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From the Authors


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The main aim of the Report for 2013 is to review the tasks of Russia’s transition to sustainable development in the context of human development, and to show the need for taking social, environmental and economic factors into account during this transition. A new development paradigm is needed, which can offer public well-being without placing excessive burdens on the natural environment. The Report uses this viewpoint to consider new approaches to the development of education and science, improvement of public health, development of a model for the ‘green’ economy and sustainability indicators. Particular attention is given to the improvement of energy, climate and regional policies, and the role of civil society and business in the transition to sustainable development.

The Report is intended for use by senior administrators, scientists and politologists, teachers, and scientific staff and students at universities.
The 2013 National Human Development Report (NHDR) for the Russian Federation has been prepared by a team of Russian experts and consultants. The opinions of the authors do not necessarily reflect the views of UNDP, other institutions in the UN system and the organizations, to which the authors are attached.

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We need to develop sustainable patterns of production and consumption that can ensure sustainable growth of the economy and remove all threats – all critical threats – to the environment. Society, the economy and the natural environment are inseparable. We therefore need a new development paradigm, which can ensure the well-being of society without excessive pressure on the environment. The interests of the economy, on the one hand, and preservation of the natural environment, on the other hand, must be balanced and focused on the long term. We also need innovative growth and greater energy efficiency – creation of the so-called ‘green economy’, which is definitely beneficial for all countries. Russia is an environmental donor with substantial natural resources and with national territory that accounts for one-seventh of the global land area. We have successfully addressed our obligations, including those under the Kyoto Protocol. I would like to reiterate that emissions of greenhouse gases in Russia by 2020 will be 25% below their level in 1990. We are counting on equally strong action by other countries. We are willing to be part of a global agreement on this issue, but it must be global, with the participation of all countries, and not limited to a few of the leading economies.

We believe that the ‘green’ growth model should not be made into a bureaucratic process. Each country is free to follow its own plans, but it is important that these plans are announced publicly, that they are together sufficient for achieving the goals of global sustainable development, and that there are mechanisms for constant exchange of best practices and technologies in the framework of ‘green’ development. The United Nations, through its high-level forum, and international development institutions must play the main and leading role in this process.

There is a whole group of questions concerning the role of forest and water resources for sustainable development. Our country owns 19% of the world’s forests and 22% of reserves of fresh water. We understand our responsibility and acknowledge that the lives of our own citizens and also the life of the planet and future of the world depend on how we use and preserve this potential.

There are about 80 environmental organizations active in Russia today, including the World Wildlife Fund and Greenpeace. Of course, it is not always easy to work with them: environmental organizations are difficult partners, but that is precisely why government should give them its support.

I do not underestimate the importance of the commodity sector for the Russian economy. Russia is rich in raw materials. We are building an economy based on knowledge and high technologies, increasing funding for basic and applied science, and introducing new technologies. We are consistently implementing energy-efficiency programmes and environment-friendly technologies in industry. The energy intensity of our economy (which is, unfortunately, high) is being reduced by more than 4% per year, which is a good result. We also view it as critically important to ensure harmonization of the energy policy of all the world’s major countries. Russia, naturally, has a special responsibility in this regard, because it is the world’s largest supplier of energy resources.
Foreword

This is the 16th National Human Development Report for the Russian Federation. Such reports are published in many countries on the initiative of the United Nations Development Programme (UNDP). Global development reports, containing overviews for all countries, are published annually. Texts are prepared for the UNDP by groups of independent experts.

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The authors have relied mainly on official Russian statistics, provided by the Federal State Statistics Service (‘Rosstat’ in the Russian abbreviation), ministries and government agencies. Where information from other sources is used, respective references are given.
Executive Summary

Introduction. Rio+20: New Challenges and Russia’s Choice. The evident urgency of a political appeal for sustainable development is what justified the holding in 2012 of the United Nations Rio+20 Conference, 20 years after the meeting in Rio de Janeiro devoted to sustainable development. The experience gained in those 20 years offered a number of important lessons, which determined the nature of the Conference and made it possible to formulate new priorities. The Rio+20 forum defined the main orientation – or contemporary formulation – of sustainable development as a long and successful development to improve the quality of people’s lives, ensuring global sustainability by addressing socio-economic problems through the principles of the green economy, which can simultaneously provide a solution to global environmental problems.

Russia needs to mobilize its huge capacity for addressing socio-economic problems using the principles of the green economy. That requires measures to ensure interest in the green economy at all levels – from industries to households. Modernization must be profitable. The country must use its capacities for the development of ‘sparing’ forms of natural-resource use, including the broad use of renewable sources of energy, sustainable forestry, environment-friendly agriculture and eco-tourism. A system of sustainable development indicators is needed in order to set development priorities and measure progress in their implementation, and such a system must be tailored to the specific features of each country. For Russia, this means a generalization of rich regional experience, and incorporation of sustainable development proposals in plans for social and economic development at the federal and regional level. A broad movement in support of sustainable development is needed, and this should be the priority for Russia as an environmental donor in its co-operation with the international community. Positioning Russia as a donor requires awareness of the country’s environmental responsibility and the development of international mechanisms to compensate Russia’s efforts to preserve and enhance its natural wealth. Russia, together with other BRICS countries, could become a leader in the Rio+20 movement for sustainable development.

Chapter 1. Russia and the World: the Path to Sustainable Development. Russia has outlined the framework of a sustainable development policy with three aspects – economic, social and environmental. Key policy documents adopted over the last 20 years and new socio-economic targets for improving the quality of life of the Russian people are contained in the Foundations of State Policy for Environmental Development of the Russian Federation in the Period up to 2030, the Concept for Long-term Socio-Economic Development of the Russian Federation for the period up to 2030, the Concept for Long-term Socio-Economic Development of the Russian Federation for the period up to 2030, and in Presidential Decrees.

Greening of Russia’s economic development is a crucial tool for modernization of the Russian economy, transition to an innovative, socially-oriented development path and the achievement of long-term goals. Russia is a global environmental donor with a fifth of the world’s forests, as well as huge water spaces and other natural resources. Therefore issues of economic development and the welfare of its people do not only concern present and future generations of Russians, but all of mankind.

At the turn of 20th and 21st centuries Russia has taken steps and achieved positive results in improving the energy efficiency of its economy and reducing its resource consumption through the implementation of various sectoral and corporate programmes. Russia is taking part in the global effort to achieve the Millennium Development Goals (MDGs), improving its own development indicators and contributing to the achievement of these objectives in other countries. Success in attaining the MDGs in Russia has been mixed: there have been notable achievements (in reducing levels of poverty and of maternal and infant mortality), but acute problems still persist (pollution, waste, degradation of ecosystems).
Russia needs a new environmental and economic development concept, with new patterns of production and consumption based on greater energy efficiency and productivity without additional pressure on natural resources and the climate system. The creation of an innovative, energy-efficient green economy and the application of green technologies to minimize damage to the environment are advantageous from both environmental and economic points of view. In order to place economic growth on a solid footing, there has to be a reasonable, long-term balance between the interests of the economy and the need to protect the environment.

**Chapter 2. Science and Education for Sustainable Development.** The landmark international conferences, Stockholm+40 and Rio+20, both held in 2012, demonstrated to the international community the continued relevance of the ideology of sustainable development, mainly because there is no acceptable alternative to it. The documents of both conferences once again underlined the central importance of scientific research as a means of furthering sustainable development. And education continues to be viewed as a decisive factor in achieving change for the better. The critical role of science and education in sustainable development is recognized to be universal for all countries and peoples of the world, without exception. This fully applies to Russia.

The adoption and promotion in Russia of a global project for sustainable development represents a unique opportunity to raise the status of education as a civilizing institution. It also offers a real chance to demonstrate the potential of science to modern society and to impart to science an environmental aspect, which is a vital element of the knowledge and skill systems needed to ensure genuine sustainability and the well-being of society.

Movement towards sustainable development helps to identify objectively existing environmental constraints on economic development and to adapt society to these constraints. Implementation of sustainable development principles with the support of government enables a new stage in the greening of education in Russia – a radical modernization of the education system through the greening of all subjects taught in secondary school and university. Raising the overall environmental culture of citizens by means of both formal and non-formal education is a particularly important task.

**Chapter 3. Health and Sustainable Development.** Russia has seen positive changes in recent years as regards demographics and the development of healthcare, but measures to date are inadequate for addressing the backlog of problems. The development of healthcare must target a substantial reduction in levels of mortality, which are the main challenge to the system at present, as well as increasing the availability of quality healthcare to the general public, protecting the system against the financial risks associated with the treatment of diseases, and achieving greater efficiency in the use of financial, material and human resources.

The Russian healthcare system requires major changes if it is to meet these challenges. The changes must focus on priorities in the allocation of financial resources, the skills and motivation of staff, the organization of healthcare provision, and the economic mechanisms of its functioning. Major improvements of public health can and must be achieved by promotion of healthy lifestyles and disease prevention. These tasks require large investment of resources. Changes are needed in the way healthcare is provided, particularly at the level of primary care, where the need is for greater professional development of local doctors, expansion of their functions and renewal of their ranks. The upgrading of primary care will have much positive effect on the system as a whole. Human development, greater use of information technology and competition in healthcare should be state policy priorities for the foreseeable future if Russia’s sustainable development is to be ensured.

**Chapter 4. A New ‘Green’ Economy for the World and for Russia.** Mounting economic, social and environmental problems make the creation of a new economy for the world and for Russia into an urgent task. The transition to a green economy will happen differently in different countries, depending on specifics of the natural, human and physical capital in each country, on its level of development and socio-economic priorities. The main task for the Russian economy at the present stage is to reduce its dependence on sales of raw materials. The transitions that are needed in Russia in order to modernize the economy and to create a green economy are largely one and the same. So there is a ‘win-win’ course to be pursued in the next 10-20 years for Russia’s socio-economic and environmen-
tal policies. A key objective is to radically improve energy efficiency, which will give a huge environmental impact.

Modernization and structural-technological changes could increase Russia’s GDP by 2-3 times at the country’s present level of production and use of natural resources, by deploying the huge amounts of raw materials, which would be saved, in the domestic economy and for export. This would greatly improve the well-being, and the social and environmental quality of life of the Russian population. This is the high road to creation of a green economy in Russia. Economic and legal instruments should be used to encourage and compel publicly owned and private companies to improve their resource efficiency through modernization and innovation, to prevent wastage of raw materials, and to adequately compensate for damage inflicted on society and the environment.

Chapter 5. Energy Efficiency: The Key Element of the New Economy. Improvement of people’s well-being requires consistently high rates of economic growth. But extensive exploitation of natural resources, which played a significant role in the growth of recent years, has largely exhausted itself. The limitations of the current development model must be overcome through a substantial increase in the efficiency of resource use in the economy, and one of the main challenges in this regard is to increase the energy efficiency of the Russian economy.

The Russian Government is aware of this need and has already taken a number of measures – not merely declarative – in order to improve energy efficiency. But this policy is still in the initial stages. It requires, firstly, the definition of more precise objectives for the Russian fuel and energy sector and its future role in the economy and, secondly, the clarification of priority goals and economically feasible mechanisms for achieving them, including studies of successful foreign experience.

Chapter 6. Climate Policy and Human Development. Climate change is a source of serious risks and threats to human security and sustainable economic growth, creating new challenges and needs for human development. This Chapter looks at the impact of climate change on the prevalence of infectious diseases and analyzes effects on human health of the heat wave in Moscow in the summer of 2010. The programmes and measures implemented in Russia since 1990, which have led to a significant reduction in greenhouse gas emissions, are described, and Russia’s position on participation in international efforts to reduce greenhouse gas emissions (including the Kyoto Protocol) are outlined. Urgent tasks include preservation and development of the human and institutional capacity, which has been created in Russia as part of preparation for ‘joint implementation’ projects, as well as the harmonization of climate policy mechanisms with partners and neighbor countries (Belarus, Kazakhstan and Ukraine), which are actively preparing to launch national emissions trading markets.

The protection of public health from the effects of heat waves, extreme cold and other climate change requires effective adaptation measures. Such measures, along with efforts to reduce greenhouse gas emissions and adapt economic systems to new weather and environmental conditions, should be the priority objectives of climate policy in Russia. The Chapter emphasizes the key role of science and innovation in adapting the economy and the general public to climate change and in the implementation of climate policy.

It is recommended that national targets for reduction of greenhouse gas emissions by 2020 and a programme for weather and climate research up to 2020 should be enshrined in legislation in the framework of the Climate Doctrine of the Russian Federation.

Chapter 7. Regional Development: In Search of Sustainability. The reduction of differentiation between levels of development in Russian regions is an important task for Russia’s transition to sustainable development. Regional differences in household incomes and per capita GRP decreased in 2005-2010 thanks to large-scale redistributive policies by the state. Regional disparities in poverty rates were mitigated and steady reduction of social inequality between regions was achieved.

The volume of polluting emissions into the atmosphere and waste water pollution were reduced in more than 60% of regions in the second half of the 2000s. However, regions which are inserted into the global economy as suppliers of raw materials and semi-finished products (focused on the extractive industries, and production of metals and chemicals), are characterized by high levels of pollution.
The largest metropolitan areas of the country are also highly polluted, due to waste water and vehicle fumes. Russia’s environmental problems are typical of a catch-up economy.

Measuring the sustainability of regional development in Russia using HDI gives a positive picture: the Index rose substantially in all regions during the 2000s. However, the number of oil-producing regions in the Top-10 has increased, due to high oil prices. Industrialized regions with depressive economies have become more numerous among the outsiders due to the post-crisis recession, lower life expectancy and low enrolment in education, while the HDI of underdeveloped republics (formerly the principal outsiders) has grown faster thanks to massive aid from the federal budget.

**Chapter 8. Russian Business and Sustainable Development: Implementation of International Standards in Environmental Risk Management.**

Government environmental regulation in developing countries is often based on lower environmental standards and has high corruption risks. Common rules of global competition with respect to environmental indicators can be achieved by transition to international voluntary environmental standards that are based on a balance of the interests of stakeholders, with compliance certified by a ‘disinterested third party’, such as an independent auditor. The need for movement in this direction is confirmed by the study of trends in use by Russian companies of such voluntary mechanisms as ISO 14001 environmental management systems, GRI non-financial reporting, voluntary forest certification (FSC) and voluntary certification of marine biological resources (MSC).

The analysis shows that voluntary international standards are increasingly used by those Russian industries, which have the largest environmental impacts. The trend towards greater use by leading companies of higher voluntary environmental standards, which are also less vulnerable to corruption, will continue as the Russian economy integrates with the global economy and joins the leading international economic communities. The main Russian companies, which have businesses extending beyond national borders and need to use the tools of international finance, will be compelled to use these environmental standards in their corporate governance.

Further implementation of international environmental standards and better verification are key factors for improving the competitiveness of Russian companies in world markets and for reducing environmental risks and negative impacts on the environment in the Russian Federation. The Chapter’s conclusions include recommendations for measures by government to encourage environmental responsibility and make Russian companies more competitive.

**Chapter 9. Sustainable Development Indicators.**

Traditional socio-economic indicators do not reflect the challenges of sustainable development adequately, and this is particularly true of the widely-used GDP indicator, since growth of GDP can mask deterioration of natural and human capital. Russia and the world therefore need to develop indicators of sustainable development. The Chapter identifies four groups of indicators used to assess sustainability: integrated indicators, aggregating various indicators in a single index; systems of indicators that combine indicators reflecting specific aspects of sustainability; specific indicators (primarily of environmental capacity and pollution rates); and indicators derived from opinion polls. The concept and calculation methods of the Index of Adjusted Net Savings offer an appropriate integral indicator for Russia. Greater use should also be made at federal and regional level of the MDG system adapted for Russia. The most important specific indicator for Russia’s purposes is energy intensity (energy efficiency).

Decoupling, which breaks the link between growth in levels of human well-being, on the one hand, and resource consumption and environmental impact, on the other, is of critical importance for the transition to sustainable development. Trends in environmental capacity and pollution rates in Russia in 1990–2010 were positive. However, levels of these indicators remain much higher in Russia than in developed countries and many transition economies, reflecting raw-materials dependence and high environmental intensity of the Russian economy.

**Chapter 10: Sustainable Development and Civil Society.**

In essence, success in promoting sustainable development depends on the level of development of civil society. Building a new economy based on sustainable development depends on the existence of demand from consumers for green products and services, and that is determined by the level of development of a society and its culture. Most Russians are concerned about environmental issues and believe that sustainable development in the country as a whole is not possible without their
solution. However, harmonizing the relationship between man and nature does not number among the Top-10 priorities for the general public, which is more concerned about other important social and economic problems. Proper assessment of the prospects for civil society activity in the sphere of sustainable development and the environment must start from the fact that environmental concerns and willingness to participate in the solution of environmental problems increase with levels of income and education. It is also clear that Government agencies and the media are not working hard enough to promote sustainable development and the environment as important issues.

Sustainable development is only possible with the interested participation of civil society. This requires a broad movement in support of sustainable development, which must be accorded priority by civil society and must receive support from the state and business. Education, the media and social advertising all have a part to play in creating awareness and interest on the part of the general population. A national code of ethics for sustainable development is required in order to set priorities for joint action (the Earth Charter could be used as the basis of such a document). Success in realizing the ideas of sustainable development requires their adaption to the interests of the various actors in civil society, the assessment of the successes and challenges on the road to sustainable development at the regional and national level, and the development of international cooperation between civil society and the expert community, particularly with the CIS and BRICS countries.
INTRODUCTION.

Rio+20: New Challenges and Russia’s Choice

The essence of sustainable development is the need to tailor our ever-increasing demands to the natural capacities of the planet. The idea is not new: it has been ‘officially’ put forward by the global community for more than twenty years. Not many political calls to action have lasted so long. Voices are occasionally heard suggesting that the time has come to find a new idea, which can replace that of sustainable development. Indeed the slogan could be altered for the sake of diversity, the idea could be presented somewhat differently, but the essence of the principle cannot go out of fashion. And that is not due to any ‘rules of the game’. It is because sustainable development is the condition for our survival. Of course, you can close your eyes and try not to think about it. There have been several such attempts, but they have not lasted long, because the consequences of such inattention have been quickly apparent and not easily forgotten. Once, in the early period of industrialization, the British Parliament was forced to break off work and take urgent measures when the eyes of the parliamentarians became itchy and they had difficulty breathing due to thick smog. The Great Lakes in the US and Canada, and the rivers of Western Europe were on the verge of becoming lifeless waste ponds, representing a danger to public health. We have quickly forgotten the cost and efforts, which were required in order to remedy those situations.

The lessons are getting tougher, and their impact more costly. The oil spill in the Gulf of Mexico and the recent anomalous heat wave in Central Russia are cases in point. And it is becoming increasingly difficult to find someone or some specific factor to blame in each case. These disasters are rather a consequence of our relationship to ourselves and nature, and of our misguided behavior. Environmental problems are becoming ever more acute worldwide: increasing scarcity of fresh water and food; climate change; reduction of biodiversity and forest cover; increasing desertification; and many others. It is worth detailing a few of the problems:

- 40% of land in the world is being degraded by soil erosion, reduced soil fertility and depletion. Productivity of land is declining and worse-case forecasts suggest that up to 50% of crop yield could be lost.
- More than 884 million people lack clean drinking water, 2.6 billion people lack access to adequate sanitation, 1.4 million children under five die each year due to lack of clean water and access to essential hygiene services. If current trends continue, water shortages will increase and reserves will be sufficient for only 60% of the world’s needs in 20 years’ time.
- Up to 20% of the world’s grain producers are using water in a unsustainable way, undermining future growth of agriculture and adding to water scarcity.
- Deforestation of the planet is continuing. Forest cover was reduced by 13 million hectares each year in 1990–2005.
- Semi-arid territories, which are now home to a third of the world population, are threatened by desertification.
- Climate change could affect nearly 2 billion people living in coastal areas, etc.

In this context the urgency of a political appeal for sustainable development and the need to hold the Rio +20 Conference, organized by the UN in 2012 (20 years after the Earth Summit in Rio de Janeiro) could be in no doubt. A number of important lessons had been learnt in the 20-year period between the two events. These lessons set the agenda for the Conference and enabled new priorities to be formulated.

The call for sustainable development is motivated by realization that the long-term successful development of mankind depends on solving social and economic problems within the limits of our planet’s environmental capacity. Such is the formula, which has been put forward by three leading international environmental organizations: the United Nations Environment Programme (UNEP), the International Union for Conservation of Nature (IUCN) and the World Wildlife Fund (WWF). It was suggested that three pil-

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lars of sustainable development — economic, social and environmental — need to be harmoniously combined in order to meet this challenge (in Figure 1 sustainable development is located at the intersection of these three elements). This principle is the basis of all the major documents on sustainable development, which have been adopted at both international and national level, starting with the 1992 UN Earth Summit, at which the concept was supported by the international community as the basic paradigm for development. Various interpretations of sustainable development appeared subsequently, including some that are more specialized (developed by international organizations and by individual countries), but which kept the basic principle of the ‘classical’ approach. The definition of sustainable human development given by the UNDP is most relevant for the purposes of the present Report (Box 1).

**Box 1.**

Sustainable human development is development that not only leads to economic growth, but also to the equitable distribution of its results, which regenerates the environment rather than destroying it and increases people’s responsibility rather than turning them into mere agents. Such development gives priority attention to the poor, increasing their opportunities and ensuring their participation in decisions that affect their lives. It is development for people, for nature, for the creation of new jobs and for improving the position of women in society.


Russia has expressed its commitment to sustainable development. The Decree of the President of the Russian Federation, ‘Concepts for Transition by the Russian Federation to Sustainable Development’ (1996) stressed that improvements to the quality of life must be achieved within the capacity of the biosphere.

In reviewing the results of implementation of the sustainable development concept, the international organizations referred to above had to acknowledge that the three pillars of sustainable development are not in equal proportion to one another. The most significant, as before, were economic aspects, followed by social aspects, while the environmental issues, which were the original basis for proposing the concept of sustainable development (Figure 1), were relegated to last place. This suggested that environmental needs should be addressed, not so much through individual programs, but rather as the basis for resolving socio-economic issues that are of most concern to everyone.

At the same time it became clear that active participation in solving environmental problems is difficult without solutions to basic socio-economic problems and particularly to the problem of poverty. This made it necessary to give a different interpretation of the pillars of sustainable development.

It is now generally accepted that due account for the long-term social and environmental consequences of economic decisions, which are taken today, is a central part of the concept of sustainable development.

The future tasks of sustainable development have now been clarified. The threat of natural resource scarcity and the negative effects of economic activity on future generations are already relevant today. Practical realization of the principles of sustainable development is increasingly the responsibility of each individual and not merely of government. It has become apparent that implementation of the ideas of sustainable development is not possible without the active participation of civil society. The unpopularity of the call to limit our demands has demonstrated the need to formulate more fundamental principles that make it possible to do without a direct correlation between economic growth and depletion of natural capital.

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Rio+20: Finding the Way to the ‘Future We Want’

The Rio+20 UN Conference on Sustainable Development, which was held on June 20-22, 2012, adopted the concept of sustainable development. The Conference was one of the most representative forums held by the international community in recent years. Its importance might be briefly summarized as a further important step by the international community in the right direction. The main outcome of the Conference was that the heads of most of the world’s nations turned once again to the theme of sustainable development, and concluded the Conference by adopting a declaration entitled ‘The Future We Want’ 3—a comprehensive document, which sets out all main aspects of sustainable development. The declaration emphasized once again the dangers of the development course, to which humanity is currently committed, and the need for its radical adjustment.

It was noted during preparations for the Conference and at the Conference itself that the current formulation of proposals for sustainable development does not sound as categorical as in Rio de Janeiro in 1992, or at the Stockholm Conference on the Environment in 1972.4 There are several reasons for this. Firstly, while previous forums drew up the tasks, the time has now come to take stock of their implementation, and experience has shown that implementation is no simply matter. In many countries, vital necessities, including the problems of hunger and poverty, overshadow any other problems. Also the financial crisis of recent years limits capacities for ensuring global sustainability, even in the most developed countries and even with full understanding of its relevance and importance for further development. So the general mood at the forum was one of reflection on how to give sufficient attention to global environmental problems in a context of extremely acute socio-economic problems that need to be addressed immediately. On the other hand, all those at the forum were unanimous in recognizing the relevance and growing importance of the principles of sustainable development. That was in contrast with the earlier situation, when voices were still heard suggesting that the basic paradigm of modern development needed to be rethought.

A clear achievement of the forum is the recognition at international level that long-term successful development is only possible by applying the principles of the ‘green’ economy. The essence of the proposed green economy is to combine improvement of welfare with minimal negative impacts on the environment.5

Proposals for the development of the green economy call for simultaneous solution to priority social and economic problems, including issues of employment and improvement to people’s living conditions. This means including support for the priorities of the green economy in national budgets even in the difficult context of financial crisis and providing for their further development within the framework of anti-crisis programmes.

An important feature of today’s agenda is that calls for sustainable development should present voluntary restrictions for developed countries and new opportunities for developing countries in finding a development path towards the green economy, and towards conservation and enhancement of their natural wealth through its capitalization and the receipt of benefits from the global community. Worldwide support for green growth is the key direction in combatting poverty today.

The Rio+20 Conference formulated the ideas of sustainable development in contemporary terms, putting the accent on a long and beneficial development aimed at improving people’s quality of life, achieving global sustainability by addressing socio-economic problems based on green economy principles, offering a simultaneous solution to global environmental problems.

More specific suggestions at the forum, which have already issued in actions by the world community today, include the following:

- Development of the concept of energy security. This task was referred to by the UN Secretary General before the forum, and was developed at the forum.
- Preparations for designing new sustainable development goals for the period after 2015.
- Strengthening coordination of activity by the international community through creation of an appropriate forum and the strengthening of UNEP.
- Support for various specific initiatives to implement the ideas of sustainable development.

There is a clear need for each country to adapt these ideas to match their interests and specifics, and to further assess the prospects for their development and possible contribution to global sustainability, upon which the success of their national development plans ultimately depends.

New Challenges and Russia’s Choice: The ‘Green’ Economy and Modernization

Russia and the world are facing new challenges, which entail the need for modernization of the economy, including innovative development and energy efficiency. We must not forget that the content and direction of modernization are dictated by its ultimate goal, which is to improve the lives of everyone today and ensure favorable living conditions for future generations (the goals of economic growth, technical excellence and competitiveness are obviously important, but must take second place). This objective is formulated today as sustainable development based on principles of the green economy. Russia has affirmed this approach as the need for environment-oriented production and consumption, based on the fact that the environment and the economy are now largely one and the same.

Economic growth today is associated with the increase of pollution and environmental degradation, depletion of natural resources, imbalance of the biosphere and climate change, leading to a deterioration of human health and limiting scope for further development. This situation clearly shows that exclusive focus on the improvement of people’s living standards does not provide the quality of life, which they need. Hence the need for modernization as technological progress, which offers both economic development and the maintenance of a favorable environment (environmental security, which is a priority for economic growth and human survival).

The modernization of production has to be supported through a ‘win-win’ approach, which provides both economic efficiency and sparing use of natural resources, reducing emissions and the production of waste. The experience of such modernization in Russia and worldwide shows that it leads to better economic performance and substantial improvement of people’s living conditions. This experience needs to be supported and disseminated, and that should be the task of modern innovative development, which depends on awareness of the importance of meeting environmental needs, but also on economic interest, including all available mechanisms: moderniza-
tion must be beneficial. Commitment to use of the best available technology is a promising approach, but caution is required in the assessment of new technologies and the possible consequences of their use. The approach has shown its value in developed countries, but experience suggests that its introduction requires a significant amount of time. A number of urgent steps therefore need to be taken in Russia today: a law should be passed on compulsory payment for negative impact on the environment; monitoring should be put in place; the practice of temporary emission permits should be stopped; projects should be subject to government environmental review; work should be carried out to address past environmental damage; and a law should be passed on regions with serious environmental problems. Solution to the problem of waste requires support for production of recycled materials, and a law on deposit value for packaging.

Widespread use of a system of voluntary certification and of corporate social business reporting represents an effective and relevant measure to ensure cleaner production. It includes reporting on sustainable development, based on increasing demands that products and services on the global and national market should be environmentally friendly.

The energy sector has special significance for Russia’s development. Priorities for the sector include security in use of traditional fuels and the achievement of energy efficiency. The vast scope for energy efficiency makes it important to take measures, which can ensure commitment to energy efficiency at all levels, including various industries and households (priority steps include the installation of water and heat meters in homes and the introduction of incentives for energy saving at enterprises).

Modernization should take account of Russia’s enormous potential for the use of renewable energy sources, including the greatest potential of any country in the world for the development of wind energy. Progress in this direction requires incentives for the production of energy from renewable sources and support for domestic production of the necessary equipment. As has been recently shown in Western Europe, initial support will enable the use of renewables to develop at an accelerating rate. Such an approach is not contrary to, but strengthens the current position of the country as a supplier of hydrocarbons, because it gives additional export capacities, ensuring national independence and prospects for further development. The use of renewable energy is particularly relevant today for sparsely populated areas of Russia (up to 70% of the country’s territory). It is important to provide incentives for the use of renewables as an additional energy supply to households as well as in industry and in hydrocarbon production.

Solutions to the problem of economic modernization in Russia must take account of the enormous capacity of the country in terms of ecosystem services, including the role of its forests, wetlands and other natural features in the global ecosystem. Ecosystem services are the benefits that people receive from ecosystems. There is huge potential for the development of markets for ecosystem services and environmental investments at both international and domestic level. Russian regions must learn to cooperate based on assessment of their ecological services (increasing the value of natural wealth and the commodification of what has not been viewed as a commodity before now, including a wide range of ecosystem services) and gaining access to the international market to obtain compensation for their efforts to preserve and develop their natural wealth. Russia will thus position itself not only as a fuel and energy supplier, but also as an ecological donor by capitalizing and obtaining benefits from the country’s ecosystems.

Russia should make best use of its great potential for low-impact exploitation of its natural wealth (by means of renewable energy, organic farming, eco-tourism and sustainable forest management).

Movement worldwide towards sustainable development has intensified after the Rio+20 Conference and Russia today is among the countries, for which it is particularly important. There are several reasons for this, including the country’s economic growth, abundant natural resources, and its search for an optimal development path. Russia’s priorities in innovation policy, energy efficiency, modernization of the economy to the best-possible standards, naturally determine movement towards sustainable development, in which Russia, together with other BRICS countries, could be among the leaders.

The position of the Russian Government, as stated at the Rio+20 Conference is based on the priorities of addressing socio-economic challenges, including the fight against poverty, overcoming the financial
crisis and creating new jobs, with a focus on the knowledge economy, recognition of the advantages to be gained from the ‘green’ economy, and positioning of the country as an ecological donor.\(^6\)

These objectives require the design and implementation of a new policy. However, the policy, which is needed, is not one of declarations (they have already been made and are contained in Russia’s Environmental Doctrine), but one of purposeful activity – a sequence of steps, starting from the situation as it is now and with a clear vision of the desired objectives. The importance of a coherent policy for sustainability is clear enough, but its implementation must not be divorced from the high-road of development and should be incorporated into policies, plans, programmes and mechanisms for Russia’s development. If programmes for environmental goals are kept separate, they will – regardless of any declaration of their importance – be viewed as ‘additional’ and financed only on a residual basis. Priorities of the green economy and environmental needs should be included in general development plans targeted at the solution of social and economic problems. It is advisable that even environmental measures as such (the creation of conservation areas, protecting biodiversity, etc.) should be included in market mechanisms that are understandable for all partiers (in the form of payments for ecosystem services). This also applies to other aspects of environmental policy, including legislation, education, culture and civil society development. Otherwise, the current practices of non-compliance with environmental legislation, lack of real support for the environmental movement, and the failure of declarations of the importance of environmental education and culture will be perpetuated.

The primary measure to assess the situation and identify priorities for action is the introduction of a system of sustainable development indicators, particularly indicators of the natural resource capacity and the energy intensity of economic growth, and specific indicators for pollution. Account must also be taken of accumulated environmental damage (including pollution and waste), the depletion of resources (which, in the long run, is in no way compensated by the discovery of new reserves), landscapes degradation and the effects of pollution on human health. In defining development prospects, it is highly important to estimate the potential offered by renewables and ecosystem services (forest, water, wetlands, biological resources, biodiversity, area of nature reserves). The basis for changeover to such a modern form of accountability has been laid by Presidential Decrees on improving energy and environmental performance (2008)\(^7\) and obligatory energy-efficiency reporting by regions (2010).\(^8\) Such accounting should also be extended to other areas.

In order to achieve the objectives of the new economy using market mechanisms, two main conditions must be met, which are defined by the level of society’s development and culture. The first necessity is to activate a mechanism of competition. Creation by government of a competitive environment, movement away from monopolization of the economy, will stimulate enterprises to engage in innovation. The second necessity is to ensure that the requirements of the market are applied to natural goods and the features of various products, and that the demands of consumers (citizens, government, business) are met, which involves taking account of the human factor and the priority of enhancing the value of nature and of people.

Success in modernization of the economy, energy efficiency and sustainable development depends on the active position and the personal commitment of each person, and that depends on education and awareness-raising activities, targeted media work and social advertising. Necessary and urgent measures for the dissemination of environmental knowledge include the introduction of a compulsory subject in secondary schools and the teaching of basic concepts of sustainable development in higher education, as well as ongoing environmental information activities with wide coverage of topics in the media, including mandatory limits for social advertising. Culture (cinema, pop art, literature) and the


\(^7\) Decree № 889 of the President of the Russian Federation, ‘On measures to improve energy and environmental efficiency of the Russian economy’ (June 4, 2008).

\(^8\) Decree № 579 of the President of the Russian Federation, ‘On assessment of the efficiency of executive government in administrative regions of the Russian Federation and of municipal and local government in energy saving and improvement of energy efficiency’ (May 13, 2010).
cultural and natural heritage have a vital part to play in making society turn towards sustainable development, and engaging the interest of the general public. The role of civil society is also vital, including both grassroots organizations and youth movements, as well as professional sustainable development institutions (as public policy institutions, working in contact with public chambers). The development of such institutions at Russia’s federal center and in the regions would help to consolidate the efforts of the expert community and civil society to find ways of achieving specific tasks in the modernization of the economy to ensure sustainable development. Civil society today is the initiator of the Rio+20 process, demonstrating commitment to the cause on the part of the general public and delegating government to ensure Russia’s active participation in the advancement of the international community towards sustainable development. The success of these ideas requires the development of a broad movement in support of sustainable development as a priority of civil society, and definition of the theme as a key area for support by government and business.
The policy foundations for sustainable development in the Russian Federation are set out in the Concept for Transition by the Russian Federation to Sustainable Development (1996), which was designed to ensure 'a balanced solution to socio-economic challenges and to the task of ensuring that the environment and natural resource potential remain in a fit state to meet the needs of present and future generations.' The Concept called for the preparation of various programme and forecasting documents: a state strategy for long-term action; long-term and medium-term forecasts (including, as their main component, predictions of environmental change and changes to ecosystems as a result of various economic activities); as well as short-term forecasts and programmes at the level of industries, regions (territories) and at federal level.

The concept of sustainable development was further developed by the Environmental Doctrine of the Russian Federation, which was approved by Resolution № 1225 of the Federal Government on August 31, 2002. These steps marked the beginning of the sustainable development process in the new conditions of a market economy in Russia.

In 2008 the Concept for Long-Term Socio-Economic Development of the Russian Federation up to 2020 was approved. The Concept defines the following principal development goals for Russia: ‘Sustainable improvement of the well-being of Russian citizens and of national security, rapid development of the economy, and strengthening of Russia’s positions in the world community.’ The Concept sets specific tasks for modernizing the economy, ensuring the civil and political rights of citizens, development of human capital, as well as other tasks. As of today the Concept is the principal policy document reflecting the country’s development objectives in the coordinate system of sustainable development (in the economic, social and environmental spheres) (Box 1.1).

Box 1.1. Some Indicators of Sustainable Development in the Concept for Long-Term Socio-Economic Development of the Russian Federation up to 2020

The Economy. By 2020 Russia will not only remain a world leader in the energy sector and in production and refining of raw materials, but must also create a competitive knowledge economy and high technologies, achieving increases of labour productivity by 3–5 times.

- Modernization and increase of energy efficiency in the economy
  The share of industrial companies engaged in technological innovation must rise to 40–50% (from 8.5% in 2007), and the share of innovative outputs in total outputs must increase to 25–35% (from 5.5% in 2007). Energy intensity of the Russian economy should be reduced by 1.6–1.8 times in the period up to 2020.

1 Approved by Decree of the President of the Russian Federation № 440 (April 1, 1996).
4 Sustainable development indicators in the Concept for Long-Term Socio-Economic Development of the Russian Federation up to 2020 and progress in attainment of the goals, which were set, have been considered in previous Human Development Reports for Russia (2010 and 2011).
• Research & development
An economy based on knowledge and high technologies will be created. Internal spending on R&D should rise to 2.5-3% of GDP by 2020 (from 1.1% in 2007) and there should be a cardinal improvement in the outcomes of fundamental and applied science. Public spending on fundamental and applied science will increase from 0.7% of GDP in 2008 to 1.3% in 2020.

The Social Sphere. The share of people living below the poverty line should be reduced from 13.4% in 2007 to 6–7% in 2020 and the share of the population defined as belonging to the middle class should rise to 50% by the same time. Measures are planned for reinforcing the healthcare system, education, social adaptation of people with handicaps, employment levels and involvement in business among young people, and levels of pension benefits.

• The unemployment rate will be reduced to 4% of the working-age population.
• Spending on healthcare will represent 7% of GDP by 2020 (compared with 4.2% in 2007).
• Rehabilitation and integration of people with disabilities:
  > the number of handicapped children, receiving rehabilitation services in special institutions for children with disabilities will rise to 60% of all handicapped children by 2020 from 40% in 2007;
  > the employment rate among people with disabilities will rise to 40% by 2020.
• Education:
  > the share of the population with higher and secondary specialized education will rise to 60–70% by 2020 (from about 50% in 2007);
  > free-of-charge additional education services will be provided to at least 60% of children from 5 to 18 years old;
  > at least 50% of people of working age to be in continuing education each year;
  > total spending on education to increase from 4.8% of GDP (in 2007–2008) to 7% of GDP by 2020.
• Housing:
  > average living space per person to reach about 30 m² by 2020 (about 100 m² per average family);
  > the period of waiting for low-income families to receive protected, low-rent accommodation will be shortened to 3–5 years after their application is accepted;
  > a loan financing mechanisms will be established for housing construction and development of housing infrastructure.

The Environment. The goal of Russian environmental policy is to achieve substantial improvements in the state of the natural environment and the ecological conditions in which people live, and to create an environmentally oriented model of economic development and environmentally competitive industry. Spending on reduction of harmful emissions, waste recycling and restoration of the natural environment is scheduled to increase to 1.5% of GDP by 2020. Specific national development goals in the environmental sphere, as defined by the Concept, are as follows:

• reduction of per unit levels of environmental impact by 3–7 times in various sectors;
• reduction of the number of cities with high and very high levels of pollution by at least 5 times;
• reduction of the share of the Russian population living in locations with unfavourable environmental conditions from 43% in 2007 to 14% in 2020;
• increases of technological and environmental efficiency of the economy will lead to reduction of the level of environmental impact by 2–2.5 times by 2020.
The principles of sustainable development are taken into account in design of regional development strategies. In Tomsk Region, for example, the ideas of sustainable development have been used at all stages of regional development planning: both in the Medium-Term Programme for Socio-Economic Development of the Region in 2006–2010 and in the Strategy for Development of Tomsk Region up to 2020 (Box 1.3).

