007 "On withdrawal and allocation of land plots"

Decree of the President of the Republic of Belarus No. 45 dated 27 January 2003 "On the establishment of the State Inspectorate for Protection of Fauna and Flora under the President of the Republic of Belarus"

Decree of the President of the Republic of Belarus No. 214 dated 7 May 2007 "On selected measures to improve operations in the forestry sector"

Decree of the President of the Republic of Belarus No. 444 dated 9 September 2009 "On approval of the procedure for leasing forest areas and (or) providing them for use to legal entities to engage in forest management activities"

Decree of the President of the Republic of Belarus No. 50 dated 28 January 2008 "On measures to streamline the activities of gardening associations"

Decree of the President of the Republic of Belarus No. 109 dated 20 March 1996 "On measures to improve the efficiency of use of electricity and heat"

Decree of the President of the Republic of Belarus No. 450 dated 1 September 2010 "On licensing of certain types of activities"

Decree of the President of the Republic of Belarus No. 48 dated 9 February 2015 "On measures to ensure state control (supervision) over compliance with technical regulations"

Decree of the President of the Republic of Belarus No. 313 dated 11 July 2012 "On selected issues related to management of consumption waste"

Decree of the President of the Republic of Belarus No. 581 dated 8 December 2005 "On strengthening the responsibility for violation of the rules of fisheries and game management, fishing and hunting"

Decree of the President of the Republic of Belarus No. 510 dated 16 October 2009 "On enhancement of control (surveillance) activities in the Republic of Belarus"

Decree of the President of the Republic of Belarus No. 261 dated 19 April 2006 "On introduction of a national fee for import to the territory of the Republic of Belarus of ozone-depleting substances"

Decree of the President of the Republic of Belarus No. 64 dated 4 February 2014 "On utilization fee for vehicles"

Decree of the President of the Republic of Belarus No. 618 dated 3 December 2010 "On amendments to Decree of the President of the Republic of Belarus No. 348 dated 24 June 2008"

Decree of the President of the Republic of Belarus No. 426 dated 27 September 2012 "On certain aspects of the system of electronic toll collection of vehicles on certain roads in the Republic of Belarus"

Decree of the President of the Republic of Belarus No. 72 dated 25 February 2011 "On some issues of regulation of prices (tariffs) in the Republic of Belarus"

Decree of the President of the Republic of Belarus No. 618 dated 17 November 2008 "On public procurement in the Republic of Belarus"

Decree of the President of the Republic of Belarus No. 550 dated 5 December 2013 "On some issues of regulating tariffs (prices) for utilities and amendments to some decrees of the President of the Republic of Belarus"

Decree of the President of the Republic of Belarus No. 372 dated 2 June 2006 "On measures to develop agri-ecotourism in the Republic of Belarus"

Decree of the President of the Republic of Belarus No. 613 dated 26 November 2010 "On the passage of heavy and (or) large vehicles on the roads"

Decree of the President of the Republic of Belarus No. 378 dated 22 July 2010 "On approval of the priority directions of scientific and technological activities in the Republic of Belarus for 2011–2015"

Decree of the President of the Republic of Belarus No. 483 dated 13 October 2014 "On amendments to Decree of the President of the Republic of Belarus No. 551 dated 28 November 2005 "

Decree of the President of the Republic of Belarus No. 72 dated 7 February 2006 "On measures for the state regulation of location and organization of the construction of residential buildings, utilities, transport and social infrastructure"

Decree of the President of the Republic of Belarus No. 211 dated 20 May 2015 "On amendments to Decree of the President of the Republic of Belarus" (into the Decree No. 214 dated 7 May 2007)

Decree of the President of the Republic of Belarus No. 504 dated 8 November 2012 "On amendments to Decrees of the President of the Republic of Belarus No. 214 dated 7 May 2007 and No. 444 dated 9 September 2009"

Decree of the President of the Republic of Belarus No. 329 dated 30 June 2014 "On measures to streamline forest management"

Decree of the President of the Republic of Belarus No. 214 dated 7 May 2014 "On development of satellite towns"

Decree of the President of the Republic of Belarus No. 55 dated 13 February 2015 "On approval of the plan of developing draft laws in 2015"

Decree of the President of the Republic of Belarus No. 168 dated 12 April 2013 "On some measures to optimize the system of governmental bodies and other governmental organizations as well as number of their staff"

Decree of the President of the Republic of Belarus No. 215 dated 7 May 2007 "On the rates of tax for use of natural resources (environmental tax) and some issues of its collection"

Decree of the President of the Republic of Belarus No. 59 dated 9 February 2012 "On some issues of developing specially protected natural areas"

Decree of the President of the Republic of Belarus No. 551 dated 5 December 2013 "On amendments to the Decrees of the President of the Republic of Belarus No. 580 dated 8 December 2005 and No. 200 dated 26 April 2010"

Decree of the President of the Republic of Belarus No. 209 dated 18 May 2015 "On the use of renewable energy sources"

Decree of the President of the Republic of Belarus No. 499 dated 2 November 2013 "On construction of the Belarusian Nuclear Power Plant"

Directive of the President of the Republic of Belarus No. 3 dated 14 June 2007 "Economy and prudence – main factors of national economic safety"

Directive of the President of the Republic of Belarus No. 4 dated 31 December 2010 "On the development of entrepreneurial initiative and stimulating business activities"

Edict of the President of the Republic of Belarus No. 5 dated 31 August 2015 "On foreign grant aid"

Codes of the Republic of Belarus

Procedural Executive Code of Administrative Offences of the Republic of Belarus dated 20 December 2006

Water Code of the Republic of Belarus dated 30 April 2014

Land Code of the Republic of Belarus dated 23 July 2008

Code of the Republic of Belarus on Subsoil Resources dated 14 July 2008

Forest Code of the Republic of Belarus dated 14 July 2000

Air Code of the Republic of Belarus dated 16 May 2006

Civil Code of the Republic of Belarus dated 7 December 1998

Labour Code of the Republic of Belarus dated 26 June 1999

Code on Misdemeanours of the Republic of Belarus dated 21 April 2003

Education Code of the Republic of Belarus dated 13 January 2011

Budget Code of the Republic of Belarus dated 16 July 2008

Tax Code of the Republic of Belarus (General Part dated 19 December 2002, Special Part dated 29 December 2009)

Criminal Code of the Republic of Belarus dated 9 July 1999

Code on Inland Water Transport of the Republic of Belarus dated 24 June 2002

Code on Merchant Shipping of the Republic of Belarus dated 15 November 1999

Laws of the Republic of Belarus

"On environmental protection" dated 26 November 1992 (as revised on 17 July 2002)

"On specially protected natural areas" dated 20 October 1994 (as revised on 23 June 2000)

"On wildlife" dated 10 July 2007

"On the protection of the ozone layer" dated 12 November 2001 (as revised on 16 June 2014)

"On drinking water supply" dated 24 June 1999

"On bodies and departments of emergency situations of the Republic of Belarus" dated 16 July 2009

"On state ecological expertise" dated 9 November 2009

"On waste management" dated 20 July 2007

"On legal regime of territories exposed to radioactive contamination as a result of the Chernobyl NPP disaster" dated 26 May 2012

"On social protection of citizens affected by the Chernobyl NPP disaster and other radiological accidents" dated 6 January 2009

"On the sanitary and epidemiological well-being of the population" dated 7 January 2012

"On motor roads and road activities" dated 2 December 1994 (as revised on 22 July 2003)

"On patents for plant varieties" dated 13 April 1995 (as revised on 4 January 2014)

"On radiation safety of the population" dated 5 January 1998

"On the protection of the population and territories from natural and man-made emergency situations" dated 5 May 1998

"On energy saving" dated 8 January 2015

"On the quality and safety of food raw materials and foodstuffs for human life and health" dated 29 June 2003

"On the scientific and technical information" dated 5 May 1999

"On industrial safety of hazardous production facilities" dated 10 January 2000

"On the transport of dangerous goods" dated 6 June 2001

"On plant protection" dated 25 December 2005

"On hydrometeorological activities" dated 9 January 2006

"On the safety of genetic engineering" dated 9 January 2006

"On the geodesic and cartographic activities" dated 14 July 2008

"On atmospheric air protection" dated 16 December 2008

"On land reclamation" dated 23 July 2008

"On the use of atomic energy" dated 30 July 2008

"On renewable energy sources" dated 27 December 2010

"On assets that are wholly owned by the Government and activities over which the Government enjoys exclusive rights" dated 15 July 2010

"On architectural, urban planning and construction activities in the Republic of Belarus" dated 5 May 2004

"On the state forecasting and socioeconomic development programmes of the Republic of Belarus" dated 5 May 1998

"On approval of main directions of internal and foreign policy of the Republic of Belarus" dated 14 November 2005

"On state regulation of external trade activity" dated 25 November 2004

"On international treaties of the Republic of Belarus" dated 23 June 2008

"On information, informatization and protection of information" dated 10 November 2008

"On the requests from citizens and legal persons" dated 18 July 2011

"On state secrets" dated 19 July 2010

"On copyright and related rights" dated 17 May 2011

"On tourism" dated 25 November 1999

"On public procurement of goods (works and services)" dated 13 July 2012

"On plant world" dated 14 June 2003

"On administrative–territorial division of the Republic of Belarus" dated 5 May 1998

"On commercial secrets" dated 5 January 2013

"On public associations" dated 4 October 1994

"On republican budget for 2012" dated 30 December 2011

"On republican budget for 2015" dated 30 December 2014

"On frameworks for transport activities" dated 5 May 1998

"On automobile transport and freight" dated 14 August 2007 (as revised on 4 January 2014)

"On forwarding activity" dated 13 June 2006

"On pipeline transport" dated 9 January 2002

"On rail transport" dated 6 January 1999

"On road traffic" dated 5 January 2008 (as revised on 11 July 2014)

"On transport of dangerous goods" dated 6 June 2001 (as revised on 12 July 2013)

"On urban electric transport and metro" dated 5 May 2014

Resolutions of the Council of Ministers of the Republic of Belarus

Resolution of the Council of Ministers of the Republic of Belarus No. 1504 dated 30 October 2002 "Cooperation of the Republic of Belarus with international organizations"

Resolution of the Council of Ministers of the Republic of Belarus No. 1042 dated 17 July 2008 "On approval of the procedure of calculating the amount of compensation for harm caused to the environment and drafting an act to establish the fact of harm to the environment, amendment and revocation of selected resolutions of the Council of Ministers of the Republic of Belarus"

Resolution of the Council of Ministers of the Republic of Belarus No. 1739 dated 29 November 2010 "On the limits on use of natural resources, amendment of Resolution of the Council of Ministers of the Republic of Belarus No. 1379 dated 22 October 2007 and revocation of selected resolutions of the Council of Ministers of the Republic of Belarus"

Resolution of the Council of Ministers of the Republic of Belarus No. 1677 dated 12 December 2011 "On measures to implement Decree of the President of the Republic of Belarus No. 528 dated 17 November 2011"

Resolution of the Council of Ministers of the Republic of Belarus No. 156 dated 17 February 2012 "On approval of the unified list of administrative procedures carried out by state bodies and other organizations in relation to legal entities and individual entrepreneurs, amendments to Resolution of the Council of Ministers of the Republic of Belarus No. 193 dated 14 February 2009 and revocation of selected resolutions of the Council of Ministers of the Republic of Belarus"

Resolution of the Council of Ministers of the Republic of Belarus No. 503 dated 20 June 2013 "On selected issues related to the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus"

Resolution of the Council of Ministers of the Republic of Belarus No. 126 dated 30 January 2008 "On selected issues related to management of wild animals pertaining to the species listed in the Red Data Book of the Republic of Belarus, and to the species covered by the international treaties of the Republic of Belarus, and to regulation of the distribution and populations of wild animals"

Resolution of the Council of Ministers of the Republic of Belarus No. 1408 dated 27 October 2007 "On selected issues related to protection and sustainable use of European Bisons"

Resolution of the Council of Ministers of the Republic of Belarus No. 1836 dated 27 December 2007 "On approval of the Regulations on the Red Data Book of the Republic of Belarus" (ceased to be in force with the passing of Resolution of the Council of Ministers of the Republic of Belarus No. 622 dated 12 July 2013)

Resolution of the Council of Ministers of the Republic of Belarus No. 1919 dated 29 December 2007 "On the scheme of rational siting of specially protected natural areas of national significance until 1 January 2015"

Resolution of the Council of Ministers of the Republic of Belarus No. 466 dated 6 April 2006 "On measures to implement Decree of the President of the Republic of Belarus No. 580 dated 8 December 2005"

Resolution of the Council of Ministers of the Republic of Belarus No. 1837 dated 27 December 2007 "On selected issues related to wildlife monitoring and inventory"

Resolution of the Council of Ministers of the Republic of Belarus No. 1260 dated 4 October 2007 "On approval of the procedure for leasing water bodies (or parts thereof) for fish farming and other purposes"

Resolution of the Council of Ministers of the Republic of Belarus No. 168 dated 7 February 2008 "On approval of the procedure for determining the amount of compensation payments and their implementation"

Resolution of the Council of Ministers of the Republic of Belarus No. 698 dated 2 June 2006 "On approval of the Rules of capture of wild animals for the purpose of keeping them in captivity and (or) captive breeding, as well as for the purpose of settling, introduction, reintroduction, acclimatization and crossing"

Resolution of the Council of Ministers of the Republic of Belarus No. 928 dated 10 July 2002 "On selected issues related to sale and use of fishing nets and netting materials"

Resolution of the Council of Ministers of the Republic of Belarus No. 700 dated 2 June 2006 "On approval of the Rules of using wild animals for scientific, educational, recreational, aesthetic and other purposes when conducting cultural activities"

Resolution of the Council of Ministers of the Republic of Belarus No. 466 dated 6 April 2006 "On measures to implement Decree of the President of the Republic of Belarus No. 580 dated 8 December 2005"

Resolution of the Council of Ministers of the Republic of Belarus No. 699 dated 2 June 2006 "On approval of the Rules of killing and (or) procuring wild animals that do not pertain to huntable and fishable species"

Resolution of the Council of Ministers of the Republic of Belarus No. 1105 dated 6 October 2005 "On approval of the Protocol Amending the Agreement on Cooperation in the Field of Environmental Monitoring dated 13 January 1999"

Resolution of the Council of Ministers of the Republic of Belarus No. 918 dated 17 June 1999 "On the Interstate Scientific and Technological Programme for Development of a System for Seismic Monitoring of the Territories of the Member States of the Commonwealth of Independent States"

Resolution of the Council of Ministers of the Republic of Belarus No. 201 dated 8 February 1999 "On local environmental monitoring in the Republic of Belarus"

Resolution of the Council of Ministers of the Republic of Belarus No. 1466 dated 19 November 2004 "On approval of the Regulations on the system of monitoring and forecasting of natural and man-made disasters"

Resolution of the Council of Ministers of the Republic of Belarus No. 82 dated 27 January 2004 "On approval of the Regulations on the system of social and hygienic monitoring" (ceased to be in force with the passing of Resolution of the Council of Ministers of the Republic of Belarus No. 635 dated 11 July 2012)

Resolution of the Council of Ministers of the Republic of Belarus No. 635 dated 11 July 2012 "On selected issues related to sanitary and epidemiological well-being of the population"

Resolution of the Council of Ministers of the Republic of Belarus No. 1036 dated 15 August 2007 "On approval of the Regulations on the procedure for conducting forest monitoring as part of the National Environmental Monitoring System in the Republic of Belarus and using their data"

Resolution of the Council of Ministers of the Republic of Belarus No. 386 dated 28 March 2007 "On approval of the Regulations on the procedure for conducting land monitoring as part of the National Environmental Monitoring System in the Republic of Belarus and using their data"

Resolution of the Council of Ministers of the Republic of Belarus No. 1277 dated 13 August 1999 "On approval of the Agreement on Cooperation in the Field of Environmental Monitoring, signed in Saratov on 13 January 1999 by the Governments of the Member States of the Commonwealth of Independent States"

Resolution of the Council of Ministers of the Republic of Belarus No. 949 dated 14 July 2003 "On the National Environmental Monitoring System in the Republic of Belarus"

Resolution of the Council of Ministers of the Republic of Belarus No. 576 dated 17 May 2004 "On approval of the Regulations on the procedure for conducting wildlife monitoring and radiological monitoring as part of the National Environmental Monitoring System in the Republic of Belarus, and using their data"

Resolution of the Council of Ministers of the Republic of Belarus No. 482 dated 28 April 2004 "On approval of the Regulations on the procedure for conducting monitoring of surface waters, groundwaters, atmospheric air and local environmental monitoring as part of the National Environmental Monitoring System in the Republic of Belarus, and using their data"

Resolution of the Council of Ministers of the Republic of Belarus No. 412 dated 14 April 2004 "On approval of the Regulations on the procedure for conducting flora monitoring and geophysical monitoring as part of the National Environmental Monitoring System in the Republic of Belarus, and using their data"

Resolution of the Council of Ministers of the Republic of Belarus No. 161 dated 16 February 2004 "On approval of the Regulations on the procedure for conducting ozone layer monitoring as part of the National Environmental Monitoring System in the Republic of Belarus, and using their data"

Resolution of the Council of Ministers of the Republic of Belarus No. 247 dated 20 April 1993 "On establishment of the National Environmental Monitoring System in the Republic of Belarus (NEMS)"