It is important to note the experience, which has been gained in the measurement of sustainable development in Russian regions. Various sustainable development indicators were brought into use at the start of the 2000s by regional governments in Tomsk, Samara, Kostroma, Kemerovo and in other administrative regions. Specifically, these regions have measured so-called ‘genuine savings’, which confirm that proper account of the social and environmental costs of economic growth can entail substantially lower growth indicators.

Many other examples of the inclusion of sustainable development principles in regional development planning also deserve to be mentioned.

The Concept for Sustainable Development of Small Indigenous Ethnic Groups of the Far North, Siberia and the Far East of the Russian Federation, which was approved in 2009, calls for strengthening of the socio-economic potential, preservation of the living environment and of the traditional way of life and cultural values of 40 such ethnic groups (living in 28 Russian administrative regions) for the benefit of present and future generations. The Concept for Sustainable Development of Rural Territories of the Russian Federation in the period up to 2020, approved in 2010, sets the objective of bringing rural territories, which constitute 23.4% of total Russian territory, to a new development level, which will enable integrated and balanced solutions to economic, social and environmental challenges, while preserving the natural resource and historical-cultural potential of the Russian countryside.

Additionally, in April 2012 the President of the Russian Federation approved the document, ‘Foundations of State Policy for Environmental Development of the Russian Federation in the Period up to 2030’. These Foundations are designed to address socio-economic tasks for ensuring environmentally oriented growth of the economy, preservation of the environment is a satisfactory state, and protection of biodiversity and natural resources to meet the needs of present and future generations, enacting the rights of individuals to a favourable environment and strengthening the rule of law in the field of environmental protection and security.

In 2012 the President of the Russian Federation, Vladimir Putin, set new targets for Russia’s social and economic development, including objectives for achievement in the spheres of healthcare, social security, the employment market, science, etc., supplementing and clarifying targets that had already been set. Specific tasks for reinforcement of human potential include: increase of average life expectancy in Russia to 75 years by 2025, reduction of mortality from tuberculosis to 11.8 per 100,000 population, lowering of infant mortality to 7.5 per 1000 live births, creation and modernization of 25 million highly productive jobs by 2020, the creation of up to 14,200 special work places per year for people with disabilities in 2013–2015, etc.

Adjustment of economic growth priorities in Russia to take account of the environment represents a valuable instrument for modernization of the Russian economy, changeover to an innovative and socially oriented growth model, and achievement of the goals, which have been set by the Concept for Long-Term Socio-Economic Development of the Russian Federation up to 2020.

Key elements of the green economy or green growth have been taken as the basis for plans, prepared in 2008–2011, to enhance energy and environmental efficiency of the economy by 40% in the period until 2020, to raise the share of renewable sources of energy used in total electricity generation from less than 1% to 4.5% by 2020, etc. Steps have been taken and tangible results have been achieved in Russia at the turn of the 20th and 21st to raise energy efficiency and lower resource intensity through the implementation of various sectoral and corporate programmes. According to expert estimates, these steps together with structural transformations

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7 Approved by the President of the Russian Federation on April 30, 2012.
in the economy in 2000–2008 led to reduction of energy intensity of Russian GDP by more than 4% per annum, which is a much higher rate than in many other countries worldwide. Growth of GDP in 1998–2010 was 86%, while growth of greenhouse gas emissions was only 12%. The results obtained have served as a basis for the design of further government policy aimed at increasing energy efficiency.


Success in meeting the challenges of the ‘green’ economy depend on modernization, but they also depend on overcoming the problems of accumulated damage to the environment and the development of measures to reduce volume of waste creation and of a system for the recycling of various types of waste (issues connected with the ‘green’ economy are discussed in more detail in Chapter 4). Such measures are important for lowering negative environmental impact and reducing man-made emissions of greenhouse gases. The ‘green’ economy also depends on the development of environmental education and promotion of environmental issues, the creation of environmental culture in society, and positive presentation of ‘green’ development of the economy.

The Russian Federation occupies a unique position in the world as a global supplier of energy resources as well as contributing to global energy security through its participation in global efforts as part of the UN’s ‘Sustainable Energy’ initiative and meeting its own energy needs through large-scale improvement of energy efficiency in the economy and diversification of energy sources. In pursuing this initiative the Russian Federation takes due account of national specifics. The priorities for Russia are installation of energy-efficient technologies, connecting various regions of the country to natural gas supplies (since gas is a highly efficiency energy source, use of which has less negative impact on the environment in comparison with other fossil fuels), development of hydropower (Russia has about 9% of the world’s hydropower potential), use of bio-resources and development of nuclear power.

Russia is taking part in global efforts to attain the Millennium Development Goals (MDGs), which were adopted in 2000, improving its own development indicators and supporting attainment of the MDGs in other countries. Progress towards achievement of the MDGs in Russia has been uneven. On the one hand, poverty has been reduced by about 2.5 times in comparison with 1992, and maternal and infant mortality rates have been reduced by two times (Chapter 3). There has also been a substantial increase in government financing of measures to assist attainment of the MDGs in Russia and abroad (federal budget financing provided by Russia in 2009 to developing countries on a bilateral and multilateral basis was in excess of USD 785 million). And Russia has written off or committed itself to writing off debt owed by African countries amounting to about USD 20 billion. On the other hand, while there has been progress in addressing issues of environmental protection, further efforts are needed in order to resolve a range of issues: pollution of the atmosphere and water resources, degradation of ecosystems, waste recycling and overcoming accumulated environmental damage.

Russia is a global environmental donor, possessing a fifth of the world’s forests, as well as major water resources and other natural resources, so that success in meeting the challenges of Russia’s economic development and improving the standard of living of its citizens are of concern not only to present and future generations of Russians, but also to humankind as a whole.

Challenges, which remain, include the achievement of gender equality in senior levels of government, improving the quality of education, and adapting education to meet the needs of the Russian economy and labour market. Regular assessment of progress in attainment of the MDGs enables a clear view of strong points and problem areas in

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8 Approved by Order of the Government of the Russian Federation № 2446-p (December 27, 2010).
9 The MDGs adapted for Russia were the subject of two UNDP National Human Development Reports in the Russian Federation, in 2005 and 2010.
achievement of the tasks, which have been set, and assists in the design of the most efficient means of MGD attainment. The availability of objective statistical data is an important condition for attainment of the MGDs. Statistical observation is not carried out for some indicators and is substituted by estimative data from international agencies, which tends to make assessment less reliable. It is therefore important to make improvements to the system of statistical data collection in order to measure progress towards MDG attainment.

During the last 20 years the concept of sustainable development in Russia and the world has been treated mainly in the context of environmental conservation. The environment and development are not two separate spheres, but are two aspects of one and the same agenda and therefore require an integrated approach to the formation of sustainable development strategies, in order to take due account of the environmental and social costs of economic growth. A new type of economic development is needed, which can provide growth of social well-being without placing additional burden on natural resources and the climate system, by making the economy more energy efficient and improving productivity. This type of growth will keep environmental and social costs to a minimum. Such environmental-economic development is sometimes referred to by experts as the ‘ecology economy’.

The key sustainable development challenges for Russia at present and in a long-term perspective are as follows:

- Increase of global competition for factors that define the competitiveness of innovation systems.
- Demographic problems – aging of the population, population decline, migration processes, increase of the social burden. Russia is currently home to 143 million people. Although natural decline of the population has come down by 7.3 times since 2000 and average life expectancy has approached 70 years, natural growth of the population has not yet been achieved.
- Climate change. Russia’s climate is more sensitive to global warming than that of many other world regions. Warming of the climate in Russia as a whole in the last 100 years (1907–2006) has been 1.29°C compared with a world average of 0.74°C. In 2011 the average annual temperature of surface air in Russia exceeded the average for 1961–1990 by 1.55°C, while global air temperature in 2011 was only 0.4°C higher than average levels (according to data of the World Meteorological Organization). Ice cover in the Arctic has been in decline since the start of the 1980s (ice cover in 2011 was 4.61 million km², which is less than the previous record minimum of 2007). Environmental pollution. At present 56.3 million people (55% of Russia’s urban population) live in towns and cities with high levels of pollution.
- Degradation of ecosystems.
- Worldwide problems associated with food supplies.
- Increase of demand for energy resources in Russia and worldwide.
- Growth in volumes of waste, including hazardous waste, and challenges as regards the elimination of accrued environmental damage.

Russia’s has a number of advantages in the process of building a new economy based on principles of sustainable development (an ecologonomy): an improving system of health care and social provision; modernization of the country’s industry and installation of energy efficient technologies; a highly educated population; and cultural and scientific heritage. This provides a basis for the economic transformations, which have begun in Russia, and for maximum realization of the country’s economic potential, as well as a basis for sustainable development to guarantee social justice, economic stability and protection of the environment.

The Rio+20 Conference produced a large final document (66 pages in the Russian translation) with the symbolic title ‘The Future We Want’, setting out specific tasks for 2012–2014 to carry out the work that was begun in Rio. A working group is now being set up, consisting of representatives of regional UN groups, which in a year’s time will present a list of development goals that takes account of the conditions, opportunities and levels of development of various countries and of national strategies and pri-

orities, and also of the three components of sustain-
able development and the interconnection between
them. A universal high-level inter-governmental fo-
rum is being created, which will eventually replace
the Commission for Sustainable Development. The
work format of the forum will be decided in an ‘open,
transparent and comprehensive negotiation process
at inter-governmental level’ at the start of the 68th
Session of the UN General Assembly (2013).

It is important that Russian representatives should
be party to the work of the new bodies. The sustain-
able development initiatives and activities of NGOs in
Russia are also in need of coordination and govern-
ment support (see Box 1.2, and also Chapter 10).

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Box 1.2. Environmental NGOs

Support for sustainable development is traditionally associated with the ‘green’ movement, which
consists mainly of environmental NGOs. Well-known international NGOs (WWF, Greenpeace, Oxfam)
operate in Russia, as do a number of national NGOs. The latter include: the Social-Environmental
Union, Green Cross, All-Russian Society for Nature Conservation, the Centre for Environmental Policy
and Culture, the Center for Russian Environmental Policy, the Center for Wildlife Conservation, the
Nature Reserves Eco-Center, and the Eco-Consensus Center. Relatively new organizations include the
EKA Youth Ecology Movement and the Greenlight International Social Organization. There are also a
number of regional organizations with a strong environmental orientation, including: the Altai 21st
Century Foundation (Barnaul), the Center for Environmental Policy and Information (Tomsk), the Altai
Sustainable Development Foundation (Gorno-Altaiisk) and others. Organizations in other sectors of
the NGO movement also carry out environmental work. In particular, Wings of Hope, the Women’s
Congress and the National Agency for Sustainable Development are among organizations, which have
contributed to the Rio+20 movement.

The Social Chamber of the Russian Federation has a Social Forum for Sustainable Development,
which brings together representatives of regional branches of the Centre for Environmental Policy and
Culture from more than 60 of Russia’s administrative regions, as well as representatives of regional
social chambers, sustainable development institutes in more than 30 regions, other NGOs, business
(including the Russian Chamber of Commerce and Union of Industrialists and Entrepreneurs), gov-
ernment structures, universities (Moscow University, the Russian Chemical Technologies University,
the Institute of International Relations, the State University of Eastern Siberia), the Russian Academy
of Sciences, the Association of Teachers and Environmentalists, and others. This work is coordinated
by the Sustainable Development Institute (a joint programme of the Russian Center for Environmental
Policy and the Social Chamber of the Russian Federation), which publishes a bulletin, The Road to
Sustainable Development in Russia (since 1995). International cooperation on civil society issues
and for the expert community is being developed in partnership with other CIS and BRICS countries
through economic and social councils and councils on sustainable development.
Conclusions and Recommendations

The steps and approaches that are needed for successfully addressing the challenges of sustainable development are as follows:

✓ A new concept for environmental and economic development is needed, which includes the creation of new production and consumption models based on greater energy efficiency in the economy without additional burden on natural resources and the climate. Development of an innovative, energy-efficient, ‘green’ economy, and implementation of ‘green’ technologies that minimize negative environmental impact are beneficial from both environmental and economic viewpoints. Secure economic growth is only possible if there is a proper, long-term balance between the interests of the economy and the need for nature conservation. Such growth will ensure that the environmental and social costs associated with growth are kept to a minimum.

✓ Economic growth entails growth of demand for energy resources. A concept for a sustainable energy sector must address the issues of access to modern forms of energy, greater efficiency in energy consumption, and changeover to cleaner sources of energy (including the development of renewables) with due account for the environmental impact of their introduction.

✓ A cautious and civilized attitude towards the environment must become the norm in the development and implementation of large infrastructure projects. The quality of the environment is becoming a key factor of economic competitiveness, but it must not become a factor for the creation of barriers or hidden discrimination in international trade.

✓ The concept of sustainable development is perceived by the business community as an aspect of competition. The private sector must make greater use of sustainable development principles and the government must set standards for public-sector companies with respect to sustainable development policy, including regular non-financial reporting.

✓ Transfer to sustainable development in Russia depends to a large extent on the adaptation and broad application of its principles in Russian regions, and the prioritization of these principles in regional socio-economic programmes.

✓ Sustainable development must encourage participation by all social groups in economic and political life, including groups with disabilities. About 13 million people in Russia currently qualify as disabled, representing 8.8% of the country’s population. A Presidential Commission for People with Disabilities was set up by Presidential Decree № 1201, dated August 21, 2012.

✓ The Russian population includes representatives of more than 180 ethnic groups. This multinational character is a unique advantage of Russia, where representatives of the most varied nationalities and religious confessions have lived together for more than 1000 years. Sustainable development must support ethnic harmony and preserve the traditional human environment, ways of life and cultural values of 40 small ethnic groups now living in Russia.

✓ Peace, development and the environment are connected and inseparable. Conflicts slow down development and put it into reverse. Peace cannot be well-established and durable if the natural resources, which provide appropriate living standards and adequate functioning of eco-systems, are damaged or destroyed. The new paradigm for global development must ensure the preservation of peace and international security.

✓ Sustainable development also depends on the creation of a security system with respect to both natural and man-made threats, including dangerous weather and climate phenomena. This requires improvement to national systems for monitoring and early warning, the modernization and strengthening of the scientific basis for forecasting. International cooperation also has a major role to play in this sphere.

✓ Science has a key role in the new sustainable development paradigm, since it is the source for technology advances in all spheres of life and provides the basis for economic and political decision-making.

✓ Education also has a key role to play in sustainable development. The quality of education needs to be improved, environmental education needs to be installed at all levels of the school curriculum, and society must be taught the importance of concern for the environment. More educated people make more rational choices. Future innovative development depends to a large extent on attitudes and models of
conduct, which are instilled in people from childhood. Moral aspects of education are highly important: people must be made aware of causal chains and must understand their own responsibility for the well-being of other people and society as a whole. Particular importance attaches to the development of spirituality and the moral foundations in all social groups, as well as support for dialogue between confessions at global and regional level.

- Sustainable development targets (and the respective indicators) must be established by countries taking due account of their national specifics and needs, which will ensure that actions are suited to national development priorities.

- Monitoring of attainment of sustainable development targets will depend on new development indicators, which reflect not only economic growth, but also environmental and social aspects of development, as well as social and environmental costs associated with economic growth. However, the new sustainable development indicators should not become barriers or a form of hidden discrimination in international trade.

- Sustainable development also depends on efficient interaction between government bodies at all levels, the professionalism and competence of those who take decisions on interconnected issues of socio-economic development and nature conservation, as well as participation by civil society in the making of political decisions.
Box 1.3. The Experience of Tomsk Region in Changeover to Sustainable Development and Implementation of ‘Green’ Growth Projects

The adoption of sustainable development in a region depends on the design of strategic priorities, which take account of the nature of trends and expected results in social life, the technology base, economic and political factors, as well as natural and climatic conditions in the region, living standards, the technological, intellectual and social potential of the population, resource potential, etc. These tasks are being addressed in Tomsk Region using a system of strategic planning and an integrated, programmatic approach. A sustainable development concept for Tomsk Region was adopted in 1992 and the concept was taken into account in design of a strategy for development of the Region up to 2020.

The strategic development goal for Tomsk Region is the achievement of high living standards and quality of life through:

1. The creation of a fast-developing, balanced and competitive regional economy which provides a high level of household income in the Region.
2. Making Tomsk Region a better place for living, work and leisure.

One of the key goals is № 3, ‘Rational use of natural capital’, for which the key indicators are shown in Figure 1.1. The goal is being attained by implementation of the following tasks:

3.1. Ensuring rational use of natural resources;
3.2. Making the regional economy more energy efficient;
3.3. Enhancing quality of the environment;
3.4. Raising levels of environmental culture in local society and in corporates.

For attainment of its strategic goals the Administration of Tomsk Region has designed a Medium-Term Programme for Socio-Economic Development in the Period 2013–2018.

Figure 1.1. Key Indicators for Goal № 3, Rational Use of Natural Capital
An important role in implementation of the Sustainable Development Concept is played by the design of sustainable development indicators for Tomsk Region, which characterize changes and the rate of change in the Region’s economy, social sphere and environment. The system of indicators for the Region is not an isolated structure: most of the indicators are also used in the Strategy and Programme for Social and Economic Development, and in sectoral programmes and programmes being implemented by government departments. The indicators are also included in higher-education curricula.

The following indicators are used in Tomsk Region for attainment of the goals, which have been set:

3.1. Rational use of natural resources
Indicators:
- Ratio of reserve replacement to crude oil production in the oil & gas industry, %: 2005 – 37.1; 2010 – 40.73; 2015 – 90 (forecast).
- Percentage consumption of total areas of forest, which have been made available to the timber industry, %: 2005 – 8; 2010 – 8.8; 2015 – 19.6.

3.2. Energy efficiency of the regional economy
Indicators:
- Share of energy produced from renewable sources, %: 2005 – 0; 2010 – 0; 2015 – 0.04 (forecast).

3.3. Improving the quality of the environment
Indicators:
- Share of atmospheric emissions in need of purification, which are captured and rendered harmless, as a share of all such emissions, %: 2005 – 68.1; 2010 – 78.3; 2015 – 80.3 (forecast).
- Share of industrial waste, which is recycled for secondary use, in total amounts of waste production, %: 2005 – 37; 2010 – 44.7; 2015 – 45.3 (forecast).
- Share of water spaces, used by industry, where water quality (measured by a pollution index) showed improvement, %: 2005 – no data; 2010 – 17.4; 2015 – 39.1 (forecast).

3.4. Improvement of environmental culture of the general public and corporates
Indicators:
- Share of companies and organizations carrying out economic and other activity within the established limits for environmental impact, %: 2005 – 87; 2010 – 87.5; 2015 – 90 (forecast).

The present system of environmental management at federal level is lacking in coordination. Responsibility for various environmental issues is divided between a large number of agencies: the Russian Ministry for Natural Resources and the Environment (Rosprinrpronadzor, the Federal Agency for Mineral Use, the Federal Agency for Water Resources, the Federal Agency for Forests, the Federal Agency for Hyrdometeorology and Environmental Monitoring), the Ministry of Agriculture (Rosselkhoznadzor), Rosrybolovstvo (fisheries), Rospotrebnadzor (consumer issues) and other government agencies.

Regional administrations have responsibility for:
1. State environmental supervision over sites in regional control (water, atmosphere, waste).
2. State geological supervision and control of ORPI.
3. Issue to organizations under regional control of permits for release of pollutants into the atmosphere.
4. Allocation of quotas for taking of bio-resources from water spaces.
5. Holding competitions and awarding zones for conduct of commercial fisheries.

Regional administrations also carry out delegated functions, as follows:
- Management, disposal and state control over wildlife resources (hunting and other spheres).
- Organization and conduct of environmental expert studies at regional level.
- Management and disposal of water resources.
- State control and supervision in forest areas.

Successful progress towards sustainable development, including such progress in the environmental sphere, largely depends on coordinated action by all structures, which are concerned with such development. An environmental coordination council, headed by the Regional Governor, has been set up for that purpose in Tomsk Region (Figure 1.2).

**Federal executive bodies:**
- Rosprirodnadzor
- Rosselkhoznadzor
- Rospotrebnadzor
- Department for mineral use
- Water resource department of the Directorate for the Upper-Ob Basin
- Tomsk Department of the Upper-Ob Section of Rosrybolovstvo
- Tomsk Hydrometeorology and Monitoring
- Tomsk Center for Hygiene and Epidemiology
- Upper-Ob Water and Fisheries
- Civil Defense and Emergency Departments

**Universities, science:**
- Tomsk State University, Tomsk Polytechnical Institute, Tomsk Architecture and Construction Institute

**Social environmental organizations:**
- Tomsk Regional Hunting and Fishing Association
- Regional Association for Nature Conservation

**Companies, organizations, legal entities and individuals**

**Municipal government**
- Nature Conservation Department of the Tomsk City Administration

**Executive government in Tomsk Region:**
- Department of Natural Resources and Environmental Conservation
- Regional Committee for the Environment
- Department for Development of Business and the Real Sector
- Department for Mineral Use and Development of the Oil & Gas Industry
- Committee for Civil Defense and Emergencies
- Tomsk Forest Management
- Veterinary Department
Scientific and educational institutions in Tomsk Region are carrying out work for the study and conservation of unique eco-systems as part of environmental sustainability efforts. For example, work by scientists at Tomsk State University in association with other Russian and foreign specialists has revealed the important role of the West-Siberian marshes in global climate regulation.

‘Green’ growth projects have also been designed and successfully implemented in Tomsk Region (Figure 1.3) in partnership with various interested parties.

The Department for Natural Resources and Nature Conservation in Tomsk Region is involved in large-scale enterprises at inter-regional, federal and international levels. ‘Protecting the Environment and Rational Use of Natural Resources’ was among leading sections at the Tomsk Innovation Forum in 2011. At total of 2600 representatives of 46 Russian regions and 20 countries took part in the Forum.

In November 2011 representatives of Tomsk Region were the sole representatives of Russian regions taking part in the founding congress of the Platform for Environmental Development Technologies. Candidates from scientific and educational institutions in Tomsk Region were put forward for membership of the Platform’s council. The main purpose of the Platform is to generate mechanisms for enhancing the efficiency and competitiveness of the Russian economy through the coordinated efforts of science, government, business, and society in order to create environmentally efficient and energy-saving technologies ‘made in Russia’, which can address accumulated environmental problems and ensure environmental security.

A number of promising directions for R&D work, having substantial social and economic significance for Tomsk Region, were defined as part of the cooperation with the Technology Platform:

Medium-term priorities:
1. Development of waste recycling (in energy production, metallurgy and agro-industry) and lowering of the hazard levels of waste, including through bio-processing of waste (the ‘bio-gas ring’ model project).
2. Improvement and application of technologies for recycling of biological waste, including waste that represents a biological hazard, to produce secondary raw materials and/or finished products.
3. Treatment of natural water to make it fit for drinking.
4. Development of renewable and alternative sources of energy (including wind and solar energy).

Long-term priorities:
5. Deep processing of natural resources.
6. Technologies for purification of technical and waste water (including biological purification).
7. Making buildings and facilities more energy efficient (development of new building materials, production technologies, construction techniques, and design and implementation of new construction and hygiene technologies).
8. Technologies for monitoring the state of the environment.

Work began in Tomsk Region in 2011 on the long-term project ‘INO-Tomsk 2020’ for creation of an education, research and design center, where rational use and deep processing of natural resources will be one of seven main focus areas. Most of the university institutions in Tomsk are involved in this project, as are the R&D institutes of the Tomsk Scientific Center of the Siberian Branch of the Russian Academy of Sciences. A center for transfer of nature conservation and resource-saving technologies has been set up at Tomsk Polytechnical University to assist projects at INO-Tomsk.

The analysis of key environmental impact indicators in Tomsk Region shows that they are on a positive trend. The volume of waste, which is disposed of in accordance with sanitary standards and rules is steadily increasing. For example, there has been an increase in the amounts of solid household waste being delivered to a special site in Tomsk, which is the main collection point for such waste.
in the Region. The share of untreated or inadequately treated waste water in total waste water in Tomsk Region in 2010 was 18.3%, which is substantially less than in other regions (30% in Moscow, 31% in St. Petersburg, 82% in the Siberian Federal Districts and 89.8% in Russia as a whole). Although indicator results remain uneven, there has been an overall increase in atmospheric pollutant emissions, which comply with emission rules, as a share of overall pollutant emissions.

Regular monitoring of indicators for environmental management efficiency enables executive government bodies to react flexibly to changes in the ongoing situation, applying the management tools that are most effective in each given instance.

Prof. Alexander M. Adam, Dr.Sc. (Tech.)
Director of the Regional Committee for Nature in Tomsk Region (State budgetary institution)

Figure 1.3. Model for implementation of ‘green’ growth projects in Tomsk Region

<table>
<thead>
<tr>
<th>Level of interaction</th>
<th>Government bodies</th>
<th>Large Russian and international companies</th>
<th>Innovative companies</th>
<th>Universities and research institutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>International</td>
<td>Innovus Innovation Forum (‘green’ growth)</td>
<td>Environmental growth technologies (regional component)</td>
<td>Inter-regional Association for Innovative Energy-saving Technologies</td>
<td>Center for Transfer of Energy-saving technologies</td>
</tr>
</tbody>
</table>
Chapter 2. Science and Education for Sustainable Development

The landmark international conferences, Stockholm + 40 and Rio + 20 (both held in 2012), demonstrated to the international community the growing relevance of the ideology of sustainable development, mainly by showing the lack of any reasonable alternatives to this ideology. The documents of both conferences stressed once again the central importance of scientific research for sustainable development, and the role of education as a decisive factor in achieving change for the better. The critical role of science and education in sustainable development is recognized as universal for all of the countries and peoples of the world, without exception. This fully applies to Russia.

The adoption and promotion in Russia of a global project for sustainable development represents a unique opportunity to raise the status of education as a civilizing institution. It also offers a real chance to demonstrate to modern society what science is capable of and to instil environmental culture as a vital element of any system of knowledge and skills that can underwrite genuine sustainability and the well-being of society.

Progress towards sustainable development helps to objectively identify existing environmental constraints on economic development and to make society adapt to such constraints. Implementation of sustainable development principles, supported by government, can enable a new stage of the ‘greening’ of Russian education – a radical modernization of the education system by linking environmental issues to all of the subjects taught in secondary schools and universities. The development of environmental culture among the general public is to be achieved using the potential offered by both formal and non-formal education.

2.1. Russian Specifics of the Scientific Ideology of Sustainable Development

In recent years, the Russian political leadership has cited the principles of sustainable development with increasing frequency. As Vladimir Putin said in a speech on August 1, 2009: ‘...nearly all developed countries now live by the logic of sustainable development.’ The speech, effectively called for greater inclusion of this logic in Russian political, economic and social practice. But the decisions, which are taken using this logic, must take account of Russia’s specifics and exploit the achievements of Russian science, which are still far from being used to the full.

The concept of sustainable development, as it exists today, is justifiably viewed worldwide as an interdisciplinary approach for addressing the most complex challenges, which society faces. As well as its large economic content, sustainable development also concerns geography and social ecology (which is closely related to geography).

The development in Russia of an original concept of rational environmental management was a major and datable step forward in Russian science, signaling the appearance of a new scientific field – the geography of development, – which objectively supplements development economics (or the economics of sustainable development, as it is otherwise known).

The outstanding Soviet scientist, D.L. Armand (geographer, landscape scientist and conservationist) can be considered to be an originator of the concept of rational environmental management thanks to his book, published in 1964 by Mysl publishing house under the highly significant title For Us and Our Grandchildren. The book was to be for Soviet readers what the book by the Swiss author, Jean Dorst, Before Nature Dies would be for western readers.

For Us and Our Grandchildren gave the first detailed exposition in Russian of the modern scientific approach to the use of natural resources, which treats them as crucial and eternal sources of value for human society. In effect, it was a manifesto for rational management of natural resources, offered to society as an alternative to the wastage and neglect of the treasures of nature, which had become widespread at the time (Box 2.1)
Assessing the academic achievements of D.L. Armand, historians of science usually define his work as being in the field of ‘rational environmental management.’ However, for the present purpose it is much more important that Armand’s book *For Us and Our Grandchildren* is conceptually very close and even coincides in many respects with the Brundtland Commission Report, *Our Common Future*. The title of the book, also serving as the main thesis, which the book formulates and defends, is really a brief, aphoristic statement of the concept of sustainable development: ‘Development that meets the needs of the present, but without compromising the ability of future generations to meet their own needs.’

The similarity between Armand’s book and the Brundtland Report is not accidental, as can be ascertained from the last paragraph of the book’s conclusion, where Armand writes: ‘It is the moral duty of each generation to leave natural resources for the next generation in better condition and in greater quantity than it received them from the previous generation.’ The chief idea is of distributing the bounties of nature in a way that is equitable towards our descendants.

This idea of this Soviet scientist seems to find its echo in the Brundtland Commission Report. For example, in the Report section entitled ‘Preserving and strengthening the resource base’ (a formulation that is close to Armand’s call to ‘leave natural resources for the next generation in better condition and in greater quantity’, we read: ‘It [the environment] should be regarded as part of our moral duties towards other people and future generations.’ There is a similarity both in the form of expression and in the thought contained. And it should be remembered that Armand’s book appeared 23 years earlier than the Report, *Our Common Future*.

Almost since its invention, the concept of rational environmental management has been treated as a highly interdisciplinary area of scientific research and practice, in which important roles are taken by geography, economics and biology (Box 2.2). A highly important event for the development of the economic aspect of rational environmental management was the publication of the article by the patriarch of Soviet economic science, Academician S.G. Strumilin ‘On the price of Nature’s “Free Gifts”’ (Problems of Economics 1967, № 8), where Strumilin shows the foolhardiness of the approach used at the time, where the expenses of environmental management are not reflected in the real value of created products.

The affinity between the ideas and content of the Western concept of sustainable development and the Russian concept of rational environmental management is unsurprising, since both concepts reflect the movement of civilization towards greater equity and responsibility for the future. So the ideology of sustainable development has continuity with approaches that are already well-known in Russia, although not fully implemented, and the ideology is not alien
Box 2.2. The Interdisciplinary Concept of Rational Environmental Management

The ideology of rational environmental management was rapidly adopted by economists, who used the relevant terms and ideas from the start of the 1970s, making original and often invaluable contributions to the concept. In 1973 N.P. Fedorenko and his colleagues at the Economics and Mathematics Research Center of the Soviet Academy of Sciences used in-depth analysis to conclude that environmental management represented a new, quickly developing sphere of material production. A number of component sub-systems were then distinguished: the use of natural resources (environmental management in the narrow sense), nature conservation and environmental safety.

The economists who deserve mention as having created the economic basis for the concept of rational environmental management include the Academician T.S. Khachaturov (the founder and first head of Russia’s first-ever Department of Environmental Economics at the Economics Faculty of Moscow State University), as well as K.G. Gofman, M. Ya. Lemeshev, etc.

The biological component of the rational environmental management concept is usually associated with the work of scholars such as V.E. Sokolov, N.N. Vorontsov, N.F. Reimers, F.R. Shtilmark and A.V. Yablokov, who were theoreticians and practitioners of environmental policy and particularly of the crucial issue of nature reserves. Conservation work (‘the environmental reservation of territories and water spaces’, as it is sometimes called in an international context) is rightly regarded as one of the most important components of rational environmental management and also of the Western concept of sustainable development, and underscores how closely the two concepts are related. It was no accident that Academician V.E. Sokolov represented our country in the Brundtland Commission, at the time when it originated the concept of sustainable development.

2.2. Special Research for Sustainable Development

Much of the development of science in modern societies worldwide and, specifically, in Russia is targeted at sustainable development. However, in recent years, there have been increasing amounts of specialized research and development work focused on modernization as a specific mechanism for sustainable development. In July 2011, the Russian President Dmitry Medvedev signed a decree ‘On approval of priority directions for the development of science and technology in the Russian Federation and a list of critical technologies for the Russian Federation’ ([http://www.gazeta.ru/science/2011/07/07_a_3688573.shtml](http://www.gazeta.ru/science/2011/07/07_a_3688573.shtml))

The Decree lists the following priority areas for science, technology and engineering in the Russian Federation:

2. The nanosystems industry.
3. Information and telecommunication systems.
4. Life sciences.
5. Weapon technologies, military and special equipment.
6. Rational environmental management.
7. Transport and space systems.


All of them have a crucial role to play in the country’s transition to sustainable development. They in-
clude a number of technologies, which are to become locomotives for human development in Russia:
• New and renewable energy technologies, including fuel cells.
• Technologies for monitoring and predicting the state of the environment, and for the prevention and elimination of pollution.
• Technologies for prospecting, exploration, development and production of minerals.
• Technologies for the prevention and overcoming of emergency situations (both natural and man-made).
• Technologies to reduce losses caused by social diseases.
• Technologies for high-speed vehicles and intelligent control systems for new types of transport.
• Technologies for creating energy-saving transportation systems, and for the distribution and use of energy.
• Technologies for energy-efficient production and conversion of energy from organic fuel.

The Russian Ministry of Education and Science is working on a long-term forecast for the development of science and technology in the Russian Federation up to 2030. The work includes the creation of a network of sectoral forecasting centers at leading Russian universities in priority area of science and technology development ‘Rational Environmental Management’. Network coordination is the responsibility of the Geography Faculty of Moscow State University, under the direction of the Dean, Academician N.S. Kasimov. A Center for Science and Technology Development Forecasting in Rational Environmental Management has been set up at the Faculty.

The establishment of industry forecasting centers at leading universities will help to mobilize the expert community of environmental and natural resource specialists for long-term forecasting on key areas of science and technology development up to 2030.

The project represents a platform for interaction between key universities that are pursuing educational and research activities in environmental issues and rational use of natural resources, monitoring the state of the ecosphere and its sustainable development, and addressing environmental security issues, regional development tasks, and many other urgent matters. A variety of groups (universities, research institutes, design organizations, industrial enterprises, and research and investment funds) are taking part in the initiative.

The university environmental forecasting network will also work closely with the Environmental Development Technology Platform. The Government Commission on High Technology and Innovation, chaired by Vladimir Putin, has included the Environmental Technology Platform in a government-approved list of technology platforms.

The founding conference of the Environmental Technology Platform, held at Moscow University in November 2011, approved a Provision on the Technology Platform, as well as the membership of the Supervisory Board, the Steering Committee, and the Chairman of the scientific-technical and investment councils. As decided by the Steering Committee, work is now being carried out for preparation of a programme of strategic studies and a roadmap of objectives for the Technology Platform (Box 2.3).

A number of the technologies, which are being developed as part of the Environmental Technology Platform, belong to a list of ‘critical’ technologies, having major socio-economic importance and importance for national security (the list was approved by the Federal Government on August 25, 2008). They include the following:
• Monitoring and forecasting the state of the atmosphere and hydrosphere.
• Resource assessment and forecasting of the state of the lithosphere and biosphere.
• Recycling and disposal of waste.
• Reducing the risk and consequences of natural and man-made disasters.
• Environmentally safe and resource-saving production and processing of agricultural raw materials and food products.
• Environmentally safe techniques for mineral field development and mining.
• Safe management of radioactive waste and spent nuclear fuel.
• Protecting the general public and sensitive sites against terrorist threats.

Many of these technologies coincide with key aspects of the ‘green economy’ (food security, nutrition and sustainable agriculture, water and sanitation, power generating, sustainable transport, sustainable cities and towns), progress towards which was prioritized in the outcome document of
Box 2.3. The Environmental Development Technology Platform

The Platform has been set up to support the efficiency and competitiveness of the Russian economy by coordinating the efforts of science, government, business and society to develop environmentally friendly and energy-efficient Russian technologies, address accumulated environmental problems, and ensure environmental security.

These objectives are to be achieved by:
• Development and deployment of technologies, which assist efficiency and resource economy and which reduce the negative impact of economic and other activities on the environment.
• The creation of a technology base for the elimination of previously accumulated environmental damage, and for ensuring the environmental security of major energy and infrastructure projects.
• Helping Russian environmental technologies to catch up with international standards, ensuring the competitiveness of Russian technologies in global and national markets.
• Creating market-based instruments for the regulation of greenhouse gas emissions in industry and the energy sector.
• Increasing innovation activity by firms, including the use of coordination mechanisms created by the Technology Platform for applied research at the pre-competition stage, and the establishment of a sustainable partnership with leading research and educational organizations.
• Concentration of public funding for R&D, taking account of demand from business.
• Eliminating the risk of duplication of research funded from different sources, combining different sources of funding of joint innovation projects.
• Significant expansion of opportunities for effective commercialization of technologies.

the Rio+20 Conference (‘The Future We Want’). The document calls for replacement of unsustainable by sustainable forms of consumption and production, amounting to transition to a new model of resource use and the creation of a new technological order – the most science-intensive in history.

Scientific support for sustainable development and modernization depends largely on the formation of various institutional structures, bringing together the scientific capabilities of existing academic, university and industry institutions (Box 2.4).

Box 2.4. The Contribution of Science to the Practice of Sustainable Development

The latest scientific ideas have impact on sustainable development practice in Russia thanks, in large part, to relatively new structures which have been created to support the process of modernization and which have substantial (even dominant) participation by representatives of academic and applied science. Russia’s Public Chamber has its own successfully operating Institute for Sustainable Development, which is academic in its composition and which put forward the idea of a new development paradigm for Russia on the eve of the Rio+20 Conference. A Social Council including representatives of science was set up in 2011 at the Russian Ministry of Natural Resources with the specific purpose of supporting the country’s transition to a model of ‘green’ development. The Environment Protection Commission at the Russian Geographical Society, which was re-established in 2012, will play a similar role in the field of natural heritage.
2.3. Education for Sustainable Development

Education for sustainable development (ESD) is still a relatively young concept, dating from the 1990s, but it has quickly assumed an important role as a ‘civilizing’ mission associated with sustainable development, ranging from private actions at the level of some education institutions to the establishment of infrastructure management at national and international levels. This process went ahead of the announcement of the UN’s Decade of Education for Sustainable Development (2005–2014). ESD was initially viewed with skepticism, as a mere gesture of recognition in the realm of education towards the ‘fashion’ for sustainable development. But the phenomenon of ESD has since proved that it meets a genuine need in the absolute majority of countries around the world.

As often happens in such situations, ESD had to pass through three stages in the crystallization of society’s attitude towards it: skepticism, bordering on total rejection, was followed by cautious and sometimes condescending acceptance that its basic concepts may have a role to play, until it was finally accorded full and unconditional recognition. In nearly all countries of the world there is still some distance remaining to the third stage, but steady movement towards it is unmistakeable. A reassessment of attitudes to ESD is also taking place in Russia.