Resolution of the Council of Ministers of the Republic of Belarus No. 1397 dated 23 September 2008 "On selected issues related to the procedure of movement of certain goods across the customs border of the Republic of Belarus"

Resolution of the Council of Ministers of the Republic of Belarus No. 2001 dated 24 December 1999 "On approval of the Regulations on state control and supervision in the field of drinking water supply"

Resolution of the Council of Ministers of the Republic of Belarus No. 377 dated 21 March 2006 "On approval of the Procedure for establishing the size and boundaries of water conservation zones and coastal strips of water bodies and the conditions of conducting economic and other activities within them, and revocation of selected resolutions of the Council of Ministers of the Republic of Belarus"

Resolution of the Council of Ministers of the Republic of Belarus No. 1286 dated 9 October 2007 "On approval of the Regulations on the procedure of development, approval and implementation of schemes of complex water use and conservation"

Resolution of the Council of Ministers of the Republic of Belarus No. 669 dated 7 May 1999 "On approval of the Regulations on issuing permits for special water use and provision of water bodies for individual water use"

Resolution of the Council of Ministers of the Republic of Belarus No. 603 dated 22 April 2010 "On approval of the Regulations on the procedure of review and approval of technical standards for water use and sanitation and introduction of amendments and additions to Resolution of the Council of Ministers of the Republic of Belarus No. 1379 dated 22 October 2007"

Resolution of the Council of Ministers of the Republic of Belarus No. 1087 dated 28 November 2012 "On approval of the Rules of improvement and maintenance of settlements"

Resolution of the Council of Ministers of the Republic of Belarus No. 731 dated 5 June 2002 "On approval of assignments and activities to regain order in land use and improve the sanitary status of territories"

Resolution of the Council of Ministers of the Republic of Belarus No. 260 dated 29 February 2000 "On approval of the Regulations on the siting of on-farm construction facilities on agricultural lands"

Resolution of the Council of Ministers of the Republic of Belarus No. 958 dated 29 July 2006 "Issues related to the State Property Committee of the Republic of Belarus"

Resolution of the Council of Ministers of the Republic of Belarus No. 462 dated 26 March 2008 "On selected measures to implement Decree of the President of the Republic of Belarus No. 667 dated 27 December 2007"

Resolution of the Council of Ministers of the Republic of Belarus No. 2045 dated 30 December 2008 "On selected measures to implement the Code on Subsoil Resources of the Republic of Belarus"

Resolution of the Council of Ministers of the Republic of Belarus No. 1833 dated 27 December 2007 "On the national nature reserves"

Resolution of the Council of Ministers of the Republic of Belarus No. 195 dated 5 February 1999 "On approval of the Regulations on the procedure of state supervision over sustainable use and conservation of subsoil resources and safe conduct of works related to the use of subsoil resources" (ceased to be in force with the passing of Resolution of the Council of Ministers of the Republic of Belarus No. 2056 dated 31 December 2008)

Resolution of the Council of Ministers of the Republic of Belarus No. 1765 dated 6 December 2001 "On the felling age (of forest tree species for final fellings)"

Resolution of the Council of Ministers of the Republic of Belarus No. 1030 dated 12 July 2001 "On approval of procedure of forest surveying of the forest estate"

Resolution of the Council of Ministers of the Republic of Belarus No. 298 dated 16 March 2004 "Issues related to the Ministry of Forestry of the Republic of Belarus"

Resolution of the Council of Ministers of the Republic of Belarus No. 1032 dated 12 July 2001 "On approval of the procedure of maintaining inventory of the forest estate"

Resolution of the Council of Ministers of the Republic of Belarus No. 1320 dated 4 October 2011 "On approval of the Regulations on the procedure of granting special rights to use wild flora resources and notifying local executive and administrative bodies of the planned procurement of wild plants and (or) their parts, and revocation of selected resolutions of the Council of Ministers of the Republic of Belarus"

Resolution of the Council of Ministers of the Republic of Belarus No. 1525 dated 1 December 2004 "On approval of the Regulations on the procedure of imposing restrictions or bans on the handling of flora resources"

Resolution of the Council of Ministers of the Republic of Belarus No. 1691 dated 20 December 2006 "On additional measures to reduce the cost of housing construction"

Resolution of the Council of Ministers of the Republic of Belarus No. 828 dated 7 July 2004 "On approval of the Regulations on botanical collections" (ceased to be in force with the passing of Resolution of the Council of Ministers of the Republic of Belarus No. 622 dated 12 July 2013)

Resolution of the Council of Ministers of the Republic of Belarus No. 1066 dated 12 November 2014 "On amendments to the Resolution of the Council of Ministers of the Republic of Belarus No. 733 dated 26 November 2010"

Resolution of the Council of Ministers of the Republic of Belarus No. 1580 dated 13 December 2004 "On approval of the Regulations on the procedure of maintaining the State Flora Cadastre and using its data"

Resolution of the Council of Ministers of the Republic of Belarus No. 1426 dated 25 October 2011 "On selected issues related to handling of flora resources"

Resolution of the Council of Ministers of the Republic of Belarus No. 1436 dated 1 November 2007 "On approval of the Regulations on the procedure of development and approval of territorial complex schemes for sustainable use of natural resources and environmental protection, and financing thereof"

Resolution of the Council of Ministers of the Republic of Belarus No. 755 dated 19 May 2010 "On selected measures to implement the Law of the Republic of Belarus dated 9 November 2009 "On state ecological expertise""

Resolution of the Council of Ministers of the Republic of Belarus No. 1592 dated 29 October 2010 "On approval of the Regulations on the procedure of conducting public environmental review"

Resolution of the Council of Ministers of the Republic of Belarus No. 769 dated 8 November 1993 "On the procedure for payment of expenses related to the conduct of state ecological expertise"

Resolution of the Council of Ministers of the Republic of Belarus No. 1104 dated 23 July 2010 "On selected issues related to waste management"

Resolution of the Council of Ministers of the Republic of Belarus No. 1178 dated 29 August 2002 "On approval of the Regulations on the procedure of storage of medical products and medical equipment and the Regulations on the procedure of destruction of medical products and medical equipment"

Resolution of the Council of Ministers of the Republic of Belarus No. 1397 dated 23 September 2008 "On selected issues related to the procedure of movement of certain goods across the state border of the Republic of Belarus"

Resolution of the Council of Ministers of the Republic of Belarus No. 1391 dated 23 October 2009 "On approval of the list of hazardous wastes, which time-limited assignment transactions (other than under haulage contracts), and alienation to another legal entity or natural person, including an individual entrepreneur dealing with waste management, are subject to registration"

Resolution of the Council of Ministers of the Republic of Belarus No. 61 dated 17 January 2008 "On approval of the Regulations on the procedure of registration of time-limited waste assignment transactions (other than under haulage contracts), and alienation to another legal entity or natural person, including an individual entrepreneur dealing with waste management"

Resolution of the Council of Ministers of the Republic of Belarus No. 1789 dated 21 December 2007 "On approval of the list of produced and imported goods, the manufacturers and importers of which are required to collect the waste generated after these products lose their consumer properties" (ceased to be in force with the passing of Resolution of the Council of Ministers of the Republic of Belarus No. 708 dated 31 July 2012)

Resolution of the Council of Ministers of the Republic of Belarus No. 708 dated 31 July 2012 "On measures to implement Decree of the President of the Republic of Belarus No. 313 dated 11 July 2012"

Resolution of the Council of Ministers of the Republic of Belarus No. 231 dated 20 February 2008 "On approval of the Regulations on the procedure for calculating the amount of cash collateral payable to the republican budget by the owner of the waste or the person authorized by the owner in the event of import of waste into the Republic of Belarus and (or) its transit through the territory of the Republic of Belarus, as well as the procedure for payment of this collateral to the republican budget and its return"

Resolution of the Council of Ministers of the Republic of Belarus No. 404 dated 13 March 1998 "On approval of the Regulations on coordination of economically sound use of production and consumer wastes" (ceased to be in force with the passing of Resolution of the Council of Ministers of the Republic of Belarus No. 708 dated 31 July 2012)

Resolution of the Council of Ministers of the Republic of Belarus No. 858 dated 4 August 2005 "On streamlining the harvesting and procurement of wild plants and (or) their parts" (ceased to be in force with the passing of Resolution of the Council of Ministers of the Republic of Belarus No. 1320 dated 4 October 2011)

Resolution of the Council of Ministers of the Republic of Belarus No. 1679 dated 2 November 1998 "On measures to strengthen control over commercial harvesting, procurement, and sale of wild-growing products and streamlining these activities" (ceased to be in force with the passing of Resolution of the Council of Ministers of the Republic of Belarus No. 1320 dated 4 October 2011)

Resolution of the Council of Ministers of the Republic of Belarus No. 1275 dated 12 October 2004 "On approval of the Regulations on the procedure of removal of flora objects located on the land of residential areas" (ceased to be in force with the passing of Resolution of the Council of Ministers of the Republic of Belarus No. 1426 dated 25 October 2011)

Resolution of the Council of Ministers of the Republic of Belarus No. 1461 dated 5 November 2007 "On approval of the Regulations on the procedure for determining the losses of flora objects located on the land of residential areas that should be recompensed, and to amend the Resolution of the Council of Ministers of the Republic of Belarus No. 1275 dated 12 October 2004" (ceased to be in force with the passing of Resolution of the Council of Ministers of the Republic of Belarus No. 1426 dated 25 October 2011)

Resolution of the Council of Ministers of the Republic of Belarus No. 638 dated 18 May 2009 "On selected issues related to the handling of wild animals and plants"

Resolution of the Council of Ministers of the Republic of Belarus No. 653 dated 25 July 2013 "On approval of the Regulations on the procedure of conducting wildlife monitoring and using its data"

Resolution of the Council of Ministers of the Republic of Belarus No. 404 dated 31 March 2009 "On approval of the Regulations on the procedure of development, financing and control over the implementation of state, regional and sectoral programmes and revocation of selected resolutions of the Council of Ministers of the Republic of Belarus"

Resolution of the Council of Ministers of the Republic of Belarus No. 934 dated 19 June 2010 "On approval of the Regulations on the procedure of maintaining the State Cadastre of Wastes"

Resolution of the Council of Ministers of the Republic of Belarus No. 62 dated 16 January 1999 "On approval of the Regulations on the procedure of maintaining the State Cadastre of Subsoil Resources of the Republic of Belarus"

Resolution of the Council of Ministers of the Republic of Belarus No. 1580 dated 13 December 2004 "On approval of the Regulations on the procedure of maintaining the State Cadastre of Flora and using its data"

Resolution of the Council of Ministers of the Republic of Belarus No. 1301 dated 4 October 2006 "On approval of the Regulations on the State Hydrometeorological Fund and the Regulations on the State Cadastre of Climate"

Resolution of the Council of Ministers of the Republic of Belarus No. 5 dated 3 January 2011 "On amendments to the Regulations on the procedure of maintaining the State Cadastre of Flora"

Resolution of the Council of Ministers of the Republic of Belarus No. 836 dated 24 June 2011 "On approval of the Regulations on the procedure of maintaining the State Cadastre of Renewable Energy Sources and using its data, the Regulations on the procedure of verifying the origin of energy produced from renewable sources and issuing a certificate to confirm the origin of energy, and on amendments to selected resolutions of the Council of Ministers of the Republic of Belarus"

Resolution of the Council of Ministers of the Republic of Belarus No. 509 dated 21 April 2009 "On approval of the Regulations on the procedure of maintaining the State Cadastre of Atmospheric Air and using its data"

Resolution of the Council of Ministers of the Republic of Belarus No. 485 dated 10 April 2006 "On approval of the Regulations on the State Cadastre of Anthropogenic Emissions by Sources and Removals by Sinks of Greenhouse Gases"

Resolution of the Council of Ministers of the Republic of Belarus No. 664 dated 21 May 2009 "On approval of the Regulations on the procedure for issuing permits for pollutant emissions into the atmospheric air, amending and (or) supplementing, suspending, renewing, and extending permits for pollutant emissions into the air, and their termination"

Resolution of the Council of Ministers of the Republic of Belarus No. 1460 dated 16 December 2005 "On approval of the Concept of the Draft Environmental Code"

Resolution of the Council of Ministers of the Republic of Belarus No. 929 dated 17 June 1999 "On the uniform state system of control of and accounting for individual doses of radiation"

Resolution of the Council of Ministers of the Republic of Belarus No. 152 dated 2 March 2015 "On selected measures to implement the Water Code of the Republic of Belarus"

Resolution of the Council of Ministers No. 1038 dated 8 August 1997 "On measures to improve state regulation of ozone-depleting-substances-related activities" (ceased to be in force with the passing of Resolution of the Council of Ministers of the Republic of Belarus No. 184 dated 9 February 2006)

Resolution of the Council of Ministers No. 135 dated 17 February 2014 "On fixing for the year 2014 amounts and directions for the use of funds coming from producers and suppliers of packaging, amounts of compensation to legal entities and individual entrepreneurs of the costs of collection of packaging waste and packaging, as well as introduction of amendments to the Resolution of the Council of Ministers of the Republic of Belarus No. 708 dated 31 July 2012"

Resolution of the Council of Ministers No. 172 dated 27 February 2014 "On measures to implement Decree of the President of the Republic of Belarus No. 64 dated 7 February 2014"

Resolution of the Council of Ministers No. 1042 dated 17 July 2008 "On approval of the Regulation on the way to calculate the amount of environmental damage compensation and to complete the act on the fact of environmental damage, as well as the termination of validity of some resolutions of the Council of Ministers of the Republic of Belarus"

Resolution of the Council of Ministers of the Republic of Belarus No. 571 dated 12 June 2014 "On approval of the Regulation on the way of calculation and payment for utilities and payment for use of housing premises from the state housing fund, amendments to the resolution of the Council of Ministers and termination of validity of resolutions of the Council of Ministers of the Republic of Belarus and their structural elements"

Resolution of the Council of Ministers of the Republic of Belarus No. 1269 dated 30 December 2014 "On amendments to the resolution of the Council of Ministers of the Republic of Belarus No. 1166 dated 30 December 2013"

Resolution of the Council of Ministers of the Republic of Belarus No. 116 dated 1 February 2011 "On approval of lists of scientific and technical programmes for 2011–2015 and until 2020 and termination of validity of some resolutions of the Council of Ministers of the Republic of Belarus"

Resolution of the Council of Ministers of the Republic of Belarus No. 1987 dated 20 December 2008 "On some issues of conducting public procurement"

Resolution of the Council of Ministers of the Republic of Belarus No. 687 dated 1 June 2011 "On approval of the Regulation on public consultations in architectural, urban planning and construction activities" (as revised by the Resolution of the Council of Ministers of the Republic of Belarus No. 109 dated 10 February 2014)

Resolution of the Council of Ministers of the Republic of Belarus No. 247 dated 20 March 2012 "On selected issues of organization of public consultations of draft regulatory legal acts related to development of entrepreneurship, as well as amendments to the Resolution of the Council of Ministers of the Republic of Belarus No. 2070 dated 31 December 2008"

Resolution of the Council of Ministers of the Republic of Belarus No. 1064 dated 12 November 2014 "On approval of the Rules on providing touristic services"

Resolution of the Council of Ministers of the Republic of Belarus No. 1186 dated 1 August 2000 "On the Interagency Expert and Coordination Council on Tourism under the Council of Ministers of the Republic of Belarus"

Resolution of the Council of Ministers of the Republic of Belarus No. 1623 dated 11 December 2009 "On approval of amendments to the Statutes of the Republican State-Public Association "Belarusian Republican Society for Saving on Waters" and approval of the Rules for Protection of Life of People on Waters" (as amended by Resolutions of the Council of Ministers of the Republic of Belarus No. 1049 dated 4 August 2011 and No. 1149 dated 28 December 2013)

Resolution of the Council of Ministers of the Republic of Belarus No. 26 dated 10 January 2011 "On the list of actions for environmental protection and restoration of natural resources to be financed from state budgetary nature protection funds" (as modified by the Resolution of the Council of Ministers of the Republic of Belarus No. 328 dated 9 April 2014)

Resolution of the Council of Ministers of the Republic of Belarus No. 1129 dated 23 December 2013 "On the determination of the taxes on sales of standing timber in 2014"

Resolution of the Council of Ministers of the Republic of Belarus No. 639 dated 12 July 2012 "On development of organic farming in Belarus"

Resolution of the Council of Ministers of the Republic of Belarus No. 734 dated 24 May 2008 "On approval of the Regulation on the development and update of the state fund of data on environment and environmental impacts and the content of environmental information of general use subject to mandatory dissemination, as well as the holders of such information and the frequency of its dissemination"

Resolution of the Council of Ministers of the Republic of Belarus No. 783 dated 12 August 2014 "On service information for restricted use"

Resolution of the Council of Ministers of the Republic of Belarus No.152 dated 7 March 2013 "On amendments to the Resolution of the Council of Ministers of the Republic of Belarus No. 404 dated 31 March 2009"

Resolution of the Council of Ministers of the Republic of Belarus No. 71 dated 4 February 2015 "On republican preserves"

Resolution of the Council of Ministers of the Republic of Belarus No. 1039 dated 12 July 2001 "On approval of the way of maintaining the State Forest Cadastre"

Resolution of the Council of Ministers of the Republic of Belarus No. 428 dated 21 May 2015 "On some issues of land-keeping"

Resolution of the Council of Ministers of the Republic of Belarus No. 590 dated 13 July 2015 "On amendments to some Resolutions of the Council of Ministers of the Republic of Belarus"