In Russia the idea of ESD was initially viewed with much suspicion by some and evoked a definite negative reaction from others. Most experts did not see what contribution it could make to the national education system. Professionals perceived ESD as something incidental, perhaps even speculative and imposed from outside. They (rightly) believed such a concept could only have a future in Russia if it responded organically to the national context and offered continuity with Russian traditions and realities. Without this, it would be difficult for the concept of ESD to take root in Russia, even if it had strong support from above (driven by political considerations).

But the ideas of ESD have started to take root in Russia at the beginning of the 21st century, helped by the logic of human development at the start of the new millennium. The community of education professionals has taken an objective interest in ESD as an educational concept. Teachers and organizers have seen the real potential of ESD, which, though it may not be capable of rescuing the Soviet educational system – once reputed the best in the world, – can nevertheless prevent the total destruction of that system and help to adapt its surviving elements to the new realities.

Such should be the position of the Russian government, which understands that education in our country is a decisive factor of change. Russia has declared education to be a national priority, underpinning the success of a cultural revolution and of the country’s modernization ever since the revolution of 1917 (i.e. long before the Johannesburg memorandum and other UN documents, which gave the green light for ESD). One of Lenin’s favorite sayings was: ‘Learn, learn and learn!’

The UNESCO World Conference on Education for Sustainable Development, held in 2009 in Bonn, was the central event of the UN Decade of Education for Sustainable Development and was also the
most important political action by the international community in modern times for the establishment of a global education policy. The Conference served as a link between all the preceding and subsequent efforts in the international arena, which have worked to ensure that education is acknowledged as the most important social institution of modern civilization, and as the best means for rising to the challenges of our time.

The results of the Conference were presented in its main policy document: the Bonn Declaration. The Declaration includes the important assertion that ESD is a new direction in education for all (paragraph 6) and it also notes substantial advances by ESD in countries around the world (paragraphs 11-13). ESD has the highly important mission of establishing the values, knowledge, skills and competence for people to live in a sustainable fashion (paragraph 4).

There is general agreement in the educational community today that the main bottleneck in advancement of ESD is a widespread discrepancy between teacher qualifications and actual needs. In 2011, in order to address this problem and achieve improvements, the UN Committee on Environmental Policy approved the document ‘Learning for the Future: Competence in the Field of Education for Sustainable Development’, which was designed by a group of experts with Russian participation.

The paper argues that increase of the capacities of teachers must be a central element of any initiative to improve professional qualifications. Teachers themselves are key agents of change in education systems. The effectiveness of educational reforms depends on the readiness of teachers for change, on their ability to implement change and the assistance, which they receive for that purpose. The document places special emphasis on the need to develop the competencies of teachers working in higher education. Universities play a crucial role in shaping future leaders and specialists in various fields, including education itself. While recognizing the contribution of academic freedom in the creation of knowledge, teachers at this level must also take account of their actual skills and strive to develop them.

The document presented by the UN Committee on Environmental Policy sets out the teacher skills, which need to be purposefully developed in order to give the ideas of sustainable development a firm basis worldwide. This original blueprint by international experts has been received with interest in Russia.

2.4. ESD and Education Policy in Russia

Russia, like all the states of the former Soviet Union, had strong traditions as regards the scientific, methodological and organizational aspects of its education system, the rich history of its universities and teacher-training colleges, and the high-quality of its employment training. This also applies to environmental education in these countries. ESD in the region is mainly developing as a natural next step, based on past experience of environmental education, and also including economic and social components. At the same time, the experience and traditions of the education system lay a solid foundation for the construction of an ESD system. The success of this enterprises is supported in our countries by a centralized approach, the presence of national standards, and an established system of basic curricula and common programmes.

It is internationally recognized that environmental education and the ‘greening’ of education provide a launching pad for ESD. Russia has been and remains one of the world leaders in this area, as evidenced by many facts, which have been acknowledged by experts. The number of Russian universities, where there are departments and programmes with an environmental profile, increased from 2 to 160 over the period from 1995 to the present. As might be expected, almost all of Russia’s universities associated with geographical, biological, and environmental education are helping to promote ESD in Russia in one way or another.

The key socio-economic impacts of the ‘greening’ of education at the national level in Russia include the following clear results:

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• Mitigation of environmental crisis impacts in Russia.
• Development of environmental infrastructure.
• Providing access to environmental information.
• Increased environmental awareness.
• Creating a network of environmental non-governmental organizations as an element of civil society.

It is clear, however, that the results listed above have not delivered and could not alone deliver a decisive breakthrough in the environmental situation for Russia and the world. This is due, among other things, to the emergence of new global challenges that have a significant national component and that are relevant to Russia. They include global climate change, increasing threat of natural disasters, the increasingly acute problem of access to good-quality water, the problem of food quality, collapse of the waste management system, etc. In analyzing the causes of increased global environmental situation the inadequacy (outdated character) of the education system (formal and informal) to the challenges of the time becomes apparent.

In recent years, researchers in the field of awareness and education have repeatedly pointed out that the main ideas of ESD were already inherent to Russian education, as it existed in the pre-Soviet and Soviet periods. It is also understood that the widely recognized achievements of our education system are largely due to its close association with academic science.

The idea that social development needs qualities such as reliability, durability, and sustainability has been integral to the progress of Russian science for at least the last two centuries. In the expression of Vasily Dokuchaev, the outstanding Russian geographer and soil scientist: ‘Only what is done in harmony with nature can be solid, durable, vital, profitable and guaranteed to last into the future.’ This thought, which is germane to all of Dokuchaev’s work and to the creative concepts of this outstanding Russian scientist, is a clear forerunner of the concept of sustainable development.

ESD took shape in Russia in the late 1990s, when major studies were carried out to establish the nature of this global innovative educational project. The studies were carried out at leading Russian universities, institutions of the Russian Academy of Sciences and the Russian Academy of Education, and at some non-governmental organizations. Studies in the theory and practice of ESD were supported mainly by the Ministry of Education and Science of the Russian Federation, as well as scientific, public and private foundations, including several based outside Russia (in the UK, USA, Sweden, etc.).

The results of such studies have been the subject of scientific and practical conferences and seminars since 2000, and have also been extensively presented in the scientific literature, the popular press and electronic media, as well as being increasingly presented in publications abroad, proving their quality and the interest, which they inspire in the foreign scientific and educational community.

Scientific and applied research topics concerning ESD in the works of Russian specialists include:
• The interpretation of foreign experience in the establishment of ESD and related educational paradigms.
• Studies of main approaches to greening, humanization and socialization of education (formal and non-formal, from pre-school to post-graduate).
• The development of innovative ESD models in the form of study programmes, educational disciplines, teaching materials, etc.
• Adapting ESD capacities to meet current challenges and educational specifics.

The phenomenal growth of research work in this field and its relevance to current educational practice shows the topicality and social significance of such work.

Scientific study of the ESD concept in Russia prepared the way for experiments in practical implementation of this paradigm in secondary and (to an even greater extent) in higher education. Teaching of the scientific principles of sustainable development has now begun at a number of Russian universities (Moscow State University, St. Petersburg State University, the Russian Presidential Civil Service Academy, Mendeleev University of Chemical Technology, Moscow Independent Environmental-Political University, etc.). Masters programmes in various aspects of sustainable development have also been designed and are being implemented at leading universities of Russia, as well as at a number of leading Western universities. The results obtained to date in such programmes are very promising.

Support from the educational and scientific community and from government, political circles and civil society structures have all been essential to the successful establishment of ESD in Russia in the last
decade. Nearly all of the debates concerning ESD inside Russia have been accompanied by political declarations in support of it.

A national scientific-practical conference entitled ‘Education for Sustainable Development in Russian Higher Education: Scientific Principles and Development Strategy’ was held at Moscow State University in October 2008 with the participation of the Ministry of Education and Science and the Public Chamber of the Russian Federation. The final resolution of the conference stated: ‘The decisive factor in ensuring broad support for the doctrine of education for sustainable development in Russia – as previously for the concept of sustainable development as such – is its conformity with our national interests in the field of education. The concept of education for sustainable development is fully consonant with the basic provisions of the priority national project “Education”, which is being successfully implemented in Russia at the present time. Adopting the principles of the ESD global innovation project expands real opportunities in the sphere of education in Russia through integration of the best domestic achievements with the progressive innovations of foreign countries.’

Issues of sustainable development and the promotion of ESD have been repeatedly considered in the Federal Assembly of the Russian Federation, the Public Chamber of the Russian Federation and in special projects implemented by the country’s political and social organizations. One example is offered by parliamentary hearings, ‘On participation by the Russian Federation in implementation of the strategy of the UN Economic Commission for Europe for sustainable development education,’ which were held on May 25, 2006. By adopting specific recommendations to the various branches of the Russian government, the participants of the hearings gave their clear support to the UNECE strategy and to work on a national ESD system. Much work in support of educational innovation has also been carried out at national level by the Public Chamber of the Russian Federation and by a number of other public organizations.

The Russian government is in no hurry to define its position with respect to ESD, and this is clearly not conducive to its advancement. This may be due in part to lack of understanding of the attitude of students (those for whom the new educational ideology is ultimately intended) concerning ESD. It is therefore highly important to establish how students do in fact view the ideology of ESD, and their attitude can also be taken as one of the most accurate indicators of the adequacy of national education policy in this field. So thinking about the ideology of ESD leads to an understanding that the views, interests and attitudes of students must be taken into account at all stages of the formation of this ideology and of its implementation in specific educational practices (Box 2.5).

Box 2.5. Web-Seminars on Education for Sustainable Development

Taking account of the interests of students may in some cases lead to the adjustment of sustainable development teaching curricula in higher education. The course on sustainable development, taught at the Department of Geography at Moscow State University includes web-seminars. Each year, students are offered a new and original seminar theme, which allows the students to fully realize their creative potential, and offers faculty members and other stakeholders a unique social cross-section of a mature professional community. The following seminars have been held in the past:

- Sustainable development ideology in geography education (2007).
- Sustainable development ideology in higher education (2008).
- The potential for sustainable development in Russia: assumptions, factors and risks (2010).
- Risks for sustainable development in Russia: geographical discourse (2012).

These seminars represent a multifaceted attempt to introduce ESD ideology as part of a specific educational practice. The results were found to have much significance and have been systematically presented to the public in the form of blocks of speeches given at the seminars (available on the Faculty website, http://www.geogr.msu.ru/science/projects/our/web/).
2.5. Problems and Prospects

It might be expected that a comprehensive system of ESD would arise in Russia on the solid and sustainable foundation of environmental education, and there are both methodological and organizational-political conditions for this to happen. However, what often happens is that environmental education, being the driving force of the process, becomes a substitute for ESD. This state of affairs contains nothing that is surprising at first sight, but it shows that environmental and conservation courses based on ESD are inadequate in their present form and that a comprehensive approach is needed, which enables full integration with economic and social disciplines, implementation of the principles of sustainable development in the management and organization of educational process and other areas of university life, as well as the development of partnerships with other sectors of society, and work on education of the general public, capacity building and the use of media. At present these needs are not obvious, and what in fact happens is a ‘substitution’ of concepts: environmental education is altered contextually into SD, while its content is kept the same. One of the tasks in implementing the UNECE Strategy for ESD is to ensure the full development of ESD, not instead of but together with environmental education.

One of the problems of ESD is the slow integration of environmental aspects into vocational and general education courses, weak interaction between secondary schools and universities, and lack of motivation among teachers, lecturers, civil servants and education authorities. There is a shortage of real experience in management and implementation of ESD policy in schools. ESD financing and personnel are inadequate, and sustainable development still has low priority as an objective for society.

There is a lack of teaching materials and of quick access to data in national languages on the Internet. Instead there is a prevalence of Western publications in translation, which are not always suited to local cultural, historical and economic conditions, and are not quality-controlled to national standards. There is still insufficient training and retraining, especially for the purposes of teaching at secondary-school level.

There have been plenty of achievements in Russia in the field of ESD and other areas of education. But the attention of all those concerned with the development of ESD is understandably focused on the problems, which are constraining its development in Russia. The most frequently cited problems are:

- Weak support for ESD as a new educational paradigm on the part of government, especially regional and local government.
- Relatively little acceptance of sustainable development in society due to lack of prestige attaching to the concept.
- Overall degradation of the system of education and culture in the post-Soviet period.

The overall change of the international political climate, deepening antagonisms between individual countries and groups of countries, the struggle for geopolitical supremacy and desire for a new division of the world could not fail to reflect on the process of international cooperation in the field of ESD. Recent years have seen increasing ‘exploitation’ of the concept of ESD in the form of excessive attention to ‘fashionable’ topics. These include a list of issues that are being actively discussed at the global level as part of international cooperation in the field of environment and development, and also a number of global environmental conventions. There has been a spawning of educational courses and projects under such titles as ‘ESD and climate change’, ‘ESD for sustainable production and consumption’, ‘ESD and the concept of environmental security’, etc., all of which attempt to use topical themes or associative pairs to draw attention to traditional issues. There are many reasons for this, including marketing techniques and attempts to obtain financial support for the pursuit of traditional objectives. As a result donor interest has shifted from purely environmental issues and become vaguely focused (on cross-sectoral partnerships and the transition to sustainable development, gender issues, youth involvement, support for ESD as an alternative to environmental education, and other matters).

A political platform, strategic documents, regular reviews of progress and exchange of experience are important milestones on the road to success. But much remains to be done before ESD in Russia can move beyond the stage of attractive theory and successful innovation projects to attain full expression in reality. The priorities for achieving that transformation include:

- Active involvement of the Ministry of Education and Science (the creation of expert groups, cross-
sectoral cooperation, community advisory boards, etc.).

- Attracting budget, non-budget and donor funding, facilitating a favorable tax regime for support to ESD structures.
- Actual implementation and use of sustainable development principles in the running of education and training institutions.
- Conceptual division between environmental education and ESD.

What is needed in the sphere of formal education is the development of new standards and/or the inclusion of ESD in existing standards, real integration of ESD in vocational courses, and training and retraining of personnel for ESD. A national methodological journal in the field of ESD would be very useful, since it would make it possible to compile and disseminate best practices for school and university teachers, as well as for researchers, policy makers and ESD practitioners, contributing to the expansion of national dialogue and cooperation in the field. Educational materials for ESD in the Russian language and based on local materials should be published and republished, and resources should be professionally and systematically catalogued in the RuNet (the Russian-language internet).

Higher education represents the vanguard of ESD in Russia. This makes it crucial that the rudiments of sustainable development should be a part of the training of all higher-education professionals. Retraining of decision-makers and educators using ESD principles should be carried out systematically in all parts of Russia. It is highly important to provide guidance and practical help to universities and secondary schools in ESD. As well as theory and methodology, the education system will need to adopt ‘sustainable lifestyles’ in practice – in university administration, energy management, use of materials, energy conservation, transportation planning and procurement, etc. Real progress will only be possible through the practical application of sustainable development principles in management, planning and everyday life.

Much also remains to be done in the spheres of informal education and instruction. Successful implementation of ESD depends on application of the principles of sustainable production and consumption, using the media and social advertising for broad presentation and popularization of the ideas of sustainable development. The creation of partnerships requires the mobilization of resources and support from all sectors of society. Environmental education programmes in sustainable development using the potential of protected natural areas are particularly promising.

The points made above and the course taken by Russia’s leadership towards national modernization (inconceivable under present conditions without emphasis on environmental aspects), mean that further steps towards the establishment of environmental education have to be taken. The essence of these steps will be a radical modernization of the education system by the introduction of environmental aspects in all subjects taught in secondary and higher education (from mathematics to linguistics), together with work to raise environmental awareness among the general public by means of both formal and non-formal education. We believe that new international standards for environmental education and ESD are essential in this context, whether as a part of ISO/RISO 14000 or as an independent system of standards similar to ISO/RISO 14000. There is also a need for radical modernization of the system of specialist training in the field of environmental policy and natural resource management through universal innovative master programmes in environmental administration, based on established MBA programmes (Box 2.6).

**Box 2.6. A Russian-Swedish ESD Project**

The joint project between Russian and Swedish parties was inspired by a mutual desire to share experience in in the field of education for sustainable development. The project partners at government level were the Swedish Environmental Protection Agency and the Russian Ministry for Natural Resources and the Environment, and the research and educational institutions concerned were the the Russian Presidential Civil Service Academy, Moscow State University, and three Swedish universities that are ESD leaders: Lund and Baltic (Uppsala) Universities and Lulea University of Technology.
The aim is to share ESD experience, identifying, improving and testing new educational methods that are needed for the further education of civil servants in the field of sustainable environmental management in Russia. Particular attention is paid to the key concepts of sustainable development, such as the ‘green’ economy, biodiversity, sustainable cities, ‘environmental footprint’, clean production and sustainable consumption, renewable sources of energy and energy efficiency. The project has been linked with other projects in the framework of Swedish-Russian environmental cooperation, particularly those in the Barents Sea and Baltic regions.

The main idea of the project is to design and improve approaches to the system of additional education and retraining of civil servants and decision-makers by organizing and holding educational seminars in the relevant field. The target audience includes government officials responsible for environmental policy and decision-making in the relevant federal government bodies of the Russian Federation and the staff of scientific and educational institutions involved in ESD. The project has 12 directions for work, grouped into three main parts: 1/ training sessions, 2/ the dissemination of information and 3/ assessment and recommendations.

The educational seminars, which have been held in Moscow and other regions of Russia, have proved effective both for those directly involved and for the institutions they represent. More information about the project can be found at http://www.geogr.msu.ru/science/projects/our/ross_swed/.

Conclusions and Recommendations

The world is finding a new way of living with technology, where qualitative characteristics will depend largely on new approaches to natural resource use. The world is entering into a new technological order, where qualitative characteristics will be largely determined by the technology of the “new environmental management”. These are more needed now than ever before as the inevitability of ‘greening’ of the economy (a move away from the moribund ‘grey’ economy) becomes increasingly apparent. Humanity seems to have no other option but to make the economy and ways of life conform to environmental criteria. There is no alternative to the green economy.

The new global development paradigm requires observance of natural ‘limits to growth’, adapting our social and economic parameters to the conditions of the environment. Finding a solution to this unprecedentedly complex problem is only possible by making science serve the goals of sustainable development. Academic and applied science in Russia is aware of its responsibility to ensure technological breakthrough to a sustainable future. But that will require dozens and possibly hundreds of Russian research centers similar to that already established at Skolkovo and much greater state support for science and education than is now available.

Genuine changeover to a ‘green’ economy in Russia requires real adoption of environmental criteria in industry, for which Russia is essentially ready, having a system for the training of specialists in this field already in place. But more is needed to make the transition to sustainable development not only in word but in deed. The experience of recent decades shows that Russia’s attempts to travel the path of sustainable development have been unsuccessful and the country has actually been marking time. The main reason for this must be the inability of the country’s leaders (all or nearly all) to make such a transition.

Until now, leaders in all spheres of Russian life have had a fairly abstract or even a distorted picture of what ‘sustainable development’ means, including its environmental component. In a country where, as ever, bureaucrats decide everything, they are continuing to do so without taking account of the urgent need for transition to sustainable development. The requirements of social justice, social responsibility
and environmental culture are viewed as pleasant-
ries, and not priorities that need to become a part of
our living arrangements.

In this situation the only way to achieve radical
change for the better is to appoint people with ad-
equate knowledge, skills and competence in the field
of sustainable development to positions of respon-
sibility at all levels and in all spheres of life, and this
is only possible by means of appropriate modern
educational technologies. Some specific recommenda-
tions of this kind are given in the previous section.
However, the extent of the new educational paradigm
in Russia can and should be much greater, reflecting
the processes and phenomena that can be observed
in other parts of the world.

The historic summit in Rio de Janeiro in 1992 set
out an Agenda for the 21st Century, which identified
a wide range of strategies to achieve sustainability,
including a key role for education. It was hoped that
national governments would review the state of envi-
ronmental education situation in their respective
countries and strengthen their support for it at all
levels. Work is indeed underway around the world
to put ESD systems in place. In developed countries,
it has led to impressive development of the institu-
tional framework and the provision of government
support. This experience is of interest to Russia. But
while creative borrowing of foreign experience can
prove valuable, it is also necessary to fully utilize do-
mestic potential in the respective fields.

A global project for ESD represents a unique op-
portunity to raise the status of education as a civiliz-
ing institution. It also offers a real chance to demon-
strate the potential of science to modern society, and
to introduce environmental culture as a vital element
in the system of knowledge and skills that can en-
sure the genuine stability and well-being of society.

The ongoing discussion of how to establish
ESD in Russia is occurring in a post-crisis context,
and it creates many new challenges for our soci-
ety. But that in no way detracts from the urgency
of such improvements to education. The words of
the great Russian scientist and humanist, Academi-
cian Vladimir Vernadsky, are more relevant now than
ever: ‘Russia’s salvation depends on the expansion
of education and knowledge.’ And we, his descend-
ants, can see ever more clearly that the same precept
is the road to salvation, not only for Russia but for
the whole world. There is nothing available to us in
today’s society, which is better suited for addressing
crises and achieving sustainability, than ‘the expan-
sion of education and knowledge.’ And this is true
not only with respect to economic crises, but also
to environmental and social crises, which represent
even greater challenges for humanity.
3.1. Lifestyle and Public Health in Russia

Health is an essential component of human development, and it largely determines the long-term sustainability of socio-economic development in any country.

The main indicators of public health are mortality rates and life expectancy at birth. Recent years have seen trend improvements in both of these indicators. The mortality rate decreased from 16.1 per 1,000 population in 2005 to 13.5 in 2011 (Figure 3.1), while life expectancy at birth increased from 65.3 years to 69.8 years.¹ The total fertility rate (average number of children born to one woman of reproductive age) rose from 1.287 to 1.606 during the same period.²

These changes are explained by a number of factors:

• Change in the structure of women of reproductive age.⁴

• Demographic policy measures to stimulate fertility (‘maternal capital’ provided by the Government since 2007 to women who give birth to a second child and other support measures for families with several children).

• Reduction of per capita alcohol consumption (from 9.7 liters of pure alcohol in 2007 to 8.9 liters in 2010).⁵

• Increased access to quality health care thanks to the creation of perinatal centers, expansion of targeted programmes on cardio-vascular disease, tumors, tuberculosis, and to provide medical assistance to the victims of road accidents, increase of the number of patients receiving free tertiary care by

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² The state of reproductive health in Russia is considered in Box 3.1.
2.5 times over the period 2006–2011, etc.\textsuperscript{6}

- Higher income levels of Russian households, giving them greater access to effective drugs for outpatient treatment (real disposable income per capita rose by 1.42 times from 2006 to 2011 and spending by the general public on medicines and medical supplies increased by 1.94 times in comparable prices).

However, it is very difficult at this stage to make a comparative assessment of how these different factors have contributed to the indicator trends described above. The causes of the observed positive changes require further analysis.

The mortality rate in Russia has fallen, but remains substantially higher than in the EU countries (by 1.4 times). Mortality is particularly high among people of working age. The probability of dying between the ages of 15 and 60 years is almost twice greater in Russia than the European average (the respective figures were 255 and 146 per 1,000 people in 2009). Life expectancy at birth for Russian citizens is 11 years less than for EU citizens.\textsuperscript{8}

Conclusions about the state of health of Russians can be drawn from dynamics of primary morbidity (number of new cases of disease) and overall morbidity (Box 3.2). They increased until 2009 and decreased only slightly in 2010 (Figure 3.2). In 2011, primary morbidity increased slightly. The morbidity dynamic may reflect changes in the health status of the population, and it may also reflect better work by the healthcare system (greater access to healthcare). According to the Ministry

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure3.2.png}
\caption{Morbidity rates per 1000 people in Russia, 1990–2011. Sources: Rosstat and the Ministry of Health and Social Development\textsuperscript{9}}
\end{figure}
of Health of the Russian Federation, the morbidity dynamic in recent years is explained by increase of disease diagnosis and better access to health care, and this dynamic is an indirect indicator of a new trend towards health improvement among the Russian population. But it must be remarked that the rate of growth of overall morbidity in 2005-2009 (9.8%) exceeded the rate of growth of primary morbidity (7.6%), which suggests that chronic diseases became more prevalent. A household survey found that 46% of respondents aged 15 and over suffer from a chronic disease.

The majority of Russians (60% of respondents) say that they look after their health. But the practices they refer to are usually passive in nature: exposure to fresh air is cited by 53% of respondents, while avoidance of overeating, use of vitamins and physical exercise are cited two or three times less often (Figure 3.3). On average, only about 20% of respondents are engaged in exercise and sport for health purposes. And one in five adults make no effort whatsoever to care for their health. The major obstacles to a healthy lifestyle, which are referred to, are not lack of money or access to sports facilities, but lack of free time, lack of motivation (no desire, too lazy) and tiredness.

Smoking and alcohol abuse are widespread in Russia: 35% of the adult population (55% of men and 18% of women) smoke and approximately 18% are passive smokers, while 59% of the adult population consume alcohol, and 27% consume spirits at least a few times a month.

The main factors provoking non-infectious diseases among the Russian population are high blood pressure (35.5% contribution), hypercholesterolemia (23.0%), smoking (17.1%), inadequate intake of fruit and vegetables (12.9%), obesity (12.5%), physical inactivity (9.0%), and alcohol abuse (11.9%).

**Figure 3.3.** How Russians look after their health (distribution of answers to the question: ‘Which of the following did you do in the last 12 months to preserve and maintain your health and fitness, other than medical treatment?’, %)

*Source: All-Russian Representative Survey of Households, Higher School of Economics and the Levada-Center, 2011.*

10 Improved diagnosis of disease was due to additional screening of several categories of employees, in compliance with the Decree of the Ministry of Health and Social Development of the Russian Federation № 290 ‘On the procedure and terms of payment for additional medical examination of employees and for provision to them of primary health care’ (14.04.2006), and also due to implementation of sub-programmes (‘Diabetes’, ‘Tuberculosis’, ‘HIV infection’, ‘Oncology’, ‘Sexually transmitted diseases’, ‘Viral Hepatitis’, ‘Mental disorders’, ’High blood pressure’ as part of the federal target programme ‘Prevention and Control of Social Diseases (2007-2012)

11 Here and throughout this section data are taken from a sociological survey of the population on the subject of healthy lifestyles, carried out by the Higher School of Economics and the Levada-Center in October and November 2011 on a sample of 4,000 respondents living in urban and rural areas of Russia and aged 15 years and over.

3.2. Current Challenges and Problems in Organization of Healthcare

The high level of mortality remains the principal challenge for the Russian health care system, despite significant decline of mortality in recent years. According to estimates by experts of the World Health Organization, economic losses from deaths due to heart disease, stroke and diabetes in Russia amounted to 1% of GDP in 2005. For comparison, the figure in other BRIC countries was less than 0.35% of GDP, and the level in countries such as the UK and Canada was less than 0.1%.

Proper response to this challenge requires significant changes to lifestyles, the environment (particularly in urban areas, see Box 3.4) and to the healthcare system itself.

The Government has done a lot in recent years to improve the healthcare system: a network of health centers has been set up to identify risk factors among the general public; the large-scale ‘Health’ federal programme has been underway since 2006, including the provision of material and technical equipment for outpatient and emergency services nationwide; large-scale vaccination and prophylactic services have been made available; high-tech healthcare has been put in place and new regional centers have been built to provide this and other medical care. Regional healthcare modernization programmes have been implemented in 2011–2012 in each region with financial support from the federal budget, including the equipping of health facilities with the latest medical equipment and computerization (electronic reservation of an appointment with a doctor, electronic records of illness, a unified personalized database of patients), the introduction of modern treatment standards, greater linkage between remuneration to payment healthcare workers and results achieved, etc.

Spending on healthcare in Russia is growing steadily (public expenditure on health grew by 1.4 times in real terms during 2006-2010), but it remains much lower than in the EU in both absolute and relative terms. The share of total health expenditure in GDP is 1.8 times less than in the EU (5.4% against 9.8% in 2009), while the share of public expenditure on healthcare in GDP is 2.1 times less than in the EU (3.5% compared to 7.3% in 2009). In absolute terms, the Russian government spends 3.5 times less per capita on healthcare than the average for the EU (USD 669 compared with USD 2371, respectively, at purchasing power parity in 2009).

Passing of a law on compulsory health insurance at the end of 2010 has supported modernization of the health financing system, which should make it more stable, even out levels of financing of medical care provision in all regions of the country, and make the functioning of medical institutions more efficient.

A new law on healthcare provision,15 passed in November 2011, should strengthen government guarantees of free medical care, ensure that care is more available, make it easier for people to choose their medical organization and doctor, and make the healthcare system more manageable. A government programme entitled ‘Development of the Health System’ was passed at the end of 2012 16 for the period up to 2020. It is expected to give the following results:

- Motivate people towards more healthy lifestyles.
- Increase public satisfaction with the quality of healthcare services.
- Ensure that any Russian citizen, regardless of his place of residence, will receive a guaranteed volumes of medical care, based on single standards of availability and quality.
- Increased the attractiveness of healthcare work, level of training of medical personnel and the prestige of the profession, partly by means of a substantial increase in wages.
- Create conditions for population growth and increase of life expectancy.

Specific programme targets include:

- Reduction of mortality from all causes to 11.4 per 1000 population by 2020.
- Reduction of the maternal mortality rate to 15.5

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16 The Programme was approved by Russian Government Order N° 2511, dated December 24, 2012.
deaths per 100,000 live births and infant mortality to 6.4 per 1,000 live births by 2020.

- Reduction by 2020 of the mortality rate from diseases of the circulatory system to 622.4 people, from traffic accidents to 10, and from neoplasms (including malignant neoplasms) to 190 per 100,000 people.
- Reduction of alcohol consumption to 10 liters of pure alcohol per capita per year, and reduction of tobacco smoking to 25% of the adult population and 15% of children and adolescents.
- Increase of life expectancy at birth to 74.3 years by 2020.

There have been positive changes in government health policy in recent years, but the steps taken have not been sufficient for an effective response to the challenges, which the health system faces. The system continues to be focused primarily on the treatment of people who are already ill, the greater part of public spending on health care is focused on this task, while only a small part is spent promotion of healthy lifestyles, and on the prevention and detection of diseases in their early stages. Measures to develop healthcare facilities are insufficiently coordinated with efforts to improve non-medical factors of health improvement (lifestyle, physical exercise, environmental issues, etc.).

Healthy lifestyle policy has progressed in Russia in recent years: important programme documents have been approved, health centers have been set up, excise duty rates on alcohol and tobacco have been increased, etc. (Box 3.3).

However, the scale of action to promote healthy lifestyles is still inadequate to fully exploit their potential for reducing morbidity and mortality. According to the household survey mentioned above, 43% of people do not notice anti-advertising for tobacco, 53% have never seen anti-advertising for alcohol and 55% of the population are unaware of the existence of preventative health centers.

The Russian healthcare system suffers from serious structural imbalances. They include the dominance of inpatient care and poor development of primary care, rehabilitative and medical-social services, as well as insufficient coordination between medical institutions and doctors at different stages of care. The share of spending on inpatient care in total healthcare costs is almost twice higher than that on outpatient care, while in Western countries their shares are about equal. More than 30% of hospitalizations could be replaced by outpatient care without harm to the patient’s health.

Real change requires substantial political, organizational, financial resources and a period of time. At least 8–10 years will be needed in order to achieve a material improvement in the structural efficiency of healthcare, and the longer the changes are postponed the more expensive it will become for government to maintain healthcare in its present state.

Rapid development of medical and information technology presents new challenges to the healthcare system. This development offers the possibility of a radical efficiency increase in the detection of individual risk factors, early diagnosis of disease, reducing the volume of patient care by use of minimally invasive outpatient surgery, telemedicine and remote monitoring of a patient’s condition. These advances will, in turn, stimulate structural changes in the healthcare system. The development of medical technologies generates growth of the demands and expectations of patients and doctors, the satisfaction of which requires every greater resources, because new technologies are increasingly expensive. Access to new technologies will initially be limited to those who are fortunate enough to obtain the appropriate quotas for free treatment, and those who can pay for the full price for treatment. The current system of tertiary care financing does not meet the new technological challenges and, if left unchanged, will constrain the scale of introduction of new technologies.

The Russian healthcare system faces the challenges of increasing and equalizing access to quality health care for different social groups in different regions, and of providing better protection for patients against the risk of incurring high costs for treatment. Despite the broad guarantees of free medical care, which are now in place, some 29% of people seeking medical care pay for their treatment in full.

Lack of public awareness about patient rights and opportunities for obtaining free medical care is a major problem, as is uncertainty about how much treatment should cost. Mechanisms for people to pay for their own treatment in a transparent and controlled manner are insufficient, as development of the market for paid medical services has not been accompanied by the required strengthening of its regulation in the interests of consumers and to ensure effective competition. Both those who are treated gratis and those who pay risk being treated by medical personnel who are not properly qualified. Patients may not receive the attention they need, and effective mechanisms to protect patient rights are lacking.

Doctors themselves admit that the level of qualification of medical workers falls short of modern professional requirements. This is due to deficiencies in the system of medical education and low wages. The salary of a Russian doctor is 25% above the national average wage (2012), but in the countries of Central Europe it is 1.5–2 times higher, and in leading industrial countries even young doctors belong to the upper-middle class as measured by income level.

It is notable that the Russian population perceives the state of the healthcare system as much worse than that of other social sectors, with the exception of social services (Figure 3.4).

**Figure 3.4.** Answers to the question: ‘In your opinion, what is the current state of the listed social sectors in our country?’ (% of respondents)

Source: All-Russian Representative Survey of Households, Higher School of Economics and the Levada-Center, 2009

<table>
<thead>
<tr>
<th>Social Sector</th>
<th>Don’t know</th>
<th>Bad</th>
<th>Satisfactory</th>
<th>Good</th>
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<tbody>
<tr>
<td>Culture</td>
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<td>36</td>
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<td>5</td>
</tr>
<tr>
<td>Healthcare</td>
<td>2</td>
<td>53</td>
<td>40</td>
<td>5</td>
</tr>
</tbody>
</table>

0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

3.3. Healthcare Policy for Sustainable Development

In order to meet the current challenges, Russia needs an active modernization policy that is capable of creating an integrated, transparent and effective system of health care.

3.3.1. Creating an integrated system of healthcare

Improvement of the state of health of the Russian population requires the creation of an integrated healthcare system, providing a comprehensive mul-

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19 Data of the Russian Ministry of Labour.
ti-sectoral approach to health, coordination between organizations that offer different types of care, and a genuine partnership between the general public and health-care organizations to prevent, detect and treat diseases.  

Substantial improvements to public health can be achieved through a comprehensive strategy that combines medical and non-medical factors of disease control in an optimal fashion. The greatest and most underused potential is for reduction of morbidity and mortality among people of working age (Box 3.5). While continuing to build capacity in the treatment of severe diseases, which most often affects the elderly, there also needs to be a dramatic increase in preventive medicine, promotion of healthy lifestyles and environmental activities. Modest growth in levels of spending on these items can provide major improvements to public health.

Key steps that need to be taken in order to encourage healthier lifestyles among the Russian general public are as follows:

- A total ban on advertising of tobacco products.
- Gradual introduction of a ban on smoking in public places.
- Gradual increase in excise tax on alcohol and tobacco products (tobacco prices should be prohibitive for adolescents).
- VAT increases on some food products that are particularly harmful to health (sweet soda, fast food, etc.).
- Public access to sports facilities at educational institutions, sports schools, and sports infrastructure belonging to government agencies.
- Inclusion of healthy lifestyle teaching as a part of the standard curriculum at primary and secondary schools.
- Large-scale expansion of social advertising of healthy lifestyles in the press, television and Internet.
- Involvement of all ministries and government departments in public health, expanding the powers of the Ministry of Health as coordinator of these efforts.

The healthcare system needs structural changes to optimize the balance between inpatient and outpatient care.

The burden on specialists and hospitals can be reduced by increasing the efficiency of primary health care, providing training for primary care doctors, expanding their functions in the healthcare system and improving their equipment. For this purpose, primary care doctors should gradually learn some of the functions of specialist doctors and take over functions for the organization and coordination of care provision at all stages. Their routine work load (accounting, processing of medical records, writing prescriptions, etc.) must be reduced by computerization and the partial transfer of these functions to nursing staff in order to leave them time for the extra care functions.

Outpatient care can be improved by chronic disease management programmes at polyclinics (identification, ongoing monitoring, training of patients with chronic diseases, etc.). As a first step, such programmes should be developed at federal level for asthma, diabetes and stroke.

Integration of work by various links in the medical care system will enable unified electronic medical cards for patients. Current deficiencies in continuity between primary care, secondary outpatient care and inpatient care can be largely overcome by replacing paper records by electronic medical records throughout the system.

Electronic media will be increasingly used to support doctor’s orders (reminders on self-treatment procedures and medication, warnings of possible complications, arranging tests and informing of their results, adjustment of drug therapy and writing of prescriptions).

Bed availability in hospitals needs reorganizing to ensure more efficient use of resources in hospital care. This means the concentration of specialized medical care at large hospitals and the formation of sub-regional centers for specialized medical care, leading to changes in outpatient care and reduction of excess numbers of hospital beds. Such transformation has already begun, but only in certain regions and on an insufficient scale.

3.3.2. The development of human potential in healthcare

Government policy needs to emphasize human development and greater efficiency of labour con-
tracts in the health sector as a way of ensuring growth of skill levels and quality of medical staff.

Russia’s political leadership has set the goal of increasing the average salary of doctors to 200% of the average wage in respective regions by 2018, and ensuring that average salaries of low and middle-level medical personnel reach 100% percent of the average wage. More efficient work contracts for healthcare workers (higher wages, increased differentiation and linkage to specific levels of service quality and quantity) should be introduced stage-by-stage together with the introduction of a new system for certification of personnel and raising their responsibility for service quality (including financial mechanisms). Existing certification of health workers when they complete courses for raising of qualifications once in five years should be replaced by a new kind of certification that takes account of the specific modules, which the health workers have studied in the system of continuous education, and assesses their compliance with approved professional standards.

Russia’s regions (subjects of the Federation) should implement programmes for improving the skills of health personnel, assessing their level of qualification, and addressing health staff shortages, as well as providing differentiated social support for health workers, focused particularly on staff with skills that are in short supply.

A long-term programme is needed to enhance the social status of doctors and revitalize ethical standards of medical practice based on transition to efficient contracts with healthcare providers.

Professional communities should be given a greater role in the management of healthcare, including the authority to carry out certification of healthcare providers, healthcare quality assessment, and licensing of health education activities.

Reform is needed in the system of professional medical education and especially in the training of outpatient care staff. Professional standards of healthcare workers activity need to be designed, setting requirements for the qualification and level of education, type of work performed and quality criteria for healthcare staff. Educational standards must comply with these professional standards.

A fundamentally new model of post-graduate education is needed. Instead of training provision once every five years as part of a single curriculum, a system of continuous education should be put in place, using a system of credits and choice of courses. Medical institutions should be able to pay for post-graduate education of their staff, and leading clinics should be able to implement their own education programmes.