Resolution of the Council of Ministers of the Republic of Belarus No. 74 dated 30 January 2013 "On some issues of maintenance and use of the unified information database of enforcement agencies which includes data of regulated entities and their respective risk groups on the basis of the criteria for classifying regulated entities to risk groups for the purposes of planned inspections"

Resolution of the Council of Ministers of the Republic of Belarus No. 372 dated 4 May 2015 "On approval of the Regulation on the Radioactive Contamination Control System"

Resolution of the Council of Ministers of the Republic of Belarus No. 1031 dated 12 July 2001 "On approval of the way of maintaining the State Forest Cadastre"

Resolutions and Orders of the Ministry of Natural Resources and Environmental Protection

Resolution of the Ministry of Natural Resources and Environmental Protection No. 17 dated 27 February 2008 "On entrusting the officials of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus and its territorial bodies with authority to draw up protocols on administrative offences and prepare administrative cases" (amended by Resolution of the Ministry of Natural Resources and Environmental Protection No. 25 dated 31 May 2010)

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 26 dated 9 June 2014 "On establishing lists of rare and endangered species in the territory of the Republic of Belarus of wild animals and plants included in the Red Data Book of the Republic of Belarus"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 38 dated 16 April 2008 "On the register of specially protected natural areas of the Republic of Belarus"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 41 dated 21 April 2008 "On establishing categories of national environmental significance and the criteria for assigning species of wild animals and plants, which are rare and endangered in the territory of the Republic of Belarus, to these categories"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 94 dated 29 October 2008 "On selected issues related to specially protected natural areas"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 55 dated 30 May 2008 "On approval of the application form for registration of a set of wild animals, their parts and (or) derivatives as a zoological collection" (ceased to be in force with the passing of Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 36 dated 23 July 2013)

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 54 dated 30 May 2008 "On selected issues related to maintaining the State Cadastre of Fauna"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 32 dated 11 April 2008 "On approval of the Instruction on the procedure for conducting fauna monitoring" (ceased to be in force with the passing of Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 41 dated 25 July 2013)

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 31 dated 4 April 2008 "On approval of the form of certificate for registration of zoological collections" (ceased to be in force with the passing of Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 36 dated 23 July 2013)

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 19 dated 10 March 2008 "On approval of the Instruction on the procedure for taking stock of wildlife objects and scope of their use, with the exception of huntable and fishable wild animals"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 16 dated 29 February 2008 "On approval of the Instruction on the procedure for assessing wildlife resources"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 16 dated 27 February 2007 "On the requirements for the transport of wild animals, keeping them in captivity and (or) captive breeding, as well as for the purpose of settling, introduction, reintroduction, acclimatization and crossbreeding"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 98 dated 11 November 2008 "On establishment of the list of observation points of the radiation monitoring system under the jurisdiction of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 64 dated 10 July 2008 "On approval of the Regulations on the information and analysis centre for local environmental monitoring under the National Environmental Monitoring System in the Republic of Belarus" (ceased to be in force with the passing of Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 49 dated 3 October 2013)

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 119 dated 17 December 2008 "On approval of the Instruction on the procedure for maintaining the state registry of observation points under the National Environmental Monitoring System in the Republic of Belarus"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 43 dated 28 December 2004 "On approval of the Instruction on the exchange of environmental information within the National Environmental Monitoring System in the Republic of Belarus"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 102 dated 17 November 2008 "On approval of the Interagency Coordinating Council for support of the National Environmental Monitoring System in the Republic of Belarus" (ceased to be in force with the passing of Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 41 dated 17 September 2012)

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 45 dated 29 December 2004 "On approval of the Regulations on the information and analysis centre for fauna monitoring under the National Environmental Monitoring System in the Republic of Belarus" (ceased to be in force with the passing of Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 36 dated 23 July 2013)

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 9 dated 1 February 2007 "On approval of the Instruction on the procedure for conducting local environmental monitoring by legal entities engaged in economic and other activities which have a detrimental effect on the environment, including environmentally hazardous activities"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 67 dated 21 May 2007 "On approval of the List of legal entities conducting local environmental monitoring as part of the National Environmental Monitoring System in the Republic of Belarus"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 12 dated 1 March 2005 "On approval of the Regulations on information and analysis centres for monitoring of surface waters and air under the National Environmental Monitoring System in the Republic of Belarus"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 63 dated 13 October 2009 "On approval of the Instruction on the procedure for conducting integrated monitoring of ecological systems in specially protected natural areas"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 39 dated 14 June 2006 "On approval of the Instruction on the procedure for conducting groundwater monitoring"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 60 dated 11 November 2005 "On approval of the Regulations on the information and analysis centre for groundwater monitoring under the National Environmental Monitoring System in the Republic of Belarus"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 34 dated 28 July 2005 "On approval of the Regulations on the main information and analysis centre under the National Environmental Monitoring System in the Republic of Belarus"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 35 dated 10 August 2005 "On approval of the Regulations on the information and analysis centre for radiation monitoring under the National Environmental Monitoring System in the Republic of Belarus"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus, the Ministry of Health of the Republic of Belarus, and the Ministry of Emergency Situations of the Republic of Belarus No. 41/30/45 dated 12 September 2005 "On approval of the Instruction on the exchange of environmental information between the National Environment Monitoring System in the Republic of Belarus, the system of socio-hygienic monitoring and the system of monitoring and forecasting of natural and man-made disasters"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 7 dated 23 January 2008 "On selected issues related to inventory of analytical laboratories performing measurements in the field of environmental protection" (ceased to be in force with the passing of Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 32 dated 6 October 2013)

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 47 dated 30 December 2004 "On approval of the Instruction on the procedure for monitoring the consumption and reporting on the management of ozone-depleting substances" (ceased to be in force with the passing of Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 42 dated 8 December 2014)

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 65 dated 22 October 2009 "On the requirements for the scope and content of schemes of complex water use and water conservation"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 31 dated 9 July 2010 "On selected issues related to issuing special water use permits and revocation of Resolutions of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 14 dated 2 April 2003 and No. 18 dated 4 March 2008"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 125 dated 30 December 2008 "On approval of the Instruction on the procedure for water budget analyses"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 78 dated 29 October 2007 "On the requirements for designing water conservation zones and coastal strips of water bodies"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 48 dated 21 May 2008 "On approval of the Regulations on the procedure of development, review and approval of technical standards for water use and sanitation"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 55 dated 4 August 2009 "On approval of the Instruction on classification of hydrocarbon reserves and prospective and projected resources, as well as operating reserves and resources of groundwater"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus and the Ministry of Health of the Republic of Belarus No. 43/42 dated 8 May 2007 "On selected issues related to standardizing the quality of water in fishery water bodies"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 75 dated 21 September 2007 "On approval of the Instruction on the procedure for conducting primary accounting of water use"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 117 dated 16 December 2008 "On approval of forms of documents on the use of subsoil resources and revocation of Order of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 57 dated 17 March 1999"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 19 dated 6 March 2007 "On selected issues related to botanical collections" (ceased to be in force with the passing of Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 36 dated 23 July 2013)

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 49 dated 31 December 2004 "On approval of the Instruction on the procedure for state accounting of botanical collections" (ceased to be in force with the passing of Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 40 dated 25 July 2013)

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 32 dated 15 October 2004 "On the Expert Committee on botanical collections" (ceased to be in force with the passing of Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 40 dated 25 July 2013)

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 14 dated 14 April 2011 "On establishment of cadastral record card forms for registering flora objects and revocation of Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 88 dated 20 November 2007"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 2 dated 10 January 2012 "On approval of the Instruction on the procedure for conducting scheduled surveys of territories and revocation of Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 46 dated 29 December 2004"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 1 dated 10 January 2012 "On establishing forms of cadastral books and revocation of Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 44 dated 28 December 2004"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 46 dated 3 November 2011 "On establishing forms of documents for removal and transplantation of flora objects in residential areas"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus and the Ministry of Forestry of the Republic of Belarus No. 37/36 dated 31 August 2005 "On approval of the Rules of tree sap harvesting, harvesting (procurement) of wild plants and (or) their parts"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 79 dated 28 December 2006 "On approval of the Instruction on the procedure for registration and handling of flora objects located on lands pertaining to specific categories"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 40 dated 26 October 2011 "On approval of the Instruction on the procedure for assessing flora resources and setting limits on the use of flora objects" (ceased to be in force with the passing of Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 39 dated 25 July 2013)

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 105 dated 29 December 2007 "On approval of the Instruction on the procedure of using flora objects for research, educational and experimental purposes"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 34 dated 16 April 2008 "On the Coordinating Council on the Implementation of the State Programme for Development of the System of Specially Protected Natural Areas in 2008–2014"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 67 dated 2 November 2009 "On approval of the Instruction on defining requirements for the scope and content of territorial complex schemes of sustainable use of natural resources and environmental protection" (ceased to be in force with the passing of Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 33 dated 23 July 2014)

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 25 dated 7 June 2013 "On approval of the Instruction on the procedure of maintaining environmental passports of enterprises and revocation of Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 107 dated 1 December 2008"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 45 dated 22 October 2010 "On approval of the Instruction on the procedure for drafting and approval of instructions for industrial waste management"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 44 dated 22 October 2010 "On selected measures to implement Resolution of the Council of Ministers of the Republic of Belarus No. 1104 dated 23 July 2010"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 47 dated 21 May 2008 "On approval of the Regulations on the national contest for maximum recovery of recyclables from municipal waste"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 112 dated 9 December 2008 "On approval of the form of accompanying passport for transporting production waste and the Instruction on the procedure of its preparation"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 61 dated 31 December 2010 "On the limits on use of natural resources and revocation of Resolutions of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 11 dated 28 February 2005 and No. 25 dated 12 May 2009" (ceased to be in force with the passing of Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 44 dated 29 April 2008)

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 5 dated 21 January 2008 "On approval of the Instruction on the organization of collection, separation by type, disposal and (or) use of waste generated after the loss of consumer properties by products included in the list of produced and imported goods, the manufacturers and importers of which are required to collect the waste generated after these products lose their consumer properties" (ceased to be in force with the passing of Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 37 dated 1 August 2012)

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 90 dated 22 November 2007 "On approval of the Instruction on the procedure of development and approval of schemes of handling the waste generated in garage cooperatives, gardening associations and other consumer cooperatives, as well as on the lands having nature conservation, health-related, recreational, historical and cultural status"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 17 dated 29 February 2008 "On approval of the Instruction on the procedure of inventorizing production wastes"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 85 dated 8 November 2007 "On approval of the Classifier of wastes generated in the Republic of Belarus"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 27 dated 26 November 2001 "On approval of the Rules of waste accounting" (ceased to be in force with the passing of Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 32 dated 9 July 2014)

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 33 dated 2 June 2009 "On approval of record forms in the field of environmental protection and the Instruction on the application and completion of record forms in the field of environment" (ceased to be in force with the passing of Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 27 dated 20 June 2014)

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 27 dated 20 June 2014 "On selected issues related to the accounting of exploited natural resources, emissions and releases of pollutants into the environment, waste management, and other adverse environmental effects and revocation of Resolutions of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 33 dated 2 June 2009 and No. 62 dated 31 December 2010"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 62 dated 24 June 2008 "On approval of the Rules of treatment of equipment and wastes containing polychlorinated biphenyls"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 89 dated 24 October 2008 "On selected measures to implement Resolution of the Council of Ministers of the Republic of Belarus No. 1397 dated 23 September 2008"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 43 dated 28 December 2004 "On approval of the Instruction on the exchange of environmental information within the National Environmental Monitoring System in the Republic of Belarus"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 19 dated 4 May 2015 "On approval of the Instruction on Establishment of Basin Councils"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 70 dated 7 August 2008 "On approval of the Instruction on the organization of atmospheric air monitoring" (ceased to be in force with the passing of Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 24 dated 7 June 2013)

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 52 dated 11 October 2013 "On approval of the Instruction on the procedure for development and approval of instructions for exercising in-process control in the field of environmental protection and sustainable use of natural resources, and revocation of Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 4 dated 17 March 2004"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 42 dated 8 December 2014 "On selected measures to implement Law of the Republic of Belarus "On the protection of the ozone layer" (with the Instruction on the procedure of maintaining records of ozone-depleting substances and the Instruction on the procedure of inventorizing equipment and engineering devices containing ozone-depleting substances)

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 122 dated 19 December 2008 "On approval of the Instruction on the management of ozone-depleting substances"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 38 dated 8 June 2009 "On approval of the Instruction on the procedure for collection, compilation and dissemination of information on best available techniques"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 70 dated 7 August 2008 "On selected issues related to organization of atmospheric air monitoring"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 43 dated 23 June 2009 "On approval of the Instruction on the procedure of setting standards for allowable emissions of pollutants into atmospheric air and revocation of selected resolutions of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 42 dated 23 June 2009 "On approval of the Instruction on the procedure of inventorizing emissions of pollutants into atmospheric air and revocation of Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 80 dated 28 December 2006 and paragraph 1, subparagraph 1.2 of Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 97 dated 30 November 2007"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 39 dated 9 June 2009 "On approval of the Instruction on the procedure of controlling emissions of pollutants into atmospheric air in adverse weather conditions and revocation of selected resolutions of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 53 dated 20 December 2011 "On selected issues related to issuing integrated environmental permits" (with the Instructions for completing an integrated environmental permit application)

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 31 dated 29 May 2009 "On approving the list of pollutants, categories of targets of atmospheric air impacts, for which allowable rates of emissions of pollutants into atmospheric air are established, and the list of facilities with atmospheric air impacts and emission sources, for which allowable rates of emissions of pollutants into atmospheric air are not established, and revocation of Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 10 dated 28 February 2005"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 5 dated 24 January 2011 "On setting standards for environmentally safe air pollutant concentrations in specially protected natural areas, selected natural complexes and objects in specially protected natural areas, and natural areas subject to special protection"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 51 dated 16 July 2009 "On approval of the Instruction on selected issues related to issuing permits for air pollutant emissions and revocation of Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 69 dated 29 December 2005 and paragraph 1, subparagraph 1.1 of Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 97 dated 30 November 2007"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 6 dated 15 February 2010 "On approval of the Instruction on the procedure of accounting for air pollutant emissions from mobile sources"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 19 dated 27 March 2006 "On selected issues related to conduct of environmental audits"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 2 dated 19 January 2007 "On the Public Coordination Environmental Council at the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 45 dated 9 October 2012 "On approval of the Regulation on the procedure of setting up of expert committees on performing the state ecological expertise and their activity"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 30 dated 29 May 2009 "On approval of the Instruction on classification of facilities with an impact on atmospheric air"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 30 dated 1 June 2014 "On establishing a ban on the hunting of waterfowl game in the spring hunting season"

Recommendations for assessment and control of pollution of small rivers by biogenic substances approved by the Order of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 331 dated 19 November 1999

Methodology for calculating the transfer of biogenic substances and assessment of the status of small rivers approved by the Order of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 331 dated 19 November 1999

Order of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 19 dated 8 February 1996 "On introduction of environmental passports for waste disposal facilities"

Order of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus and the Ministry of Housing and Utilities of the Republic of Belarus No. 14/8a dated 19 January 2000 "On approval of regulatory guidelines on selection and arrangement of temporary storage sites and mini-landfills of municipal solid waste in rural and urban-type settlements"

Regulatory legal acts of other state bodies

Resolution of the Ministry of Labour and Social Protection of the Republic of Belarus No.25 dated 17 March 2005 "On approval of industry standards regulating free provision of personal protective equipment to employees of state-owned organizations"

Resolution of the Ministry of Education of the Republic of Belarus No. 37 dated 24 May 2004 "On approval of the Regulations on the information and analysis centre for ozone layer monitoring"

Resolution of the Ministry of Forestry of the Republic of Belarus No. 41 dated 30 December 2008 "On approval of the Instruction on the procedure of monitoring the state of forests"

Resolution of the Forestry Committee under the Council of Ministers of the Republic of Belarus No. 21 dated 20 December 2001 "On approval of the Instruction on the organization and conduct of eco-reclamation monitoring of reclaimed forest lands"

Resolution of the Ministry of Forestry of the Republic of Belarus No. 9 dated 4 May 2007 "On approval of the information and analysis centre for forest monitoring under the National Environmental Monitoring System in the Republic of Belarus" (ceased to be in force with the passing of Resolution of the Ministry of Forestry of the Republic of Belarus No. 25 dated 19 December 2012)

Resolution of the Ministry of Forestry of the Republic of Belarus No. 19 dated 23 June 2008 "On approval of the Instruction on the procedure of maintenance of forest stands along the republican motor roads"

Resolution of the Ministry of Forestry of the Republic of Belarus No. 1 dated 15 January 2001 "On approval of the Rules of forest management in the radioactively contaminated areas"

Resolution of the Ministry of Forestry of the Republic of Belarus No. 4 dated 20 March 2001 "On approval of the list of minor forest uses and the Rules of harvesting of minor forest products and implementation of minor uses of forests"

Resolution of the Ministry of Forestry of the Republic of Belarus No. 55 dated 21 December 2007 "On approval of the Instruction on bleeding and resin tapping in pine stands"

Resolution of the Ministry of Economy of the Republic of Belarus No. 100 dated 30 June 2011 "On the tariffs for electric energy produced from renewables and termination of validity of some resolutions of the Ministry of Economy of the Republic of Belarus"

Resolution of the Ministry of Economy No. 45 dated 7 August 2015 "On the tariffs for electric energy produced from renewables in the territory of the Republic of Belarus by individual entrepreneurs and legal entities which are not part of the State Energy Production Association "Belenergo" for the energy supplied to energy supply organizations of this Association"