### 3.3.3. Developing a competitive and open healthcare system

The development of insurance principles for health financing and competition between medical organizations are key mechanisms for ensuring sustainable development of the health system towards better quality of care and more efficient use of resources. This particularly requires focused efforts to promote competition among health care providers in the compulsory health insurance (CHI) system. Administrative and economic barriers to participation in the CHI system by organizations in different forms of ownership must be overcome. The introduction of mechanisms for the transfer of healthcare facilities to long-term lease and their concession to private management companies will assist the development of competition.

A competitive model for participation in the CHI system by medical insurance companies need to be put in place. Their functions should be expanded and should include provision of medical care to the insured parties. The financial mechanism for operation by health insurance companies needs to be changed to ensure that they have an interest in quality control of care provision, protection of the rights of those insured and the rational use of healthcare resources.

Improvements to healthcare efficiency will also depend to a large extent on a new level of transparency in medical institutions and insurance companies:

- Establishing detailed requirements for information provision on websites and by public and private health institutions and health insurance companies (not advertising, but full information, which enables users to make a choice).
- Preparation of ratings of medical facilities and health insurance organizations with the participation of physicians and patient associations.

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21 Decree of the President of the Russian Federation № 597 ‘On measures for implementation of state social policy’ (May 7, 2012).
22 Decree of the President of the Russian Federation № 598 ‘On improvements to state healthcare policy’ (May 7, 2012).
Finally, it is important to increase the personal responsibility of doctors for treatment errors, including liability insurance.

3.3.4. Distribution of responsibility for healthcare between the government and the general public

The healthcare system should operate clear and realistic guarantees of free medical care, together with legal, understandable and fair conditions for obtaining paid medical services. The establishment of a clear division of responsibility between the government and the general public in health funding can be best achieved by the consistent application of the policy, which has already been initiated, for hard-and-fast guarantees of free health care based on economically realistic standards and procedures for medical care provision. The standards should define the lists of medical services and medicines, which are provided free of charge to the patient in the treatment of specific diseases at public expense. Tests and medicines, that are not included in the standard list, are provided free of charge based on specific medical results. Medical care procedures establish what kinds of institution provide treatment at public expense.

These state guarantees of free medical care must be complemented by the further introduction (where economically and socially justified) of a legal principle for co-financing of medical care by the state, employers, charity organizations and individuals with sufficient income. Co-financing is particularly suited for some species of care, based on innovative and preventative methods of treatment, which will be developed in the future thanks to new medical technologies (production of pharmaceutical products to meet the needs of individual patients, remote computer monitoring of the treatment process, growing of artificial organs, etc.). The introduction of co-payments by patients will enable the state to expand the scope of treatment using new technologies without extra expense, while also making such treatment more affordable than if they had to shoulder the full cost. So co-financing will lead to more rapid application of new technologies in healthcare. According by household surveys, most people support the introduction of co-payments for treatment of patients using new technologies (Figure 3.5).

Figure 3.5. Attitudes to introduction of co-payments for treatment using new technologies (distribution of answers to the question ‘Do you agree that all, except the poor, should pay extra for treatment using new technologies, but that standard medical assistance should remain free of charge for all?’ %)

Source: All-Russian Representative Survey of Households, Higher School of Economics and the Levada-Center, 2011

The question of who pays for medicines during outpatient treatment requires separate treatment. It is highly important, from the point of view of public health and rational division of costs, to have a system of subsidized medicine provision for certain patient groups over and above the drug reimbursement programmes, which are already operative. This is not a matter of scaling up existing programmes. The state of health of the population would benefit from a 25-50% discount on the price of drugs, even for a limited number of diseases and from a narrower list of medications compared with the list of products, which are currently provided free of charge to certain groups (the disabled, war veterans, etc.).

The proposed policies for modernization of the Russian healthcare system require increase of government spending on healthcare by least 1% of GDP by 2020.
Conclusions and Recommendations

Russia has seen clear positive changes in its demographics during recent years, but the mortality rate is still much higher than in countries with developed market economies. The scale of public funding and current health policy are inadequate for solving the accumulated problems. Development of healthcare should provide a significant lowering of the mortality rate, which is the main challenge to the healthcare system, as well as increasing access to quality healthcare services, protecting people from financial risks associated with disease treatment, and using financial, material and human resources more efficiently.

The Russian healthcare system cannot meet these challenges without major changes to the priorities for allocation of financial resources, improvement of the skills and motivation of its staff and the organization of health care, and better economic mechanisms. Significant improvements in the health of the Russian population can and should be achieved through the development of healthy lifestyles and disease prevention. This area requires major investments. The key changes, which are needed to the system of care provision, are at the level of primary care: local doctors need professional development, expansion of their functions and new human resources. Improvement of primary care arrangements will have major positive impact throughout the health system. Human development, development of information technology and competition in health care should become government policy priorities in the foreseeable future to ensure Russia’s sustainable development.

Box 3.1. Reproductive Health and Reproductive Behaviour Among Russian Youth

Reproductive health is among the most important components of social and economic development of any country, largely determining the levels of such development. Investments in reproductive health, especially that of the young, are both morally and economically justified.

The special role of reproductive health in development programmes is recognized globally. For example, the World Summit in 2005 included universal access to reproductive health services in the scope of the Millennium Development Goals. Achievement of Goal 5, to improve maternal health, is based on twin objectives: to reduce the maternal mortality ratio by three quarters by 2015 compared with 1990, and to ensure universal access to reproductive health services by 2015.

Reliable and high-quality information about reproductive health, primarily as it concerns young people (their attitude towards their health, birth of children, family values, their assessment of reproductive health services), are the basis for the successful development, implementation and monitoring of social and demographic policy in any country.

Russia carried out its first sample survey of reproductive health in 2011. The survey was conducted by the Federal State Statistics Service (Rosstat), together with the Russian Ministry of Health, in partnership with the United Nations Population Fund (UNFPA) and the Center for Disease Control and Prevention of the United States. More than 10,000 women aged 15–44 years in 60 regions of the country were polled in order to obtain information on the reproductive health and attitudes to childbirth among Russian women, access to health services and assessment of the quality of these services.

The survey results revealed behavioural changes among young people with respect to sexual and reproductive health. Young Russians today are sexually active at a younger age, which implies the growth of a number of social risks, including unwanted pregnancy and birth, abortion and sexually transmitted diseases. This implies an urgent need to increase awareness among young people in modern Russia about healthy sexual behavior, including contraception.
In the survey, when asked about their sources of information on topics related to sexual behaviour, young women aged 15–24 most often referred to parents (34%) or friends (20%). Only one in ten respondents said that their source was a doctor or healthcare professional and only 8% said that a teacher had been their most important source of information. The survey also found that awareness of respondents concerning contraceptive methods was slightly higher among those who discussed them with their parents than among those who received information about contraception in school. However, the vast majority (88%) of the 15–44 year-old women who were surveyed support the idea of sex education in school.

Agreement on the need for sex education in schools, as shown in the results of the survey, is a testament to the reality of the problem of early adolescent sexual activity. Proper provision of information and the effective organization of age-appropriate education on sexuality and health can allay the possible concerns of parents regarding sex education classes in school and increase the responsibility of adolescents for their future health.

The overall abortion rate has declined significantly over the past 15 years, but remains high in young age groups. Results of the survey suggest that 2.5% of girls aged 15–19 years have had an abortion and the proportion increases to 13% in the 20–24 age group.

Use of contraception, particularly condoms, is widespread among young Russians. More than half (58.9%) of the young women surveyed, who had sexual experience, had used some method of contraception during their first sexual intercourse.

The most widely known method of contraception among young women are condoms (89%), birth control pills (71%), coitus interruptus (58%), and intrauterine devices (52%). However, there is little knowledge of injectable contraceptives (10%), vasectomy (16%) and spermicides (19%). Only every third young woman knew about emergency contraception, which is a low figure given that unplanned sex and unwanted pregnancy are not uncommon among young people.

The survey data indicate the need to expand programmes, which teach young people how to protect themselves from risky sexual behavior.

From a sample survey of reproductive health in Russia, carried out in 2011 by the Federal State Statistics Service (Rosstat) together with the Ministry of Health, with the support of UNFPA 23


Health trends are usually measured evaluated by means of demographic dynamics, most commonly the mortality rate of population. High levels of mortality may reflect greater prevalence of diseases, which cause death, in comparison with other countries or they may reflect the availability and quality of care provided in the event of illness.

In Russia, the main source of information on morbidity is official statistics. Russia is the only country in the world (with the exception of some of the former republics of the USSR), which has used nationwide unified accounting for more than half a century to collect data on morbidity, as identified in all contacts by members of the population with medical organizations of the Russian Ministry of Health. These data are summarized in official reports. However, these reports fail to reflect actual prevalence of disease. For example, the prevalence of high blood pressure in 2010 among people

of retirement age, according to statistics of the Ministry of Health and Social Development, was only 21.7% (incidence of 9.6%), while epidemiological research\textsuperscript{24} suggested that its prevalence among people aged 18 years and over is about 40%, and studies by SAGE supervised by the WHO\textsuperscript{25} found high levels of systolic and diastolic arterial pressure (or one of the two) among 62.5% of people over 50 years-old, and 52.8% of people said that doctors had diagnosed them as having hypertension.

Non-state and private medical institutions have expanded their activity and their participation in the compulsory health insurance system in recent years. The data bases of these institutions also collect information on identified diseases and abnormalities.

Clearly, accurate evaluation of morbidity rates depends on a complete picture of all the cases reported, both inside and outside the Ministry of Health system, and that requires the design of new methodological approaches. But up to now assessment of incidence and prevalence of diseases is still based solely on registration inside the Ministry of Health system. These data, which have been collected over a long period of time, show increase in incidence of the morbidities, which they record, by more than 50% from 1992 to 2011. But the pace of change in different disease groups is unequal (Table 3.1).

There has been almost no change in prevalence rates of mental and behavioural disorders from 1992 to 2011 (the increases were less than 5%). The prevalence of infectious and parasitic diseases is a matter of general concern, but registration of these conditions has remained unchanged. It is especially important to note a relatively small increase in cases of injury and poisoning over the last two decades (11% increase in comparison with other diseases). The prevalence in Russia of injuries, poisoning and other external causes of harm is the highest among all the CIS countries (only Belarus has comparable levels). This indicator has substantially declined in most CIS countries since 1995, with Russia as the disappointing exception.\textsuperscript{26}

Over the same period, according to the Ministry of Health data, the prevalence of diseases of the circulatory system, diseases of the genitourinary system, and of the musculo-skeletal system and connective tissue has more than doubled. These are mainly age-related diseases, the prevalence of which increases greatly in older age groups, and the worsening figures may be associated with decrease in the share of children and adolescents and increase in the share of older people in the overall population. In the early 1990s, people below working age accounted for 24.4% of the total population, and those above working age were 18.7%. In 2006 the respective figures were 16.3% and 20.5%. The national population census of 2010 offered figures of 16.2% and 22.2%.

It is difficult to interpret the trend for ‘Symptoms, signs and abnormalities revealed by clinical and laboratory tests’, which increased by almost five times over the period. This may reflect the quality of diagnostics in healthcare facilities serving the population. It should be noted that this group, along with external factors and diseases of the circulatory system, showed the largest excess in 2010 compared with the EU in terms of causes of death (the respective excesses for the three groups were 3.1, 3.9 and 3.1 times).

The structure of disease registration is affected by access to health care (outpatient care is relatively less common in the countryside and hospitalization is relatively more common there; disease incidence of the rural population in 2011 was 1194.8% compared with 1604% for the overall population). Availability of health checks plays a certain role, but information factors are also important, as is the quality of

\textsuperscript{24} S.A. Shalnova, Factors of Risk of Diseases of the Vascular System and Life Expectancy Indicators in Russia (based on the national representative sampling study), Doctoral Dissertation in medical science, Moscow, 1999.
\textsuperscript{25} T.M. Maximova, N.P. Lushkina, E.V. Ogyryzko, ‘Problems with Measurement of Medical Care Provision to Patients with Vascular Disorders Using Official Statistics’ // Problems of Social Hygiene and the History of Medicine, 2012, № 6
accounting (diagnoses by paramedical personnel are not included in statistics, although they sometimes work with patients and provide treatment), specifics of payment via the CHI system, and specifics of disease coding using ICD-10.

Prevalence of diseases of the nervous system, eye and ocular apparatus, ear and mastoid process, and the digestive system increased by 15–25% in 2001–2011 according the registration data, while genitourinary disorders, pregnancy and childbirth complications, tumors and congenital anomalies rose by more than 30%. These increases can be explained by the improvement of diagnostic capacities at medical institutions, as well as expansion of the possibilities for surgical intervention. Russian accounting of the incidence and prevalence of cancer is fairly strict. Recorded incidence of neoplasms (including benign) rose by more than 30% in 2010–2011. Incidence of malignancies in Russia was lower, but resulting mortality was higher in Russia than in Europe, which may indicate shortcomings in both the diagnosis and treatment of these diseases. There was a much larger increase (by more than 50%) of recorded prevalence of diseases of the endocrine and circulatory system. Russia is in the mainstream in this regard, as diseases of the endocrine system, such as diabetes and obesity, are on the increase worldwide. The prevalence of cardio-vascular diseases increases with age, and is likely to increase in the future due to the ageing population. More than 60% of those treated at Russian hospitals for diseases of the circulatory system are above working age, while the same statistics in Europe are even higher (75–85%) and as high as 90% in Finland. Russian medical institutions must prepare to work with more elderly patients as ageing of the population continues.

Social stratification and membership of certain groups dictate living conditions, behaviour and lifestyle choices, which have significantly impact on human health. According to various studies, the social gradient is most clearly manifest in the relationship between prevalence of chronic diseases and socio-economic factors: the higher the social status, the lower the prevalence of chronic diseases. The gradient is also clear and sustained in growth and development of children, cardio-vascular diseases, diabetes, diseases of the joints, chronic respiratory diseases and diseases of the digestive system. High incidence of specific disease types in certain large social groups (manual workers and office workers) has been repeatedly confirmed, although the division is somewhat schematic. Both male and female manual workers have higher levels of injury and poisoning, with female workers more subject to pregnancy and childbirth complications, while male office workers are more likely to suffer from cardio-vascular complaints and women office workers are particularly subject to neurotic disorders and diseases of the respiratory system.

Changes of employment structure in the post-Soviet period have much significance for health. Somatic diseases are more common among public sector workers, both men and women. These groups are particularly vulnerable to cardio-vascular diseases, and other serious and debilitating illnesses such as diabetes, asthma, peptic ulcer and duodenal ulcer, osteochondrosis, and gynecological pathology among women.

People who work in the private sector enjoy better health. They are less subject to chronic illness and very serious diseases (diabetes, asthma) are a rarity. Their subjective assessment of their health is also higher than that of public sector workers.
The social gradient is also visible in disease outcomes. According to a survey by cardiologists, deaths as a result of acute myocardial infarction are much more common among low-income patients than among all those affected.31

Morbidity as an objective phenomenon is determined by a complex set of factors and conditions, including work of the health system, so changes in these factors lead to different dynamic shifts in the prevalence of pathology and its outcomes. Statistical indicators of morbidity produced annually by the Ministry of Health organizations do not give an accurate picture of the incidence and prevalence of disease, although they are helpful for ascertaining what diseases the system has to deal with and healthcare coverage of patients as a share of the population. In order to obtain a fuller picture, it is important to carry out special epidemiological studies on a regular basis, which would provide international comparability.

Similarity in the rate of prevalence of certain diseases in Russia and developed countries (Figure 3.6) and higher levels of mortality in Russia from these diseases clearly shows the need for further reform of the country’s healthcare system, improving access to and quality of care.

Figure 3.6. Prevalence of various diseases in Russia (SAGE) and the USA, %


Prof. Tamara M. Maximova, Dr.Sc. (Med), Chief Researcher and Nina P. Lushkina, Ph.D (Economics), Leading Researcher at the National Institute of Public Health (Russian Academy of Medical Sciences)
Table 3.1. Morbidity of the overall population registered in the system of the Russian Ministry of Health by classes of disease (total cases per 1000 people)


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<td>Certain infectious and parasitic diseases</td>
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<td>59.6</td>
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<td>8.8</td>
<td>9.3</td>
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<td>Endocrine, nutritional and metabolic diseases</td>
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<td>50.7</td>
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<td>150.6</td>
<td>46.5</td>
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<td>…</td>
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<tr>
<td>Diseases of the skin and subcutaneous tissue</td>
<td>46.3</td>
<td>56.6</td>
<td>53.8</td>
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<td>55.5</td>
<td>56.6</td>
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<tr>
<td>Diseases of the musculo-skeletal system and connective tissue</td>
<td>62.3</td>
<td>67.1</td>
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<td>Diseases of the genitourinary system</td>
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<td>70.6</td>
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<td>Pregnancy, childbirth and the puerperium</td>
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<td>92.7</td>
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<tr>
<td>Congenital malformations, deformations and chromosomal abnormalities</td>
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<td>4.8</td>
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<td>5.2</td>
<td>5.4</td>
<td>5.9</td>
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<td>7.0</td>
<td>7.0</td>
<td>7.1</td>
<td>31.5</td>
</tr>
<tr>
<td>Symptoms, signs and abnormal clinical and laboratory findings, not elsewhere classified</td>
<td>2.5</td>
<td>3.0</td>
<td>3.8</td>
<td>...</td>
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<td>14.8</td>
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<tr>
<td>Injury, poisoning and certain other consequences of external causes</td>
<td>84.1</td>
<td>89.1</td>
<td>86.0</td>
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<td>88.1</td>
<td>89.6</td>
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<td>91.9</td>
<td>93.4</td>
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<td>4.2</td>
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</table>

*) In ICD-9 diseases of the nervous system and sense organs were included in Class 6.
Box 3.3. Policies for healthy lifestyle and disease prevention in Russia

Russia has adopted a number of laws and government regulations in recent years that determine state policy priorities for promoting healthy lifestyles:


– A package of measures to improve the efficiency of market regulation of alcohol production in the Russian Federation and the production of ethanol, approved by Government Order № 1940 (December 14, 2011).

– Demographic Policy Concept of the Russian Federation up to 2025, approved by the Decree of the President of the Russian Federation № 1351, dated October 9, 2007.


– Russian Government Order № 1134, ‘On approval of the action plan for implementation of state policy in the field of healthy nutrition up to 2020’ (30.06.2012).


The Government programme ‘Healthy Russia’ was launched in 2009. It is a comprehensive national communications campaign, using advertising, television projects, special events and a hot-line, aimed at reducing consumption of tobacco and alcohol, and encouraging more healthy nutrition. A ‘healthy lifestyle’ Internet portal, www.takzdorovo.ru, set up in 2009, offers advice on how to escape dependence on smoking, alcohol and drugs. The project won the Runet [Russian Internet] Prize in 2010.

Surveys by the VTsIOM polling agency in November 2011 found that the share of Russian citizens reached by the ‘Healthy Russia’ campaign and motivated by it to pursue a healthy lifestyle had grown substantially (to 31% in 2011 from 3% in 2010).

Pursuant to Federal Law № 268, ‘Technical Regulations for Tobacco Products’ (December 22, 2008), the Russian Ministry of Health and Social Development approved Decree № 490 ‘On approval of warning inscriptions on the dangers of smoking, accompanied by drawings’ (May 5, 2012), according to which, from July 26, 2010, graphics were introduced to accompany warnings on the dangers of smoking in strict accordance with Article 11 of the WHO Framework Convention on Tobacco Control.
Wide-ranging measures to reduce tobacco consumption are to be implemented in Russia in the near future, in accordance with the new Federal Law, ‘On protection of the general public from the effects of tobacco consumption’, adopted by the State Duma of the Federal Assembly of the Russian Federation on 13.02.2013, and came into force on 01.06.2013.


Various important measures to combat the abuse of alcohol are being implemented, including limitations on production, sales, advertising, and the regulation of taxes (excise) and product prices. In 2011, a new version of the Federal Law № 171, ‘On state regulation of production and turnover of ethyl alcohol and products containing alcohol’ (November 22, 1995) was approved, making requirements for the sale of alcoholic beverages more stringent.

Federal Law № 218, ‘On amendments to the Federal Law “On state regulation of production and turnover of ethyl alcohol and products containing alcohol” and to certain legislative acts of the Russian Federation and the repeal of the Federal Law “On limitations to retail sales and consumption of beer and drinks made using beer”’ (18.07.2011) classified food products (made with or without the use of ethanol produced from food raw materials) and (or) alcohol-containing food products that have ethanol content greater than 0.5% of the finished product as alcoholic products, and also introduced a ban on the consumption of alcoholic products in certain public places, prohibition of retail sale of alcohol to minors, etc.

The subjects of the Russian Federation have approved more than 230 regional programmes for reducing and preventing alcohol abuse in compliance with the State Policy Concept for the Reduction of Alcohol Abuse and Prevention of Alcoholism up to 2020. The regional initiatives take account of specific traditions of alcohol consumption and scale of the problem of alcoholism in different segments of the population. The anti-alcohol measures have been included as a sub-sections of various regional programmes for the promotion of healthy lifestyles, development of healthcare, combatting drug abuse, crime prevention, development of physical culture and sport, etc.

Special programmes are being designed to implement national policy in the field of healthy nutrition for the the period up to 2020. Physiological standards for energy and nutrient needs for different groups of the population have been developed and approved (MR 2.3.1.2432-08), and recommended food consumption norms meeting modern requirements for a healthy diet were approved by Decree № 593 of the Russian Health Ministry (02.08.2010).

The Russian Academy of Medical Sciences and the Ministry of Health are working to establish an advisory and diagnostic center on healthy diet at the Institute of Nutrition (part of the Academy of Medical Sciences), as well as a network of advisory and diagnostic centers on nutrition in Russia’s federal districts and administrative regions.

Russia has in place a legislative, regulatory and methodological framework for food safety, many aspects of which are in accord with international requirements.

Pursuant to paragraph 3 of Russian Government Order № 1134 (June 30, 2012), action plans are being prepared in Russian regions for implementation of regional policy in the field of healthy nutrition for the period up to 2020.

The ‘Healthy Cities’ project is being implemented under the auspices of the European Regional Office of WHO in the cities of Cherepovets and Veliky Ustyug (Vologda Region), Cheboksary and Novocheboksarsk (Republic of Chuvashia), Izhevsk (Udmurtia), Stavropol, Samara, and Stupinsky municipal districts (Moscow Region). Work as part of the project is also beginning in the cities of Yakutsk and Ulyanovsk. The initiatives are focused on ‘healthy’ urban planning, health in old age and active lifestyle.
The Government programme ‘Development of Health Care’ defines the following key policies: development of responsible public attitudes towards health, reduction of smoking, alcohol and drug abuse, creation of conditions for healthy lifestyles, and the correction and regular monitoring of behavioral and biological risk factors for non-infectious diseases at the levels of the whole population, social groups and the individual.

The most important structural elements of the primary healthcare system for the prevention of non-infectious diseases are health centers, medical prevention offices and preventive medicine departments at polyclinics, dispensaries, mobile medical units, health centers, and medical points at enterprises and educational institutions, between which a system of cooperation and coordination has been established.

A total of 502 health centers for adults and 204 children’s health centers, staffed by specially trained professionals, have been established and equipped at state healthcare institutions in Russian regions. As required by Order № 597 of the Russian Health Ministry, ‘On the organization of health centers to promote healthy lifestyles among the citizens of the Russian Federation, including the reduction of alcohol consumption and tobacco’ (19.08.2010), each health center has been assigned a territorial area of responsibility, which is served by outreach units, helping to achieve a healthy lifestyle among people living in the countryside and remote areas. Mobile health centers have been deployed in some regions. The Russian Health Ministry has created the Federal Coordination and Methodological Health Center as part of the State Research Center for Preventive Medicine. The main purposes of the Coordination Center are: to raise the efficiency of adult health centers at Russian medical institutions; and to optimize preventive care through the development and implementation of evidence-based approaches to encouraging healthy lifestyles and preventing non-infectious diseases. A scientific laboratory on healthy lifestyles and a clinical health centre have been set up at the Federal Coordination and Methodological Health Center.

The main function of the health centers is to identify and address risk factors for disease. Child health centers carry out examinations of children, provide hygiene training, and work to dissuade children from use of alcohol and tobacco, as well as working with families.

Improvement of public health will also be assisted by the introduction of universal screening, which is scheduled to start from January 1, 2013, in compliance with the Order of the Russian Ministry of Health, ‘On Approval of the procedure for medical screening of specific groups of adults’ (03.12.2012).

Data of the Ministry of Health of the Russian Federation

Box 3.4. Public Health and Quality of the Environment

Human health in urban areas and small settlements depends largely on the quality of ambient air, drinking water, food, and other components of the environment. Sustainable development aims to gradually improve the quality of the environment and reduce the number of people who are exposed to harmful factors. Official materials of the Russian Ministry for Natural Resources and the Environment, Rosgidromet (the Federal Service for Hydrometeorology and Environmental Monitoring) and Rospotrebnadzor (the Federal Service for Consumer Protection) suggest that the situation is negative and there is no clear trend towards improvement. The number of cities and towns with high levels of air pollution has not changed in recent years (there are 130 such cities), and the maximum concentrations of pollutants exceed the guideline values (above 10 times the maximum permitted level) in 40 cities with total population of 32 million people. Some 27 cities, including Krasnoyarsk, Norilsk, Ke-
merovo, Ekaterinburg, Nizhny Tagil, Novokuznetsk and others (home to 16.3 million people) have very high levels of air pollution. Pollutant emissions are gradually declining, but their concentrations in the atmosphere have remained roughly constant.32

This indicates either inaccurate information on emissions, or the lack of a monitoring system. A similar situation has been observed as regards quality of drinking water. In the period since 1998 water from 21-30% of sources of drinking water failed to meet hygiene and chemical standards, and the state of both underground and surface sources of centralized water supply and water quality at water intake points remained unsatisfactory. More than 10 million people, i.e. one in every 14 Russians, consume poor-quality drinking water.33

What effect is this having on public health? Since the level of pollution in ambient air has remained almost unchanged, previous estimates can be used, which suggested that there are up to 40,000 excess deaths in polluted cities per year.34 The impact of contaminated drinking water on public health nationwide cannot be estimated due to the lack of a reliable database. Research in some cities allows estimates of the impact of some toxic substances on public health (mostly that of children, as the most sensitive group). An analytical survey initiated by the Russian Public Chamber showed that nearly every region of the country has carried out such studies and the studies have proved significant health changes associated with exposure to environmental pollution in the cities of Sverdlovsk Region (Krasnouralsk, Kamensk-Uralsky, Kirovgrad, Polevskoy), Chelyabinsk Region (Magnitogorsk, Karabash, Plast), Orenburg Region (Novotroitsk, Orsk), Murmansk Region (Monchegorsk, Nickel), as well as in the Republic of Bashkortostan (Salavat, Sterlitamak, Ufa), and elsewhere.35 In recent years new data have been obtained concerning the adverse effects of environmental pollution on human health in such small towns as Zakamensk (Buryatia), which has a large mining and processing combine in its vicinity, as well as in Novotroitsk (Orenburg Region), Kungur (Perm Region), settlements near the Solnechny mining and processing combine (Khabarovsk Region), and Chita, where people are at particularly high risk of developing cancers.

The impact of the environment on health is most clearly seen in depressed regions with low HDI scores, where levels of air pollution are high, including regions with high levels of coal burning. Average life expectancy in the Republic of Buryatia, Amur Region, Jewish Autonomous Region, Trans-Baikal Territory, and the Republics of Altai and Tuva is 60.9 years, which is 4.4 years less than the national average. For example, Ulan-Ude, where coal is the main fuel, has a high level of airborne particle pollution (300 µ/m3) and excess mortality from this cause amounts to 17% of total mortality.36 Sub-standard water is used by 73% of the population in Kalmykia, 31% in the North Caucasus republics (Karachaevo-Cherkessia, Ingushetia) and the Nenets Autonomous District, 27% in Yamal-Nenets Autonomous District and 66% in Yakutia. Drinking water of acceptable quality is in particularly short supply in Kalmykia, Dagestan and Astrakhan Region. In Kalmykia up to 42% of the population lack drinking water on a daily basis (www.fotoelista.com/2008/kalmykia-water). This situation is to be addressed by the construction of a trans-regional water system in the south of Russia. However, construction of the system has not yet been undertaken.

In many countries the effectiveness of measures to improve the quality of the environment is assessed using environmental health indicators, recommended by WHO. These include such general

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indicators as the number of people exposed to air pollution, noise pollution, and using contaminated drinking water. Their levels in Russia show almost no change. Other more specific and accurate indicators, associated with specialist research, are needed. These would include levels of lead and arsenic in children’s blood, mercury in urine, persistent organic pollutants in breast milk, etc. These indicators are currently used in only a few localities in Russia, and findings confirm positive effect from reduction of environmental pollution on levels of toxic substances in children in cities with a poor environmental reputation, such as Krasnoauralsk, Dalnegorsk (lead) and Chapaevsk (dioxins).

Russia has a dismal international rating for effects of environmental pollution on human health. The Bloomberg Ranking 2012 placed Russia in 97th place out of 145 countries. Even assuming a measure of inaccuracy in the ranking, it is clear that Russia is not among the world’s 50 most ‘healthy’ countries. What are the prospects for improving the quality of the environment in Russia’s urban areas? The new state programme for 2012-2020, entitled ‘Protecting the Environment’, should reduce the number of cities with high air pollution and reduce the number of people living in them (by 2.7 times in 2020 compared with the 2007 baseline), mainly through reduction of emissions from stationary sources of air pollution. However, it is not clear what this optimistic outlook is based on: emissions of pollutants into the atmosphere from stationary sources has actually declined slightly (from 21.3 million tonnes in 1995 to 19.1 million tonnes in 2010), but their concentrations in the atmosphere have not changed and in some cities they have increased due to the rapid growth of road transport. The number of most environmentally disadvantaged Russian cities (more than 100 in total) has not declined in recent years. Not all of the black spots are known, as there are no data on quality of the environment in small villages located near ore mining and processing facilities, medium-sized airports, large landfills and other sources of pollution. In Norilsk, where per capita emissions total 11 tonnes per year, there is no station for monitoring of air quality, so assessment of the risk to public health, which was previously possible, is now impossible. Emissions from production by Norilsk Nickel increased by a further 31,400 tonnes in 2011 compared with 2010 emissions. Plans to install major new facilities have appeared in recent years, and have been met with public opposition. The plans include creation of the Yenisei Ferrous-Alloys plant in Krasnoyarsk Territory and a ferrous-alloy plant in Novokuznetsk (proposed by Siberian Mining Company), and development of nickel mining in Voronezh Region.

In many cities vehicle emissions are more to blame for poor quality of atmospheric air than industrial emissions, reflecting increase of vehicle numbers by 40% since 1996. The introduction of EURO-3 and EURO-4 emission standards for vehicles have been delayed until 2013 and 2016, respectively, and there is no certainty that these deadlines will not be extended. Even in Moscow where vehicles meet the new standards, the current state of transport infrastructure means that satisfactory air quality is unlikely to be achieved, and people are forced to breathe polluted air.

Unfortunately, sustainable development of the environment and public health system is only just beginning in Russia. A number of decrees and regulations intended to improve the environmental situation in the country have been enacted in recent years. The Principles of State Environmental Policy for the Period up to 2030 were approved by a Decree of the President of the Russian Federation dated 30.04.2012.


Prof. Boris A. Revich, Dr.Sc. (Med), Head of the Environment Quality and Public Health Monitoring Laboratory, Institute of Economic Forecasting of the Russian Academy of Sciences

**Box 3.5. Work Conditions and Health of the Working Population**

On May 23, 2007, at the 60th Session of the World Health Assembly, the World Health Organization adopted the Global Plan of Action for Workers’ Health in 2008–2017, which emphasizes that workers represent half the world’s population and are the main contributors to the economic and social development. The document expressed concern about the state of workers’ health in many countries around the world, and their exposure to occupational risks.39

According to the WHO, more than 100,000 chemicals, 200 biological and about 50 physical factors, as well as the nature of labour (heavy, intense, with tough shift schedules) can have a negative impact on workers’ health. It is also important to realize that levels of impact from harmful and dangerous factors in the workplace (even when sanitary and hygiene standards are observed) can exceed levels in the environment by tens or hundreds of times, since the approach to definition of standards in the two cases differs significantly. The complete elimination of unfavorable factors and psycho-emotional overloads in the production environment is impossible even in workplaces that have the benefits of advanced technology, up-to-date equipment, high production culture and high-quality healthcare on hand. It is even less possible in current conditions at Russian enterprises, which use outdated technology and old equipment. Moreover, new factors and technologies are constantly arising, which may pose a threat to the health of workers, and also to future generations, given that working age largely coincides with reproductive age.

**Working conditions.** The share of workers in Russia employed in industries with hazardous or dangerous conditions increased in the period from 2004 (the year of transition from the All-Russian Classifier of Branches of the Economy to the Russian Classification of Economic Activities) to 2010. The increases were 23.7% for men and 35.1% for women in the extractive industries, 25.2% for men and 31.5% for women in manufacturing, respectively 70.2% and 48.3% in construction, and 63.3% and 93.8% in transport, storage and communications. The share of employees engaged in heavy work in Russia has increased over the same period by 93.2% for men and by 2.65 times for women.40

Russia currently has two indicators that characterize the health of the working population: occupational morbidity and accidents at work.

Occupational diseases is any illness that develops as a result of exposure to risk factors arising from employment (ILO definition).

Recorded levels of occupational morbidity in Russia are much lower than in developed countries, but the share of jobs that do not meet sanitary and hygiene standards is growing. During the period

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from 2001 to 2010 officially reported rates of occupational morbidity fell by almost a quarter, from 2.24 to 1.73 per 10,000 workers.\footnote{On the State of Work-Related Illness in Russia in 2004, Handbook of Statistical and Information Materials, Moscow, Federal Center for Hygiene and Epidemiology (part of Rospotrebnadzor), 2005, 38 pages; On the State of Work-Related Illness in Russia in 2010, Handbook of Statistical and Information Materials, Moscow, Federal Center for Hygiene and Epidemiology (part of Rospotrebnadzor), 2011, 76 pages.} Frequency of these annually identified illnesses in Russia is 40 times lower than in Denmark, 25 times lower than in the USA, 13 times below Finland and 3.5 times below Germany.\footnote{WHO database: URL: http://data.euro.who.int/hfadb/ (consulted on 20.09.2012).} Russia is in 24th place in Europe in level of occupational morbidity.

Harmful and dangerous working conditions can lead to the appearance not only of occupational diseases but also of work-related illness. The latter are diseases, which can occur throughout the population (diseases of the circulatory system, non-specific respiratory diseases, cancer, etc.), but which may arise more frequently and at a younger age compared with the overall population at certain work places, where their occurrence is also more severe and therefore lead to higher levels of disability and mortality.

This is evidenced by numerous epidemiological cohort mortality studies carried out in Russia at the Institute of Occupational Health, Institute of Carcinogenesis, and elsewhere, which show a relatively higher risk of death from disease associated with harmful production factors among core production workers in ferrous and non-ferrous metallurgy, the tire industry, coal mining, as well as in carcinogenic industries, mining and enrichment of antimony, mercury, manganese, jobs involving exposure to lead aerosols, also associated with the heating microclimate in the work place, etc. This negative effect has been observed despite the fact that the individuals with particularly strong health are often selected to work in such hazardous conditions.

\textbf{Accidents at work}. The rate of registered accidents in the work place decreased by 3.0 times in Russia during 1990-2010, from 6.6 to 2.2 per 1000 employees. Fatalities at work fell by 27.1\% over the same period (from 0.129 to 0.094 per 1000 employees). The number of man-days lost due to accidents at work declined by 4.6 times (from 10.2 million to 2.2 million), but the average duration of absence doubled (from 23.4 to 45.9 days), indicating that registrations were dominated by severe injuries, sick leave for which averaged about 50 days (Rosstat figures).

The observed decline of officially recorded levels of occupational injuries in Russia, including fatal accidents, and the simultaneous increase in the share of workers employed in hazardous and arduous work conditions, together with increase in the average duration of sick leave due to occupational injury, suggest that a large share of accidents in the work place go unreported and unrecorded. This applies mainly to injuries of mild to moderate severity.

The unreliability of official data on accidents at work in the Russian Federation is also indicated by comparison with other countries. Recorded frequency of accidents in Russia is 10–15 times lower than in the EU, but fatal accidents (which cannot be concealed) are 3–7 times higher in Russia.\footnote{ILO database URL: http://laborsta.ilo.org/} Failure to record accidents at work is due to many factors, but principally to economic considerations and the Russian legal framework. At present, employers have no economic interest in the improvement of working conditions and safety, but accidents at work could lead to increase in premiums for compulsory social insurance against industrial accidents and work-related illness. The penalty for concealing a work injury is only from 500 to 1000 rubles (12–25 euros) for a company official and between 5,000 and 10,000 rubles (125–250 euros) for a company official and between 5,000 and 10,000 rubles for a company, so instances are likely where employers pressure injured workers not to register their injury.

\footnote{Article. 15.34, which supplemented Chapter 15 of the Russian Administrative Code (Federal Law № 195, dated December 30, 2001) in compliance with Federal Law № 213, dated July 24, 2009, and came into force on January 1, 2010.}
Employees themselves may also have an interest in concealing accidents. A large number of businesses and organizations in Russia, particularly small businesses, still pay a substantial portion of salaries to their employees unofficially (‘in an envelope’). In case of injury, sick leave is paid to the employee on the basis of the official salary, which is substantially below the real salary, and the employer may offer to pay the costs of treatment and provide necessary time-off without official sick leave. So tax avoidance practice creates additional incentives to hide accidents. The discrepancy between available information on accidents at work and the real situation means that health and safety in the Russian work place cannot be properly assessed, and an adequate system of preventive measures to protect the health of the working population cannot be put in place.

Box 3.5.1. Implementation of Government Policy on Health and Safety

A number of steps were carried out in 2010 as part of the Programme of Measures to Improve Working Conditions and Health and Safety in the Russian Federation in 2008–2010. The measures included:

– Preparation for renewal of the health and safety system by relating assessment and management of work-place risks to specific working conditions and the state of health of employees. Assessment of work-place risk is to be based on assessment of conditions in each specific work place (the identification of harmful and/or hazardous factors through the certification of work places by their conditions) and assessment of workers’ health, as a result of which steps will be taken to harmonize working conditions with government health and safety regulations. The system for prevention of work-related illness will also be developed.

– Modernization of the regulatory framework for health and safety in order to improve its operation.

– Creation of information resources for health and safety management.

– The ‘Professional Risks’ automated informational and analytical system for monitoring of work-place risks in the Russian Federation (a unified health and safety information system) was brought into operation.

State policy in the field of health and safety in 2011–2012 was focused on modernization of system management.

The main objective of the modernization of the health and safety management system is transition from a costly, compensation-based model to a modern system for management of work-place risk, enabling a preventative approach to health and safety and reducing all of the costs associated with adverse working conditions.

The priorities for government policy in the field of health and safety in 2011–2012 are as follows:

– Further work to create a system of regulations harmonized with international best practice and an optimal system of work-place risk management, the establishment of uniform safety standards in order to identify and eliminate hazardous jobs.

– Improving mechanisms for objective assessment of working conditions.

– Improvement of insurance mechanisms and economic incentives for employers to introduce new safe technologies and to eliminate jobs, which are harmful or represent a risk to reproductive health.

45 V Khusberg, ‘Some accidents simply are not registered in Russia’ // Supplement to Kommersant, 2006, № 207/V (3538), 07.11.2006.
– The creation and development of a system of preventive healthcare for workers, including medical and vocational rehabilitation, and health treatment for people at high risk of work-related and production-specific diseases.
– Design and implementation of new approaches to health and safety training of workers by introduction of modern teaching technologies focused on practical skills for safety at work, implementation of a set of training and consultancy activities (particularly for SMEs).

In 2012, the Government of the Russian Federation introduced draft laws to:
– Amend the Labour Code of the Russian Federation, reducing the administrative and financial burden on business by replacing costly and inefficient certification of health and safety measures by employer declarations of compliance with health and safety requirements (free of charge for the employer).
– Amendments to the Administrative Code and to Article 143 of the Criminal Code of the Russian Federation in order to increase employer liability for violation of health and safety legislation.

In order to build a modern system of work-place risk management the concepts of ‘work-related risk’ and ‘management of work-related risk’ have been written into the Labour Code of the Russian Federation, responsibilities of the Ministry of Labour and Social Protection for approval of risk assessment and risk management procedures have been defined (Federal Law № 238, dated July 18, 2011), and a list of actions that can be taken each year by employers to improve working conditions and reduce the levels of work-related risk has been introduced (in order to prevent the misuse of funds allocated for the health and safety purposes).

In order to increase accountability of employees at enterprises with high levels of industrial hazards for violation of safety rules that can lead to accidents and emergencies, Federal Law № 35 (March 8, 2011) has been passed, setting out disciplinary measures applicable to employees of organizations with production facilities that represent radiation and nuclear hazards.

**Data of the Ministry of Labour and Social Development of the Russian Federation**

**Health of the working age population.** Indicators of health of the working population can be supplemented by health indicators for the population of working-age, as most people in this age group are in the labour force. According to Rosstat, 74.9% of men and 70.0% of women of working age were employed in the economy in 2010.

Disability. Russia has seen growth of the total contingent of people with disabilities who are registered with the Pension Fund. Their numbers increased from 7.9 to 13.2 million in the years 1997-2010 alone. In 2010 some 49.4% of the total number of persons certified as disabled for the first time were of working age (441,000 people).  

**Mortality and life expectancy of the working-age population.** Russia has made progress since 2006 in reducing mortality, including mortality of the working-age population. According to Rosstat, the mortality rate had decreased by 11.8% in 2009 compared with 2005, and the reduction in the working-age population was 22.9%. However, growth of working-age mortality during 1990-2005 was so intense that return to the level of 1990 has not yet been achieved. The mortality rate for men of working age in 1990 was 7.5 per 1000 for men and 1.9 per 1000 for women. In 2010, these figures had risen, respectively, by 29.3% for men (to 9.7 per 1000) and 36.8% for women (to 2.6 per 1000).
The largest growth for both men (by 1.3–1.6 times) and women (by 1.6–1.8 times) was between the ages of 25 and 39 years. During the same period levels of child mortality, and particularly infant mortality, decreased by 1.4–2.2 times. There was no change in mortality among people above working age, or it did not exceed 9.0% in different age groups. So the decline in life expectancy of the total population was driven by excessive mortality among the working-age population, and the negative trends were mitigated by reduction of infant mortality.

Since the integral criterion of public health is life expectancy, it is important to consider and evaluate changes in the most important component of this indicator, which is interval life expectancy and the average loss of man-years of life for men and women of working age.

In 1990 each man lived on average 40.58 years of the 45 potential years of working-age life (60–15). So the average life-years lost per man were 4.42 years. In 2010, the loss of years were higher by 20.1% at 5.31 years. However, there has been an improvement of almost a quarter compared with 2005, when the death rate was highest and the loss of man-years was 7.02.

Analysis of life tables for the female population shows an average of 39.07 years interval life expectancy out of potential 40 (55–15) in 1990, i.e., the average loss was 0.93 years. By 2005, the loss had increased to 1.53 years. Reduction in mortality, which began in 2006, has led to a reduction in the losses to 1.23 years, but that still represents an excess of 32.3% compared with 1990.

Hypothetical life tables by causes of death indicate the contribution of various causes to the reduction of life expectancy in the working-age interval. The biggest increase of interval life expectancy for working-age men in 1990 would occur by elimination of external causes of death (2.27 man-years, Figure 3.7a). By 2005, the contribution of external causes had increased to 3.03 man-years, but in 2010 it fell below the level of 1990, to 2.16 man-years (Figure 3.7b). This success can be ascribed to improvement of the socio-economic situation in Russia and the implementation of social, demographic and health programmes aimed at reducing mortality from accidents, poisonings and injuries, including road traffic injuries.

**Figure 3.7.** Years of life lost due to specific causes of death in the male population of working age in Russia in 1990 (a) and 2010 (b)

**Figure 3.8.** Years of life lost due to specific causes of death in the female population of working age in Russia in 1990 (a) and 2010 (b)
The picture of loss of years in the working-age interval among the female population is different from that for men. Losses for women due to external causes were 0.35 years in 1990, 0.57 years in 2005 and 0.41 years in 2010, i.e. the losses were reduced by 28.1% in 2010 compared with 2005, but remained 17.1% higher than in 1990 (Figure 3.8a,b).

The second and third most significant causes of mortality in both the male and female population of working age are diseases of the circulatory system and neoplasms. But their contribution to the total loss of man-years of life was significantly lower than that from external causes, and their dynamics differ. Over the past 20 years, the loss of life in the working-age population from diseases of the circulatory system increased by one-third for men and by a half for women, but losses from neoplasms declined.

Increase of the loss of years in the working-age interval due to avoidable causes of death (digestive diseases, infectious and parasitic diseases, and respiratory diseases) is a clear negative trend: these classes of diseases took fourth, fifth and sixth places, respectively, in the ranking of causes of death. By 2005, the total losses due to these three causes had increased more than twofold among men and nearly threefold among women in comparison with 1990. Their impact declined during the next 5 years, but only by 9.3% for the male population and 6.2% for women. Overall reduction of man-years of life in the working-age population in 2006–2010 was 20–25%.

These figures show that the brunt of impact on mortality rates and life expectancy during the last two decades was borne by the working-age population, which was most severely affected by the negative impacts of social and economic reforms. Children and senior citizens have been more sheltered from these impacts. Specific new developments in Russia during the past two decades have included unemployment, which has been a major cause of poverty and the spread of alcoholism. It is generally acknowledged that the unemployed are more prone to alcoholism, mental illness and risk of death, particularly from suicide, accidents, poisonings, injuries, heart disease and other causes (these patterns have been established in many countries and not only in Russia). Another negative consequence of the high level of unemployment and poverty in the transition to a market economy, according to N. Izmerov and V. Zakharenkov, has been ‘wastefulness’ with respect to labour resources by a large part of businessmen, an attitude which has been reinforced by traditional low valuation of their own lives and health among workers themselves. State of health has become a factor in occupational selection and occupational suitability.

It should be noted that polyclinic services are particularly difficult to access for people in full-time employment, since working and polyclinic opening hours coincide. Morbidity with temporary disability (absences from work per 100 employees) began to decline in the 1990s. In 2006, they stood at 51.7, which is one third below the level of the late 1980s and early 1990s. However, average duration of absences increased, from 12.1 days in 1986 to 14.0 days by 2006. This suggests that workers were seeking medical assistance later, when their disease had progressed further and more time was required for recovery.

In the Soviet period, nearly all workers in industry and those in many other sectors were protected by a preventative health system. Academician N.F. Izmerov points out that in the early 1990s, this system consisted of more than 1000 health units, more than 1500 medical treatment and 20,000 first-aid points, and that as many as 80,000 doctors were employed in health provision within industry. Most large enterprises had their own sanatorium for preventative medicine. In the transition years, deterio
ration of working conditions at enterprises was accompanied by drastic cuts in social programmes with devastating effects on workers’ health. It should be emphasized that this Soviet system not only provided preventative and therapeutic support, but also included programmes to promote a healthy lifestyle, including organization of sports activities, healthy eating in the workplace, and encouragement to give up smoking and drinking. Nowadays, only the largest and richest companies are investing in the improvement of working conditions and the health of their workers.

So the tasks of improving human well-being and encouraging healthy lifestyles must be supplemented by improvement to working conditions and reconstruction of the healthcare system for the working population, adapted to the new socio-economic environment in Russia.

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4.1. Contours of the New Economy: The Rio+20

The various crises, which have plagued the world in recent years, show the instability of the current model of global economic development. The key weakness of the model is its absolute prioritization of economic growth at the expense of solutions to social and environmental problems. Mankind is now trying to find new paths of economic development. In the late 1980s and early 1990s UN agencies produced fresh conceptual approaches to the development of society and the economy. Two new theories in particular have had a huge impact on the discussion of alternative models: the theories of sustainable development and of human development. The two concepts differ, but they are alike in taking people as their central focus, as was highlighted at the Rio+20 conference. Unfortunately, although these concepts have become generally accepted, progress towards their global implementation has been limited. One reason for preservation of the traditional type of economic development with its low sensitivity to social and environmental issues has been the lack of attention paid to these issues by economists and economic theory. The economic ‘mainstream’ is clearly situated within the traditional paradigm of economic growth, as can be clearly surmised from the development programmes of the vast majority of countries, including Russia. It is no accident that the report on global sustainability compiled by the High-Level Group (‘group of wise men’) and issued by the Secretary-General of the United Nations before the Rio+20 conference, entitled ‘Resilient People, Resilient Planet: A Future Worth Choosing’ stresses the need to develop a new ‘political economy of sustainable development’, which will shift the paradigm of sustainable development from the periphery of global economic debates to their center.1

The disproportion between economic development and environmental degradation has become acute in recent decades. The past quarter century has seen enormous growth of world GDP (by four times), which has increased the standard of living of hundreds of millions of people. But this growth has been achieved, to a large extent, by the global depletion of natural capital and degradation of ecosystems.

Continuation of the negative environmental trends may lead to extremely dangerous consequences for humanity as a whole and for individual countries. The world’s population will increase by 2040 from 7 billion to about 9 billion people, and the number of middle-class consumers will increase to 3 billion over the next 20 years, so the demand for resources will rise exponentially. By 2030, the food needs of the world population will increase by at least 50%, energy needs by 45% and water needs by 30%, and this will occur at a time when threshold values of environmental indicators are imposing new restrictions on extensive economic growth.2

Growth of world prices for food by 30–50% in real terms can be expected in the coming decades, which will increase price instability and worsen the living conditions of hundreds of millions of people.

The evident need to develop and implement a new economic model for the world and in specific countries runs like a thread through the outcome document of the Rio+20 Conference, entitled ‘The Future We Want’ and speeches by leaders of the participating countries. The new model proposed is that of the ‘green’ economy. This term is supplemented by a long series of definitions of the new economy, which are already used in research work and international documents: the knowledge economy (an economy based on knowledge); the innovation economy; the science-intensive economy; the information economy; the socially-oriented economy; the postindustrial economy, etc. Regardless of the for-

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1 High-Level Group of the Secretary-General on Global Sustainability (2012), Resilient People, Resilient Planet: A Future Worth Choosing, New York, United Nations, 2012.
2 Ibid.
mal definition, the proposed transformation of the traditional economic model is based on: prioritizing of human potential capital, knowledge and information; deep structural and technological changes; and compliance with environmental constraints. For the purposes of the present Report, we give a general definition of the new economy as the ‘sustainable economy’ in the unity of all its economic, social and environmental aspects. Given the need for transition to sustainability, it is obvious that the future of the economy must be ‘green’, based on knowledge, and on social and technological innovation, etc. The different definitions of the new economy all agree on its main outline. Basic features, which should be inherent to the new economy, include:

– Environmental sustainability, ‘greening’ of the economy.
– Social orientation.
– Maximum structural and territorial coverage.
– Putting a higher value on natural goods.
– Emphasis on knowledge.
– Reducing risks (including environmental risks) associated with development.
– Innovation.
– Sustainable consumption and production.
– New approaches to measuring progress.

In what follows we will consider the global and Russian situation, using these features as starting points.

Growing environmental constraints have led to the recognition, in both theory and practice, that the world needs a new type of economic development, a way forward in the economy based on ‘green’ principles. The outlines of what is needed are made clear in initiatives by the United Nations Environment Programme (UNEP) for transition to a ‘green’ economy and the green growth programmes of OECD countries (2008-2012).\(^3\) The final document of the Rio de Janeiro Conference, ‘The Future We Want’, contains base proposals for transformation of the current global economic model.

Russia also recognizes the need for a radical change of the global economic model. Representing Russia at the Rio+20 Conference, Prime Minister Dmitry Medvedev emphasized that ‘Society, the economy and the natural environment are inseparable. We therefore need a new development paradigm, which can ensure the well-being of society without excessive pressure on the environment. The interests of the economy, on the one hand, and preservation of the natural environment, on the other hand, must be balanced and focused on the long term. We also need innovative growth and greater energy-efficiency – creation of the so-called ““green” economy”, which is definitely beneficial for all countries.’\(^4\)

The ‘green’ economy is defined by UNEP as an economy, which improves the well-being of people and enables social justice, while reducing environmental risks and environmental degradation.\(^5\) The key features of such an economy are the efficient use of natural resources, preservation and increase of natural capital, reduction of pollution, low carbon emissions, preventing the loss of biodiversity and ecosystem services, and the growth of income and employment. The priority feature of growth in the ‘green’ economy is a radical increase of energy efficiency. Hence the broad currency, which has been obtained by the term ‘low-carbon economy’.

The ‘green’ economy is not a substitute for the concept of sustainable development. But it is increasingly recognized that achievement of sustainability depends almost entirely on shaping the ‘right’ kind of economy. In past decades, humanity has created new wealth on the basis of an anti-environmental ‘brown’ economy.

According to UNEP experts, just 2% of global GDP would be sufficient to launch the processes needed for greening of the world economy. Forecasts for 2030 and 2050 show the huge potential of the ‘green’ economy (compared with inertial development) for reducing impact on the environment and reducing demand for energy resources by almost half in 2050 (Figure 4.1). Such a course could also give 14% growth of per capita GDP by 2050.

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\(^4\) http://government.ru/docs/19427/

The emergence of a new economic model worldwide and in specific countries is increasingly evident, and the global crisis has contributed to the search for paths to a green economy. Many nations are working on anti-crisis programmes, which include a major environmental component. Examples include the EU’s 20:20:20 plan (for improvement of energy efficiency and the share of renewable energy by 20%, all to be achieved before 2020), US programmes to reduce greenhouse gas emissions, etc. Countries of the G20 are allocating nearly 16% or USD 522 billion to ‘green’ investments out of a total USD 3.3 trillion package of government measures to stimulate the economy. According to studies by HSBC, the environmental share in anti-crisis measures of various countries is 8–13% in the USA, Canada and Germany, 21% in France, 38% in Germany and 81% in South Korea. However, efforts by the Russian Government during the crisis were focused on rescuing large companies and banks in order to avoid the social consequences of closures (unemployment, decline of personal income, etc.).

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Countries where environmental interests have traditionally been subordinated to economic growth are beginning to join developed countries in according an increasingly important role to environmental priorities. The policy changes in China, a country with the second largest economy in the world and severe environmental problems, are a good example of this. China is launching the largest environmental reform in its history: the five-year ‘green’ plan, which came into force in 2011, involves the introduction of a new system of environmental regulation aimed at reducing pollution of the environment and natural resources, promotion of clean technologies in industry and the creation of a ‘green’ tax, which will relate to the amount of resources consumed rather than to labour. A new system of market-based environmental charges on emissions, a package of standards for specific emissions of greenhouse gases, and a domestic emissions trading system are also being prepared. Another idea under discussion is for transition from a system that assesses the efficiency of economic development using GDP growth to a system based on an index of sustainable development. In total, China plans to invest at least 3 trillion yuan (USD 468 billion) on the implementation of environmental programmes during the next five years. The multiplier effect in ‘green’ industry is believed to be 8–10 times greater than in other industrial sectors.8

Along with environmental priorities, the concept of the green economy gives much attention to the issue of social justice. The essence of the problem is clearly highlighted in the title of the Global UNDP Human Development Report 2011: ‘Sustainability and Equity: A Better Future for All’.9 The issue of social justice has many aspects: equality within and between generations, between rich and poor countries, in distribution of income within countries, etc. The major challenge is to overcome the growing inequality between rich and poor countries. On the threshold of the 21st century, the richest 20% of the world’s population accounted for 86% of spending on consumption, while the poorest 20% accounted for just 1.3%.10 At present an inhabitant of a developed country produces nearly 30 times more greenhouse gas than an inhabitant of a poor country.11 Inequalities in consumption are also very pronounced inside some countries, including Russia, where the income gap between rich and poor is widening.

Compensating for natural resource use and overcoming their limitation and exhaustibility through accumulation of knowledge is fundamental to the future economy and its sustainability.12 Humanity has to shift from development based on the use of natural resources to development based on the application of its most powerful renewable resource, which is knowledge. As T.Sakayya has said: ‘The only economic goods, which mankind will have in abundance and which will not have to be used sparingly, are human skills and knowledge.’ 13

Reduction of risks in the new economy is closely related to the process of accumulation of knowledge. These risks can be very diverse – from the financial risks, which led to the economic shocks in the world economy after 2008, to social risks associated with growth of the income gap, failure of the mechanism of social lift, etc. The principal feature of the new, green economy is a significant reduction of risks to the environment and its degradation. At present human knowledge of the laws of nature and environmental risks remain insufficient, and the global economic model remains environmentally maladjusted. The severe environmental crisis now being experienced by our planet is a result of these factors.

New nature-intensive megaprojects with unclear environmental outcomes should be viewed with extreme caution. The huge oil disaster in the Gulf of Mexico in 2010 showed the environmental risk of offshore projects, and future plans for Russian energy production on Sakhalin Island and in the Barents and Kara Seas should be considered in that light. Global climate change may affect the projected new energy production sites in various regions of the world, including the permafrost regions of Siberia and the Far East.

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10 Decoupling Natural Resource Use and Environmental Impacts from Economic Growth, UNEP, 2011.
Adequate economic valuation of the environment in the process of economic decision-making is an important aspect of the new economy. There is a clear need to place a higher value on natural goods (resources and services) in economic theory and practice. The world is increasingly aware of the limitations of equating natural capital with natural resources, and successful economic growth requires that other functions of natural capital should be recognized. Hence an attempt to take the economic significance of all the components of natural capital into account, in both theory and in practice, reviewing their ability to generate income and benefits, as benefits any form of capital. In general terms, four functions of natural capital can be distinguished:

1) The resource function (providing resources for the production of goods and services).
2) Regulative environmental services (absorption of pollution and waste, regulation of climate and water regimes, etc.).
3) Functions associated with aesthetic, ethical, moral, cultural and historical aspects of man’s relationship with nature (‘spiritual’ environmental services).
4) Ensuring that human beings and the environment remain in good health (this feature is still new to economics and, to a certain extent, it is a derivative of the first three functions of natural capital, but it can be treated separately in view of the priority of health for the development process).

One of the main reasons for negative environmental impact from economic activity is the hiddenness (latency) of many environmental problems: the traditional market simply does not see them. A modern economy cannot accurately gauge the benefits and damage which it produces for the economy and the environmental price of its operations, it cannot put environmental issues into figures and represent them in economic terms to government, business and society. Outstanding environmental and economic problems include: the absence of valuation of the majority of natural goods; underestimation of environmental damage; diffusion of benefits; inadequate reflection of the time factor (short-sightedness of the market); and public goods.

A critical problem for specific economic decision-making, preventing optimal functioning of the market, is undervaluation or lack of any valuation for many natural resources and services. There are no markets for many natural goods, and the harsh rule of any economy is: ‘What has no price, no economic evaluation, does not exist for the economy and is not taken into account in economic decision making.’ If an attempt is made to include natural capital in the decision-making, it becomes apparent that only one of its functions – that of resource provision – is in fact included in the market system, while the others (regulatory, cultural, aesthetic, etc.) are effectively outside the market. The theory says unequivocally: undervaluation or lack of any valuation entails that goods/resources are used and consumed in excessive amounts (over-used), which inevitably leads to their degradation and depletion.

A consequence of the failure of the modern economy to adequately value natural goods is the underestimation of environmental damage or, in the language of economics, of negative externalities. Many conservation measures would have been unnecessary if the exact external costs from the operation of polluting industries had been known, since a ‘polluter pays’ principle could have imposed additional payments on businesses that pollute the environment.

The latent (hidden) nature of environmental problems is also manifest when benefits from the operation of many environment systems are underestimated or even ignored due to the diffusion (dispersion) of these benefits. The market economy cannot take account of the mechanisms of many positive natural effects. The economic benefits of ecosystems are often dispersed over large areas – the entire planet in many cases – and a huge share of these benefits are manifested and consumed far from the system that created them. For example, the existence of a local ecosystem such as a wetlands – of little evident value to the owner – proves extremely beneficial over large territories due to its function in preventing fires and floods, and treating water (Box 4.1 and Figure 4.2). So the conservation of wetlands provides ‘off-market’ values to various beneficiar-

14 S.N. Bobylev, B.M. Zakharov, Modernization and Sustainable Development, Moscow, Ekonomika, 2011.
15 Externalities (external effects) can be most generally defined as uncompensated impacts (positive or negative) of one party on another party.
ies, who may be at a distance of tens, hundreds or thousands of miles from the actual wetland habitats. Russia experienced this to the full in recent years, when fires caused enormous economic damage. And wetlands have important economic benefits for the world community because they bind greenhouse
gas emissions. Another example: if all the ecosys-
tem functions of forests (water regulation, carbon sequestration, air purification, flood prevention, etc.) are taken into account, the value of wood in living trees is 3–5 greater than its value as timber.

Box 4.1. Benefits of Wetland Conservation

An international study of the value of ecosystem services of wetlands has demonstrated the com-
plexity of identifying the benefits and obtaining payments/compensation from beneficiaries (Figure
4.2). The main benefits of wetlands are in mitigating extreme climate events (USD 1907/hectare / year), wastewater treatment (USD 654/hectare/year) and climate regulation, i.e. wetland services, for which there is no market. Their ecoservices for production of food and raw materials, for which there
is a market and pricing, are much less (USD 150/hectare/year).

Figure 4.2. The economic valuation of ecosystem services of wetlands.
Source: The Economics of Ecosystems and Biodiversity for National and International Policy makers, UNEP, 2009.

The mechanisms of the Kyoto Protocol for pre-
venting global climate change represent an impor-
tant precedent for adequate measurement of the
value of nature’s benefits, both for economic theory
and for practical action. By agreeing to establish a
new global market for greenhouse gas emissions,
the countries of the world agreed, in effect, to trade fresh air. Each ton of greenhouse gases now has its
own specific price based on supply and demand and
the cost of reducing the emission of these gases. It
is highly important that the mechanism gives a valu-
ation to the regulatory functions/ecosystem services
of forest and agricultural land in binding greenhouse
gas emissions. How is progress toward a ‘green’ economy – the
rate of greening of sectors and activities – to be
measured? The first step is to change the views of
the vast majority of politicians, businessmen and sci-
entists on the issue of development, which currently
remain tied to such mottos as ‘economic growth is
the key to progress,’ ‘growth first, and then the so-
lution of environmental problems’, etc. Such mottos
had remained unchallenged until recently. In the
existing economic stereotypes, economic growth is usually identified with increase of gross domes-
tic product (GDP), the maximization of profits, cash
flows and other financial indicators, while the qual-
ity of growth and its costs (environmental and so-
cial) are usually ignored. Use in the decision-making process of economic and financial measures that do not fully reflect the real economic, social, and ecological processes, is largely what led to the global crisis. The prime example of an indicator that fails the test of sustainability is GDP\(^{16}\) – the most classic and widely used economic indicator in the world. Until now, the vast majority of countries, including Russia, have measured their development success by the value of this indicator. But, GDP, which began to be applied at the beginning of the 1950s, is really only suited as a measure of traditional industrial economies. By contrast, growth of GDP in countries with large natural capital through expansion of their resource sector is of dubious value. The easiest way to achieve such growth is by over-exploitation of hydrocarbon and coal fields, forests, land, etc. In particular, Russia’s favorable GDP before the crisis was largely based on the depletion of natural capital and shift of the Russian economy to a raw-materials export model.

The Rio+20 Conference criticised excessive reliance on GDP for assessing progress. The UN Statistics Commission has now developed new approaches to greening of the System of National Accounts, proposing new approaches to global environmental accounting, which cover the most important aspects of resource efficiency and environmental damage.\(^{17}\)

Appropriate indicators are needed in order to carry out monitoring and judge whether movement towards a ‘green’ economy is taking place, or whether the ‘brown’ economy is being perpetuated. Work in at least two directions is required: to develop sustainable development indicators and to achieve the effect known as ‘decoupling’. These issues are dealt with in Chapter 9 of this Report.

An important issue is the territorial and structural-technological scale of the ‘green’ economy. The ‘green’ economy can only succeed if it is global. Greening in a limited area (in the developed countries, for example) cannot ultimately be successful without transformation of the world’s major economies. Developed countries alone – for all the effectiveness of their own efforts to shift to a low carbon economy – will be unable to prevent destruction of the global climate system unless there is coordination with the largest emitters of greenhouse gases, which are China, India and Russia.

The issue of the structural and technological scope of the green economy is also controversial, and much confusion attaches to it at present. The green economy is often understood to refer only to ‘green’ business, which covers the production of various types of pollution control equipment, utilization of secondary resources and waste, the provision of environmental services, etc. In this case, the ‘green’ economy is a part of the ‘big’ economy. But, clearly, peaceful coexistence of such a green economy with the natural-resource ‘brown’ economy is hardly possible. Green transformation has to extend to the whole economy, and the greening process can only be effective in the long run if it includes the macro level.

The issue of energy efficiency and the low-carbon principle are of central importance for the new economy. Chapters 5 and 6 of the present Report are devoted to these questions.

### 4.2. Creating a Green Economy in Russia

The transition to a green economy will happen differently in different countries, because it depends on the specifics of the natural, human and physical capital of each country, its level of development, socio-economic priorities, and the level of environmental culture. The final document of the UN Conference in Rio de Janeiro, ‘The Future We Want’ (2012), stresses that each country can choose the approach to transition to a ‘green’ economy, which best suits its national plans, strategies and sustainable development priorities. A rigid set of rules is not desirable.

The concept of the ‘green economy’ is essentially new for Russia and is hardly ever used in official documents. However, national targets, which have been set for the next 10-20 years, largely correspond to the objectives of transition to such an economy. This is reflected in the general policy for use of re-
sources and protection of the environment in the future, and in legal and economic instruments, which are available. The main task of the Russian economy at the present stage, as reflected in the principle documents describing the country’s development trajectory in the medium and long term, and also in speeches by the Russian President and Prime Minister of the Russian Federation, are for movement away from raw material dependence. This is also the central objective in the green-economy concept. The task has a central place in main Government documents: the Concept for Russia’s Long-Term Development (2008); the draft Strategy for Long-Term Development (the ‘Strategy 2020’) (2012); Principles of State Policy in Environmental Development up to 2030, approved by the President of the Russian Federation (2012); etc. For example, although the latter document does not use the term ‘green economy’, the strategic goal of Government environmental policy up to 2030 is proclaimed as being: ‘the solution of socio-economic tasks, ensuring environmentally-oriented growth of the economy’. In this context, the term ‘environmentally-oriented growth’ largely coincides with the term ‘green growth’.

A key goal of the green economy is energy efficiency, and this is a particular priority for Russia. It is set out in the Energy Strategy of Russia up to 2030 (2010), the Presidential Decree ‘On improving energy and environmental efficiency’ (2008) and the Law on Energy Efficiency (2009). Development priorities for green sectors of the economy have been reflected in existing long-term programmes for specific resources.

Russia can play a crucial role in formation of the new global green economy. It can do so by virtue of its huge natural capital and ecosystem services, which contribute to the sustainability of the biosphere and provide economic benefits to all mankind. Russia’s vast areas untouched by economic activity, its colossal forest and wetlands, freshwater, biodiversity potential—all of these make a major contribution to shaping the new global economy. As Dmitry Medvedev said at the Rio+20 Conference, Russia is an environmental donor to the world. The country must play a more active role in greening of the global economy, from which it can obtain economic benefit by ‘capitalizing’ its status as an environmental donor. These opportunities are also discussed in the Concept for Russia’s Long-Term Development (2008). In this regard, it is highly important for Russia to coordinate national efforts with those of international organizations, particularly in the framework of the WTO, which Russia joined in 2012 (Box 4.2), and to integrate the principles of international agreements in the country’s own legal framework and economic decision-making.

In order to achieve its environmental objectives, Russia must radically change the trend towards commodity exports, which has enormous inertia power at the present time. It is becoming increasingly clear, as confirmed by the economic crisis, that Russia’s economic model based on the export of raw materials has exhausted itself.

Environmental sustainability has become an important feature of the new model for the national economy. ‘Unsustainable’ aspects of Russia’s current development trajectory are confirmed by: the exhaustion of natural capital as a factor of economic growth; structural shifts in the economy; the increasing relative share of natural-resource exploiting and polluting industries; the growth of environmental risks due to the high physical wear of equipment; high levels of environment intensity; dominance of natural resources in exports; environmental imbalance in investment policy, leading to an increase in disparities between natural-resource sectors and the processing, manufacturing and infrastructure sectors of the economy; impact of environmental pollution on human health; etc.

The development of unsustainable trends is largely due to the natural-resource-intensive restructuring of the economy in the 1990s towards raw-material and polluting sectors, and worsening of the ‘environmental quality’ of plant and machinery, which was accompanied by the decline of resource-sparing and and high-tech industries. The Russian President Vladimir Putin has described the result of these trends as ‘a large-scale de-industrialization’. High energy prices, particularly the huge increase in prices for oil and raw materials in the 2000s, contributed to making the structure of the Russian economy more ‘heavy’. En-

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energy and metallurgy (ferrous and non-ferrous), which have the largest impact on the environment of any industrial sectors, currently account for more than half of Russian industry. The share of industries that have relatively little impact on the environment, notably machine-building, declined in the same period. The crisis exacerbated Russia’s environmentally negative structural changes, since export-oriented raw material industries, survived best, helped by Government support. The Russian economy is becoming increasingly dependent on commodity exports.

Unfortunately, the new environmental and economic realities are not taken into sufficient account by documents on Russia’s long-term economic development. For example, the generally constructive and ambitious Strategy 2020 (2012), developed for the Russian Government Federation by leading experts for the period up to 2020, takes much account of social factors, but has little to say about the environment. The strategy is also based on the traditional paradigm of GDP.

The new economy should focus on qualitative rather than quantitative development. Instead of striving to increase production and consumption of natural resources, with increasing impact on the environment, Russia should make better use of the raw materials, which are already drawn into the economic cycle (see also Chapter 9). Russia has huge potential for saving natural resources by means of modernization. The pursuit of quantitative indicators, whether of value (GDP, etc.) or volume (amounts of oil, gas, metals, etc.), is mistaken. Quantitative indicators should take second place to the social and environmental quality of growth.

In order to attain stability the future economy should have the following key features:

- Economic strategies / programmes / plans should include aspects expounded in UN and OECD documents on the green economy and growth, and on the low-carbon economy.21
- Acknowledgement of the importance of environmental living conditions of the population and maintaining decent environmental living conditions.
- Priority development of knowledge-intensive, high-tech manufacturing and infrastructure industries with minimal impact on the environment, typical of the knowledge economy.
- Reduced share of the raw materials sector in the economy.
- Radical increase in the efficiency of natural resource use and resource savings, enabling major reduction of natural resource expenditure and of pollution per unit of end-product (reduction of environmental intensity and pollution intensity).
- Less pollution of the environment.

Transition to sustainable development requires compensation of Russia’s natural capital depletion by growth of investment in human and physical (man-made) capital. Key steps include a drastic increase of investment in science, education, public health, innovative development, and the development of special funds (similar to the Fund for Future Generations), which are used in many countries around the world.

The most important goal of economic policy, supported by Government, business and society, should be transition to sustainable development in the entirety of its economic, social and environmental components. The priority for achievement of the green economy and the greening of economic policy can be summarized: Do not maximize levels of use of natural resources, since they are limited, and their rapid consumption leads to additional pressure on ecosystems, depletion of natural capital and environmental pollution. Existing, outdated and resource-intensive technologies also lead to over-consumption, the loss of natural resources and increased pollution. Technological modernization of the Russian economy and its structure could release 30-50% of all the natural resources, which are now used inefficiently and wasted, while increasing the final results of production processes. Production levels and the territories used for development of energy resources and minerals, as well as areas used for farming, and rates of deforestation, etc., can be stabilized. As made clear by the Energy Strategy of the Russian Federation for the period up to 2030, almost half of the energy now consumed in Russia could be saved by the installation of fairly simple energy-saving technologies.

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Investments are needed to improve the use of natural resources that are already being developed and to protect the environment through modernization of the economy, support for innovation, replacement of resource-intensive technologies by technologies that are resource-sparing and energy-efficient (best available technologies), deepening and diversification of raw material processing, etc. This will improve the well-being of the population, increase GDP by 2–3 times at the present level of raw material extraction and use of natural capital, and reduce levels of pollution.

This is the high road to the creation in Russia of a new, green economy: by investing in resource-saving restructuring of the economy, radically changing the technology base and reducing environment intensity, the costs that are needed to counter the negative environmental effects of economic development can be minimized now and in the future.

The conditions for transition to a green economy, as formulated in the documents of international organizations, highlight the need to limit costs in sectors that deplete natural capital. Russia should not rush ahead in the near future with high-cost mega-projects to exploit new natural resources, particularly energy resources, with unpredictable consequences for the environment and the human population (at offshore zones and the permafrost zone, where transport infrastructure is lacking, etc.). Such caution is justified not only by environmental considerations, but also by purely economic logic: swings and falls in world market prices for raw materials may cut off a significant part of the market for output from new fields with their infrastructure and pipelines by making them unprofitable, as is already happening to some extent in the gas market due to increased global production of shale gas. We must hold back from rapid development of capital-intensive new fields. Growth in levels of final output can instead be achieved by enhanced recovery techniques, equipment upgrades and deeper processing of raw materials, including for export.

The priority of macroeconomic steps, which determine economic development, economic growth and well-being of the population, is evident to decision-makers in today’s economy. But the environmental consequences of economic policy are receiving insufficient attention in Russia. In the transition to a green economy, measures of economic policy need to deliver environmental gains (or be at least environmentally neutral), achieving a ‘win-win’ situation on economic and environmental fronts. This amounts to a ‘fusion’ of macroeconomic and environmental policies. At the national level, examples of this fusion include: adjustment of fiscal policy (heavier taxation of resource use and pollution); reform and the reduction of subsidies that lead to degradation of natural resources and the environment; the introduction of new market instruments; transition to green public procurement; improvement of environmental standards and ensuring that they are applied; environmental insurance; the creation of new ‘green’ jobs and associated re-training of employees from the ‘brown’ economy. All of this can improve the competitiveness of the green economy. A classic example of the ‘win-win’ approach would be radically improved energy efficiency (by 40% up to 2020), which can provide huge economic benefits as well as environmental dividends.

Environmental ‘rules of the game’, set by Government for the economy, encourage private business to recognize and use genuine opportunities offered by the transition to a green economy in a number of key sectors, and to react to the reform of public policy and price signals by increasing financing and investment in greening of the economy.

The center of gravity in tax policy should be moved from labour and capital to natural resources, as is happening in many countries. At present in Russia the economy based on raw materials is being perpetuated by the tax and revenue generating importance of the natural resource sectors, particularly energy. According to Government data, half of the budget (49.2% in 2011) effectively consists of oil and gas revenues. Reduction to 43.5% is targeted by 2014. The fact that the current tax burden on the manufacturing sector, which has little environmental impact, is higher than that on raw materials and ‘brown’ processing sectors is clearly not conducive

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to greening of the economy. At present taxation levels are 11.1% for machinery and equipment production and 11.3% for construction, while the level for metallurgy is 3.3% and that for production of coke and petroleum products is 5%.\(^{24}\) Clearly the tax system must be transformed with the objectives of sustainable development, diversification and modernization of the economy: environment-intensive and polluting activities should be taxed at the highest rates, while the tax burden on high-tech, manufacturing, processing and infrastructure sectors should be minimized.

The system of subsidies in Russia does not facilitate transition to a green economy. This is especially true of the energy sector. Government support for oil and gas producers is substantial. According to some estimates, subsidies to the oil and gas industry amounted to USD 14.4 billion in 2010, which is more than 14% of all tax and other payments to the federal budget by the sector.\(^{25}\) The bulk of remissions are on mineral extraction tax (MET) and export duties: these two together account for USD 9.8 billion or 68% of the total. Government subsidies to oil and gas producers are mainly intended to stimulate the development of new fields, including fields in the Arctic.

The Russian government is currently making efforts to alter the system of taxes and subsidies in the commodity sector. For example, at the G20 Summit in 2010 Russia unveiled a strategy to ‘rationalize and, in the medium term, to eliminate inefficient subsidies that encourage wasteful consumption of fossil fuels’ as part of the Energy Strategy up to 2030 and the Concept for Socio-Economic Development up to 2020. The Government amended the Tax Code for these purposes in November 2011, doubling the MET rate on gas produced by Gazprom in 2012 from 237 to 509 rubles per 1000 m\(^3\), with further increases planned to 582 rubles in 2013, and 622 rubles in 2014.\(^{26}\)

Greening of public procurement could give a major boost to the green economy. Procurement accounts for a significant proportion of total government spending in both developed and developing countries, and sustainable public procurement techniques can generate high and long-term demand for green products and services, encouraging private and public companies to make longer-term investments in innovation, and manufacturers to carry out economies of scale, reducing their costs. This in turn can contribute to wider commercialization of green products and services, creating the conditions for sustainable consumption.

Payments for ecosystem services, which are being implemented in several countries can expand the market and raise valuation of natural resources and services. An approach similar to that used in the Kyoto Protocol mechanisms should be extended to all kinds of natural resources and services, not just those that are already ‘in the market’. Payments for ecosystem services offer new development prospects for Russia, due to its huge natural capital.

As well as economic means of regulation, the Government should also make greater use of legal and institutional mechanisms in the field of natural resource use and conservation. Ensuring the execution and implementation in practice of Russia’s extensive environmental legislation is particularly important for progress towards the green economy.

Innovation, science and technology development, information technology, new materials, products and technologies, etc., can reduce consumption of natural resources and the amount of pollution per unit of production and services by several times. Modernization through the renewal of fixed assets in industry offers huge potential for transition to a green economy. Old equipment cannot make efficient use of natural resources and lead to growth of pollution. As much as half of Russian industrial fixed assets are full depreciated and in need of replacement. The aging of physical capital and the growth of environmental risks can have potential benefits, which should be exploited: 1) the possibility of significantly reducing natural resource use and pollution per unit of production by deployment of best-available technology; and 2) a technology ‘leap’ that enables radical improvement in the use of natural capital.