Resolution of the Ministry of Transport and Communications of the Republic of Belarus No. 21 dated 17 June 2013 "On some issues of toll collection for the passage of vehicles on pay roads of the Republic of Belarus"

Order of the State Committee on Land Resources, Geodesy and Cartography of the Republic of Belarus No. 01-4 /78 dated 24 May 1999 "On approval of the Regulations on removal, use and conservation of topsoil during works involving soil disturbance"

Regulations of the Ministry of Emergency Situations of the Republic of Belarus dated 3 August 1998, the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus dated 4 August 1998, the Ministry of Economy of the Republic of Belarus dated 31 July 1998, the Ministry of Health of the Republic of Belarus dated 31 August 1998, No. 263 "On the procedure of accounting, storage and collection of mercury and mercury-containing waste"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus and the Ministry of Housing and Utilities of the Republic of Belarus No. 38/37 dated 20 December 2004 "On the environmental protection requirements applicable to siting and operation of facilities dealing with sorting and recycling of municipal waste"

Resolution of the Ministry of Health of the Republic of Belarus No. 81 dated 22 November 2002 "On approval of the Instruction on the rules and methods of deactivation of waste pharmaceuticals, medical devices and medical equipment"

Resolution of the Ministry of Housing and Utilities of the Republic of Belarus No. 43 dated 31 August 2005 "On approval of the Instruction on the calculation of rated water losses and unaccounted for water consumption in municipal water supply systems of residential areas in the Republic of Belarus"

Resolution of the Ministry of Housing and Utilities of the Republic of Belarus No. 40 dated 29 December 2004 "On approval of the Instruction on the procedure for registration and handling of flora objects located on the land of residential areas"

Resolution of the Ministry of Housing and Utilities of the Republic of Belarus No. 26 dated 30 July 2003 "On approval of the Instruction on the organization of source separation (collection), storage and transport of municipal waste"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus, the Ministry of Health of the Republic of Belarus, and the Ministry of Emergency Situations of the Republic of Belarus No. 3/13/2 dated 17 January 2008 "On approval of the Instruction on the procedure for establishing the hazard level of production wastes and hazard class of hazardous production wastes"

Order of the Ministry of Housing and Utilities of the Republic of Belarus No. 128 dated 26 December 1995 "On approval of the Rules for using communal water supply and sewerage systems"

Resolution of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus and the Ministry of Agriculture and Food of the Republic of Belarus No. 5/6 dated 3 February 2005 "On approval of the Rules of treatment of obsolete pesticides"

Resolution of the Ministry of Housing and Public Utilities of the Republic of Belarus and the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 18/27 dated 27 June 2003 "On approval of the Rules of setting standard rates for generation of municipal waste"

Resolution of the Ministry of Health of the Republic of Belarus No. 115 dated 16 November 2011 "On approval of the Sanitary standards, rules and hygiene standards "Noise at workplaces, in vehicles, in residential and public buildings and in housing estates" and termination of some resolutions and certain provisions of the resolution of the Chief State Sanitary Officer of the Republic of Belarus"

Resolution of the Ministry of Health of the Republic of Belarus No. 191 dated 6 December 2012 "Sanitary norms and standards "Noise standards for sound-reproducing and sound-intensifying devices in closed premises and open spaces", and sanitary standards "Maximum allowable concentrations for sound of sound-reproducing and sound-intensifying devices in closed premises and open spaces"

Resolution of the Ministry of Health of the Republic of Belarus No. 77 dated 30 June 2009 "On approval of the Sanitary standards, rules and hygiene standards "Hygiene requirements for quality of atmospheric air in settlements and recreation areas" and termination of the Resolution of the Chief State Sanitary Officer of the Republic of Belarus No. 146 dated 20 December 2002

Resolution of the Ministry of Health of the Republic of Belarus No. 105 dated 2 August 2010 "On approval of the Sanitary standards, rules and hygiene standards "Hygiene requirements for the sources of non-centralized water supply of the population" and termination of the Resolution of the Chief State Sanitary Officer of the Republic of Belarus No.141 dated 22 November 2006"

Resolution of the Ministry of Health of the Republic of Belarus No. 105 dated 22 September 2009 "On approval of the Sanitary standards, rules and hygiene standards "Hygiene requirements for design, equipment and operation of swimming pools and aquaparks"" (as amended by Resolutions of the Ministry of Health No. 76 dated 1 July 2010 and No. 111 dated 3 November 2011)

Resolution of the Ministry of Health of the Republic of Belarus No. 137 dated 31 December 2013 "On approval of the Sanitary standards and rules "Requirements for ensuring radiation safety of the personnel and the population during implementation of activities on use of nuclear energy and ionizing radiation sources" and additions to the Resolution of the Ministry of Health of the Republic of Belarus No. 213 dated 28 December 2012"

Resolution of the Ministry of Health of the Republic of Belarus No. 213 dated 28 December 2012 "On approval of the Sanitary standards and rules "Requirements for radiation safety" and of the Hygiene standard "Criteria for assessment of radiation impact""

Resolution of the Ministry of Health of the Republic of Belarus No. 149 dated 27 September 2012 "On approval of Sanitary standards and rules "Requirements to use, conditions of transportation and storage of pesticides (means of plant protection), agrochemicals and mineral fertilizers", and of Hygiene standard "Hygiene standards of the content of active substances of pesticides (means of plant protection) in environment, food raw material and foodstuffs"

Resolution of the Ministry of Health of the Republic of Belarus No. 120 dated 30 December 2014 "On approval of Sanitary standards and rules "Requirements of organizations involved in construction activities and organizations producing construction materials, devices and blocks" and amendments to the Resolution of the Chief State Sanitary Officer of the Republic of Belarus No. 53 dated 31 December 1998 and termination of validity of the Sanitary standards and rules No. 12-02-92 "Sanitary rules for enterprises of construction materials industry", Sanitary standards and rules No. 11-07-94 "Sanitary rules on design and equipment of sanitary rooms for workers of construction and mechanical organizations" and the Resolution of the Chief State Sanitary Officer of the Republic of Belarus No. 157 dated 31 December 2002"

Resolution of the Ministry of Health of the Republic of Belarus No. 238 dated 30 December 2008 "On approval of the Sanitary standards, rules and hygiene standards "Hygiene requirements for the maintenance and operation of water bodies by using them for recreational purposes""

Resolution of the Ministry of Health of the Republic of Belarus No. 59 dated 29 June 2007 "On the approval of Sanitary rules and standards "Hygiene requirements of packaged drinking water""

Resolution of the Ministry of Health of the Republic of Belarus No. 199 dated 18 December 2012 "On approval of the Hygiene standard "Evaluation criteria of the degree of risk of adverse health effects on the person from acoustic pressure in human settlements""

Resolution of the Ministry of Health of the Republic of Belarus No. 81 dated 22 November 2002 "On approval of the Instruction on the rules and methods of deactivation of waste pharmaceuticals, medical devices and medical equipment"

Resolution of the Ministry of Health of the Republic of Belarus No. 39 dated 31 March 2010 "On approval of Sanitary norms, rules and hygienic standards "Hygienic requirements to design and operation of nuclear power stations"

Resolution of the Ministry of Health of the Republic of Belarus No. 105 dated 17 July 2012 "On social-hygienic monitoring"

Order of the Ministry of Health of the Republic of Belarus No. 570 dated 31 May 2010 "On approval of the forms of documentation of the State register of persons who suffered from exposure to radiation as a result of the Chernobyl NPP accident and other radiation accidents and the classification system for citizens who suffered from exposure to radiation as a result of the Chernobyl NPP accident and other radiation accidents, as well as termination of validity of the Order of the Ministry of Health of the Republic of Belarus No. 10 dated 25 January 1993"

Resolution of the Chief State Sanitary Officer of the Republic of Belarus No. 46 dated 19 October 1999 "On the entry into force of Sanitary rules and standards "2.1.4. Drinking water and water supply of human settlements. Drinking water. Hygienic requirements of quality of water of the centralized systems of drinking water supply. Quality control. Sanitary rules and standards Sanpin 10-124 RB 99""

Resolution of the Chief State Sanitary Officer No. 152 "On approval of the hygienic standard 2.6.1.8-10-2004 "Republican allowable concentration of cesium-137 in medicinal and technical row material (RDU/LTC - 2004)""

Resolution of the Chief State Sanitary Officer of the Republic of Belarus No. 1 dated 6 January 1999 "On the approval of Sanitary rules and standards "2.1.4. Drinking water and water supply in human settlements. Zones of sanitary protection of sources of water supply and water supply systems for household needs. Sanitary rules and standards Sanpin-10-113 RB 99""

Resolution of the Chief State Sanitary Officer of the Republic of Belarus No. 198 dated 28 November 2005 "On the approval of Sanitary rules and standards "2.1.2.12-33-2005 "Hygiene requirements for the protection of surface water from pollution""

Resolution of the Chief State Sanitary Officer of the Republic of Belarus No. 45 dated 7 April 2005 "On approval of Sanitary rules for radioactive waste management (SPORO-2005) 2.6.6.11-7-2005"

Instruction of the Chief State Sanitary Officer of the Republic of Belarus No. 11-8-1-2003 dated 7 March 2003 "The organization of work of organizations carrying out the state sanitary supervision on minimization of consequences of the Chernobyl NPP accident"

Resolution of the Chief State Sanitary Officer of the Republic of Belarus No. 147 dated 20 October 2005 "On approval of Sanitary rules and norms 2.1.7.14-20-2005 "Medical waste management rules""

Resolution of the Ministry of Housing and Utilities of the Republic of Belarus No. 21 dated 30 November 2001 "On approval of the list of municipal wastes"

Resolution of the National Statistical Committee of the Republic of Belarus No. 274 dated 29 September 2011 "On approval of the State Statistical Reporting Form 1-mineral resources (Ministry of Environment) "Report on the status and changes in stocks of solid commercial minerals" and instructions for its completion"

Resolution of the National Statistical Committee of the Republic of Belarus No. 175 dated 11 November 2011 "On approval of the State Statistical Reporting Form 2-f (gp) "Report on the implementation progress of the State Programme" and instructions for its completion" (ceased to be in force with the passing of Resolution of the National Statistical Committee of the Republic of Belarus No. 67/1 dated 5 July 2013)

Resolution of the National Statistical Committee of the Republic of Belarus No. 152 dated 1 October 2012 "On approval of the State Statistical Reporting Form 1-water (Ministry of Environment) "Report on the use of water" and instructions for its completion" (ceased to be in force with the passing of Resolution of the National Statistical Committee of the Republic of Belarus No. 209 dated 19 September 2013)

Resolution of the National Statistical Committee of the Republic of Belarus No. 277 dated 29 September 2011 "On approval of the State Statistical Reporting Form 1-waste (Ministry of Environment) "Report on industrial waste management" and instructions for its completion" (ceased to be in force with the passing of Resolution of the National Statistical Committee of the Republic of Belarus No. 208 dated 19 September 2013)

Resolution of the National Statistical Committee of the Republic of Belarus No. 67/1 dated 5 July 2013 "On approval of the State Statistical Reporting Form 1-f (gp) "Report on the implementation progress of the State Programme" and instructions for its completion"

Resolution of the National Statistical Committee of the Republic of Belarus No. 209 dated 19 September 2013 "On approval of the State Statistical Reporting Form 1-water (Ministry of Environment) "Report on the use of water" and instructions for its completion"

Resolution of the National Statistical Committee of the Republic of Belarus No. 208 dated 19 September 2013 "On approval of the State Statistical Reporting Form 1-waste (Ministry of Environment) "Report on industrial waste management" and instructions for its completion"

Resolution of the National Statistical Committee of the Republic of Belarus No. 81 dated 4 July 2012 "On approval of the State Statistical Reporting Form 1-env (air) "Report on air emissions of pollutants and carbon dioxide from stationary sources" and instructions for its completion"

Regulations of the State Committee for Standardization of the Republic of Belarus No. 65 dated 31 August 2011 "On approval of the Instruction on the organization of the state expertise of urban planning projects, feasibility studies for construction investments, architectural (preliminary) and construction (detailed) designs, assigned work stages, construction phases, start-up complexes and cost estimates (cost estimation documents)"

Resolution of the State Property Committee of the Republic of Belarus No. 68 dated 22 December 2009 "On approval of the Instruction on the organization of land monitoring"

Order of the Ministry of Education of the Republic of Belarus No. 807 dated 30 December 2006 "On establishment of the Coordination Council on Education for Sustainable Development at the Ministry of Education of the Republic of Belarus"

Rules for harvesting secondary forest resources and secondary forest use approved by the Resolution of the Ministry of Forestry of the Republic of Belarus No. 4 dated 20 March 2011 (as amended by Resolutions of the Ministry of Forestry No. 4 dated 14 February 2006, No. 26 dated 21 August 2006, No. 32 dated 6 December 2006, No. 2 dated 7 February 2008, No. 15 dated 23 April 2009, and No. 38 dated 29 December 2010)

Instruction on the flora monitoring procedure, approved by Resolution of the Presidium of the National Academy of Sciences of Belarus No. 85 dated 15 December 2006

Regulations on the Information and Analysis Centre for Flora Monitoring of the National Environmental Monitoring System in the Republic of Belarus, approved by Resolution of the Presidium of the National Academy of Sciences of Belarus No. 390 dated 7 July 2004

Instruction on the flora monitoring procedure, which is part of the National Environmental Monitoring System in the Republic of Belarus, approved by Resolution of the Presidium of the National Academy of Sciences of Belarus No. 52 dated 12 October 2012

Resolution of the Ministry of Transport and Communications of the Republic of Belarus No. 32 dated 10 September 2014 "On amendment to the Resolution of the Ministry of Transport and Communications of the Republic of Belarus No. 21 dated 17 June 2013"

Strategies and programmes

Decree of the President of the Republic of Belarus No. 19 dated 12 January 2007 "On some issues of state urban development policy"

Decree of the President of the Republic of Belarus No. 514 dated 30 September 2010 "On the State Programme for the Development of the Resort Area of the Narochansky Region for 2011–2015"

Decree of the President of the Republic of Belarus No.153 dated 30 March 2012 "On amendments to the Decree of the President of the Republic of Belarus No. 271 dated 27 June 2011"

Decree of the President of the Republic of Belarus No. 575 dated 9 November 2010 "On approval of the Concept of National Security of the Republic of Belarus"

Decree of the President of the Republic of Belarus No. 136 dated 11 April 2011 "On approval of the Programme of Socioeconomic Development of the Republic of Belarus for 2011–2015"

Decree of the President of the Republic of Belarus No. 146 dated 6 March 2008 "On approval of the State Programme for Development of the System of Specially Protected Natural Areas for 2008–2014"

Decree of the President of the Republic of Belarus No. 367 dated 24 July 2014 "On approval of the State Programme for Development of the System of Specially Protected Natural Areas for 2015–2019"

Decree of the President of the Republic of Belarus No. 433 dated 17 September 2007 "On approval of the Concept of Energy Security of the Republic of Belarus"

Decree of the President of the Republic of Belarus No. 244 dated 13 June 2011 "On approval of the State Programme for Support and Development of the National Environmental Monitoring System in the Republic of Belarus for 2011–2015"

Decree of the President of the Republic of Belarus No. 150 dated 25 March 2005 "On the State Programme on Revival and Development of Rural Settlements for 2005–2010"

Decree of the President of the Republic of Belarus No. 342 dated 1 August 2011 "On the State Programme on Sustainable Rural Development for 2011–2015"

Decree of the President of the Republic of Belarus No. 385 dated 30 August 2011 "On approval of the Main Directions of the National Urban Development Policy for 2011–2015"

Decree of the President of the Republic of Belarus No. 265 dated 7 June 2007 "On approval of the State Comprehensive Programme for the Development of Regions, and Small and Medium-sized Settlements for 2007–2010"

Decree of the President of the Republic of Belarus No. 35 dated 24 January 2011 "On the Republican Programme for Furnishing Agro-industrial Complex Organizations with Modern Machinery and Equipment, Construction, Repair and Modernization of Production Facilities of these Organizations for 2011–2015"

Decree of the President of the Republic of Belarus No. 161 dated 29 March 2010 "On the State Programme of Socioeconomic Development and Integrated Management of Natural Resources of the Pripyat Polessye region for 2010–2015"

Decree of the President of the Republic of Belarus No. 327 dated 22 June 2009 "On the State Programme of Collection (Procurement) and Processing of Recyclables in the Republic of Belarus for 2009–2015"

Decree of the President of the Republic of Belarus No. 302 dated 5 May 2006 "On approval of the National Action Plan on Rational Use of Natural Resources and Environmental Protection for 2006–2010"

Decree of the President of the Republic of Belarus No. 271 dated 12 June 2007 "On Approval of the National Plan of Implementation of the Republic of Belarus under the Stockholm Convention on Persistent Organic Pollutants in 2007–2010 and for the period until 2028" (no longer valid due to adoption of the Decree of the President of the Republic of Belarus No. 271 dated 27 June 2011

Decree of the President of the Republic of Belarus No. 271 dated 27 June 2011 "On Approval of the National Plan of Implementation of the Republic of Belarus under the Stockholm Convention on Persistent Organic Pollutants in 2011–2015"

Decree of the President of the Republic of Belarus No. 165 dated 23 April 2003 "On approval of the master-plan for the city of Minsk with nearby territories and some issues of its implementation"

Resolution of the Council of Ministers of the Republic of Belarus No. 675 dated 22 June 2005 "On the Programme for the Development of Passenger Transportation by Motor Vehicles in 2005–2010"

Resolution of the Council of Ministers of the Republic of Belarus No. 1172 dated 11 September 2006 "On the Programme on Transport Development for Forest Fund and Construction of Forest Roads in the Forests of the Republic of Belarus until 2010"

Resolution of the Council of Ministers of the Republic of Belarus No. 1886 dated 24 December 2010 "On the State Programme for Motor Transport Development in 2011–2015"

Resolution of the Council of Ministers of the Republic of Belarus No. 460 dated 2 June 2015 "On approval of the Strategy for the Management of Radioactive Waste from the Belarusian Nuclear Power Plant"

Resolution of the Council of Ministers of the Republic of Belarus No. 1895 dated 24 December 2010 "On approval of the Programme for Development of Inland Water and Maritime Transport in the Republic of Belarus for 2011–2015"

Resolution of the Council of Ministers of the Republic of Belarus No. 1707 dated 19 November 2010 "On some issues on conservation and sustainable use of biological diversity"

Resolution of the Council of Ministers of the Republic of Belarus No. 743 dated 3 September 2015 "On the National Action Plan for Conservation and Sustainable Use of Biological Diversity for the period 2016–2020 and amendments to the Resolution of the Council of Ministers of the Republic of Belarus No. 1707 dated 19 November 2010"

Resolution of the Council of Ministers of the Republic of Belarus No. 535 dated 19 April 2006 "On approval of the Republican Programme for Development of Fisheries for 2006–2010"

Resolution of the Council of Ministers of the Republic of Belarus No. 1453 dated 7 October 2010 "On approval of the State Programme on Development of Fisheries Management for 2011–2015"

Resolution of the Council of Ministers of the Republic of Belarus No. 1029 dated 31 October 2014 "On the Concept of development of the hunting sector in the Republic of Belarus"

Resolution of the Council of Ministers of the Republic of Belarus No. 159 dated 17 February 2012 "On amendments to the State Programme on Development of Fisheries Management for 2011–2015"

Resolution of the Council of Ministers of the Republic of Belarus No. 1262 dated 31 August 2010 "On approval of the State Programme of Conservation and Use of Reclaimed Lands for 2011–2015"

Resolution of the Council of Ministers of the Republic of Belarus No. 686 dated 28 May 2009 "On the State Programme to Supply Cities of the Republic with Land-based Urban Electric Transport for 2009–2013"

Resolution of the Council of Ministers of the Republic of Belarus No. 757 dated 14 June 2006 "On approval of the Concept of Road Safety in the Republic of Belarus"

Resolution of the Council of Ministers of the Republic of Belarus No. 912 dated 21 June 2001 "On Approval of the National Action Plan on Rational Use of Natural Resources and Environmental Protection for 2001–2005"

Action Plan on Conservation and Rational Use of European Bison for 2010–2014, approved by the Deputy Prime Minister of the Republic of Belarus on 28 November 2009

Action Plan on Conservation and Rational Use of European Bison for 2015–2019, approved by the Deputy Prime Minister of the Republic of Belarus on 12 June 2014

Resolution of the Council of Ministers of the Republic of Belarus No. 1475 dated 4 November 2006 "On approval of the Main Areas of Socioeconomic Development of the Republic of Belarus for 2006–2015"

Resolution of the Council of Ministers of the Republic of Belarus No. 942 dated 11 July 2011 "On approval of activities on implementation of the Programme of Socioeconomic Development of the Republic of Belarus for 2011–2015"

Resolution of the Council of Ministers of the Republic of Belarus No. 11 dated 8 January 2010 "On the State Programme "Tuberculosis" for 2010–2014"

Resolution of the Council of Ministers of the Republic of Belarus No. 1922 dated 31 December 2010 "On approval of the State Programme on Overcoming the Consequences of the Chernobyl NPP Disaster for the period 2011–2015 and until 2020"

Resolution of the Council of Ministers of the Republic of Belarus No. 1920 dated 29 December 2007 "On approval of the National Strategy for Development and Management of the System of Nature Conservation Areas until 1 January 2015"

Resolution of the Council of Ministers No. 649 dated 2 July 2014 "On development of the system of specially protected natural areas"

Resolution of the Council of Ministers of the Republic of Belarus No. 431 dated 4 April 2011 "On approval of the Programme of Development of Mineral Deposits and Development of Mineral Resource Base of the Republic of Belarus for 2011–2015 and for the period until 2020"

Resolution of the Council of Ministers of the Republic of Belarus No. 177 dated 10 February 2009 "On approval of the Strategy on Implementation of the Convention on Wetlands of International Importance, especially as Waterfowl Habitat"

Resolution of the Council of Ministers of the Republic of Belarus No. 268 dated 4 March 2011 "On the State Programme "Cardiology" for 2011–2015"

Resolution of the Council of Ministers of the Republic of Belarus No. 141 dated 1 February 2010 "On approval of the State Integrated Programme on Cancer Prevention, Diagnosis and Treatment for 2010–2014"

Resolution of the Council of Ministers of the Republic of Belarus No. 269 dated 4 March 2011 "On approval of the State Programme of HIV-Infection Prevention for 2010–2015"

Resolution of the Council of Ministers of the Republic of Belarus No. 411 dated 4 May 2012 "On approval of the National Programme of International Technical Cooperation for 2012–2016"

Resolution of the Council of Ministers of the Republic of Belarus No. 1760 dated 29 December 2006 "On approval of the Forestry Development Programme of the Republic of Belarus for 2007–2011" (ceased to be in force with the passing of Resolution of the Council of Ministers of the Republic of Belarus No. 1626 dated 3 November 2010)

Resolution of the Council of Ministers of the Republic of Belarus No. 1626 dated 3 November 2010 "On approval of the Forestry Development Programme of the Republic of Belarus for 2011–2015"

Resolution of the Council of Ministers of the Republic of Belarus No. 1046 dated 12 July 2010 "On the Programme of Construction of Forestry Roads in the Forests of the Republic of Belarus in 2011–2015"

Resolution of the Council of Ministers of the Republic of Belarus No. 1420 dated 1 October, 2010 "On approval of the Technological Development Strategy of the Republic of Belarus for the period until 2015"

Resolution of the Council of Ministers of the Republic of Belarus No. 1181 dated 9 August 2010 "On approval of the Strategy for Development of the Transit Potential of the Republic of Belarus for 2011–2015"

Resolution of the Council of Ministers of the Republic of Belarus No. 1180 dated 9 August 2010 "On approval of the Strategy for Development of the Energy Potential of the Republic of Belarus"

Resolution of the Council of Ministers of the Republic of Belarus No. 980 dated 25 July 2009 "On approval of the National Strategy for Implementation of Integrated Environmental Permitting for 2009–2020"

Resolution of the Council of Ministers of the Republic of Belarus No. 194 dated 29 February 2012 "On approval of the State Programme for Development of the Belarusian Energy System for the period until 2016"

Resolution of the Council of Ministers of the Republic of Belarus No. 706 dated 1 June 2009 "On approval of an Integrated programme for design, construction and reconstruction of energy efficient residential buildings in the Republic of Belarus for 2009–2010 and until 2020"

Resolution of the Council of Ministers of the Republic of Belarus No. 267 dated 5 April 2013 "On the Concept of the State Housing Policy of the Republic of Belarus until 2016"

Resolution of the Council of Ministers of the Republic of Belarus No. 97 dated 8 February 2013 "On the Programme for Development of the Housing and Utility Sector of the Republic of Belarus until 2015"

Resolution of the Council of Ministers of the Republic of Belarus No. 373 dated 24 March 2011 "On approval of the State Programme for Development of Tourism in the Republic of Belarus for 2011–2015"

Resolution of the Council of Ministers of the Republic of Belarus No. 927 dated 24 August 2005 "On approval of the National Tourism Development Programme in the Republic of Belarus for 2006–2010" (ceased to be in force with the adoption of the Resolution of the Council of Ministers of the Republic of Belarus No. 1796 dated 21 December 2007)

Resolution of the Council of Ministers of the Republic of Belarus No. 1796 dated 21 December 2007 "On approval of the National Tourism Development Programme in the Republic of Belarus for 2008–2010"

Resolution of the Council of Ministers of the Republic of Belarus No. 17 dated 6 January 2012 "On approval of the State Programme "Castles of Belarus" for 2012–2018"

Resolution of the Council of Ministers of the Republic of Belarus No. 622 dated 5 July 2012 "On approval of the Programme for Development of the Industrial Complex of the Republic of Belarus for the period until 2020"

Resolution of the Council of Ministers of the Republic of Belarus No. 94 dated 23 January 2008 "On approval of the State Programme "Peat" for 2008–2010 and for the period until 2020"

Resolution of the Council of Ministers of the Republic of Belarus No. 1117 dated 4 August 2008 "On approval of the National Programme of Measures to Mitigate the Effects of Climate Change for 2008–2012"

Resolution of the Council of Ministers of the Republic of Belarus No. 510 dated 21 June 2013 "On approval of the State Programme of Measures to Mitigate the Effects of Climate Change for 2013– 2020"

Resolution of the Council of Ministers of the Republic of Belarus No. 1882 dated 24 December 2010 "On approval of the National Energy Saving Programme for 2011–2015"

Resolution of the Council of Ministers of the Republic of Belarus No. 1851 dated 20 December 2010 "On approval of the State Programme for Development of Railway Transport in the Republic of Belarus for 2011–2015"

Resolution of the Council of Ministers of the Republic of Belarus No. 51 dated 27 January 2015 "On approval of the Programme for Efficient Utilization of the Capacities of Cement Industry Organizations for 2015–2020"

Resolution of the Council of Ministers of the Republic of Belarus No. 1296 dated 31 December 2014 "On approval of the State Programme for Development and Maintenance of Motor Roads in the Republic of Belarus for 2015–2019"

Resolution of the Council of Ministers of the Republic of Belarus No. 296 from 13 April 2015 "On the State program for development of hunting for 2016-2020"

Resolution of the Council of Ministers of the Republic of Belarus No. 586 dated 10 May 2011 "On approval of the National Programme for Development of Local and Renewable Energy Sources for 2011–2015 and revocation of Resolution of the Council of Ministers of the Republic of Belarus No. 1593 dated 7 December 2009"

Resolution of the Council of Ministers of the Republic of Belarus No. 361 dated 29 April 2015 "On some issues of combating land degradation (including soils)" (approved the Strategy on Implementation of the United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa)

Resolution of the Council of Ministers of the Republic of Belarus No. 1885 dated 9 June 2010 "On approval of the Programme for Construction of Energy Generation Facilities Fuelled by Biogas for 2010–2015"

Resolution of the Council of Ministers of the Republic of Belarus No. 1076 dated 19 July 2010 "On approval of the State Programme for Construction of Generation Facilities Fuelled by Local Fuels in 2010–2015"

Resolution of the Council of Ministers of the Republic of Belarus No. 1838 dated 17 December 2010 "On approval of the State Programme for Construction of Hydroelectric Power Plants in the Republic of Belarus in 2011–2015"

Resolution of the Council of Ministers of the Republic of Belarus No. 669 dated 26 May 2011 "On approval of the State Programme for Innovation Development in the Republic of Belarus for 2011–2015"

Resolution of the Council of Ministers of the Republic of Belarus No. 1395 dated 28 September 2010 "On the Programme for Development of Poultry Farming in the Republic of Belarus in 2011–2015"

Resolution of the Council of Ministers of the Republic of Belarus No. 1101 dated 16 August 2011 "On approval of the National Plan of Action to Ensure Gender Equality in the Republic of Belarus for 2011–2015"

Resolution of the Council of Ministers of the Republic of Belarus No. 1234 dated 15 September 2011 "On the State Programme on Water Supply and Sanitation "Clean Water" for 2011–2015"

Resolution of the Council of Ministers of the Republic of Belarus No. 1116 dated 28 August 2009 "On approval of the State Programme "Scientific support to development of nuclear energy in the Republic of Belarus for the period 2009–2010 and up to 2020""

National Strategy for Sustainable Socioeconomic Development of the Republic of Belarus until 2020, approved by the Protocol of the National Commission on Sustainable Development of the Republic of Belarus No. 11/15PR dated 6 May 2004

Order of the Ministry of Housing and Public Utilities No.78 dated 7 July 2014 "On approval of the Concept for Municipal Waste and Recyclables Management for the years 2014–2020"

Environmental Protection Strategy of the Republic of Belarus for the period until 2025, approved by Decision of the Board of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 8-P dated 28 January 2011

Strategy on Implementation of the United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa, approved by Decision of the Board of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 8-P dated 28 January 2011

Water Strategy of the Republic of Belarus for the period until 2020, approved by Decision of the Board of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 72-P dated 11 August 2011

Strategy for Development of Research, Scientific and Technical and Innovation Activities in the Field of Environmental Protection and Sustainable use of Natural Resources in 2014–2015 and for the period until 2025, approved by Decision of the Board of the Ministry of Natural Resources and Environmental Protection of the Republic of Belarus No. 112-P dated 26 November 2014

Strategic plan of implementation in the Republic of Belarus of the Cartagena Protocol on Biosafety to the Convention on Biological Diversity, approved by the Minister of Natural Resources and Environmental Protection on 26 December 2012

Strategy for Reduction of Adverse Impacts of Transport on Atmospheric Air of the Republic of Belarus for the period until 2020, approved by the Deputy Prime Minister of the Republic of Belarus No. 06/137-207, 214-258 dated 5 November 2013

Strategy of the Republic of Belarus on the Phase-out of Hydrochlorofluorocarbons (HCFCs) for the period up to 2020, approved by the Deputy Prime Minister of the Republic of Belarus No.06/214-62 dated 13 March 2013

Resolution of the Board of the Ministry of Forestry of the Republic of Belarus dated 28 April 2010 "On approval of the Programme for Improving the Efficiency of Utilization of Fuelwood Feedstock in Woodworking Industries (Shops) of the Ministry of Forestry of the Republic of Belarus for 2011–2015"

Programme for Development of Forest Nurseries in the Organizations of the Ministry of Forestry of the Republic of Belarus for 2010–2015, approved by the Minister of Forestry on 14 May 2010

Resolution of the Ministry of Education of the Republic of Belarus No. 16 dated 24 May 2011 "On approval of the Programme of Continuous Upbringing of Children and Youth in the Republic of Belarus for the period 2011–2015"

Resolution of the Ministry of Education of the Republic of Belarus No. 125 dated 14 December 2006 "On approval of the Concept of Continuous Upbringing of Children and Youth in the Republic of Belarus"

National Action Plan on Rational Use of Natural Resources and Environmental Protection of the Ministry of Industry of the Republic of Belarus for 2006–2010, Minsk, 2006

Programme of Development of Technical Regulation, Standardization and Conformity Assessment for Energy Saving for the period 2011–2015, approved by the Chair of the State Committee on Standardization of the Republic of Belarus on 31 October 2014

Concept of Establishing the Cycling System in Minsk for 2012–2015, approved by Decision of the Minsk City Council of Deputies No. 191 dated 23 December 2011

Strategy of Innovative Development of the Transport Sector of the Republic of Belarus until 2030, approved by the Ministry of Transport and Communications No. 57-C dated 28 February 2015

Concept of Traffic Safety in Minsk City "Kind Road" for 2012–2015, approved by the Decision of the Minsk City Council of Deputies No. 128 dated 10 June 2011

Concept of Development of Satellite Towns of the Minsk City in accordance with Specifics of their Socio-Economic Development, agreed by the Decision of the Minsk City Council of Deputies No. 118 dated 20 March 2015 and approved by the Decision of the Minsk Oblast Council of Deputies No. 78 dated 20 March 2015

Strategy for Integrated Municipal Solid Waste Management in Minsk Oblast for 2015–2029, approved by the Decision of the Minsk Oblast Council of Deputies No. 86 dated 23 June 2015

Technical Codes of Practice

TCP 126-2008 "Food products. Rules for labelling products with label "Natural product". Basic conditions"

TCP 17.06-06-2012 "Environmental protection and nature use. Hydrosphere. Rules for determining forecasted quantitative and qualitative characteristics of the water regime during the building of river dams and reservoirs"

TCP 17.06-08-2012 "Environmental protection and nature use. Hydrosphere. Procedure for setting emission limit values for chemicals and other substances in wastewater"

TCP 17.02-08-2012 "Environmental protection and nature use. Rules for organization of environmental impact assessment (EIA) and preparation of the report"

TCP 17.13-08-2013 "Environmental protection and nature use. Analytical control and monitoring. Rules for determining chemical (hydrochemical) status of river ecosystems"

TCP 17.13-09-2013 "Environmental protection and nature use. Analytical control and monitoring. Rules for determining chemical (hydrochemical) status of lake ecosystems"

TCP 17.13-10-2013 "Environmental protection and nature use. Analytical control and monitoring. Rules for determining ecological (hydrobiological) status of river ecosystems"

TCP 17.13-11-2013 "Environmental protection and nature use. Analytical control and monitoring. Rules for determining ecological (hydrobiological) status of lake ecosystems"

TCP 17.13-14-2014 "Environmental protection and nature use. Analytical control and monitoring. Basic principles"

TCP 45-3.02-191-2014 "Buildings and premises of the recreational and touristic organizations. Designing rules"

TCP 026-2006 (02080) "Sustainable Forest Management and Use. Sanitary Rules in the Forests of the Republic of Belarus"