The concept of best-available technology has already proven its high environmental and econom-

\(^{24}\) Ibid.
\(^{26}\) RBC Daily, February 7, 2012.
ic efficiency in the European Union. In Russia the Ministry of Natural Resources has prepared a law for large-scale implementation of these technologies, which will serve as a new regulatory basis in environmental protection and help to put economic incentives in place. When considering the chances of a technology leap in Russia, it is important to remember that lagging countries have an advantage when it comes to replacing old economic structures, because they are not weighed down by over-accumulation of old capital. Such countries are also at an advantage in establishment of the new structure, because they can use the investment and technology experience, which has already been accumulated by developed countries. So large-scale replacement of obsolete physical capital based on new technologies makes it possible to ‘jump over’ the traditional stages of technological innovation, enabling quick and efficient progress towards a green economy. Such a technological leap took place in the USSR in the 1930s, when the country was rapidly industrialized with help from developed countries, which were experiencing a depression at the time.

Russia’s accession to the WTO presents new challenges for the Russian economy (see Box 4.2). Despite the undoubted advantages of membership, there is a risk that it will strengthen the raw materials export model, which contradicts the goals of modernization and greening of the economy. Clearly, for the global market, and for multinational and foreign companies operating in Russia, the country’s natural-resource industries are the prime attraction. This refers particularly to energy resources, which are highly competitive goods. It would be foolish to expect substantial foreign investments in high-tech industries and machine-building in Russia, since foreign companies have no interest in creating more competition.

Accumulated economic, social and environmental problems dictate the need for a new economy in Russia and worldwide. The final document of the Rio+20 Conference outlined the contours of a green economy, which is the basis for sustainable development. The transition to a green economy will happen differently in different countries, because it depends on specifics of the natural, human and physical capital of each country, its level of development and socio-economic priorities, as well as the environmental culture of each society.

Russia should enact its own sustainable development strategy. The country’s economic strategies/programmes/plans should include themes from UN and OECD documents devoted to greening of development, the green economy and growth.

The chief task of the Russian economy at the present time, as reflected in the main documents on the country’s medium- and long-term development, is to move away from the raw-material model. This is also the central task in the concept of the green economy. In Russia modernization of the economy and transition to the green economy largely coincide. This ‘win-win’ policy should be a guiding principle of Russia’s socio-economic and environmental policy in the next 10-20 years. In particular, the country needs to radically improve its energy efficiency, since this will have a huge environmental impact.

Modernization and structural-technological changes could increase Russia’s GDP by 2-3 times at the country’s present level of production and use of natural resources, by deploying the huge amounts of raw materials, which would be saved, in the domestic economy and for export. This would greatly improve the well-being, and the social and environmental quality of life of the Russian population. This is the high road to creation of a green economy in Russia. It requires investment in a new, resource-sparing structure of the economy and radical technology upgrade, greening the economy and reducing its environment intensity, thereby conserving natural capital and minimizing the cost of remedying negative environmental impacts now and in the future.

The ageing of physical capital and growth of environmental risks create opportunities: 1) for a significant reduction in the use of natural raw materials and pollution per unit of production by the installation of best-available technology; and 2) for a technological ‘leap’, which would radically improve the use of natural capital.

The effectiveness of state regulation of the extraction and use of resources and protection of the environment needs to be strengthened. Economic and legal instruments should be used to encourage and compel publicly owned and private companies to improve their resource efficiency through modernization and innovation, to prevent wastage of raw materials, and to adequately compensate for damage inflicted on society and the environment.

Box 4.2. Russia’s Relationships with International Organizations in 2012

Russia cooperated intensively with various international organizations in 2012. The most notable event was completion of Russia’s accession to the World Trade Organization (WTO). Another highlight was the holding of the APEC summit in Vladivostok as part of the Russian presidency of APEC. Negotiations intensified on Russia’s accession to the Organization for Economic Cooperation and Development (OECD), and Russia took an active part in all the activities of the G20 and G8. Contacts were developed further in the framework of the Shanghai Cooperation Organization (SCO) and BRICS. Russia also continued to developed its relationship with the EU, which is its main trading partner.

Accession to the WTO. The 18-year process of negotiations on Russia’s accession to the World Trade Organization was fully completed on August 22, 2012, on which date Russia effectively became a member of the WTO. Membership represents a major step towards Russia’s integration with the world economy and world trade. It is also an important achievement for the WTO itself, since Russia was the last major world economy not included in the Organization.
Russia’s accession to the WTO was formalized on December 16, 2011, at the 8th WTO Ministerial Conference. The package of documents on accession was ratified by the Russian State Duma on July 10, 2012 and on July 21, 2012, President Vladimir Putin signed the Federal Law ‘On ratification of the Protocol on Russia’s accession to the Marrakesh Agreement of April 15, 1994, establishing the World Trade Organization’, after which the WTO Secretariat was notified accordingly.

Although the accession process was in its final stage, heated debates and disagreements concerning WTO membership continued inside Russia during 2012. It is therefore worth stating once again why accession to the WTO is so important for Russia. The country has exhausted the potential for further growth based on sale of hydrocarbons, and revenues from oil and gas exports will decline. Russia therefore has to radically change the structure of its exports in favor of final goods and services if it is to avoid a sharp decline in the balance of trade. Obviously, the first step is to start producing such goods and services, but making them competitive on foreign markets is equally important. That cannot be achieved without guaranteed free access to those markets, and such a guarantee can only be obtained through membership of the WTO.

The negotiation process has given Russia well-balanced overall conditions of accession to the WTO. The tariff commitments assumed by the Russian side as a result of negotiations are summarized in Table 4.1.

<table>
<thead>
<tr>
<th></th>
<th>Common customs tariff*</th>
<th>WTO: average-weighted</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>average-weighted**</td>
<td>Initial level 29</td>
</tr>
<tr>
<td>All goods</td>
<td>10.293</td>
<td>11.850</td>
</tr>
<tr>
<td>Agricultural goods</td>
<td>15.634</td>
<td>15.178</td>
</tr>
<tr>
<td>Industrial goods</td>
<td>9.387</td>
<td>11.256</td>
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</tbody>
</table>

* Common customs tariff of the Customs Union between Russia, Kazakhstan and Belarus
** Average-weighted rates are calculated using averaged customs statistics for deliveries from outside the CIS in 2008-2010

Transitional periods for liberalization of market access usually last 2-3 years, and 5-7 years for the most sensitive goods.

According to preliminary estimates, at the end of the transitional periods, i.e. when import duties have been reduced to their final level, about half of all duty rates will remain at a level not lower than the current existing common tariff of the Customs Union between Russia, Kazakhstan and Belarus. About 30% of rates will be reduced by no more than 5 percentage points.

As can be seen from Table 4.1, lowering of the average-weighted rate for the entire range of goods from the current to the final level agreed in the negotiations will be about 3 percentage points. The same applies to industrial products. The reduction for agricultural and food goods will be about 4.4 percentage points. These figures require some further explanation.

First, it should be borne in mind that the reduced rates of import customs duties will mainly affect machinery, equipment, components and rare materials, which are not produced in Russia.

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29 Maximum duty tariff level, which can be applied at the date of Russia’s accession to the WTO.
30 Maximum duty tariff level, which can be applied at the end of the transitional periods.
The average-weighted level of tariffs on industrial goods will decline from 9.387% to 6.410% during the transitional period (for comparison, the analogous figure for China is 7.5%, for Ukraine 4%, and for the USA and the EU less than 4%).\(^{31}\) i.e. the market for industrial products in Russia will remain more protected by import duties than the relevant markets in the USA, the EU and Ukraine. The level of tariff protection of the agricultural market will remain higher compared with the market for manufactured goods: the final level of the average-weighted duty for agricultural goods will be 11.275%. Russia’s membership of the WTO binds the country by generally accepted international rules in trade, giving a doubly positive effect. On foreign markets Russia’s trading partners no longer have any excuse for discriminating against Russia on the grounds of its non-compliance with the principles and rules of the multilateral trading system. This is very important, since data of the Russian Ministry of Economic Development in the middle of 2012 suggested that Russia was one of the most discriminated-against economies in the world: a total of 73 restrictive measures were in operation against Russian manufacturers and exporters in 19 countries around the world, causing annual losses in excess of USD 2.5 billion. WTO membership gives real levers for gradually reducing these losses.

The positive effect at home is no less important. One of the chronic systemic problems of the Russian economy remains an unhealthy competitive environment. Improving Russia’s economic health without liberalizing markets and admitting foreign goods, services and technologies is not feasible. And improvement of the competitive environment will give another positive effect by reducing levels of corruption in Russia.

The fruits of WTO membership are not automatic, but will be obtained by Russia’s taking an active role in the organization. This means that the Government’s external economic staff must learn to work in the context of the WTO and to assimilate the vast accumulated experience of member states in protecting their national markets, resolving disputes, etc. This will require highly qualified personnel working in the Government service and for large companies with major trade operations, and also at consulting firms and law firms, which will provide legal assistance to business. The training of such personnel is a vital task for Government and business in the near future.

**Russia and the World Bank**

Russia is a member of the World Bank and has participated in its various bodies. At the same time Russia receives support from the World Bank, intended to:

- Maintain high rates of growth.
- Improve the quality and efficiency of the public administration.
- Improve the quality of basic social services.
- Assist Russia in strengthening its global role.

As of January 2012, the World Bank was financing nine investment projects in Russia worth USD 756 million. Since 1992 the World Bank has funded more than 70 projects in Russia in association with the Russian Government, which have led to significant improvements in such areas as governance and fiscal policy, infrastructure and human resources, energy efficiency, environmental protection and sustainable forest management.

Lending to Russia by the World Bank has declined in recent years, as shown by World Bank data:

- 2008 – USD 200 million
- 2009 – USD 150 million
- 2011 – USD 125 million

In June 2012, the World Bank published a study entitled ‘Doing Business in Russia 2012’.

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\(^{31}\) Here and below is the data of the Ministry of Economic Development of the Russian Federation on the results of negotiations on Russia’s accession to WTO.
**Russia and the International Monetary Fund (IMF)**

Russia has participated in the work of the IMF as one of its members. In April 2012, the Finance Minister Anton Siluanov announced at a meeting of finance ministers and central bank heads of the G20 that Russia may increase its contributions to the IMF. At the end of July the Russian President Vladimir Putin signed a law amending the IMF agreement through increase in the quotas of developing countries, including Russia, by 0.22 percentage points to 2.71%. This will entail an increase in total votes of the BRIC countries from 10.71% to 14.18%. In absolute terms, the Russian quota will be 12.9 billion SDRs (special drawing rights). Russia’s position in terms of influence in the IMF will rise from 10th to 9th place as a result of the increase.

**Negotiations on accession to the OECD**

Accession to the OECD is among Russia’s priorities in the field of international cooperation. The decision to start negotiations on accession was taken by the OECD Council at ministerial level on May 16, 2007. Presentation to the OECD on June 24-25, 2009 of an Initial Memorandum on the Position of the Russian Federation in Respect of Legal Acts of the OECD marked the official start of negotiations on Russia’s accession to the Organization.

There was some progress towards Russia’s accession to the OECD in 2012, including the fulfillment of two important conditions for accession: Russia became a member of the WTO, and ratified the OECD Convention on Combating Bribery of Foreign Public Officials in International Business Transactions. Ratification of the Convention indicates compliance of Russia’s anti-corruption laws with international standards. In April 2012, the Secretary-General of the OECD Angel Gurria visited Moscow and discussed the current stage of negotiations on Russia’s accession to the OECD at a meeting with Russian President Dmitry Medvedev. In June 2012, during the St. Petersburg International Economic Forum, Russian President Vladimir Putin outlined the time frame for the accession process, suggesting that Russia could join the OECD in 2014.

Completion of the process by that time will require further intensive negotiations in 2013, and the Russian side will have to meet number of conditions of varying complexity. In particular, it has been recommended that Russia should abandon its prohibition on the opening of branches of foreign banks inside the country (the prohibition was not canceled when Russia joined the WTO), give up restrictions on insurance companies with foreign capital (the restrictions should be removed later under the terms of WTO membership), liberalize cross-border securities transactions, and reduce the list of requirements which foreign companies must meet in order to enter strategic sectors of the Russian economy, particularly the extraction of natural resources. However, these points are advisory in nature and hard-and-fast requirements have not been laid down for any of them.

Another condition requires tighter environmental regulation by the Russian Government. Measures to protect the environment are ultimately beneficial, but their implementation involves costs for business and Government.

A particularly sensitive issue concerns recognition by Russian of test findings carried out in foreign laboratories on medicines, pesticides, cosmetics and food additives: if Russia has not established its own national laboratory testing programme to the required standards, Russia will have to recognize foreign test results.

Another condition is the establishment of clear rules for granting export credits (including the size of down payments, repayment terms and procedures, and interest rates) and for the issue of Government guarantees on such credits. Failure to comply with the OECD standards in this area could lead to the application of economic sanctions against Russian exporters, with serious consequences for Russia’s international image.
Cooperation with the OECD, in its current status as a partner country and future status as a member of the Organization, is of paramount importance to Russia. High-quality analytical interaction with the OECD and is a priority for many countries in the world, since it gives access to top-level international expertise, allows the countries to participate in design of strategic economic development, and enables them to provide data on their national economy and its individual sectors for the purposes of international studies by the OECD.

The OECD also has a growing interest in Russia’s reforms and is keen to obtain more up-to-date and complete information about the scale, dynamics and the future of the reform process in Russia.

**Presidency of APEC**

In 2012, Russia’s held the Presidency of the Asia-Pacific Economic Cooperation Forum. The Russian leadership lent much importance to the central event of the Presidency – the APEC Summit held in Vladivostok on September 2–9, 2012. Agenda priorities at the Summit were: strengthening food security; creating reliable transport and logistics chains; interaction for innovative growth; the liberalization of trade and investment; and regional economic integration. The Russian side gave strong support at the Summit to the common positions of Russia, Belarus and Kazakhstan, confident that the Customs Union, Single Economic Space, and (in the future) the Eurasian Economic Union will play an efficient role in global economic processes and in shaping the regional and international agenda.

The Summit participants agreed that they will not introduce new export restrictions or create new barriers to investment and trade until the end of 2015, and that they will reject protectionism. An APEC list of environmental goods was approved, consisting of 54 items: duties on these goods are to be lowered by the end of 2015. President Putin noted that this was the first time in APEC’s 10-year history when such a list had been approved.

One meeting at the Summit was devoted to the issue of food security, at which the potential for future cultivation of land in Western Siberia and the Russian Far East was noted. Opportunities for joint production of biofuel were also considered.

The agenda item most actively supported by the Russian side was a package of more than 20 transport infrastructure projects with a total capital intensity of about 12.3 trillion rubles, headed by major modernization projects for the Trans-Siberian and BAM railways. Russia’s package of transport initiatives at the APEC Summit also included the Northern Sea Route (via the Arctic Ocean), which has been used by Russia since the 1930s, and the Trans-Korean Railway (from the South Korean port of Pusan through North Korea to Russia). Parallel negotiations are being held on electricity supply lines and gas pipelines to South Korea. However, implementation of the Korean projects depends on the development of relations between North and South Korea.

**Participation in meetings of the G20 and G8**

Russia continued to take an active part in the work of the G20 and G8 during 2012. It is important to note that the significance of the G20 has increased in recent years due to changes in the balance of forces in the global economy at the start of the 21st century towards fast-growing developing countries such as China, India and Brazil, which are not included in the G8, but are members of the G20.

The G20 summit in Los Cabos (Mexico) in June included the first face-to-face meeting between Vladimir Putin and Barack Obama as heads of state (following Putin’s re-election as Russian President). The Russian side greeted the dialogue with the USA at Los Cabos as ‘very positive’, constructive and open. The Russian president said that it had proved possible ‘to reach agreement on key issues.’

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32 The term ‘ecological goods’ (‘ekologicheskiye tovari’) used in Russian-language materials of the Russian APEC Presidency is unfortunately incorrect, since it does not correspond to the concept of ‘environmental goods and services’ used in international negotiations, including APEC materials in English [note by A. Portansky].
The Heads of State issued a joint statement setting out the position of the two countries on regional issues, including Syria, Iran, North Korea and Afghanistan.

**Cooperation as part of the Shanghai Cooperation Organization**

The 12th meeting of heads of state of Russia, China, Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan – members of the Shanghai Cooperation Organization (SCO), took place in early June 2012 in Beijing. The summit showed substantial convergence of the interests of the participants in the face of various threats (terrorism, separatism, the deployment of the European missile defense system, and the economic crisis), and it was agreed that they can be best overcome through the deepening of integration.

A total of 10 documents were signed at the summit and a final declaration was made, condemning the violence in Syria and any military intervention in the Middle East. The signed documents include:

– A declaration by the Heads of State on work to build a region of long-term peace and common prosperity.
– A resolution of the Council of Heads of States on guidelines for medium-term development of the SCO.
– Approval of a resolution on political and diplomatic measures and mechanisms for response by the SCO to situations, which pose a threat to peace, security and stability in the region.
– Approval of a programme of cooperation to combat terrorism, separatism and extremism in 2013–2015.

Based on the signed documents, the Heads of State view the main tasks of the SCO to be the construction of an internal economic space, and the development of common positions on international issues with a focus on resisting terrorism and separatism in the upcoming withdrawal of troops from Afghanistan in 2014. Practical proposals in this area include the establishment of a regional anti-terrorist structure to combat drug trafficking, extremism and terrorism (the idea of Vladimir Putin) and a committee to resist ‘Internet aggression’ (the idea of Nursultan Nazarbayev).

However, the chief members of the SCO, Russia and China, have differing views on the future of the Organization. Both Moscow and Beijing are vying for a dominant position in the SCO: China by strengthening its financial influence in the SCO, and Russia by creation of the Eurasian Union, which increases its weight among the Organization members. China is eager for the SCO to create its own development bank, an idea opposed by Moscow, which has the more modest proposal of opening a special SCO account (on the eve of the Beijing summit, the Russian President’s special representative denied rumors of a stand-off between Russia and China over the bank issue). Beijing’s aims are clear: to use its cash cushion to lend to SCO countries, thus gradually pushing the dollar out of the SCO region and increasing its authority in the Organization. The decision on establishment of the bank has not yet been accepted, but China has insisted on allocating additional USD 10 billion from its budget for joint projects.

The positions of all SCO members coincide on main points: that the Organization must increase its international authority and speak with one voice on key issues in the global arena.

**Cooperation between the BRICS**

In 2012, the Russian leaders attached great importance to the development of the relatively new international grouping of Brazil, Russia, India, China and South Africa, although the BRICS remain a weakly institutionalized structure, acting on an informal basis. International analysts characterize the BRICS as ‘an alliance of reformers’, referring to their common aspiration to the reorganization of key international institutions (particularly financial-economic institutions). In this regard, the BRICS countries are de facto seeking new formulas of global governance, interacting with the G8 and working within the G20.
In March 2012, New Delhi hosted the 4th BRICS summit. The summit was attended by the leaders of Brazil, Russia, India, China and South Africa, who exchanged views on the state of the world economy, the reform of global governance institutions and issues of international security and stability. The outcomes of the summit were summarized in the Delhi Declaration. The participants also signed a general agreement on the provision of credits in national currencies for a system of interbank cooperation between BRICS members and a multilateral agreement on confirmation of letters of credit. In addition, a document entitled 'The BRICS economies: Report on Brazil, Russia, India, China and South Africa' was presented to the summit.

The political and diplomatic rapprochement by the BRICS creates favorable conditions for bilateral trade and economic exchange between its members. Recovery of trade between the BRICS counties has been more rapid than in other segments of the world market in the aftermath of the world crisis. In particular, trade turnover between Russia and Brazil increased by 18% in 2011, the increase between Brazil and China was 37%, and trade between Brazil and India grew by 20%.

Closer cooperation within the BRICS depends on overcoming lack of unity within the group on a number of important policy issues. For example, members are in opposition over the Libyan issue and reform of the UN Security Council by the inclusion of Brazil and India as permanent members (Russia and China are opposed to this). Antagonism also exists between India and China. India, Brazil and South Africa have a separate association – IBSA, –in which they often coordinate their positions on major diplomatic issues.

**Russia in the Council of Europe**

Russia has subscribed to 54 main contractual and legal acts of the Council of Europe, including the Convention for the Protection of Human Rights and Fundamental Freedoms, Conventions relating to the protection of national minorities, prevention of torture, local government, cooperation in the fields of culture, education, sports, film production, etc. By subscribing to these Conventions and also to the development of new conventions Russia obtains full rights to cooperate in the creation of a common European legal space.

Russia takes part in 5 of the 13 autonomous organizations (satellite organizations) of the Council of Europe: the Partial Agreement on Forecasting, Prevention and Provision of Assistance in the Event of Natural and Man-made Disasters; the Pompidou Group to Combat Drug Abuse and Illicit Drug Trafficking; the European Audiovisual Observatory; the European Commission for Democracy through Law (Venice Commission); and the Group of States against Corruption (‘GRECO’).

**Russia – EU**

The European Union is Russia’s main trading partner, accounting for over 50% of the country’s foreign trade, and the EU made a significant contribution to the success of Russia’s accession to the WTO. However, trade and economic cooperation between Russia and the EU periodically encounters more or less serious problems. In the second half of 2012, the European Commission launched an investigation regarding Gazprom’s supply policy on the European market. Brussels has also protested against alleged breach by Russia of the WTO obligations, which it assumed, and certain aspects of Russian domestic politics have been subject to criticism by the European Union. The elaboration of a new Agreement on Strategic Partnership between the EU and Russia is currently the most important item on the agenda.

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CHAPTER 5.  
Energy Efficiency:  
The Key Element of the New Economy

5.1. Exhaustion of the Extensive Model

Transition of the economy to sustainable development requires rejection in principle of an orientation to extensive economic growth, which draws ever more resources into economic activity. Improving energy efficiency is the key to emergence of a new ‘green’ economy. This position is emphasized in recent concept documents from the UN and particularly in the discussions and conclusions of the Rio+20 conference.¹

After its transformation crisis the Russian economy experienced a recovery in the first 7–8 years of the new century, during which an extensive approach brought the economy close to full employment of its labour and natural resources. The rapid growth of oil and gas output at fields that were already in development (coinciding with increase of energy consumption both globally and inside Russia) and increase of electricity generation (Figure 5.1) were important components of Russia’s economic growth during the past decade.

But from the second half of the 2000s factors were increasingly visible, which pointed to exhaustion of the potential of the existing model of economic development in general and of the energy sector in particular. The rate of growth of hydrocarbon production in Russia slowed down, increase of oil recovery rates at existing fields proved unfeasible using current technologies, while the launch and development of new fields require large investments and, most importantly, new technologies.

Estimates by the International Energy Agency (IEA) suggest that lifting costs of oil production in the mature producing regions of Western Siberia and Volga are USD 4-8 per barrel, while lifting costs

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¹ See, for example, Towards a Green Economy – Pathways to Sustainable Development and Poverty Eradication, UNEP, 2011.
in the new producing regions of Eastern Siberia, Sakhalin and the Caspian are in the range of USD 6–10 per barrel, and the level at more challenging offshore fields is as high as USD 15 per barrel. Capital expenditures for the development of traditional fields may be no more than USD 5 per barrel, but the level at Russia’s offshore fields such as Prirazlomnoye is USD 10–12 per barrel. At the same time, the Energy Research Institute of the Russian Academy of Sciences predicts that the share of Russian oil produced in Eastern Siberia, the Far East and the Caspian will rise to 20% by 2030 (from 8% in 2010).

The prospects for the gas industry are even more challenging. According to IEA calculations, capital costs in mature regions are about USD 4 per 1000 m³ and operating costs are USD 5 per 1000 m³. But operating and capital costs for Arctic projects could be as high as USD 50 and USD 30–60 per 1000 m³, respectively. The implications are clear when it is realised that the share of Russian gas produced in Arctic regions, including Yamal, Eastern Siberia and the Far East will increase from 5% in 2010 to 45% in 2030.

Energy prices are still at a high level, justifying even expensive investment projects. Global demand for fuel and energy will increase, but the global crisis has demonstrated the volatility of these prices. In addition, the challenge to conventional hydrocarbons from unconventional sources of oil and gas, coupled with development of the market for liquefied natural gas and other new technologies in the oil & gas industry (such as gas-to-liquids) show that competition in these markets, which are of critical importance for Russia, can be very tough.

Growing concerns over climate issues, illustrated by conferences in Copenhagen, Cancun and Durban – none of them very rich in results in the short term, but promising much for the future – mean that the prospect of future climate agreements has to be taken seriously. Although Russia has refused to assume limitations as part of the second phase of the Kyoto Protocol, the problem of greenhouse gas emissions remains relevant, both for preventing climate change and for protecting the atmosphere from pollution. Meanwhile, Russia’s CO₂ emissions continue to increase. After falling to a minimum in the late 1990s equal to about 65% of the 1990 level, they have now risen above 70% of the level just before the disappearance of the USSR and look set for further growth.

Potentially strong external demand for Russian fuel, significant competition and volatile prices on energy markets, growing domestic demand and increasing costs of production of fuel and energy resources, as well as global political commitment to ‘clean energy’ – all of these factors together put pressure on Russia to deploy a significant amount of low-cost and ‘clean’ sources of energy. One solution that is being increasingly used worldwide is the development of renewable energy sources. But Russia also has another colossal source of energy: energy saving through gains in the energy efficiency of its economy.

5.2. The Role of Energy Efficiency in the New Economy

In 2008 the World Bank and the Centre for Energy Efficiency (Russia) published an analysis of potential energy savings in the Russian economy. They found that Russia’s annual energy consumption could be reduced by about 45% (as of 2005) or 294 million tonnes of oil equivalent. For comparison, total annual oil production in Russia in 2011 was about 510 million tonnes. The Russian State Programme, ‘Energy Saving and Energy Efficiency in the Period up to 2020’ (hereinafter – ‘the State Programme’), adopted at the end of 2010, admits that ‘the potential for increase of energy efficiency’ is in excess of 300 million tonnes of oil equivalent. Estimates by the IEA in its annual review are more modest, at 200 million tonnes. But that still represents 30% of total Russian energy consumption, offering an extremely attractive ‘prize’ for a successful policy of energy efficiency.

It is important here to focus on terms that can be misleading. The above-mentioned State Programme

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from 2010 took as its targets both energy saving and energy efficiency. But there is a fundamental difference between these concepts. This has been discussed in greater detail by I.A. Bashmakov in a previous UNDP Report on Human Development in the Russian Federation.\(^5\)

Energy saving means reducing overall energy consumption, which may be a consequence of, for example, the lowering of economic activity. But improving energy efficiency means lower energy costs per unit of useful effect (for example, per unit of output), or, put the other way around, increasing the useful effect of a unit of energy used. So improvement of energy efficiency may be accompanied by an increase in consumption of energy – if the increase is slow compared with the rate of growth of the beneficial effect. Energy efficiency is in inverse proportion to energy intensity, i.e. to energy costs per unit of production (or the creation of some other goods). Reduction of energy intensity is analogous to increase of energy efficiency, and changes in energy intensity of GDP are among important factors for energy efficiency of the economy.

But a decline in energy intensity can be due to a number of factors, including structural changes in the economy (the redistribution of economic activity in favour of less energy-intensive industries), changes in capacity utilization (for example, due to economic crisis), weather conditions, etc. Decline of Russia’s energy intensity by 33.5% from 2000 to 2008 was largely due to structural factors, and the State Programme up to 2020 also envisages that 16.3 percentage points of the planned 40% reduction of the energy intensity of GDP will be due to structural changes.

Such a decline of energy intensity may not be accompanied by improvement of technology in specific industries: there may be a ‘nominal’ overall increase of efficiency without any increase in the efficiency of individual industries and their technologies.

We must therefore take energy efficiency in a narrow sense, where it refers to the technological efficiency of specific processes of energy consumption in the economy. The relevant indicators are calculated in many countries, including in Russia.

One common method for calculating potential energy savings from lowering of energy intensity is to compare energy consumption in a wide range of industries based on actual and potentially achievable energy efficiency parameters for individual industries, production of specific products and application of specific technology processes in these industries. Much depends what is taken as the ‘benchmark’. For example, the IEA points out that the benchmark in its analysis of Russia’s potential for energy saving was not global best practice, but what would be considered average indicators for developed countries, so the potential, which the analysis revealed, could be even higher using another approach.\(^6\)

Energy intensity indicators are also problematic because they are clearly not comparable across different countries and regions. One of the challenges now facing Russian public policy in the field of energy efficiency is how to monitor the energy efficiency of individual regions. The specialists of relevant agencies and institutions had to find a way of drawing up an adequate ‘rating of regions’ by energy efficiency (such a rating was being developed as of August 2012), reflecting the real achievements and opportunities of regions. Obviously, comparison by energy intensity of GRP will largely reflect specifics in the industrial structure and climate of a region, and not the degree of application of new technologies and the potential for their application. The rate of change of energy intensity of GRP can serve as a measure of progress, but it will not enable comparison between the objective situation of regions relative to each other at any given time. One solution is to compare regions with respect to actual and potential energy costs, taking all of the other factors, which affect the level of energy consumption in the region, as fixed.

There are also difficulties in comparison between countries. A direct comparison of the energy intensities of GDP by country and their dynamics – as shown in Figure 5.2 – is a useful tool for political speeches and for general research. But it is more correct to limit the comparison to genuinely comparable countries, such as Russia and Canada, or Russia and the countries of northern Europe. Greater accuracy can be achieved by comparing energy efficiency.

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\(^6\) IEA, op. cit, p.257.
efficiency indexes, which have been adjusted to take account of the role of any external factors.

But, regardless of the approach used to compare energy efficiency, the potential savings that could be achieved in Russia through efficiency improvements are very great.

The question of how to realize this potential will be addressed below. First, though, it is important to understand how to use the energy savings that would be obtained by realizing this potential. Improvement of energy efficiency is not an end in itself, but acquires its importance in the context of objectives facing the economy. The list of these objectives must be topped by sustainability.

Figure 5.2. Energy intensity of GDP in Russia and other countries, 2000–2011, tonnes of oil equivalent/thousand USD, 2005 (at purchasing power parity)

Source: World Bank, British Petroleum

Some of Russia’s initial economic problems and the goals arising from them were listed above: they include difficulties in further increase of energy production to respond to high external and domestic demand; competition and volatility on energy markets; and the need to reduce emissions of pollutants. Another challenge is how to achieve stable energy provision in the country’s own economy in order to make domestic industry competitive (the share of fuel and energy in total production and selling costs of Russian manufacturing in 2010 was 6.2%, in the transport sector it was 10.3%, and in agriculture 10%) and to ensure affordable prices for the general public.

A substantial increase of energy efficiency will partly meet these challenges. By limiting domestic energy consumption Russia will be better able to meet growing external demand within the bounds of how much fuel and energy it can in fact produce, and to avoid the need for reduction of supplies in the short-term (as happened to deliveries of Russian gas to Europe in a particularly cold period of February 2012) and in the long-term.

Improvement of energy efficiency will postpone and limit the need to implement the most complex, expensive and environmentally harmful energy production projects, particularly in the Arctic. Reducing
the role of such projects and extending successful operation of existing fields will limit production costs and make Russian hydrocarbons more competitive with foreign hydrocarbons on world markets (according to the IEA and the Oxford Institute for Energy Studies, the most probable scenario would see Qatari gas in the Mediterranean region priced at USD 150–160/1000 m³ by 2020, while Russian pipeline gas from Yamal will cost at least USD 200 and Russian LNG from Arctic deposits would be priced at about USD 300). Another effect would be to ensure affordable prices for domestic customers, even if parity between domestic prices and export netback prices to Europe is achieved earlier rather than later.

The positive impact of energy efficiency on emissions goes without saying. For example, mere implementation of the State Programme would (according to the calculations contained therein) reduce cumulative greenhouse gas emissions by 2436 million tonnes in 2011–2020 (cumulatively), representing nearly 1.5x total CO₂ emissions in Russia in 2011. And the State Programme by itself only targets reduction of energy intensity by 13.5% compared to 2007. Achievement of a 40% reduction by use of other mechanisms would give a much greater reduction of emissions.

But the achievement of such challenges would not resolve the question of how to apply the gains from energy efficiency and the volumes of energy, which it makes available.

There are two generic alternatives. One of these is to use energy efficiency as an additional source of resources for consumption, making additional export and domestic supplies of fuel and energy resources.

The second way would involve a deliberate restriction of the extensive use of natural resources, treating energy efficiency as a way of doing without new fields, power plants, pipelines, so that energy efficiency would not be a supplement but an alternative to the development of natural resources.

Greater energy efficiency will in any case provide considerable benefits to the Russian economy, but the choice of the second way is more consistent with a sustainable development trajectory. Energy saving should not only reduce energy costs and greenhouse gas emissions, but also prevent the depletion of resources in the ground, and avert additional threats to the environment related to the development of these resources.

The choice between these two possible paths is made by choosing which projects to invest in. As yet, the priorities have not been set and government and companies are trying to implement both directions simultaneously: large-scale projects are being pursued with strong backing from the government (in the form of various special terms), while ambitious targets for energy efficiency are also in place.

In the context of current tasks – fulfilling export contracts, using oil & gas earnings to meet budget revenue targets, getting through the winter, etc. – any conscious decision to curb expansion of the traditional fuel and energy sector in favor of non-obvious energy efficiency may seem utopian. But such an approach could redirect the economic interests of investors in a direction, which is most favorable for long-term sustainable development of the Russian economy.

In fairness it should be noted that the vector of development of the Russian economy, and of the energy sector in particular, is not solely dependent on the decisions of the Russian government or companies. For example, the objective hydrocarbon needs of the Asia-Pacific region are such that a lack of Russian supplies could do much harm in the long run, including from the point of view of sustainable development. This refers particularly to China where shortages of hydrocarbons (primarily gas) and their high prices could prolong dependence on coal burning. This is in a situation where China accounted for more than 25% of global emissions of CO₂ in 2011 compared with less than 15% in 2000 (China’s emissions have increased by more than 2.5 times over the period in absolute terms).

The Russian government, which creates the institutional environment for development of the country’s fuel and energy sector, has to find a difficult compromise between, on the one hand, ‘a big fuel and energy sector and relatively energy-inefficient economy’ and, on the other hand, a ‘scaled-down fuel and energy sector and energy-efficient economy’, taking due account of the investment capacities of both government and companies.

Is a reduction of Russia’s energy intensity by 40% sufficient? Achievement of the goal would still leave energy intensity of the country’s GDP well above the current level of many western economies. But comparison with comparable countries makes the target look more impressive: its realization would put
Russia ahead of Canada by energy efficiency criteria and closer to Norway. Generally speaking, northern countries (even developed ones) where the natural resource sector represents a large share of the economy tend to have GDP energy intensities about 1.5 times higher than their neighbors. This is true of Canada relative to the United States, and of Norway relative to the EU (Figure 5.2).

The dynamics of Russian energy consumption in recent years inspire major doubts about attainability of the 40% goal, and projections, including even those in the Energy Strategy of Russia up to 2030 (hereinafter, ‘the Energy Strategy’) show that the target is unlikely to be achieved by 2020 (Figure 5.3). But, on the other hand, the slowdown of energy efficiency gains associated with the economic crisis (clear from indicators in 2009–2010) should not be regarded as reflecting a long-term trend.

In any case, progress toward energy efficiency should not come to an end in 2020 or whenever the 40% target is reached. Planning beyond this objective is needed. The next landmark in the Energy Strategy is 44% of 2005 levels by 2030, corresponding to 50% of the level in 2007.

Improvement of energy efficiency requires considerable investments, which do not necessarily offer rapid and significant commercial effect for the businesses, which carry them out, although the overall benefit for the economy is high. One example of this calculation is contained in the State Programme for Energy Saving and Energy Efficiency. Commercial efficiency of the Programme, which is supposed be more than 90% funded from sources other than the government budget, will recoup the spending from those sources by 2025. These benefits relate to savings on purchase of energy resources. But from the point of view of public performance, including the benefits of reduced greenhouse gas emissions, spending on the Programme (about 9.5 trillion rubles, including budget expenditures) should be paid back as early as 2018.

5.3. Energy Efficiency Policy in Other Countries

Efforts to increase energy efficiency have acquired a special urgency worldwide in recent years, and this is understandable in view of relatively high prices for energy and expectations that prices will stay high in the long run. The importance now lent to energy efficiency and development of renewables
is evident from rapid increases in public spending on research and development in these areas during recent years (Figure 5.4).

Russia also needs an energy efficiency policy in order to deal on equal terms in matters of technology and participate as an equal partner in the international politics of energy efficiency. For instance, at the end of the APEC summit in Vladivostok in September 2012, APEC leaders set the goal of reducing energy intensity of GDP in the Asia-Pacific region by 45% before 2035 (relative to 2005).

The theme of energy efficiency is regularly raised at government-level meetings of the G-8 and G-20 nations: energy efficiency and energy saving were among the principal themes of the St. Petersburg Plan of Action on Global Energy Security, adopted at the G-8 summit in 2006, and they have featured regularly in international documents since that time.

Figure 5.4. Government investments in R&D in IEA countries by industries (USD million)

Source: IEA

So Russia receives an additional impulse towards energy efficiency from outside the country, as well as additional incentives and opportunities.

Large quantitative advances in energy efficiency are not to be expected from developed countries, which have already advanced far in this direction. But many developed countries are still setting themselves ambitious goals.

The European Union is one of the most successful regions in the world by criteria of energy efficiency. But the 20-20-20 objectives, formulated in 2007, call on the EU to reduce its energy consumption by 20% in 2020 relative to the previously expected level for that year, entailing a reduction in energy consumption by 13–14% compared with 2005. A reduction of 6.5% compared with 2005 had already been achieved by 2011, so the EU is even slightly ahead of schedule. However, a significant part of the reduction in energy consumption is due to the economic crisis, from which the European countries have still not fully emerged, and future economic recovery will drive energy consumption upwards.

This means that actual implementation of European plans for energy efficiency is in doubt, as pointed out in the EU’s “Roadmap for moving to a competitive low carbon economy in 2050”, published in March 2011. Unlike goals for reducing emissions and developing renewables, reduction of energy consumption by 20% did not correspond to trends in the European economy at the time, and it is possible that only half of the 20% reduction will be achieved.
The Energy roadmap of the EU states that ‘the prime focus should remain on energy efficiency.’ All of the scenarios in the document prioritize energy efficiency. Specific policy measures to this end include:

- making buildings energy efficient, achieving ‘energy passive’ buildings with net consumption of energy close to zero;
- high standards of energy efficiency in production and appliances;
- making vehicles more energy efficient;
- installing ‘smart’ energy meters and creating ‘smart’ buildings;
- re-use of resources and waste, increasing the service life of goods.

The adoption of an Energy-Efficiency Directive in 2012 represents a major step forward, since it makes measures to improve energy efficiency mandatory for national governments (such measures were previously only indicative, unlike goals for renewables and greenhouse gas emissions). National targets will remain indicative if countries make successful progress in meeting them, though they may be replaced by directives if this does not happen. But the main innovation is the introduction, on a directive basis, of a package of special measures for energy efficiency, which make it possible to close the expected lag of 200 million tonnes of oil equivalent of energy savings by 2020. It is interesting to note that this volume coincides with Russia’s potential energy savings, according to the IEA estimate.