TCP 047-2009 (02080) "Sustainable Forest Management and Use. Instructions on Reforestation and Afforestation in the Republic of Belarus"

TCP 143-2008 (02080) "Rules for Forest Fellings in the Republic of Belarus"

TCP 228-2009 (02080) "Rules for Protection of Forest from Pests and Diseases"

TCP 17.13-12-2013 "Environmental protection and nature use. Analytical control and monitoring. Requirements for laboratories performing analytical control and monitoring of surface waters and wastewater"

TCP 17.13-02-2008 "Environmental protection and nature use. Environmental monitoring. Procedure of carrying out observations on chemical pollution of lands"

TCP 45-3.01-286-2014 "Town Planning. Town Planning Project of General Planning. General Plan of Settlements. The Scope and Development Procedure"

TCP 45-3.01-117-2008 "Town Planning. Individual Housing Areas. Design and Construction Norms"

TCP 45-3.01-116-2008 "Urban Development. Settlements. Design and Construction Norms"

TCP 45-4.02-204-2010 "Heat Supply Schemes of Settlements. Design Rules"

TCP 45-2.04-196-2010 "Thermal Protection of Buildings. Heat and Energy Characteristics. Rules and Definitions"

TCP 480-2013 "Environmental impact assessment for design and repair of automobile roads"

TCP 17.12-02-2008 "Environmental protection and nature use. Territories. Procedure and rules for rehabilitation of developed peat lands and other disturbed wetlands and prevention of disturbance of hydrological regime of natural ecosystems during land reclamation"

TCP 17.07-01-2014 "Environmental protection and nature use. Wildlife. Rules for protection of wild animals which belong to the species included in the Red Book of the Republic of Belarus, and their habitats"

TCP 17.05-01-2014 "Environmental protection and nature use. Plants. Rules for protection of wild plants which belong to the species included in the Red Book of the Republic of Belarus, and their habitats"

TCP 17.02-10-2013 "Environmental protection and nature use. Procedure for valuation of ecosystem services and determination of economic value of biological diversity"

TCP 17.08-03-2006 "Environmental protection and nature use. Atmosphere. Emissions of pollutants into the atmospheric air. Rules for calculation of emissions by motor vehicles in human settlements"

TCP 17.02-12-2014 (02120) "Environmental protection and nature use. Procedures for inventory on environmental protection and for completion of accounting forms on environmental protection"

Industry-specific Construction Code 3-84/Gosgrazhdanstroy "The Scope, Development Procedures, Coordination, and Approval of Construction Documentation for the Green Belts of Cities"

State Standards

STB 1848-2009 "Road Transport. Ecological Classes"

STB 2169-2011 "Motor vehicles equipped with compression-ignition engines. Opacity of exhaust fumes. Limits and methods of measurement"

STB 2170-2011 "Motor vehicles equipped with positive-ignition engines. Emissions of pollutants in exhaust gases. Limits and methods of measurement"

STB 17.13.04-01-2012/EN 14614:2004 "Environmental protection and nature use. Analytical control and monitoring. Guidance to assess hydromorphological parameters of rivers"

STB 17.13.04-02-2013/EN 15843:2010 "Environmental protection and nature use. Analytical control and monitoring. Guidance to determine the degree of alteration of hydromorphological parameters of rivers"

STB 1708-2006 "Sustainable forest management and forest use. Basic provisions"

STB 1625-2006 "Sustainable forest management and forest use. Secondary forest uses. Technological requirements"

STB 1627-2006 "Sustainable forest management and forest use. Requirements for forest roads"

STB 1715-2007 "Sustainable forest management and forest use. Requirements for organization and management of forestry in forests used for recreation"

GOST 28681.4-95 "Tourist and excursion service. Classification of hotels"

GOST 17.6.3.01-78 "Nature Protection. Flora. Protection and Rational Use of the Forest of the Green Zones. General Requirements"

GOST 31077-2002 "Fuel for internal combustion engines. Unleaded gasoline. Specifications"

Annex IV

RESULTS OF THE FOR FUTURE INLAND TRANSPORT SYSTEMS (ForFITS) TOOL

VI.1 Introduction

Methodology

This annex addresses projected well to wheel (*WTW*[11]) CO_2 emissions stemming from the transport sector in the country using the for Future Inland Transport Systems (ForFITS) tool.

The current impact of the transport sector of Belarus on the overall CO_2 emissions is quantified and future emissions are projected based on a reference scenario where no major shifts in the development of the transport sector take place.

Data were collected from official national sources. In some cases, data were adjusted when the scope of data provided did not match the required input definitions or if data were not internally consistent (box VI.1).

Projections of transport sector CO_2 emissions up to 2030 are provided under a *reference* scenario and four additional scenarios: *high GDP growth, high fertility, fuel price increase,* and *nuclear/increased electrified rail.*

Description of model

ForFITS can be used for estimation and assessment of CO_2 emissions in transport and evaluation of transport policies for the mitigation of CO_2 emissions.

ForFITS evaluates transport activity (expressed in terms of passenger-kilometres[12], ton-kilometres[13] and vehicle-kilometres), related vehicle stocks, energy use and CO_2 emissions in a range of possible policy contexts.

ForFITS is a sectoral model (Figure VI.1), covering both passenger and freight transport services on all transport modes (including aviation and maritime transport), but mainly targeting inland transport (especially road, rail, and inland waterways). Pipelines are also reflected in the model. Each mode is further characterized in sub-modes (when relevant) and vehicle classes. Vehicle classes are further split to take into account of different powertrain technologies and age classes. Finally, powertrains are coupled with fuel blends that are consistent with the technology requirements.

ForFITS does not provide information on the evaluation of the overall effects of changes in the transport system on the economic growth. The ForFITS tool has been proven through a series of pilot studies[14] to be a useful tool for projecting future emissions under different transport policy scenarios. For the analysis of Belarus, projections account for road vehicles, non-motorized transport, rail transport, and aircraft. Projections for vessels are excluded as insufficient data were available for analysis. Pipelines are also excluded as the focus of analysis was on scenarios related to general passenger and freight transport policies.

[11] Well to wheel (*WTW*) refers to CO_2 emissions from vehicle operation as well as emissions from the production of the fuel used for vehicle operation.
[12] Passenger-kilometre = unit of passenger carriage equal to the transportation of one passenger for one kilometre.
[13] Ton-kilometre = unit of freight carriage equal to the transportation of one metric ton of freight for one kilometre.
[14] Pilot studies were performed in seven countries in 2013 - Chile, Ethiopia, France, Hungary, Montenegro, Thailand and Tunisia.

Box VI.1: General explanation of differences between ForFITS results and results from other methodologies

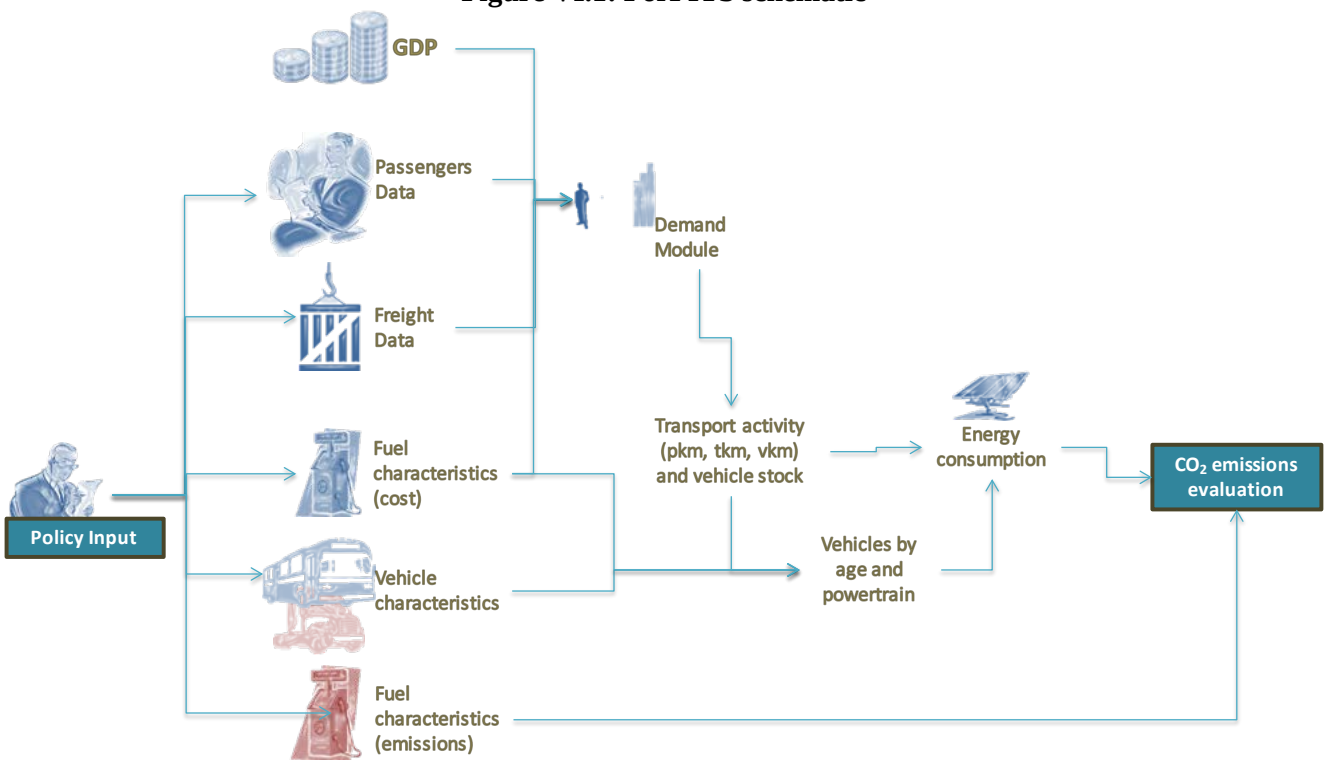
ForFITS is a model used to estimate current and future transport activity as well as energy use and CO_2 emissions from the transport sector. CO_2 emissions under ForFITS are calculated on a well-to-wheel (WTW) basis, that is, emissions from vehicle operation as well as emissions from the production of the fuel used for vehicle operation and the distribution of fuel.

All results in the model are calculated using a "bottom-up" methodology through the collection and estimation of data on the number of vehicles registered in a country by mode, and their average travel, average vehicle load and average fuel consumption, among other factors. Model input data are usually based on official national sources, and local or other expert knowledge where necessary to fill data gaps and ensure the cohesiveness of data used as inputs. As an example, official data on vehicle stock in some countries include vehicles that are registered but are no longer in use. In these cases, official data are often adjusted downward in order to better capture the true level of activity in a country's transport sector.

Differences with baseline official data as well as the estimation of gaps in official data can often result in differences in top-level official data on vehicle activity, such as passenger-km or ton-km. When comparing official data with ForFITS data, it is important to note the scope of each estimate. In some cases, ForFITS excludes vessels, aircraft and/or pipelines in transport activity calculations due to the lack of data or because of the purpose of the analysis. Conversely, official data from some countries exclude private vehicles in passenger-km calculations. Additional difficulties in comparing results can arise when official data on transport activity include travel within the country by vehicles registered in other countries or exclude international transportation by vehicles registered in the country.

Lastly, as methods of estimation and scopes of estimation differ in calculations performed by different entities, discrepancies between results on energy use and CO_2 emissions are also to be expected between ForFITS and other sources.

Figure VI.1: ForFITS schematic



VI.2 Baseline status

Breakdown of base year ForFITS inputs

Sources for road transport data include the Traffic Police of the Ministry of Internal Affairs and the National Statistical Committee. The primary sources for railway and aircraft transport data are Belarussian Railways and the State Aircraft Register, respectively. In all cases, data from these sources are adjusted.

Data were adjusted when the rate of new registrations was incongruous with vehicle stock. It is estimated in Belarus that approximately 20–30 per cent of road vehicles registered in the country may no longer be in use, these data were adjusted downward in many cases. Table VI.1 shows the breakdown of vehicle stock and

historical new registration statistics used in the analysis of Belarus. In the case of rail and freight aircraft, input data for historical fuel consumption of newly registered vehicles were unavailable and vehicle stock data were used.

The breakdown of powertrains in each vehicle type was also a required input for ForFITS and data for Belarus are shown in table VI.2. Data were adjusted for these parameters as well to align with data from pilot countries.

Baseline projections

Socio-economic data and data on fuel taxation were collected as shown in table VI.3. Population projections are based on peer review and trends found in the population of Belarus "About Countries" geographical guide (http://ostranah.ru/belarus/). The decline in population for Belarus is expected to continue with an overall decline in population of more than 7 per cent projected by 2030.

The source of 2012 GDP data was the ECE statistical database. GDP projections are based on annual growth of approximately 2 per cent through 2030 based on projections from the 2012 “The World in 2050: From the Top 30 to the Top 100” of Hongkong and Shanghai Banking Corporation. This level of growth would lead to a GDP increase of approximately 29 per cent between 2012 and 2030.

Fuel price and taxation data were derived after review of national laws on fuel taxation.

Table VI.1: Vehicle stock and new registration: 2002, 2007, 2012

	New vehicle registrations 2002		New vehicle registrations 2007		New vehicle registrations 2012		Vehicle stock 2012			
	New reg.	Avg fuel cons (lge/ 100 km)	New reg.	Avg fuel cons (lge/ 100km)	New reg.	Avg fuel cons (lge/ 100 km)	Active vehicles	Avg fuel cons (lge/ 100 km)	Avg travel /veh. (km/yr)	Avg load
Non-motorized transport										
Walking							8 518 046		490	1.0
Cycling							1 500 000		455	1.0
Two Wheelers										
Personal	16 756	4.3	16 756	4.3	16 756	4.1	277 222	4.3	1 134	1.0
Public	256	4.8	256	4.8	256	3.0	8 879	4.8	1 303	1.2
Passenger LDVs										
Personal	157 500	9.6	158 074	9.4	110 000	9.2	2 112 607	9.5	7 500	1.3
Public	5 773	11.1	12 452	10.9	15 858	10.7	86 220	11.3	9 622	2.4
Buses	1 421	29.3	3 250	28.6	2 526	27.4	44 883	28.4	55 238	17.4
Passenger Rail	38	690.0	38	690.0	25	690.0	552	690.0	116 258	105.3
Passenger Air	3	625.0	4	549.0	1	485.0	32	549.0	1 588 176	119.0
Freight LDVs	5 000	13.1	6 534	12.9	8 125	12.7	176 967	13.2	24 000	0.2
Freight Trucks										
Medium-duty	14 000	27.1	10 883	26.0	11 316	25.6	180 999	26.4	47 880	3.0
Heavy-duty	2 500	34.0	8 380	33.8	4 500	32.3	45 149	33.2	79 934	10.8
Freight Rail	30	1,147.0	30	1,147.0	30	1,147.0	654	1,147.0	76 994	633.7
Freight Air	1	1,517.0	8	1,517.0	3	1,517.0	36	1,517.0	1 588 176	35.0

Sources: Traffic Police of the Ministry of Internal Affairs, National Statistical Committee, Belarussian Railways and the State Aircraft Register, 2015.
Notes: LDV = light duty vehicle. lge = litres of gasoline equivalent. Non-motorized transport walking = estimate of number of persons walking.

Table VI.2: Powertrain shares for vehicle stock and new vehicle registrations: 2002, 2007, 2012

	Powertrain Group (% of each technology in a vehicle class)																			
	Gasoline	LPG	Diesel	Diesel-Electric Hybrid	Electric	Gasoline	LPG	Diesel	Diesel-Electric Hybrid	Electric	Gasoline	LPG	Diesel	Diesel-Electric Hybrid	Electric	Gasoline	LPG	Diesel	Diesel-Electric Hybrid	Electric
	Vehicle New Registrations -2002					**Vehicle New Registrations -2007**					**Vehicle New Registrations -2012**					**Vehicle Stock -2012**				
Passenger two wheelers																				
Personal	1.00					1.00					1.00					1.00				
Public	1.00					1.00					1.00					1.00				
Passenger LDVs																				
Personal	0.45		0.55			0.47		0.53			0.49		0.51			0.59		0.41		
Public	0.80		0.20			0.82		0.18			0.76		0.24			0.87		0.13		
Buses	0.01	0.03	0.96			0.01	0.04	0.95			0.01	0.05	0.94			0.01	0.01	0.98		
Passenger Rail			0.30		0.70			0.30		0.70			0.20		0.80			0.30		0.70
Freight LDVs	0.27	0.03	0.70			0.29	0.03	0.68			0.30	0.06	0.64			0.28	0.07	0.65		
Freight Trucks																				
Medium-Duty	0.00	0.01	0.99			0.00	0.02	0.98			0.00	0.04	0.96			0.00	0.03	0.97		
Heavy-Duty			1.00					1.00					1.00					1.00		
Freight Rail			0.43	0.48	0.09			0.43	0.48	0.09			0.43	0.48	0.09			0.43	0.48	0.09

Sources: Belarussian Railways, ECE Secretariat calculations.
Notes: LDV = Light duty vehicle. LPG = liquefied petroleum gas. No registrations for gasoline/electric hybrid vehicles.

Table VI.3: Socio-economic data and projections with fuel taxation data, 2012–2030

Value at base year & over time	2012	2015	2020	2025	2030	2035	2040
Population (thousand)	9 464	9 441	9 114	9 097	8 774	8 458	8 207
GDP (2012. constant PPP million)	127 075	124 050	136 961	149 006	163 709	180 748	200 541
Fuel price before taxation (US$/lge)							
Gasoline	0.54						
LPG	0.29						
Diesel	0.71						
Fuel taxation (as % of the fuel cost)							
Gasoline	54						
LPG	29						
Diesel	71						

Sources: National Statistical Committee, International Monetary Fund, ECE, legislation of Belarus.
Notes: LPG = liquefied petroleum gas. lge = litres of gasoline equivalent.

Figure VI.2 and figure VI.3 show the projected *WTW* CO_2 emissions from Belarus' transport sector by mode within passenger and freight transport, respectively. Projections are generated by the ForFITS tool based on transport-specific inputs given in the tables above as well as projections of socio-economic data as specified in table VI.3. This *reference* scenario also includes default data in ForFITS on the expected evolution of fuel consumption characteristics by powertrain in order to reflect future improvements in vehicle technology and their associated costs. The other characteristics defining the transport system in the base year (e.g. fuel taxation schemes, road pricing, passenger/freight transport system structure, fuel characteristics, powertrain technology shares, behavioural aspects) remain unchanged in projections.

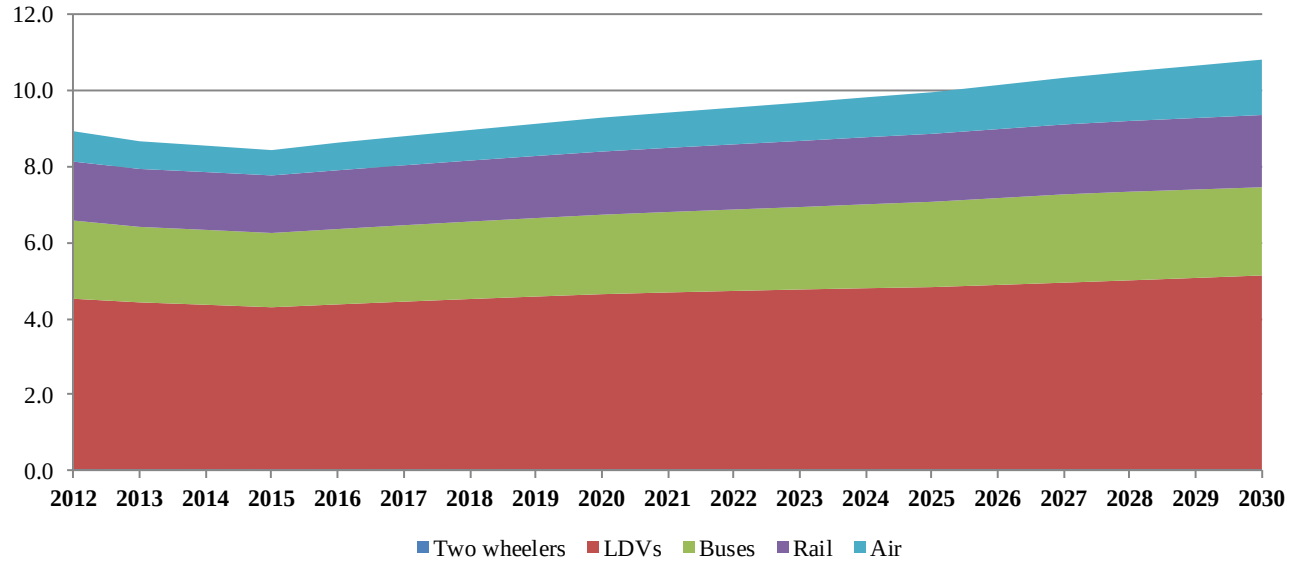
As a result of Belarus' projected population decline and GDP growth, the projected GDP per capita of the country is projected to increase by almost 40 per cent (from 15,600 to 21,600 in constant 2012 Purchasing Power Parity (PPP) units) between 2012 and 2030. The per capita GDP level over the time period analyzed is lower than levels historically coupled with a saturation of the personal vehicle ownership. This explains the projected increase of passenger transport activity and the higher contribution of personal vehicles over time despite the projected decrease in population. Freight activity increases proportionally to the growth of the economic output.

Energy use is projected to grow over time in line with projected transport activity. Fuel savings associated with the improving evolution of the powertrain technologies in terms of fuel consumption only partly offset the upward influence of growing transport activity.

The projected growth of *WTW* CO_2 emissions follows closely the trend of the energy demand increase, since the emission factors remain constant. Throughout the period analyzed, freight emissions are expected to be much higher than passenger emissions. Shares of various modes of passenger transport in total emissions under the *reference* scenario are projected to remain somewhat constant. Overall, passenger emissions are projected to increase by 21 per cent compared to 2012.

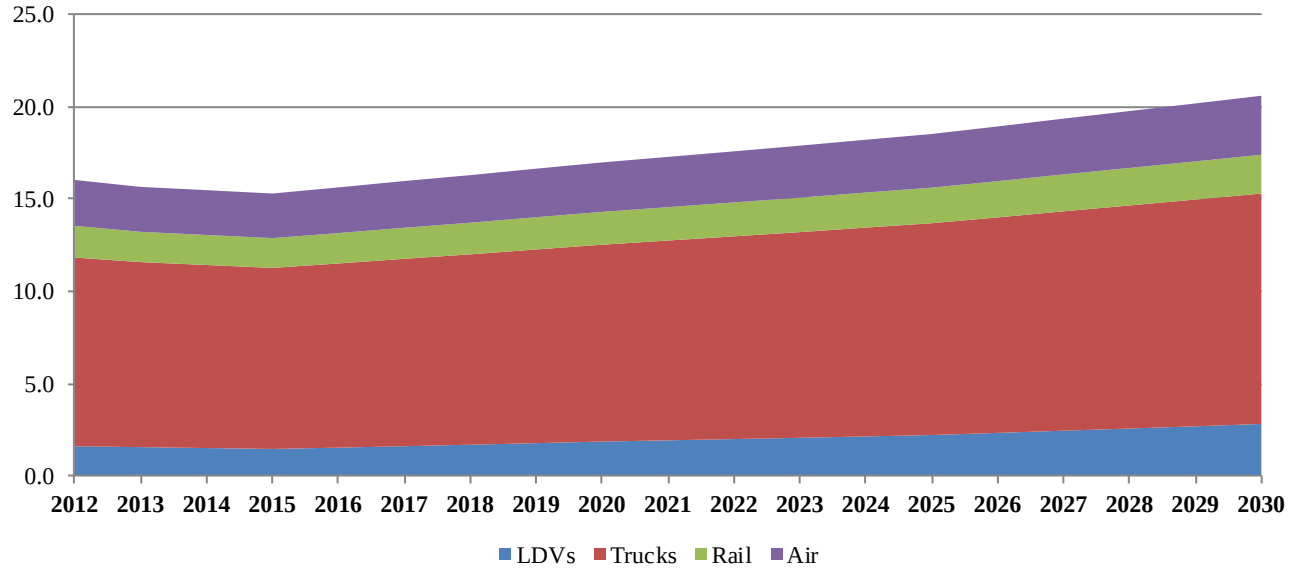
Similarly, shares of various modes of freight transport in emissions under the *reference* scenario are projected to remain somewhat constant, with the exception of an expected increase in the contribution of freight light duty vehicles (LDVs) to emissions (from 10 per cent to 14 per cent of total freight emissions). Overall, freight *WTW* CO_2 emissions are projected to increase by 28 per cent compared to 2012. This increase is greater than passenger transport as a result of the expected decline in Belarus' population over this period in contrast with a continued increase in GDP.

Figure VI.2: *WTW* CO_2 emissions by mode in passenger transport under reference scenario, 2012–2030, million tons CO_2



Notes: LDV = Light duty vehicle. Two Wheelers represent a very small proportion of CO_2 emissions and are not visible.

Figure VI.3: *WTW* CO_2 emissions by mode in freight transport under *reference* scenario, 2012–2030, million tons CO_2



Notes: LDV = Light duty vehicle.

VI.3 Scenarios

Reference Scenario

The r*eference* scenario accounts for the expected evolution of socio-economic parameters such as population and GDP. It includes default data in ForFITS on the expected evolution of fuel consumption characteristics by powertrain to reflect future improvements in vehicle technology and their associated costs. Other characteristics defining the transport system in the base year (e.g. fuel taxation schemes, road pricing, passenger/freight transport system structure, fuel characteristics, powertrain technology shares, behavioral aspects) remain unchanged in projections.

Additional scenarios

High GDP growth scenario

The *high GDP growth* scenario projects future emissions assuming an increased level of GDP growth in comparison to the *reference* scenario. This scenario has a 5 per cent GDP growth - compared against the less than 2 per cent annual growth in the *reference* scenario - based on projections from the 2012 "The World in 2050: From the Top 30 to the Top 100" of Hongkong and Shanghai Banking Corporation to simulate a return to levels of growth typical of an emerging economy.

In the *high GDP growth* scenario, the GDP per capita will also see a much larger increase than seen in the *reference* scenario, more than doubling by 2030 (to 34,100 in constant 2012 PPP). The implications this increase to GDP levels typical of higly developed countries will be correlated highly with increases in freight transport as well as passenger transport to a somewhat lesser extent.

High fertility scenario

The ForFITS *high fertility* scenario evaluates the impact of 0.3 per cent decline in projected population instead of the 0.5 per cent decline which was used in the United Nations Population Division's high fertility scenario.

This scenario has two major results that are relevant to transport activity. Increasing the population projections will increase the overall transportation needs of Belarus as additional people require. However, it has the counteracting effect of decreasing per capita GDP projections, given that GDP projections are unchanged in this scenario. This has the effect of decreasing the motorization rate as these rates are typically lower for countries

with lower income. It should also be noted that freight transport is not directly dependent on population changes and will be unaffected by this scenario.

Fuel price increase scenario

The *fuel price increase* scenario projects fuel prices to consumers to double by 2030 based on a combination of increased prices and taxes. Given, the historically low global prices of oil as well as the relatively low implicit tax rate of fuel in Belarus, this scenario is a realistic projection of possible future conditions.

The evolution of the average fuel price is assumed linear for simplicity and the changes in the prices are assumed to influence directly the cost of all fuel blends.

Nuclear/increased electrified rail scenario

The *nuclear/increased electrified rail* scenario regards an increase in nuclear power availability, the electrification of rail lines and a modal shift in freight transport toward higher usage of rail as interconnected since an increase in nuclear energy could make electrical rail lines more attractive from both an environmental and trade policy perspective.

Currently Belarus uses no nuclear power, this is expected to change soon as a new nuclear power station is put into operation. Given the expected increase in availability of nuclear power as well as investments that Belarus has made into electrifying its rail network, a reasonable scenario is one where the share of electric rail increases. Currently, 80 per cent of new passenger rail and 9 per cent of new freight rail locomotives are electric-powered. The *nuclear/increased electrified rail* scenario will increase these shares to 90 per cent and 50 per cent, respectively by 2030.

Though shares of freight transportation have been shifting towards away from rail in recent years (share of non-pipeline freight ton-kilometres on freight rail has decreased from 82 per cent in 2005 to 63 per cent in 2013), expected increases in electrified rail lines and public support for this type of transportation could reverse this trend. The *nuclear/increased electrified rail* scenario simulates a gradual increase in the modal share of tons transported by freight rail back to 2005 levels by 2030.

Scenario results

Figures VI.4 to VI.8 show the evolution of passenger/freight activity (passenger-kilometres/ton-kilometres), energy use (toe) for passenger and freight transport separately and total kg of CO_2 emissions (*WTW*) for the Belarusian case in the four scenarios. All scenarios use the *reference* scenario as a starting point for evaluating policy changes.

Table VI.4 shows the values of the main outputs in the *reference* scenario, at the first and last year of the projections, as well as the projections in 2030 for the four additional scenarios.

Table VI.4: Main outputs: reference and additional scenarios

	2012	2030				
		Ref	High GDP growth	High Fertility	Fuel price increase	Nuclear/ Electrified Rail Shift
passenger-kilometres, billion	83.7	107.3	168.9	107.3	98.1	107.4
ton-kilometres, billion	100.4	129.2	218.9	129.1	113.2	130.7
Energy use, million toe	6.83	8.58	14.72	8.54	7.68	8.04
WTW CO_2 emissions, billion kg CO_2	24.96	31.41	53.63	31.27	28.09	28.82
WTW CO_2 emissions per capita, kg CO_2/person	2 637.6	3 579.7	6 112.5	3 477.2	3 201.6	3 284.4
WTW CO_2 emissions intensity, kg CO_2/GDP * 1 000	169.3	165.4	179.2	164.6	147.9	151.7

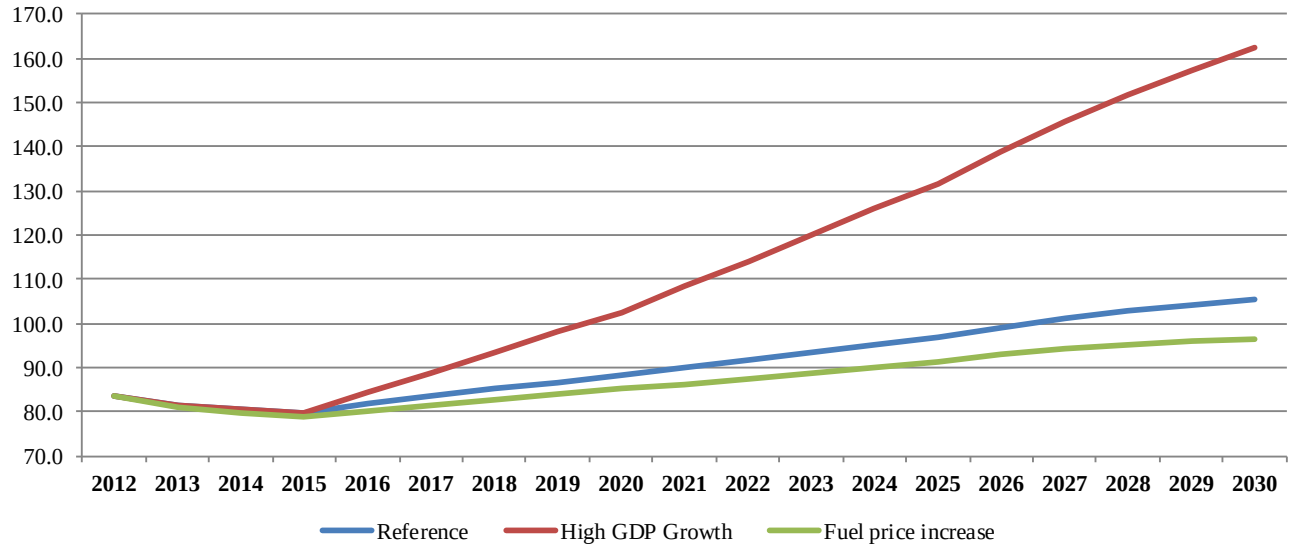
Note: GDP is measured in purchasing power parity (PPP) units at 2012 prices.

In figure VI.4, the passenger transport activity (measured by passenger-kilometres) resulting from the *high GDP growth* and *fuel price increase* scenarios are compared with the *reference* scenario. The *high fertility* and *nuclear/increased electrified rail* are not shown in this figure as the effects on passenger-kilometres of each scenario are minimal. In the *high fertility* scenario the increase in population is not significant enough to counteract the decrease in motorization rate relative to the *reference* scenario that results from the implicit decrease in GDP per capita. For the *nuclear/increased electrified rail*, total passenger transport is not affected as this scenario focuses on shifts in transport rather than decreases in total transport.

Under the *high GDP growth* scenario passenger-kilometres is projected to increase substantially in comparison with the *reference* scenario (more than 50 per cent higher by 2030). This increase in passenger travel under this scenario is explained by the increased motorization rate would occur as GDP per capita increases.

The *fuel price increase* scenario projects a lesser, but still important effect on passenger transport activity as passenger-kilometres are expected to decrease by almost 9 per cent by 2030 in comparison with the *reference* scenario. This scenario clearly shows the sensitivity of passenger transport to price increases in fuel prices. As prices increase, transport is minimized where possible and results in substantial decreases in activity.

Figure VI.4: Projected passenger kilometres under various scenarios, 2012–2030, billion passenger-kilometres



Note: High fertility and *nuclear/increased electrified rail* scenarios are not shown as each have a minimal effect on passenger-kilometres when compared to the *reference* scenario.

In figure VI.5, the freight transport activity (measured by ton-kilometres) resulting from the *high GDP growth* and *fuel price increase* scenarios are compared with the *reference* scenario. For similar reasons to passenger transport activity projections, the *nuclear/increased electrified rail* is not shown in this figure as the effects on ton-kilometres of this scenario are minimal. The *high fertility* scenario is also not shown as population is not assumed to have an effect on freight transport activity.