The new Directive will oblige energy companies to make annual energy savings of 1.5% (in the initial version) compared with their sales volume in the previous year. However, opposition from the energy lobby led to a number of amendments, which reduce the actual commitments to 1.1%. Substantial savings should also be achieved by measures for energy metering and the development of cogeneration (combined heat and power production at generating plants). A separate package of measures for the transport sector has been prepared.

Policies to improve energy efficiency are underway in many countries and regions of the world, including those which have already achieved successes in the field. This context points up the need for Russia to develop its own energy-efficient technologies in order to avoid falling even further behind.

5.4. Achieving Greater Energy Efficiency in Russia

Energy efficiency policy has seen a renaissance since 2008, when Presidential Decree № 889 set the goal of a 40% reduction of Russia’s energy intensity by 2020 relative to levels in 2007.

However, the reduction of energy intensity was interrupted for two years immediately after the Decree, due to effects of the crisis, and only resumed in 2011, when there was a reduction of almost 2%. That is a modest result when compared with declines of 5% per year between 2000 and 2008. But it should be noted that the annual reductions of energy intensity of GDP achieved in the EU and US during that period were only 1.5–2% (although, of course, from a lower level), and that energy intensity of global GDP declined by only 1.2% per year from 2000 to 2008. The latter figure reflects a redistribution of global economic power towards developing countries, where economic growth is highly energy-intensive. But that redistribution does not alter the overall trend towards improving energy efficiency.

The halt to energy intensity reductions following the onset of the global crisis in 2009–2010 was not limited to Russia, but also occurred worldwide. It happened due to a certain measure of ‘autonomous’ energy consumption, i.e. consumption, which cannot be reduced to the same extent as overall economic activity (GDP decline).

Because of this, it would be premature to draw conclusions about the inefficiency of government policy, despite the lack of clear improvements of energy efficiency. The positive trend in 2011 raises hopes for progress, although the rate of change is inadequate: an annual decline of 2% offers no prospects of meeting the targets set by Decree № 889.

Has Russia reached a ‘ceiling’ in rapid reduction of energy consumption through structural reforms? Most probably not. But as the potential gains from restructuring of the post-Soviet economy are used up, targeted government measures for energy efficiency, which were almost completely absent in the previous period, are increasingly necessary.

7 EU Energy Roadmap 2050, p. 9.
According to estimates by I. Bashmakov and A. Myshak, more than half of energy saving for the period from 2000 to 2010 was due to structural changes in sectors and sub-sectors of the economy, and less than a third was obtained by increase in the energy efficiency of equipment.

The Human Development Report for the Russian Federation 2009, which was devoted to energy issues, singled out a focused policy for the improvement of energy efficiency as one of the most important vectors of sustainable development. As the authors of this chapter stated then in their recommendations: ‘Russia needs a multi-sectoral, diversified programme for increase of energy efficiency. The large energy efficiency gap between Russia and developed countries cannot be overcome by piecemeal measures.’ In the chapter devoted to energy efficiency, I. Bashmakov set out a number of recommendations for government policy in this sphere, including: the creation of an integrated system for management of energy efficiency; establishment of the necessary legal basis for policy in this sphere; creation of a statistical accounting system; the launch of regional and municipal energy efficiency programmes; establishment of a tariff policy that encourages energy saving; and the creation of incentives for R&D work to develop green technologies.

Public policy since publication of the Report has been largely consistent with these guidelines. The first major step taken by government was to create a legal basis, by passage at the end of 2009 of the Law ‘On energy saving and energy efficiency.’ The law established the procedure for energy audit of buildings and preparation of energy certificates, energy services, handling of goods to take account of requirements for their energy efficiency (including labeling), requirements for energy efficiency programmes in Russian regions and municipalities, mechanisms for information support, and ways of addressing various underlying problems. At the same time the Russian Energy Agency (REA) was set up as the authorized state body for the implementation of the new law and of overall energy efficiency policy. These steps laid the foundation for an integrated system of energy efficiency management.

The REA was made responsible for information and analytical support to energy efficiency policy, including operation of the specially created government information system, which enables the collection and storage of data on nationwide progress towards energy efficiency, helping to formulate energy saving and efficiency programmes in the future.

The REA also took on operational management of the State Programme ‘Energy Saving and Energy Efficiency for the period up to 2020’, which was mentioned above. So the integrated, multidisciplinary programme of energy efficiency, which was called for in the Human Development Report 2009, was in fact put in place less than a year after the Report publication.

At the time of writing of the present Chapter, the State Programme is the key document for Russian energy-saving policy. However, the measures, which it calls for, should lead to reduction of energy intensity of GDP by only 13.5 p.p. The remainder of the target 40 p.p. is to be achieved by structural changes, the price factor and ‘autonomous technical progress.’

Total cumulative energy savings to be achieved during the period of implementation of the State Programme (2011 to 2020) are 1124.2 million tonnes of coal equivalent, or about 800 million tonnes of oil equivalent over 10 years. The energy savings to be made have been distributed across seven sectors (Figure 5.5).

The distribution of potential energy savings may be explained by the allocation of depreciated and outdated fixed assets (particularly in the fuel and energy sector) and by structural peculiarities of the Russian economy, which is currently dominated by the fuel and energy sector.

More than half of total energy savings called for in the Government Programme concern three key tasks in the fuel and energy sector: the modernization of gas and coal-fired thermal power plants (23.4% of total savings), the extraction and refining of crude oil (15.9%, of which 10.4% relates to utilization of associated gas) and reduction of losses in heat and electricity supply networks (12.4%).

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10 Ibid., p.102.
The Programme objectives for modernization of thermal power plants (TPPs) are expressed in terms of their operating efficiency. There are various estimates for efficiency of Russian TPPs. I. Kozhukhovsky and V. Basov offer an average figure of 37%, while V. Kolmogorov suggests 35%. Kolmogorov’s work notes that efficiency of TPPs in the USA is also 35%, while the EU has a figure of 41%, and Japanese TPPs achieve 51%. However, the American Council for an Energy-Efficient Economy estimates Russian TPP efficiency at 32%, while offering a figure of 37% for US plants, 38% for those in the EU and 44% for Japan. These and other figures show that Russia has much potential for efficiency gains.

Comparative figures for output relative to fuel burning at gas-fired power plants are more eloquent and univocal (it should be remembered that a half of Russian electricity is generated at gas-fired plants). According to the IEA, Russia burns 0.31 tonnes of oil equivalent (as gas) per kWh generated, compared with 0.18 tonnes in the USA and EU-27, and a world average of 0.21 tonnes.

Utilization of associated gas, produced during oil extraction, poses special problems. Russia’s Energy Strategy and the State Programme for Energy Saving targeted utilization of up to 95% of associated gas output by 2015, but even official data for 2011 show that more than 24% of output (more than 16 billion m3) is still being flared off. Satellite research by the US National Oceanic and Atmospheric Administration suggests that the actual volume of associated gas flaring in Russia is much higher, at about 35 billion m3 (Table 5.1), or more than a quarter of the world total.

The State Programme lists a number of efficient measures for utilization of associated gas: improvement of accounting practice (current discrepancies in data on flaring clearly demonstrate the need for this); non-discriminatory access to gas pipelines; changes to price formation for associated gas; and higher fines for violation of the rules. These measures now need to be applied.

Energy losses in the power and heat distribution system are another major problem of the Russian fuel and energy sector. But it should be noted that Russia is far from being the world’s worst offender in this respect (Table 5.2).

14 There are various, substantially differing estimates of losses from Russian heat supply networks. The State Programme estimates the losses in heat networks at 14-15% of the amount supplied at the end of the 2000s. Rosstat estimates losses of heat at the stage of consumption and transport at 7.8% in 2010, which almost coincides with figures from the IEA. The authors use the IEA figures.
distances over which electricity is transported, the figures for the two countries are quite close. Russia is also at comparable levels with developed countries as regards relative losses in heat networks. But the large role of heat supply in the Russian economy means that the losses are enormous in absolute terms and relative to GDP. The same applies to electricity: with network losses equal to 11% (against 6.3% in the United States) Russia loses more than 100,000 GWh of electricity per year. The US and China lose 2.5 times more, but the US economy is six times larger and China’s economy is almost five times larger than Russia’s. And it should be noted that these two countries – like Russia – have large territories, and must therefore also deal with special difficulties in managing their energy system and energy transfer.

The suggested solutions are clear: repair and replacement of transmission lines and substations. Improvement of electricity and thermal energy metering would provide valuable support and encouragement for this work.

Table 5.1. Flaring of associated gas in Russia and other oil-producing countries, 2010

<table>
<thead>
<tr>
<th>Country</th>
<th>Absolute figure</th>
<th>Relative figure</th>
<th>Flaring per unit of oil production</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Billion m³</td>
<td>% of world total</td>
<td>Tonnes of oil equivalent/1000 tonnes of oil production</td>
</tr>
<tr>
<td>Russia</td>
<td>35.2</td>
<td>26.2</td>
<td>58.36</td>
</tr>
<tr>
<td>Nigeria</td>
<td>15.2</td>
<td>11.3</td>
<td>121.08</td>
</tr>
<tr>
<td>Iran</td>
<td>11.3</td>
<td>8.4</td>
<td>52.03</td>
</tr>
<tr>
<td>Iraq</td>
<td>9.1</td>
<td>6.8</td>
<td>62.97</td>
</tr>
<tr>
<td>Algeria</td>
<td>5.4</td>
<td>4.0</td>
<td>74.06</td>
</tr>
<tr>
<td>Angola</td>
<td>4.1</td>
<td>3.1</td>
<td>39.56</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>3.8</td>
<td>2.8</td>
<td>46.50</td>
</tr>
<tr>
<td>Libya</td>
<td>3.8</td>
<td>2.8</td>
<td>41.71</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>3.7</td>
<td>2.8</td>
<td>7.39</td>
</tr>
<tr>
<td>Venezuela</td>
<td>2.8</td>
<td>2.1</td>
<td>16.01</td>
</tr>
<tr>
<td>China</td>
<td>2.1</td>
<td>1.6</td>
<td>8.41</td>
</tr>
<tr>
<td>Canada</td>
<td>2.1</td>
<td>1.6</td>
<td>28.41</td>
</tr>
<tr>
<td>USA</td>
<td>2.1</td>
<td>1.6</td>
<td>6.22</td>
</tr>
<tr>
<td>World total</td>
<td>134.4</td>
<td>100.0</td>
<td>31.44</td>
</tr>
</tbody>
</table>

The State Programme for Energy Saving was launched in 2011 According to the REA, the federal budget spent 5.3 billion rubles for co-financing of regional programmes (as planned). Regional budgets spent 12.3 billion rubles on implementation of the Programme (compared with planned spending in excess of 30 billion rubles). The money was spent on lighting systems, energy-saving equipment in the housing sector, installation of energy meters and conduct of energy audits.

Analysis carried out in other countries can help to address these tasks. In July 2012 the American Council for an Energy-Efficient Economy (ACEEE) published its first international comparative study on...
Table 5.2. Losses in electricity and heat supply networks in Russia and comparison countries, 2010

Source: IEA

<table>
<thead>
<tr>
<th>Country</th>
<th>Losses in electricity networks</th>
<th>Losses in heat networks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Thousand GWh</td>
<td>% of energy generation</td>
</tr>
<tr>
<td>India</td>
<td>210.9</td>
<td>23.3</td>
</tr>
<tr>
<td>Ukraine</td>
<td>21.7</td>
<td>12.8</td>
</tr>
<tr>
<td>Canada</td>
<td>65.7</td>
<td>11.7</td>
</tr>
<tr>
<td>Russia</td>
<td>104.9</td>
<td>11.0</td>
</tr>
<tr>
<td>Belarus</td>
<td>3.8</td>
<td>10.7</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>21.4</td>
<td>9.1</td>
</tr>
<tr>
<td>UK</td>
<td>26.8</td>
<td>7.4</td>
</tr>
<tr>
<td>France</td>
<td>35.4</td>
<td>7.0</td>
</tr>
<tr>
<td>Norway</td>
<td>9.0</td>
<td>6.9</td>
</tr>
<tr>
<td>China</td>
<td>256.8</td>
<td>6.6</td>
</tr>
<tr>
<td>USA</td>
<td>261.0</td>
<td>6.3</td>
</tr>
<tr>
<td>Germany</td>
<td>24.0</td>
<td>4.2</td>
</tr>
</tbody>
</table>

energy efficiency policy. A rating was prepared for 11 countries and for the EU, and Russia was found to have the worst results. It should be noted, though, that the list contains the world’s leading economies: the G-8, China, Brazil and Australia.

Rather than dwelling on Russia’s overall lag, it is more productive to examine the country’s weak and strong points as revealed by the ACEEE analysis.

Russia takes the highest possible score for having mandatory energy-saving targets in place, thanks to Decree № 889. The country also achieved the highest score for ‘tax exemptions and credits’, i.e. government guarantees of credits and tax rewards are provided in Russia (including as part of the State Programme). Russia’s score for its system of energy certificates for buildings and compulsory energy audits was at the highest possible level (thanks to the 2009 law on energy saving), and the country was commended for its long-established high level of cogeneration in the power generating industry (thanks to the industry architecture, which has been in place since Soviet times). Russia scored best among the compared countries for low automobile usage by its general public (the USA did worse by this measure, but this Russian ‘superiority’ can hardly be put to the credit of the country’s energy efficiency policy), and also for energy efficiency of its cargo transport per tonne-kilometer, thanks in part to the intensive use of rail freight transport in Russia. High investments in railway transport were also rewarded by the highest possible score in the ACEEE study.

However, the list of weak points is longer. They include the general level and trend of GDP energy intensity, low efficiency of power plants (including losses in supply networks), inadequate R&D investments in the manufacturing industry and in energy efficiency, and wasteful use of energy in the housing sector. Russia took the lowest score for application of energy efficiency standards to devices and equipment and absence of an obligatory energy manager at industrial sites. Other weak points were the absence of mandatory standards for vehicle fuel efficiency and a high ratio of cargo transport to national GDP.

The results show, firstly, that Russia has taken some steps in the right direction, which have been recognized by international observers.

Secondly, there are a number of both positive and negative objective circumstances, which have substantial impact on energy efficiency and which cannot be quickly altered by means of energy efficiency


policy. Apart from the obvious fact of climate, these circumstances include levels of freight and passenger transport, and the existing structure of the energy and transport system.

Thirdly, there are a number of clear directions for further intensive work and obvious actions, which need to be taken. In particular, the State Programme is rather schematic in its references to R&D work in the field of energy efficiency. It is stated that such work will receive budget funding, but descriptions of the work are limited to the creation of teaching materials, the regulatory framework, technical regulation and study of international experience, without stating the need for actual development of innovative energy-efficient technologies. In fact, new technologies in this field or the adaptation of existing technologies to Russian conditions can make a major positive contribution to energy efficiency. As mentioned above, the need for R&D work in energy efficiency was noted in the Human Development Report 2009, but there has not been any significant progress in this area in recent years.

Mandatory energy efficiency standards for equipment need to be introduced and made gradually more stringent. The appointment of energy and energy efficiency managers at both public- and private-sector enterprises could play a substantial role in this process.

Although the State Programme contains an indicative target for fuel efficiency of new passenger cars, road transport (a key area for potential energy savings) receives almost no attention in the Programme. The ACEEE is not the only institution to emphasize this omission: the most ‘energy efficient’ scenario for Russia, devised by the IEA, calls for the introduction in Russia of mandatory fuel efficiency standards for cars, similar to those operated in the United States.

The same IEA scenario also assumes the introduction in Russia after 2020 of a system of internal emissions trading. This appears unrealistic at present, but the idea should be considered.

Savings of Russia’s conventional energy resources can also be achieved by increased use of renewables, development of which is a key aspect of the transition to a ‘green’ economy. Target indicators in the Russian Energy Strategy include increase in the share of renewable energy in electricity generating to 4.5% by 2020. Support for renewable energy is still very weak at federal level at present, but regional initiatives have shown how great the potential is (Box 5.1).
Conclusions and Recommendations

The growth of the Russian economy during the 2000s was largely based on recovery of the country’s fuel and energy complex after the transformation crisis, thanks to high energy prices. But this basis for growth appears increasingly questionable, particularly from the viewpoint of sustainable development. Resource development is becoming more complex and expensive, prices are volatile, competition between various energy suppliers and various energy types may escalate. Society worldwide and (to an extent) Russian society are increasingly focused on environmental security and the prospects for future generations.

A significant increase in energy efficiency would do much to address these difficulties. Investments in this area will lead to a reduction of the burden on the environment and conserve natural resources for the future, provide energy that is cheaper and more competitive in the global energy market, reducing the fuel and energy costs of domestic producers and of the general public, without shifting the load to the state budget. But achievement of these results depends on targeted policies and major investments. Energy efficiency is a strong competitor to other scenarios for development of Russia’s fuel and energy sector, which carry high social costs. At some point the government will have to find the best compromise, possibly by setting limits to the expansion of traditional energy industries.

Russia has made a number of significant steps towards energy efficiency in recent years, but it is increasingly urgent to move beyond creation of a legal framework, institutional structures and ambitious goals to actual implementation of projects. Russia’s energy sector has a series of critical problems, resolution of which would give major energy savings: low efficiency of power plants, high losses of heat and electricity in supply networks, and associated gas flaring. Meanwhile, a number of other areas – the energy efficiency of buildings, appliances and equipment, fuel-efficient cars, and efficiency in energy-intensive industries – must also remain at the focus of attention.

There is an urgent need to fashion ways of supporting energy efficiency. Many approaches – government funding of energy efficiency programmes and government guarantees to relevant private projects, mandatory energy audits and other methods – are already being applied. But the analysis of international experience reveals other opportunities: the introduction and improvement of mandatory energy efficiency standards for a wide range of equipment (including vehicles); mandatory energy efficiency requirements for energy companies; and support for innovation in the field of energy efficiency. The selection and application of best practice will help to find the best way forward to efficient use of energy Russia.
Box 5.1. Regional and Civil Initiatives in Energy Efficiency and Renewables

Creation of a Centre for Energy Efficient Technologies in the Altai region

A Center for Energy Efficient Technologies in Low-rise Construction with the Use of Alternative Sources of Energy has been set up in the mountainous Gorny Altai region of southern Siberia on the initiative of the Altai – 21st Century Foundation.

The Center’s demonstration site was planned and built as a tourist complex, focused on environmental and educational tourism. The idea is to make the Center self-financing in the future, taking advantage of the tourist appeal of Gorny Altai and particularly of Chemalsky District (where the demonstration site is located), which has the benefit of developed infrastructure. Visitors will be able to see and experience alternative energy technologies in operation.

A straw-bale building has been erected at the Center and equipped to receive tourist visitors, offering literature on new technologies, film showings and round-table discussions. The use of straw-bale technology in construction has been well-received in the Region: a second such building has been erected at Altai State Technical University, and there is much interest from the general public, suggesting that the project should be further developed.

Various alternative energy systems have been installed at the Centre. Four solar modules have been acquired and are used for lighting and the operation of various electrical appliances. Solar panels are used to provide hot water and for a shower and to provide power for domestic use.

The demonstration site is used for:

- Regular scientific and practical seminars, including international seminars, on non-traditional renewable sources of energy and on energy efficiency, attended by representatives of local government, business leaders and local people.

- Regular production and distribution of informational materials: thematic brochures; sections in the monthly environmental newsletter Point of View, published by the Altai-21st Century Foundation; and video materials. In 2009, a documentary film The Real Thing was made concerning the development of alternative energy in Altai region (government grant funding, allocated in accordance with an Order of the President of the Russian Federation, was used in the making of the film).

- An exchange programme is being carried out with experts from the United States to developed knowledge of renewable energy sources and energy efficiency.

- The Center is working with regional governments in Altai Territory and the Republic of Altai on alternative energy and projects for construction of mini-hydropower plants in these regions.

- Guided tours are provided.

Solar Energy LLC in the Republic of Altai

The Republic of Altai is a mountainous area with low population density, where utilities (including electric networks) must be delivered over large distances. The current state of power supply is a major constraint to socio-economic development of the Republic of Altai.

These factors inspired a graduate of Novosibirsk Technical University, who comes from one of the remote areas of the Altai Mountains, to set up the company Solar Energy LLC. The company has carried out substantial work in a short period of time, providing electricity supply from renewable sources to three villages in the Kosh-Agachsky, Ulagansky and Ongudaisky Districts. Results of the initiative include the provision of electricity to more than 70 SMEs in the Republic of Altai.

Solar Energy LLC has shown that decentralized energy supply using alternative and renewable sources of energy located adjacent to power consumers is ideally suited for regions such as Altai, both for economic reasons and for ease of operation. Alternative and renewable energy sources are the most affordable way of providing power in areas of the Republic of Altai, which are at a great distance from centralized power supplies.

The project is pursuing targets set by the regional government programme, Development of Small and Medium-sized Enterprises in the Republic of Altai, by providing energy supply to SMEs located in remote mountainous areas, generating power from sun, wind and water.


‘Green Energy and the House of the Future’ in Primorsky Territory

‘Green Energy and the House of the Future’ is the programme of the Far East Environmental Health Foundation. It promotes green technologies and lifestyle. One aspect of its programme is to alert the general public to the potential offered by energy saving, alternative energy sources and the ‘eco-home’ concept. The foundation calls for housing in the 21st century to be comfortable, economical, energy-efficient and environmentally friendly. Such houses will be able to generate their own electricity, heat their water, purify their waste and have excellent lighting and insulation, and to carry out all of these functions at close-to-zero cost.

The programme is committed to alternative sources of energy (wind power and solar panels), and to explaining the nature and applications of these sources to the general public. Use of green energy can ensure a reliable electricity supply to people and make Russia much more energy-efficient, helping to keep water spaces and the atmosphere clean and to reduce the rate of climate change. Many obstacles still exist to the use of wind and solar energy in Russia. Our programme aims to clarify what equipment is needed, to address issues of cost, and show alternative technologies in action. Alternative energy in Russia should be understandable, reliable, energy-efficient and affordable.

Climate change is one of the most important international problems of the 21st century. The issue is not merely one of science, but is multi-disciplinary in nature, encompassing environmental, economic and social aspects of sustainable development, including that of the Russian Federation. The Russian climate is more sensitive to global warming than the climate of many other regions of the globe. Over the past 100 years (1907-2006) average surface air temperature in Russia as a whole rose by 1.29°C, while that of the Earth increased by 0.74°C. In 2011, the average annual surface air temperature in Russia exceeded the climatic norm (1961-1990) by 1.55°C. That compares with estimates by the World Meteorological Organization, which suggest that the global air temperature in 2011 was 0.4°C higher than the earlier averages. Shrinkage of ice cover in the Arctic has been observed since the 1980s (in 2011 the coverage amounted to 4.61 million km2, which is the lowest level since 2007).

Global climate change and its socio-economic impact implies significant risks in various spheres of life, particularly associated with the growing problem of water supply, the emergence of new nodes of disease, increased frequency of natural disasters and the resulting intensification of social conflicts, creating new threats and challenges to human development.

As highlighted in a new report by the non-governmental organization DARA, prepared in September 2012 by more than 50 scientists, economists and policy experts with the support of the governments of 20 countries and the international community, climate change and industrial emissions, which to a large extent precipitate climate change (particularly emissions by power stations), already caused the premature death of nearly 5 million people in 2010 and cost the global economy more than USD 1.2 trillion or 1.6% of world GDP.

The consequences of climate change are felt most acutely in developing countries, where damage to agricultural production caused by extreme weather conditions contributes to deaths from malnutrition, poverty and related diseases. The damage was estimated at 7% of GDP of the least developed countries in 2010, or at 10% of their GDP if the impact of emissions into the atmosphere, (mainly from power stations) is taken into account.

By 2030, according to researchers, the number of lives lost due to climate change and air pollution associated with carbon emissions will rise to nearly 6 million people, and the overall damage will soar to 3.2% of world GDP. The least developed countries will bear the brunt of this load, worth about 11% of their GDP, including 8% from climate change alone. In absolute terms the damage and losses will be concentrated in the world’s three largest economies – China, the USA and India. In total these countries will account for more than a half of both economic damage (USD 2.4 trillion) and premature mortality related to climate change (over 3 million people each year).

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5 Ibid.
6 Premature mortality due to the consequences of climate change alone is up to 632,000 people, and economic losses are 2.1% of global GDP. See: ibid., p.17
7 Ibid., p.19.
8 For comparison, total losses for these three countries in 2010 were USD 430 billion or 35% of the total loss worldwide; total premature mortality was 2.5 million people or 53% of total mortality worldwide from these causes. Calculated using: ibid., p.48–49.
Climate change has a growing, increasingly varied and at the same time contradictory impact on human development. On the one hand, increased frequency and scale of extreme and hazardous weather and climate events such as heat waves and periods of extreme cold, drought and heavy rain with floods, storms and hurricanes, etc., take a toll on societies and economic systems with negative consequences for human development. Most of the damage is in the form of social losses: increase of injuries and prevalence of disease (including new types of infectious diseases caused by migration), growing damage to property and other tangible assets, that pose a threat to the current standard of living and quality of life in the areas of weather and climate disasters, and also increase the flow of migrants from these areas to regions with more favourable climate, creating an additional socio-economic burden on the population of such regions. Global warming forces households to spend money on air-conditioning, reducing the family budgets of poorer people.

On the other hand, global warming, which is the most evident aspect of climate change, is almost universally accompanied by a reduction in the length of the heating season with consequent reduction of heating costs, as well as an increase in the agro-climatic potential of some regions, including those in northern parts of Russia, which creates new employment opportunities for the rural population and improves the food security of the entire population. However, in order to exploit these and other favorable factors that arise from climate change, and to successfully address the negative results of such change, countries must modernize their economic management and technology systems more quickly. Such modernization is impossible without human development and, above all, strong political and financial support for science and education, which are the main sources for knowledge and innovation to reduce climate risks and adapt people and economic systems to the new climatic and environmental conditions.

So while climate change poses serious risks and threats to human security and sustainable growth of the economy, it also represents a new challenge both in Russia and worldwide, today and in the future. This challenge motivates governments to greater political will, and emphasizes the need for intensive development of human potential. That development depends on ensuring that populations remain in good physical and mental health.

In recent years climate change has been considered as one of the main factors impacting on health and mortality, alongside such traditional risk factors of the industrial age as the pollution of air and drinking water, smoking, drugs, etc. The WHO estimates that climate change currently accounts for about 150,000 premature deaths worldwide and 55 million man-years of incapacity on average per year, equaling, respectively, 0.3% and 0.4% of global mortality and incapacity. Climate change affects human health in various ways. Direct impacts include an increase in the number of days with abnormally high and/or low temperatures, and in the number of floods, storms and typhoons. Indirect effects are mediated by environmental or socio-economic factors (increase in the area of arid land, reduction of the amount of safe drinking water, etc.).

**Extremes of temperature and public health.** Climate change is accompanied by an increase in the number of days with abnormally high temperature. The greatest danger to public health in cities is from heat waves of extended duration, which, in Russia, lead to massive forest and peat fires, pouring thousands of tons of toxic substances into the air. Pollution from the combustion process, compounding the effect of industrial and transport emissions, exacerbates chronic respiratory diseases (pneumonia, diseases of the upper respiratory tract, asthma, etc.), particularly among children.

Long and sustained periods of hot weather cause an increase in mortality and morbidity of the circulatory system (heart attack), cerebro-vascular disease (stroke), respiratory diseases and endocrine disorders (diabetes), particularly among the elderly and people suffering from chronic diseases. This was clearly demonstrated by the events of August 2003 in Western Europe, which caused over 70,000

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deaths, and the summer of 2010 in Russia, which led to more than 54,000 premature deaths.\textsuperscript{10}

The relationship between the number of requests for urgent medical assistance, total mortality and mortality from specific causes (diseases of the circulatory, respiratory, digestive and nervous systems, trauma, drowning and suicides), on the one hand, and the air temperature during the summer, on the other hand, has been identified and confirmed in a number of cities in Russia. In Moscow the minimum level of the temperature curve of overall mortality is clearly expressed, and is in the range of -20 °C to +20 °C, and the effect of ‘high’ temperatures is instantaneous, i.e. the largest dependence of mortality on temperature is obtained with zero lag. Heat waves are especially dangerous when the temperature threshold of 23.6°C is exceeded (for comparison, the danger level in Arkhangelsk is 17°C for the 65+ age group and 17.8°C for those aged 30–63, while in Athens it is above 30°C and 23.6°C in Helsinki).\textsuperscript{11}

The heat waves in Moscow in 2001 and 2002 led to over 1,300 cases of excess mortality. The WHO project, ‘Impact of climate change on human health and assessment of the adaptation capacity in the north of the Russian Federation’, found that heat waves in 1999-2008 were the cause of 110,000 excess deaths in a city as far north as Arkhangelsk.

As noted above, the effects in the the summer of 2010, when a heat wave remained in place for 40 days during a blocking anticyclone, were much more severe, particularly in Moscow, where more than 11,000 additional deaths were registered. The 2010 heat wave also reduced immunity and increased susceptibility to colds and infectious diseases, which increased the risk of epidemics in the 2010–2011 autumn-winter season (Box 6.1). After a relatively mild summer in 2011, prolonged heat waves, representing a major health risk, struck Russia once again in the summer of 2012, and were particularly marked in the Urals and Eastern Siberia, where extremes of temperatures lasted for 5 days in Krasnoyarsk, 8 days in Omsk and Novokuznetsk, for 10 days in Tomsk and 16 days in Novosibirsk. These circumstances interrupted the declining mortality trend in Moscow and other regions of Russia’s Central, Northwest and Volga federal districts, and, combined with significant decrease in the number of people of working age, they represent a risk to the demographic situation in Russia as a whole. In the long term, given the trend towards worsening effects from climate change on health and the economy, there could be serious consequences for national security.\textsuperscript{12}

\textbf{Box 6.1. The Heat Wave of Summer 2010 and Public Health in Moscow}

In July and August 2010 the average temperature in Moscow exceeded the mean monthly average by more than 5°C for 45 days. There were a total of ten temperature records (maximum temperature on a given date higher than all regular meteorological observations since 1885) in July and nine in August. At the same time forest and peat fires in Moscow Region caused a sharp increase in the concentration of air pollutants, and the anticyclone prevented their dispersal. The average daily concentrations of suspended particles (PM10) in ambient air during the fires, from August 4 to August 9, exceeded the average daily permissible maximum (60 µg/m\textsuperscript{3}) by 7–15 times, and ozone concentrations were nearly double the permissible limit. Limit concentrations were also exceeded for formaldehyde, ethyl benzene, benzene, toluene, styrene and other organic compounds (by up to eight times). The result was a dramatic increase in mortality among Muscovites: 11,000 additional deaths were recorded (in comparison with July–August 2009).

Figure 6.1. Mortality divergence in Moscow in 2010 by months compared with 2009. Source: B.A. Revich, ‘Heat Waves, Ambient Air Quality and Population Mortality in European Russia in Summer 2010: A Provisional Assessment’, Human Ecology, 2011, № 7, pp.3–9

The main causes of increased mortality were the aggravation and worsening of diseases of the respiratory system (up by 84%), circulatory system (up by 59%) and, to a lesser extent, of the nervous, digestive, genitourinary system, and suicides provoked by the heat.

Increased mortality during the heat wave of 2010 did not only affect the elderly, but also those of working age, entailing losses for the economy. According to the authors’ estimates, these losses were between 97 billion and 123 billion rubles, or 1.23–1.57% of GDP in Moscow.

It is important to put an action plan in place in Moscow for the protection of public health in case of heat waves (particularly those of long duration) and high levels of air pollution. Such a plan has been under development since 2012 on the initiative of the Moscow Department of Natural Resource Use and Environmental Protection.

The effect on human health in Russia of periods of extreme cold should also not be underestimated. Russia has one of the coldest climates in the world, but periods of abnormally cold weather are also a feature of climate change and are no less characteristic (though more rare) than heat waves. This was clearly seen in the winter of 2010-2011 when a blocking anticyclone (similar to that in the summer heat wave) led to a month of abnormally low temperatures in Central Russia. Meta-analysis of the impact of the heat waves and cold waves in four northern cities (Murmansk, Arkhangelsk, Yakutsk and Magadan) on mortality from heart attacks, strokes, respiratory diseases confirmed the prime role of cold waves.13

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The influence of climate change on the prevalence of infectious disease. Climate change affects the prevalence of infections transmitted from animals to humans by changing the conditions, which determine the existence of their carriers, and by changing the infection pathways and extent of many human and animal diseases. This effect occurs on the background of other factors: environmental, demographic and socio-economic (vaccination coverage, the suppression of focal points of disease by non-specific preventative methods, the intensity of contacts between the human population, particularly the urban population, with disease agents and carriers on private allotments, etc.).

The current epidemiological situation includes substantial growth in the number of people affected by ticks, and in some regions there has been an increase in cases of tick-borne encephalitis, which is partly ascribed to the milder and wetter climate. Climate warming has contributed to the spread of tick-borne encephalitis carriers to the north-east of European Russia and of Siberia, respectively, and has lengthened the period when they are active. The problem of tick-borne encephalitis is particularly severe in Arkhangelsk Region, which has recently seen the fastest growth (by three times since the late 1990s, versus two fold decline on average for Russia) and highest prevalence (up to 2.5 times the Russian average) of the disease. This has been associated with both climate change (warmer winters) and socio-economic developments (change of the landscape, including the creation of country houses and private plots in forest areas, more frequent outings to the country by city dwellers for recreation, mushroom and berry picking, etc., as well as reduction of special actions to control the tick population). A WHO project has also found a relationship between air temperature and the incidence of salmonella poisoning in Arkhangelsk Region.\textsuperscript{14}

The incidence of another group of infectious diseases – mosquito-borne hemorrhagic fever with characteristic high temperature and risk of possibly fatal meningo-encephalitis – is also on the increase in Russia: so-called Crimean hemorrhagic fever was previously registered in southern Russia, but the number of cases has increased dramatically in recent years, particularly in Stavropol Territory, where the natural focus of the disease is located,\textsuperscript{15} and there are signs that the disease is extending northwards.

The influence of climate warming on the prevalence of another hemorrhagic fever, West Nile fever, has also been proven. The first major epidemic outbreak of the disease occurred in Volgograd and Astrakhan Regions in 1999, which was one of the warmest years in the twentieth century. In 2007 laboratory testing confirmed diagnosis of the disease in 475 people. The outbreak was associated with the hot weather and ideal conditions for mosquito breeding, among other factors. The heat wave of summer 2010 led to a sharp increase in cases of West Nile fever, with the largest incidence in Volgograd Region (413 cases) and Rostov Region (59 cases).\textsuperscript{16}

One of the most negative consequences of global warming is a significant increase in the incidence of malaria, particularly in hot countries. The disease is quite rare in Russia, but its expansion northwards and the replacement of northern by southern populations of mosquitoes is possible. In some areas of the country the impact of climate warming on the incidence of malaria is already obvious, including a transformation of the epidemiological situation with malaria in Moscow Region. Warmer winters, early and warm springs and high average daily temperatures offer favorable conditions for mosquitoes to breed, leading to an increase in cases of malaria. Further improvement of conditions for development of the malaria agent is expected in the future, with increase in the duration of the malaria season and northward advance of the disease.\textsuperscript{17}

There are dangers associated with cattle burial grounds, particularly risk of anthrax. Cases of anthrax infection in humans and animals have been re-


\textsuperscript{15} However, an efficient anti-epidemic programme in that region minimized the risk of infection of medical personnel and reduced fatal outcomes among patients despite the unprecedented strength of the disease focus.


corded in about 29,000 settlements across Russia, and there are about 14,000 cattle burial grounds. A substantial part of the latter are located in Siberia, including Arctic regions, where global warming is causing the surface layer of permafrost to thaw over large areas. Climate change is also a real risk factor for the quality of food and drinking water. For example, in Arkhangelsk a temperature increase of 1°C was associated with an increase in the number of cases of salmonella poisoning in the subsequent month by an average of 1.9%. According to a regional climate forecast by the Voyeikov Geophysical Observatory, the frequency of heat waves in Arkhangelsk may increase by 1.8 times in 2041–2060 compared with 1980–1999, which could lead to an increase of excess mortality from these causes by 80% on average.

6.2. Designing a Policy to Reduce Greenhouse Gas Emissions

Russia ranks fourth in the list of the 10 largest emitters of greenhouse gases, which cause climate change, behind China, the USA and India. In 1990-1998, there was a decrease in Russian emissions of the greenhouse gases, which are regulated by the UN Framework Convention on Climate Change (UNFCCC). The reduction was seen in all sectors of the economy and was primarily due to the profound economic crisis. A number of federal target programmes were also approved for the purpose of reducing greenhouse gas emissions in the various sectors of the economy (Box 6.2).

Box 6.2. Federal Target Programmes (FTPs) and Greenhouse Gas Emissions

Approved FTPs:
– Technology, Machines and Production in the Future (up to 1996).
– Waste (approved by a Russian Government Resolution, dated September 13, 1996; included significant measures to reduce methane emissions by the recycling of solid and liquid waste from the residential sector, agriculture, and industry).
– National Technology Base (up to 1996, included implementation of the sub-programme, ‘Technology for a Sustainable and Environment-Friendly Habitat’).
– Clean Energy (up to 2000).
– Environment-Friendly Processes in the Chemicals Industry and Chemical Technologies (up to 2000).
– Advanced Technologies for Integrated Development of Fossil Energy Resources in Russia (up to 2000).

During the years 1999–2008, there was a rapid increase in industrial production (by more than 20% in some years). By the end of this period, the largest year-on-year increases of output has been achieved in the fuel, chemical, petrochemical and food industries, ferrous and non-ferrous metals, construction materials, machine-building and metal-processing.


18 A.M. Grjibovski et al., op. cit.
(approved in 2006), projected annual GDP growth of 4.5% over a 7-year period entailed increase in the consumption of primary energy resources by a total of 14.6%. Gas production was to increase by 11%, that of crude oil by 10% and output of solid fuels was to rise by 34%. The target increase of electricity production was 20–24%. Russia therefore needed to urgently implement strategies as part of the FTPs for reducing emissions of greenhouse gases. Such strategies had to relate to actions by the Russian Government, regional administrations and business, aiming to limit national emissions of greenhouse gases and attract investments for the implementation of climate projects in Russia.

A number of programmes were therefore developed and implemented in the late 1990s and early 2000s:

1. Energy Saving in Russia (1998–2005), approved in 1998 with the following sub-programmes:
   • Energy-saving in the fuel and energy sector;
   • Energy-saving in housing and communal services;
   • Energy-saving in energy-intensive industries;
   • Energy-saving appliances and equipment;
   • Devices for metering and regulation of energy use.

   The main aim of this Programme was to accelerate transition of the Russian economy to an energy-saving course. Implementation should have reduced energy intensity of GDP by 1.6% per year.