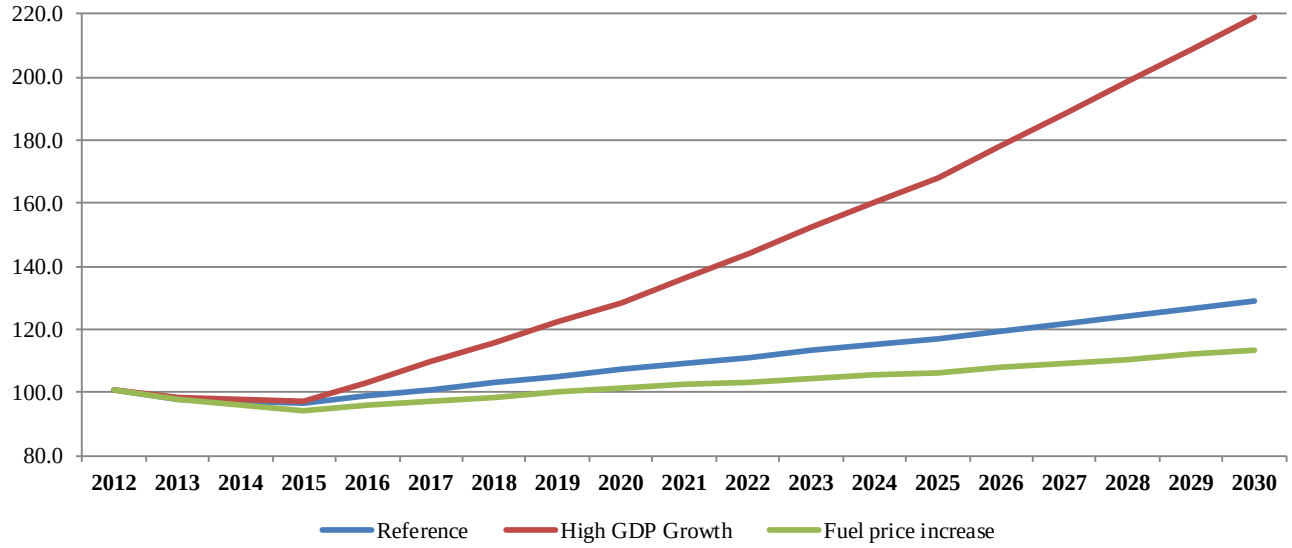
As in passenger transport activity projections, the *high GDP growth* scenario projects that ton-kilometres are projected to increase substantially in comparison with the *reference* scenario (almost 70 per cent higher by 2030). Increases in GDP are directly related to increases in freight transport, which explains the greater effect of this scenario on freight transport activity when compared to passenger transport activity.

The *fuel price increase* scenario also projects a stronger effect on freight transport activity when compared to passenger transport activity as ton-kilometres are expected to decrease by more than 12 per cent by 2030 in comparison with the *reference* scenario. This demonstrates the projected increased sensitivity of freight transport activity to price increases in fuel.

Figure VI.6 shows the projected passenger transport energy use under the *high GDP growth, fuel price increase* and *reference* scenarios. *High fertility* and *nuclear/increased electrified rail* are not shown in this figure as the

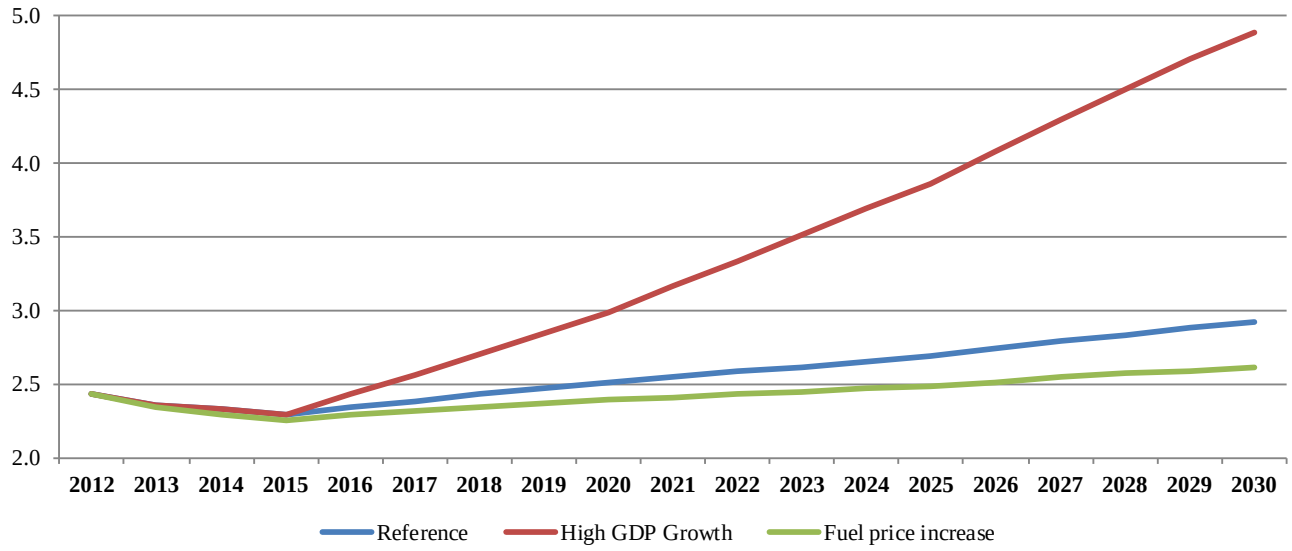
effects on passenger energy use of each scenario are minimal. The reasons for the lack of contrast in these scenarios as compared to the *reference* scenario are similar to those noted for passenger transport activity.

Figure VI.5: Projected ton-kilometres under various scenarios, 2012-2030, billion ton-kilometres



Note: High fertility and *nuclear/increased electrified rail* scenarios are not shown as each have a minimal effect on ton-kilometres when compared to the *reference* scenario.

Figure VI.6: Projected passenger transport energy use under various scenarios, 2012-2030, million toe



Note: High fertility and *nuclear/increased electrified rail* scenarios are not shown as each have a minimal effect on passenger energy use when compared to the *reference* scenario.

The large increase in passenger transport activity in comparison to the *reference* scenario under the *high GDP growth* scenario are directly translated into a large increase in energy use in comparison to the *reference* scenario. Similarly, the decrease in passenger transport activity under the *increased fuel price* scenario also has a direct effect on energy use as the decrease by 2030 in comparison with the *reference* scenario is similar to that seen in passenger transport activity.

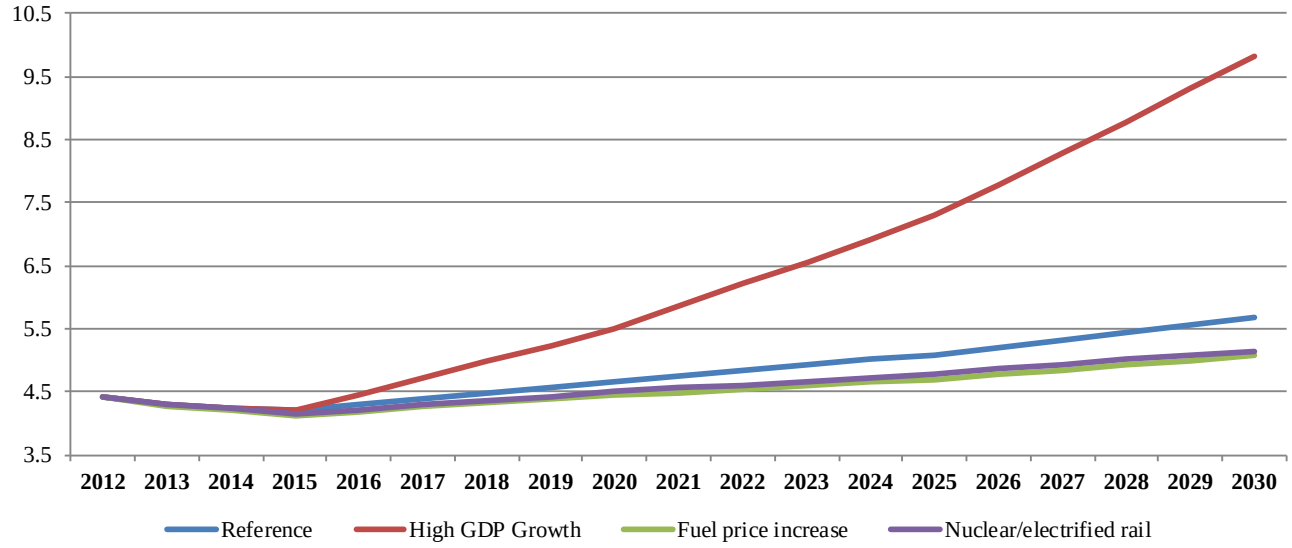
Figure VI.7 shows the projected freight transport energy use under the *high GDP growth, fuel price increase, nuclear/increased electrified rail* and *reference* scenarios. The *high fertility* scenario is not shown in this figure as the effects of population on freight transport are assumed to be negligible.

As in passenger transport, the large increase in freight transport activity in comparison to the *reference* scenario under the *high GDP growth* scenario is directly translated into a large increase in freight energy use in

comparison to the *reference* scenario. In the same way, the decrease in freight transport activity under the *increased fuel price* scenario also has a direct effect on energy use as the decrease by 2030 in comparison with the *reference* scenario is similar to that seen in passenger transport activity.

Under the *nuclear/increased electrified rail* scenario, a decrease of more than 6 per cent in freight energy use in 2030 when compared to the *reference* scenario is projected due to a modal shift in freight transport from trucks to rail. As freight rail transport is less energy-intensive than freight road transport, efficiency gains are realized under this scenario and can be seen in the freight energy use projections.

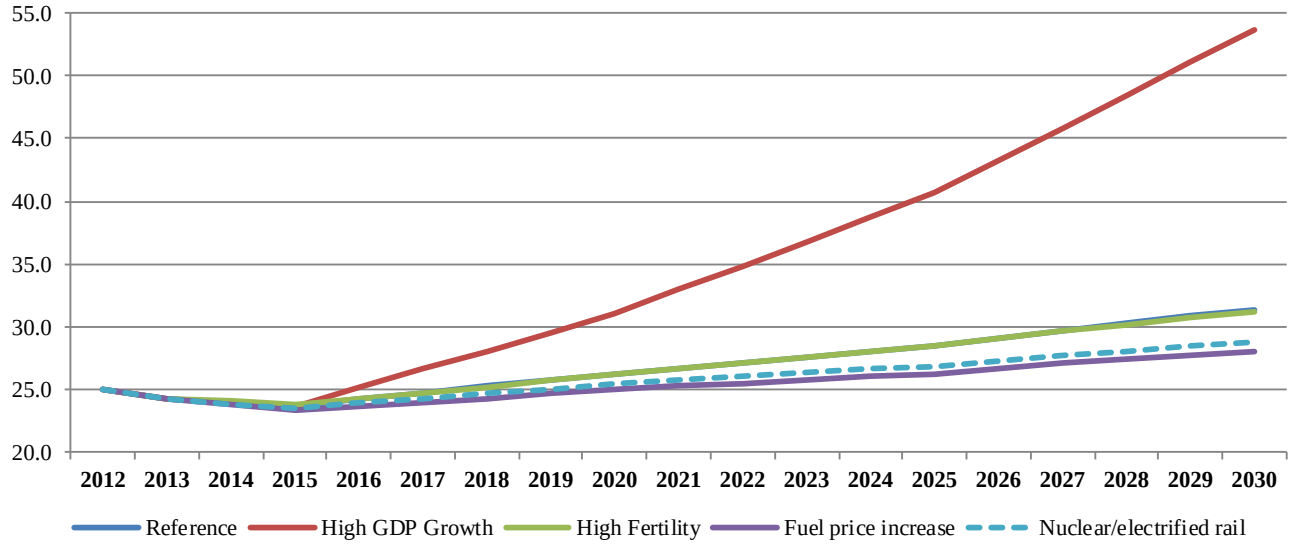
Figure VI.7: Projected freight transport energy use under various scenarios: 2012-2030, million toe



Note: High fertility scenario is not shown as it has a minimal effect on freight energy use when compared to the *reference* scenario.

In figure VI.8, the total projected *WTW* CO_2 emissions from transport activity are shown for each scenario.

Figure VI.8: Projected *WTW* CO_2 emissions for transport under various scenarios, 2012–2030, million tons CO_2



As in previous figures, the *high GDP growth* scenario projects to have the greatest effect on future emissions. Under this scenario, the increase in *WTW* CO_2 emissions in 2030 compared to the *reference* scenario is over 70 per cent. This increase stems primarily from an increase in transport activity associated with increased GDP per

capita in the case of passenger transport and associated with an increased need for the transportation of goods as a result of increased economic activity.

The *high fuel price* and *nuclear/increased electrified rail* scenarios project to have lower, but still significant effects on total emissions. For the *fuel price increase* scenario, the decrease in 2030 compared to the *reference* scenario is almost 11 per cent. As in the *high GDP growth* scenario, this decrease stems primarily from changes in total transport activity compared with the *reference* scenario.

By contrast, under the *nuclear/increased electrified rail* scenario, the decrease in total emissions (over 8 per cent in 2030 compared with the *reference* scenario) is attributed to primarily to improvements in energy efficiency, with the effect of a modal shift to freight rail contributing as well. Projected WTT[15] CO_2 emissions for electricity decrease under this scenario due to increased use of nuclear energy and increased electrified rail and the shift away from trucks and toward freight rail. As a result, despite the minimal effect of this scenario on overall transport activity, decreases in *WTW* CO_2 emissions similar to that under the *fuel price increase* scenario.

VI.4 Conclusion

The estimated *WTW* CO_2 emissions in 2012 from the transport sector for Belarus show that emissions from passenger vehicles were almost 45 per cent less than those from freight vehicles (8.9 billion kg vs 16.0 billion kg).

Projections of CO_2 emissions from the transport sector show an overall increase of more than 25 per cent by 2030, with slightly higher increases in emissions resulting freight transport in comparison to passenger transport. This difference can be largely explained by the projected decline in population over this time period in contrast with the projected economic growth. The increase in each sector, however, shows the large impact of expected economic growth on CO_2 emissions. Likewise, projections of future CO_2 emissions under the five scenarios show this same effect.

In the *high GDF growth* scenario the average annual growth of GDP to 5 per cent (compared to approximately 2 per cent in the *reference* scenario) is projected to result in a more than 70 per cent increase in *WTW* CO_2 emissions in 2030 when compared to the *reference* scenario. The projected effect of the three other scenarios is not nearly as pronounced, but important differences can still be observed.

For the *fuel price increase* scenario, transport activity is reduced by almost 9 per cent in terms of passenger kilometres and over 12 per cent in terms of ton kilometres in 2030 when compared to the *reference* scenario. These projected decreases in activity translate to a more than 10 per cent decrease in overall *WTW* CO_2 emissions in 2030.

The *nuclear/increased electrified rail* scenario results show little change in transport activity, increases in transport efficiency are projected as a result of greater use of electrified rail and a lower *WTT* CO_2 emissions rate for electricity attributed to increased availability of nuclear power. Under this scenario, an overall decrease in *WTW* CO_2 emissions of approximately 8 per cent is expected in 2030 compared to the *reference* scenario.

Lastly, the *high fertility* scenario results in a much lower projected impact when compared to other scenarios. The range of possible changes in population is not substantial and the effect on transport emissions is not as direct as in the case of the other scenarios.

These results together show the effect of socio-economic factors as well as positive steps that can be taken by Belarus to limit emissions from both the passenger and freight transport sectors. Belarus faces challenges in that its expected future economic growth would typically correspond with an increase in CO_2 emissions. However, improvements in the efficiency of its transport sector could help mitigate these issues.

The results demonstrate the potential impact of improving transport infrastructure and increasing the efficiency of the transport sector through a shift to transporting freight by rail more frequently and by specifically

[15] Well to tank (WTT) refers to CO_2 emissions from the production of the fuel used for vehicle operation.

increasing the use of electric rail. Projections generated by ForFITS based on these scenarios show that pursuing such policies can adjust the current trend of increasingly high *WTW* CO_2 emissions stemming from the transport sector of Belarus downward.

The following measures can moderate future CO_2 emissions from the transport sector:

(a) Notwithstanding the known risks associated with nuclear energy, nuclear energy generation would lead to reduction of the GHGs emissions from the transport sector and would allow increasing the efficiency of the production of electricity;
(b) Development of necessary infrastructure to support a shift toward increased use of freight rail transport;
(c) Railway electrification to support a shift toward increased use of freight rail transport and to maximize the impact of increased efficiency in production of electricity;
(d) Higher fuel prices with an aim to rationalize overall transport activity, while keeping in mind the need to mitigate impacts on the economically weaker/vulnerable social groups.

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Belarus
Environmental Performance Reviews

The United Nations Economic Commission for Europe Environmental Performance Review Programme assesses progress made by individual countries in reconciling their economic and social development with environmental protection, as well as in meeting international commitments on environment and sustainable development.

The Environmental Performance Review Programme assists countries to improve their environmental policies by making concrete recommendations for better policy design and implementation. Environmental Performance Reviews help to integrate environmental policies into sector-specific policies such as those in agriculture, energy, transport and health. Through the peer review process, the reviews promote dialogue among Governments about the effectiveness of environmental policies as well as the exchange of practical experience in implementing sustainable development and green economy initiatives. They also promote greater Government accountability to the public.

The third Environmental Performance Review of Belarus examines the progress made by the country in the management of its environment since the country was reviewed in 2005 for the second time. It assesses the implementation of the recommendations contained in the second review. The third review covers policymaking, implementation and the financing of environmental policies, as well as efforts in the area of greening the economy. It addresses air protection, water management, waste management, biodiversity and protected areas and discusses integrating environmental concerns into selected sectors, in particular, energy, transport, forestry, tourism, human settlements and health. The review also assesses the progress made by Belarus in developing environmental education and education for sustainable development. It makes suggestions for strengthening efforts towards a comprehensive and systemic response to sustainable development challenges.

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