2. High-Speed, Environment-Friendly Transport (up to 2005).


At the turn of the 21st century, it was decided to extend existing FTPs and approve a number of new programmes, as follows:

• Environment and Natural Resources in Russia (2002–2010).
• The sub-programme, Reform of Housing and Communal Services (price regulation for electricity, natural gas, fuel) within the framework of the Housing Federal Programme (2002–2010).
• Conservation and Restoration of Soil Fertility of Agricultural Land and Agricultural Landscapes as Part of Russia’s National Heritage (2006–2010).

Various measures were also envisaged as part of development programmes for various sectors of the economy, FTPs concerned with national socio-economic development, and programmes for socio-economic development of specific regions.

Significant reduction of emissions was achieved by the implementation of programmes and measures for the reform and restructuring of the Russian economy, the elimination of price distortions, changeover to new fuels and deployment of the latest energy-saving technologies. For example, savings of primary energy resources in sectors of the Russian economy during 2002–2005 alone amounted to 116 million tons of conditional fuel. According to expert estimates, these measures prevented the emission of 50-60 million tons of CO2 per year on average in 2002–2005, or about 3.5% of average annual emissions of CO2 in these years. Economic growth in the first decade of the 21st century was accompa-
nied by increasing emissions of greenhouse gases, but the rate of growth of emissions was relatively low. This was due to a general increase in energy efficiency of the economy, achieved by the implementation of special programmes and by means of structural changes, particularly growth in the share of the non-production sector of the economy.  

Total national emissions of CO₂ equivalent in 2010 were 65.7% of the 1990 level (Figure 6.2). So Russia’s obligations for the first period of the Kyoto Protocol (2008–2012) – not to exceed the level of anthropogenic emissions of greenhouse gases of 1990 – were achieved.

**Figure 6.2.** Anthropogenic emissions of greenhouse gases in the Russian Federation in 1990-2010, excluding land use, change of land use and forestry (million tons of CO₂ equivalent). 


It should be noted that the rate of growth of GDP in Russia at the beginning of the 21st century was much higher than that of greenhouse gas emissions, and carbon intensity of GDP has declined steadily since 1999 (Figure 6.3). The transition to a market economy, with structural changes due to demilitarization and the withdrawal of inefficient industries, increase of the share of natural gas in the energy mix, and the implementation of specific measures to reduce emissions in certain sectors, has made Russia the world leader in reduction of volumes of greenhouse gas emissions.

According to expert assessments, total reduction of greenhouse gas emissions in Russia in 1991–2009 were:

- 56% taking account of forestry and land use, or 33.8 billion tons of CO₂-equivalent in absolute terms cumulatively over those years, which exceeds annual global CO₂ emissions from the global power generating sector (30.4 billion tons of CO₂-equivalent in 2010) and is equal to 78% of all greenhouse gas emissions caused by power generation worldwide.

- 35% excluding forestry and land use, or 20 billion tons of CO₂-equivalent in absolute terms cumulatively over those years, which is equal to almost half of all greenhouse gas emissions by the global power generating sector. This volume is also two times greater than the annual CO₂ emissions of industrialized countries and more than five times the annual CO₂ emissions of European countries that are OECD members, and it easily offset the cumulative increase of greenhouse gases by the United States in 1990–2009.

**Russia’s participation in international efforts to reduce greenhouse gas emissions.** Russia has played a special role in the enactment of the Kyoto Protocol, making the largest absolute contribution of any country to the objective of reducing green-
house gases during the first period of action of the Protocol (2008-2012). In this regard, the continued participation or non-participation of Russia in the mechanisms of the Kyoto Protocol is one of the most urgent issues of both Russian and international climate policy.

The key position of the Russian delegation in recent years in negotiations on the UN Framework Convention on Climate Change (UNFCCC) has been the need for a new climate treaty, which would replace the Kyoto Protocol. This position has been consistently maintained, and Russia has repeatedly declared its non-participation in quantitative commitments after 2012 due to the low efficiency of the existing Kyoto Protocol for achieving global climate goals and the unjust distribution of obligations between countries. Prior to the Conference in Durban (December 2011), this position was largely justified by strong fight for a comprehensive new climate agreement.

National climate policy was implemented in the 1990s as part of the Federal Programme, ‘Prevention of Dangerous Changes in the Climate and their Adverse Effects’. The Climate Doctrine of the Russian Federation, approved in 2009, establishes the principles of modern domestic and foreign policy with respect to climate change. The strategic objective of Russian policy in the field of climate change is defined as ‘ensuring the safe and sustainable development of the Russian Federation, including institutional, economic, environmental and social (including demographic) aspects of development in the context of climate change and associated threats.’ In 2011 a comprehensive plan was approved for implementation of the Climate Doctrine of the Russian Federation for the Period up to 2020, including the development and implementation of operational and long-term measures in real sectors of the economy to adapt to climate change, as well as measures to mitigate human impact on climate.

As of today, Russia’s national policy on climate change includes:

- Improving energy efficiency in all sectors of the economy.
- Developing the use of renewable and alternative sources of energy.
- Reducing market distortions, and implementing financial and tax policy measures that encourage the reduction of man-made emissions of greenhouse gases.
- The protection and enhancement of sinks and reservoirs of greenhouse gases, including rational management of forests, afforestation and reforestation on a sustainable basis.

In 2009 the Russian Federation announced that it was targeting a 15–25% reduction of anthropogenic emissions.

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24 Confirmed by Russian Government Resolution № 1242, dated October 19, 1996.
25 Order of the President of Russia № 861, dated December 17, 2009.
26 Russian Government Order № 730, dated April 25, 2011.
greenhouse gas emissions by 2020 compared with 1990 levels. Achievement of this goal in the context of a global climate treaty, negotiations on which are continuing, is defined by two conditions: proper allowance for the contribution of Russian forests with respect to fulfilment of commitments to reduce man-made emissions and the acceptance by all major emitters of legally significant commitments to reduce man-made emissions of greenhouse gases.

One of the principal outcomes of the Durban Conference (2011) and an indisputable achievement of Russian diplomacy was the agreement of a ‘road map’ for preparation of a new climate agreement, to which all of the world’s leading countries should subscribe, and the question of the desirability and feasibility of Russia’s participation in the second commitment period of the Kyoto Protocol became a subject of debate. In particular, Russian business, having invested considerable resources over the past five years to prepare and implement climate projects, sees no reason why the country should not assume quantitative commitments and participate in the mechanisms of the Kyoto Protocol, which have already enabled Russia to attract investment resources and energy-efficient technologies. The Environment, Industry and Technology Committee of the Russian Union of Industrialists and Entrepreneurs (RSPP) has appealed to the Russian Government to review its position and to take part in the second commitment period of the Kyoto Protocol, as the EU countries and also Russia’s close neighbors and partners, Belarus, Kazakhstan and Ukraine, intend to do. The position of the RSPP has been supported by Business Russia and other organizations, which emphasize that the main positive result of participation in the Kyoto Protocol will be new contracts worth hundreds of billions of rubles for Russian engineering companies and design institutes to develop and implement new projects.

However, the petitions by the RSPP and other organizations have not changed the official position of the Russian delegation. The statement of Russia’s Special Presidential Representative for Climate Issues regarding agenda items at the 18th Session of the Conference of Parties to the UN Framework Convention on Climate Change/8th Meeting of the Parties to the Kyoto Protocol (Doha, Qatar, 26 November – 7 December 2012) confirmed that ‘...Russia does not intend to assume quantitative commitments to reduce greenhouse gas emissions in the second commitment period of the Kyoto Protocol. This decision is based on a comprehensive consideration of current environmental, economic and political realities.’

Some experience in organization of Kyoto joint implementation projects has been gained over the last two years, particularly as regards the system for approval of such projects (see Section 6.3). But full information on the outcomes of this work is not yet available, particularly as regards the volume of emission reduction units sold and offered for sale on the European carbon market, as well as the volume of funds received and invested by companies, which are members of joint implementation (JI) projects for the application of green technologies.

In any case, complete disengagement by Russia from the Kyoto Protocol is not on the agenda – there has not been any decision to withdraw from the international agreement. So Russia will provide reporting and participate in the meetings of parties to the Kyoto Protocol, and also take part in work on capacity development, technology transfer, provision of technical assistance to developing countries and other issues.

By citing environmental inefficiency (inability to achieve the internationally agreed goal of limiting global temperature rise to 2°C) as its main reason for not assuming new commitments and not taking part in the continuation of Kyoto Protocol mechanisms, Russia is factually joining those countries, which favor more ambitious goals for the future climate regime. This position entails that the country should present its vision of a new effective international regime for limiting greenhouse gas emissions and should implement the appropriate domestic policies and measures.

The present task is for Russia to formally adopt medium- and long-term goals to limit greenhouse gas emissions or lower carbon intensity of GDP, as most developed and leading developing countries have already done. Russia has a Climate Doctrine...

27 Statement by the Conference on Current Issues of Participation by Russia in International Mechanisms for the Regulation of Greenhouse gas Emissions, Moscow, Higher School of Economics, October 12, 2012.

28 http://state.kremlin.ru/administration/16936

A process of trial and error has led to the establishment in Russia of a system for approval of joint implementation (JI) projects, and it is one of few effective economic mechanisms that have been put in place to date for raising energy efficiency of the Russian economy. According to official data of Russia’s largest bank, state-owned Sberbank, which is acting as the operator of carbon units (under Russian Government Resolution № 780, dated September 15, 2011), a total of 150 JI projects have been submitted for approval by Russian companies as part of the economic mechanisms of the Kyoto Protocol with total emission reduction units (ERUs) of 384.6 million tons of CO2-equivalent. At present, Russia’s pipeline of JI projects for implementation of the economic mechanisms of the Kyoto Protocol is the second largest in the world (after that of China, which plans to issue about 700 million units) and significantly exceeds the draft portfolios of Ukraine and India with their planned issuance of up to 200 million units each.

Figure 6.4. shows the structure of Russia’s JI projects. The largest share of potential emission reductions are from projects for utilization of associated petroleum gas, but issued emission reduction certificates are dominated by projects for the reduction of emissions of hydrofluorocarbons and sulfur

The Russian Government is completing work on a legal basis for a national target to reduce greenhouse gas emissions by 2020. It will then be possible to start discussing specific options for application inside Russia of market mechanisms to encourage reduction of greenhouse gas emissions and the use of green technologies.
hexafluoride in the production of polymers by only two companies – in Perm and Kirovo-Chepetsk.

If Russia does not participate in the Kyoto Protocol mechanisms after 2012, there is a risk that the procedure for government approval and verification of emission reduction projects, which has been designed, and the human and institutional capacity for preparing and implementing projects, which has been created within Sberbank and Russian company-investors, will be wasted.

Actions are needed to ensure preservation and development of the system of climate projects in Russia. The first step has been made as prescribed by Russian Government Resolution № 780 (15.09.2011): funds received by JI investors from operations with carbon credits must be reinvested in the design and implementation by 2020 of new projects to improve environmental and energy efficiency through use of new technologies, energy saving, alternative (particularly local) secondary and renewable fuels and energy sources, utilization of associated petroleum gas, the elimination of accumulated environmental damage, and comprehensive renovation and modernization of existing facilities. According to a Sberbank representative, Russian project investors have presented investment declarations for a number of new projects to improve energy and environmental performance with value in excess of 240 billion rubles for the period up to 2020. However, this first step may not be enough, since additional measures are needed to create domestic demand for accounting, monitoring and verification of implementation of new projects to reduce greenhouse gas emissions. Creation of a domestic system for circulation of ERUs is overdue. This might be accomplished in various ways:

– By introducing competitive Government purchases of ERUs in priority sectors and technologies, for example, through the State Programme for Energy Saving and Energy Efficiency in the Period up to 2020 (by analogy with similar government tenders, which have been carried out in the Netherlands, Austria, Denmark and other countries).

– By requiring airlines to purchase ERUs to offset emissions from international flights over Russian territory (this could partially replace the mechanism of payment by international companies to use the Trans-Siberian route, which Russia has promised to cancel upon accession to the WTO). The introduction of such a requirement would help to open negotiations on the waiver of fees for Russian airlines flying to Europe.

– By the use of ERUs to offset emissions and to ensure ‘zero-carbon’ footprint for Sochi Olympics in 2014, the FIFA World Cup in 2018 and other major regional and global sporting, cultural and business events to be held in Russia.

6.4. Harmonization of Climate Policy Mechanisms with Political Partners and Neighbors

Belarus, Kazakhstan and Ukraine are preparing to develop national market-based emissions trading systems, aiming to harmonize them with international carbon markets. In December 2011 the Republic of Kazakhstan passed a law introducing a market mechanism for emission reduction and absorption of greenhouse gases, which includes: trading in emission quotas and greenhouse gas absorption units, certified emission-reduction units, emission reduction units and units for domestic emission reductions; and the organization of trading platforms (stock exchanges) to enable trading in these units.

Possible actions by Russia may include:

– Initiation of creating a single regional ERU trading system similar to that in Europe.

– Preparation of a national GHGs trading system, harmonized with those of neighbors.

– The introduction of regional turnover of ERUs from JI and quasi-JI projects (reinvesting proceeds from JI) and the use of these units as a ‘bridge’ between national systems.

There has been much interest from the expert community in the proposal by the Russian Energy Agency of a trading system for ‘white’ and ‘green’ certificates, which confirm results achieved in energy efficiency or renewable energy production in Russia, Kazakhstan and Belarus. This is a different model, which already operates in India and is now being considered by China. The Chinese plan to test and improve new market-based climate mechanisms...
in seven provinces, and then make a decision on national machinery based on the results. Some provinces will test allowance trading based on emission limits and others will trade certificates, following the example of India.

It would make sense for Russia to initially prepare and test a voluntary trading scheme, incorporating adequate financial and non-financial incentives for participation by companies. It would be advisable to prepare and launch the emissions trading scheme in pilot regions and/or sectors. Such pilot initiatives should be viewed as testing grounds for new approaches and as an opportunity to train new specialists.

**Accounting and reporting of greenhouse gas emissions.** The successful introduction of any market mechanisms depends on a reliable system of emissions accounting and control, particularly for emissions of carbon dioxide. Russia has some experience of emissions inventory by RAO UES (the recently dismantled conventional power generating monopoly) and some other companies, and emissions inventories were also kept in some regions. Unfortunately, these activities were not under Government control. Gazprom now has a system of corporate reporting, but it provides reports as part of a global project for the disclosure of carbon information. There is an urgent need for mandatory reporting of carbon dioxide emissions, at least for the largest companies, which are responsible for the bulk of greenhouse gas emissions.

**Development of the concept of ‘carbon neutrality’.** Carbon valuation can be introduced in economic indicators relatively easily through the concept of ‘carbon neutrality’, which involves the calculation of carbon emissions associated with a particular economic activity, the maximum reduction of these emissions by rationalization and the use of technology, and compensation of remaining emissions by investment in external projects to achieve additional emission reductions that offset the ‘carbon footprint’ of the particular activity. Such compensatory investments are what create a price for carbon.

The concept of ‘carbon neutrality’ can be applied to various fields, including certain types of products, organizations, and companies or their subdivisions, communities and administrative formations, travel, events, projects, etc. Declarations of carbon neutrality can be expressed in advertising, literature, technical bulletins, labels, and via digital or electronic media.

Carbon neutrality achieves its highest profile when applied to major international sporting events such as the Olympic and Paralympic Games, and FIFA football World Cups. Cities and countries hosting such events are increasingly willing to take account of the scale and complexity of possible environmental impacts and take steps to reduce them, which in turn raises the bar for future hosts and encourages them to take similar measures (Box 6.3).

**Box 6.3. Using International Experience to Make the Sochi Olympics ‘Climate Neutral’**

Russia as the organizer of the Olympic Games in Sochi in 2014 has committed itself to making the Games climate-neutral, ensuring a zero balance of greenhouse gas emissions by:

- The use of energy-saving measures at construction sites.
- Reconstruction of existing power generating facilities, and their transfer to use of renewable energy sources.
- Compensating remaining greenhouse gas emissions through the purchase of additional production or emission reduction units in special projects.

This is a completely new task for Russia, which has no precedents for the design and implementation of strategies to manage carbon emissions at major international sports or business forums. UNDP, with support from the Global Environment Facility (GEF) and the British Embassy in Moscow has offered technical assistance to ensure that the Sochi Games organizers have maximum access to relevant experience of previous Olympic Games organizers.
The analysis of international experience in the development and implementation of strategies for managing carbon emissions during the Olympic Games and other major international sporting events shows that the 2012 Summer Games in London far outdid previous Games both by the size of their ‘carbon footprint’ (3.4 million tonnes of CO₂), and the efficiency of steps taken to reduce it. The ‘BP Target Neutral’ programme, which was organized for participants and spectators of the London Games, is of particular interest for Sochi. The programme included:

- Informing spectators about the environmental impact of their travel arrangements to come to London.
- Management and financing of compensation for greenhouse gas emissions generated by spectators traveling to the Olympics.
- Information about the projects, which generating emission reductions to offset Olympic travel.
- A marketing campaign and dedicated Internet website (http://www.bptargetneutral.com).

According to preliminary expert estimates, the ‘carbon footprint’ of the Sochi Olympics could reach 5 million tons of CO₂, much of it from the construction of infrastructure (approximately 56%) and the emissions associated with transportation and provisions for spectators and participants of the Games. Nevertheless, achievement of ‘climate neutrality’ for Sochi 2014 is feasible, with various possible strategies for measurement and compensation of the ‘carbon footprint’ of the Games. It is also important to ensure the scale and sustainability of the Games’ legacy. Sochi 2014 can offer a powerful impetus for the introduction of national standards and carbon accounting systems in Russia, as well as project-based mechanisms to offset greenhouse gas emissions.

Russia will also host a number of other world-class sporting events in the future, including the World Cup in 2018, so the concept of ‘carbon neutrality’ of sporting events can and should be the locomotive for broad dissemination of this approach in other areas. Work to ensure ‘carbon neutrality’ of the Sochi Olympics could lay foundations for the future.

Information on carbon neutrality of the Sochi Olympics can be viewed at: http://www.mnr2014.ru/docs/7.html

6.5. Adaptation of People and the Economy to Climate Change and Today’s Priorities for Climate Policy in Russia

The principles of Government climate policy: priorities for adapting people and the economy to climate change. Public policy on climate change must be long-term and strategic in nature. Its principal feature at all levels of management is the leading role of the state which bears the main responsibility and financial burden for reducing climate threats and for sustainable development. The principles of this policy include:

- **Mainstreaming climate issues** (their organic integration) into Russia’s national security strategy and strategy for sustainable socio-economic development.

- **Complexity**, which is not a matter of alternative approaches, but of balanced and complementary measures to reduce the anthropogenic impact on climate and adapt the economy to climate change.

- **Cost-effectiveness** of these measures, i.e. obtaining the maximum possible effects from impact reduction and adaptation (using best-available technologies) given the existing constraints on time and resources.30

The priority in climate policy, taking account of the complexity principle, must be given to adaptation of communities and the economy to climate change. There are two reasons for this. Firstly, in any scenar-
io, the reduction of greenhouse gas emissions could at best only limit the extent of human-induced climate change and its effects, but cannot eliminate them entirely. So, in order to reduce this residual risk, one should focus on reducing vulnerability to destructive climate impact using the mechanisms of adaptation of the economy and protection of society as a whole against expected and actual climate change and its consequences. The benefits of adaptation measures accrue directly to the economic agents implementing them (enterprises, regions). So, from the outset the motivational capacity of these measures (even with additional efforts by government) exceeds that of measures to reduce man-made impact on the climate system.

The current fluctuations in some of the most important characteristics of regional climate and the consequences of these changes point to an increasing “deficit of adaptation” on the part of Russia’s people and economic systems in the face of climate change, i.e. a widening gap between the adaptive capacity of people and economic systems and the adaptation, which is in fact needed. Recurrence and increasing frequency of natural hazards, mainly related to weather and climate (the most common causes of emergencies and disasters from natural sources), will lead in the near future to a substantial increase in the costs of adaptation and, most importantly, will increase the level of risk to people’s health, life and property.

Therefore, efficient adaptation of communities and the economy to climate change requires an economic development strategy, which leads to increases of the production of goods and services while reducing the vulnerability of people and industries to climate change and its impact. The core of such a strategy is diversification of the economy and stimulation of economic growth, investments in health and education, increased ability to cope with natural disasters, improvement of crisis management, and the development of social protection networks.

Economic programmes and adaptation measures in Russia should give attention to both economic and regional specifics. The sustainable development of Russian regions, taking climate change issues into account, requires a changeover to strategic planning that combines a long-term view with a systematic approach to the development and implementation of economic programmes and individual projects, ‘embedding’ the climate-change factor in regional development plans and plans for the development of regional economies. Such linkage should reduce the negative impact and enable maximum use of the favourable opportunities associated with climate change, both directly and indirectly (through the introduction of energy-efficient and energy-saving technologies). It should also contribute to regional security (for example, by development of systems for monitoring and early warning of hazards, targeted programmes to support indigenous peoples and other vulnerable groups, etc.) and to Russia’s national security.

These regional development strategies should be harmonized with the national action plan currently being developed within the framework of the Climate Doctrine of the Russian Federation and pursuant to decisions (dated March 17, 2010) of the Security Council of the Russian Federation. This involves selection of regions, industries and population groups, which are particularly vulnerable to climate change, development of policy measures to mitigate and adapt to existing and projected climate change phenomena (including the creation of financial and institutional mechanisms and technologies to reduce climate risks), conducting climate research, and analysis and assessment of the efficiency of various adaptation measures.

Adaptation of the population to climate change: focus on health. Federal and regional action plans are needed in order to achieve the efficient adaptation of communities to climate change, particularly as regards health. It is important to gauge the level of threat posed by climate change, as registered by meteorological services at regional level and in specific localities, to the health of different age, social and ethnic groups (including indigenous peoples). Recommendations are needed for health measures that can prevent adverse effects on human health from heat waves, periods of extreme cold or other abrupt changes in the climate. Medical alerts, based on weather forecasting, can mitigate the negative im-

pacts of extreme weather events on health. Russia’s first regional plan of action has been designed for Arkhangelsk Region as part of the WHO project with financial support from the German Ministry of Environmental Security and Nuclear Safety.34

The expected intensification of heat waves, particularly in large towns and cities, requires adjustments to urban planning, and to the construction and equipment of buildings. Specific steps include the creation of new green areas, installation of air-conditioning in residential and public buildings (including medical and social service facilities), and development of a public warning system regarding heat hazard. Increased risks to certain age groups due to indirect effects (higher concentration of pollutants in the air) should also be considered and addressed by installation of energy-efficient technologies, use of clean vehicles, etc. In order to be effective these measures require support from the general public, and that will depend on timely and full provision of relevant information to the public by municipal (regional) authorities and health authorities.

Adaptation measures including increased surveillance, early diagnosis, vaccination for malaria, etc. are also needed to address the expected increase of risks from infectious diseases due to climate warming. The effect of higher temperatures on the agents of intestinal infectious diseases and parasites, and disruption to water supply and sewage systems will require stricter sanitary and epidemiological surveillance, extra health and hygiene education, as well as better control over water supply and sanitation facilities, installation of purification systems for local drinking water, etc. Hazardous weather and climate events require the organization of a public early warning system and mobile teams to provide emergency medical assistance and other rapid response. These issues were among the lessons learnt from the large-scale flooding in the Kuban region in the summer of 2012.

Special adaptation measures need to be developed and implemented for indigenous peoples in some regions of the Russian Federation (particularly the Far North), for whom climate change represents a particularly serious threat to health and sustainable development. Efforts are already being made in this direction. The Letter of the Ministry of Health and Social Development № 14-3/10/2-3936 (April 18, 2012) calls for the development and approval of regional action plans to protect public health from the effects of heat, taking account of regional specifics. These regional plans are to be based on the Action Plan for the Protection of Public Health during Heat Waves. This Plan was produced by the Russian Health Ministry in accordance with an agreement between the WHO and the Russian Government (January 18, 2009), approved by the Government Order № 1372 (September 20, 2008). The methodological guidelines MR 2.1.10.0057-12 ‘2.1.10: Public health in relation to the state of the environment and living conditions of the population. Assessment of risk and damage from climate change, leading to increased morbidity and mortality among high-risk groups’ were approved by Rospotrebnadzor on 17.01.2012.

Another urgent task is the development of a climate component for the Russian Government’s migration policy, including proper estimate of the numbers of so-called environmental migrants, including ‘climate migrants’, and ways of regulating their flow. The estimated amount of such migration in 2011 exceeded 50 million people and forecasts suggest an increase to between 200 million and 250 million people by 2050. Some of the migrants are bound to come to Russia, creating an additional burden on social and economic services, and on the local communities and environment of the host regions. This implies that the measures, which are designed and applied to address the consequences of climate change, must be suited to people from other countries, which also have a deficit of adaptation, and not only to Russian citizens.

The role of science and innovation in adaptation of the national economy to climate change and climate policy implementation. Effective adaptation of communities, industries and the national security system in Russia to climate change critically depends on the state of science, including R&D and the use of technologies. On the one hand, science and technology can help communities and industries to adapt to climate change by providing systems and technologies that reduce risks related to natural

34 Strategy for Adaption to Impact from Climate Change on Public Health in Arkhangelsk Region and Nenets Autonomous District, Ministry of Health and Social Development of Arkhangelsk Region, Northern Medical Institute, Russian Ministry of Health and Social Development, Arkhangelsk, 2012.

disasters (early warning systems, infrastructure and health protection for people living in threatened areas, including areas with extreme temperatures, precipitation levels, etc.). On the other hand, science can help to reduce climate risks by reducing man-made emissions of greenhouse gases, thus mitigating their impact on the climatic system, as discussed above.

Both mitigation and adaptation to climate change are inextricably linked to the development of innovations. R&D studies and new technologies to alleviate the impact of climate change can provide an enormous multiplier effect. This is why the long-term development strategies and crisis management programmes of developed countries and large transition economies give a major role to the modernization of energy and transport infrastructure, development of clean power generation and related R&D, as well as other components of the green economy.

The set of organizational and scientific-technical measures should include: maintaining an adequate level of preparedness and efficiency, and innovative development of systems, methods and techniques of forecasting and mitigating natural disasters, including integrated assessment of risks to critical infrastructure, which is sensitive to weather and climate change, and the development of early warning systems. Systems, equipment and methods must also be put in place for medical and sanitary protection of the general public against extreme and hazardous natural events, including maintenance of the human organism’s defenses against adverse external impacts and emergency medical and other critical support systems to help people when emergencies and disasters strike. Protection of industrial facilities is also required, particularly of hazardous facilities and those of critical importance.

The package of measures to reduce man-made impact on climate should also involve scientific and technological programmes and activities, including the development of innovative technologies. Particular attention should be paid to: the development of systems, methods and technologies for monitoring and forecasting the state of the atmosphere and hydrosphere; use of atomic and hydrogen power, as well as new and renewable energy sources; production of fuel and energy from organic raw materials; technologies and systems for energy-saving, distribution and consumption of heat and electricity; and transportation system technologies, including energy-efficient engines and propulsion systems for vehicles.

Particular importance attaches to systems and technologies, which offer a ‘triple dividend’, i.e. combination of resource (energy) saving with lower emissions of air pollutants and greenhouse gases, and cost reduction. This is most relevant in the housing and communal service sector, since services in this sector provide vital needs and determine the quality of life of the general public. Housing and communal services also account for nearly half of Russia’s electricity consumption and offer very attractive payback periods and rates of return on investment. Other promising sectors include energy, industry, construction and transport.

Implementation of these and other directions of public climate policy depend on active efforts by federal and regional authorities to raise the quality of national science and education. This is the key to obtaining new knowledge about climate and the causes of climate change. Such knowledge is crucial for overcoming uncertainty about future climate change, which seriously complicates the choice of effective economic policy.

The key role in this respect falls to the earth sciences, especially climatology, the central task of which is to assess future climate change, and which can therefore provide a basis for relevant recommendations and contribute to the development of adaptation measures. Climate science should be seen as an important component of the country’s adaptive capacity, and the state of this science indicates whether this capacity is developing or contracting. Unfortunately, the current state of affairs in Russia in this respect falls far short of modern requirements and requires urgent and drastic improvement.

Substantial advances in the development of engineering, technical sciences, human sciences (biology, medicine, etc.) and economic science are also needed to ensure adequate consideration and assessment of all aspects of economic development, including climate and other environmental risks to human health and well-being in Russia.
Conclusions and Recommendations

Climate change is a source of serious risks and threats to public safety and sustainable economic growth. It presents a new challenge to the Russian and international community and creates an urgent need for human development. Effective adaptation measures are needed to protect public health from the effects of heat waves, periods of extreme cold and other climate change. These measures, together with efforts to reduce greenhouse gas emissions and the adaption of economic systems to the new weather and environmental conditions, should be the priority areas for climate policy in Russia.

Pressing tasks include the formal adoption in Russia of medium- and long-term objectives to limit emissions of greenhouse gases or reduce carbon intensity of GDP, and the preparation of a national system of carbon regulation, including the launch of pilot schemes in regions and economic sectors to improve the functioning of institutions and create a legal framework for climate policy and the control of greenhouse gas emissions.

For these purposes, work as part of the Climate Doctrine of the Russian Federation implementation should include a special Government programme to implement the Comprehensive plan of weather and climate research up to 2020, which was developed by Rosgidromet and the Russian Academy of Sciences together with other agencies in 2010. This would enable co-ordinated studies to be carried out at national level (in the form of a national programme with its own funding) and their integration with international programmes. It would also enable qualified scientific personnel to be trained and consolidated as part of Russia’s scientific capacity, and modern information technology and computing facilities to be deployed. Finally, it is essential to develop mechanisms for the quality control of Russian research projects and their results, in order to ensure that they are carried out to the best international standards.
Sustainability of Russian regions depends on a wide range of factors – economic, social, demographic and environmental, – which may operate in opposite directions. Can development of the oil&gas-rich autonomous districts of Tyumen Region, the whole economy of which is based on extraction of a non-renewable resource, be called ‘sustainable’? Or that of Moscow, which concentrates financial and human potential from the entire country, but is choking in traffic jams? Or that of Central Russia, where the environmental situation is more favorable, but incomes are low and human potential is diminishing? Or that of the Far East, with poor infrastructure and long-term migratory outflow of the population? Even a cursory glance shows that sustainability issues vary considerably between regions, as economic, social, and environmental factors have significant and divergent territorial dimensions.

7.1. Sustainability of Economic Development in Russian Regions

Sustainable development in Russian regions is hampered by major differences between their level of economic development. This problem is viewed as paramount, but its importance is, in fact, exaggerated. Firstly, regional economic disparities have decreased through the 2000s: the ratio between per capita GRP of the richest and poorest regions, respectively oil&gas-producing Tyumen Region and the Republic of Ingushetia, fell from about 30 times in 2005 to 13 times in 2010 (adjusted for price level differences). This is due to the centralization of oil&gas revenues in the federal budget and their large-scale redistribution (increased federal transfers to the least developed regions), as well as change in the recorded population size of Ingushetia after the Census of 2010. Secondly, except for the 2–3 main oil&gas-producing regions and Moscow (at one extreme), and the under-developed republics (at the other extreme), there is not a great deal of difference between the levels of economic development of most Russian regions (Figure 7.1).

Differences between the development levels of Russian regions as measured by the Gini coefficient also narrowed starting from the second half of the 2000s. Inter-regional differences in household incomes have been declining since 2002 thanks to the Government’s redistributive policies, and regional disparities in poverty rates have been mitigated. Social inequality has been steadily reduced, but the successes have been achieved mainly through redistribution of huge oil and gas rents.

Sustainability of development in Russian regions also depends on their ability to adapt to changing economic conditions and overcome economic crises. Impact of the recent crisis was most severe in regions, which rely on the metallurgy and engineering industries, but industrial growth resumed in 69% of Russian regions in 2011. Dominance in a region of uncompetitive industries or industries that are highly vulnerable to fluctuations in the world economy is a long-term negative factor and increases development risks.

Regions that are good at attracting investments are more sustainable, but this is not a strong point of most Russian regions. Investments are concentrated in oil&gas-producing regions, the federal cities (Moscow and St. Petersburg) and their agglomerations, and in locations where major federal projects are underway (Figure 7.2). In the crisis year of 2009 investments decreased by 16%, and the decline of investment had still not been overcome in half of the country’s regions by the end of 2011. More than 40% of regions had not returned to pre-crisis rates of residential construction, and housing construc-

tion decreased in half of the regions in 2011. Slow recovery of investments and new housing construction after the crisis reflects the unfavorable investment climate, reducing the sustainability of regional development. The Government not only dictates the ‘rules of the game’, but is itself an investor: invest-

Figure 7.1. Per capita GRP of Russian regions as % of the national average (adjusted by Rosstat for difference in price of a fixed basket of goods and services)

Source: Author’s calculations using Rosstat data

Figure 7.2. The share of federal districts and some regions in fixed asset investment (from all sources) in 2008 and 2011, %

Source: Author’s calculation using Rosstat data
ments by the Government budget represent one-fifth of all investments in Russia and are divided roughly half-and-half between the federal and regional budgets. Investment from the federal budget flow mainly to large projects. Krasnodar and Primorsky Territories received almost 20% of all investments from the federal budget in 2011 for preparation of the Olympic Games and the APEC Summit (in 2010 these two regions received almost 17% of the total), while Tatarstan received 5% as it prepared to host the World Student Games (3% in 2010). In total these three regions took a quarter of all investments from the federal budget in 2011. Another 10% went to Moscow, which has its own huge budget, and the same percentage (10%) was invested in the North Caucasus republics. The need to help the least developed regions is beyond doubt, but it is equally important to improve the efficiency of public investment in the republics of the North Caucasus and other Russian regions.

Increasing dependence on federal aid has negative impact on the sustainability of regional development. In 2011, transfers from the federal budget represented 23% of the revenues of regional budgets on average (down from 27% in the crisis year of 2009, but considerably increased from 16% in 2004). In 12 regions transfers account for over half of all budget revenues, and in Chechnya and Ingushetia they are close to 90% of the republican budgets (Figure 7.3).

Figure 7.3. The share of transfers from the federal budget in consolidated budget revenue of regions, %

Source: Author's calculations using Federal Treasury data

7.2. Sustainability of Demographic and Social Development

Demographic trends have negative impact on the sustainability of development in Russia, as the country's population is shrinking and aging. Depopulation is occurring most rapidly in the central and north-western parts of Russia, where the age structure is dominated by higher age groups and the birth rate is low. The rate of population shrinkage in these parts of the country was up to 1-1.5% per year in the period between the censuses of 2002 and 2010 (Figure 7.4). Population trends in the Far East and
A significant increase in life expectancy in Russia, by 3.5 years between 2005 and 2010, represents a major social achievement. Russia’s population has become older, but not to the extent of developed countries, since this trend is opposed by life expectancy, which remains relatively low in Russia. The share of the elderly population is highest in the central and north-western parts of the country, and in adjacent regions of European Russia. According to the 2010 Census, women of retirement age exceeded 40% of all women in some rural parts of central and north-western regions, and their share in Moscow and St. Petersburg is 30–33%. The aging process will accelerate in the current decade, as members of large generations born in the 1950s reach pension age.

Aging of the population has economic consequences, increasing the deficit of the Pension Fund and the burden on the Russian budget. The social security and employment systems also need to adapt to the new environment, developing social services for the elderly, in which they can be assisted by NGOs, and helping to create jobs for retirees who are still able to work. Up to 30% of retirees are working at the present time. The share exceeds 30% in the Far East and northern parts of the country, and in the federal cities it is above 50%.

The working-age population will shrink rapidly in the 2010s due to specifics of the Russian age pyramid. This will lead to labor shortages, particularly in regions with the best economic development dy-
namics, including Kaluga, Kaliningrad and Belgorod regions. Migrants from other regions of Russia and from abroad only compensate labor shortages in the federal city agglomerations. Other developed regions attract migrants to a much lesser extent and half of the country’s regions experienced outward migration in 2011. The latter regions include northern regions and the Far East, nearly all of the North Caucasus republics, and half of the Siberian and Volga federal districts (mainly the less developed among them). However, it should be noted that current levels of intra-Russian migration, which is captured by statistics, are almost twice lower than in Soviet times.

Sustainable development requires the growth of social mobility between regions and within them. Movement of people from peripheral and depressed areas to large cities and towns with greater employment opportunities, better education and healthcare contributes to the development of human potential. Big cities need to develop as migration magnets by growth of their housing market, the creation of new jobs, increased investment in housing and transport infrastructure, and improvement of the urban environment. And this requires institutional changes: greater responsibility more budgetary resources vested with municipalities, combined with greater public control over the activities of government. Investing more in large regional centers will change the flow of migrants, which is currently focused on the Moscow and St. Petersburg agglomerations, and is exacerbating the transport, environmental and other problems of the two capitals. Growth of domestic migration will also alleviate labor shortages in large cities caused by shrinkage of the population of working age, as well as partially reducing demand for migrant workers from neighboring countries.

Social sustainability depends on employment and incomes, and their trends are mainly positive. The unemployment rate in Russia is low and does not create significant social instability except in the least developed republics and some remote areas of the north and east of the country. Growth of the unemployment rate in early 2009 (to 9.5% of the economically active population), associated with the crisis, was short-lived, and the level had dropped back to 6.6% by 2011, returning to pre-crisis levels in most regions. Government support for employment has played an important role, but labor markets in some regions, particularly single-industry towns focused on engineering, textiles and metallurgy, will face significant risks in the event of a new crisis.

Real money incomes of the Russian population grew by 2.6 times in the decade of economic growth (1999–2008) and regional inequalities, measured by average per capita income, have been in decline for the last 10 years. A collapse of household incomes was avoided in the crisis of 2009 thanks to massive government support. But the period of rapid income growth came to an end: real incomes of Russian households grew by only 6% from 2008 to 2011, and real incomes in most regions where export industries (oil&gas, metallurgy) are concentrated were below the pre-crisis level in 2011.

A significant decline in poverty, from 29% in 2000 to 12.6% in 2010, has had positive impact on sustainability. Regional differences in poverty levels were also reduced, but they are still quite high: the poverty level is above the national average in 59 of 83 Russian regions, and it is 1.5-3 times higher than the national average in 15 regions. These inequalities are due to an objective factor – major differences between the level of economic development in Russian regions – and are therefore difficult to overcome.

Development of social infrastructure and access to social services are a necessary condition for human development. Availability of services depends on the system of settlement. The settlement system is currently undergoing a transformation in most Russian regions: peripheral territories are being depopulated and the population is concentrating in urban and suburban areas. This process has been continuing for many decades, conditioned by urbanization and completion of the demographic transition in most regions. Big cities attract people, so there is an increasing burden on their social institutions. Rising birth rates led to an acute problem of shortage of places and overcrowding in kindergartens in the second half of the 2000s. In 2010 only two of the 94 Russian cities with populations in excess of 200,000 people and 14 other smaller regional centers had kindergartens, which were not overcrowded. In Krasnodar and Yakutsk there were 150 children per 100 places and pre-school facilities are overcrowded by 25-50% in a third of big cities. The problem is being gradually overcome by the construction of new kindergartens, but so far only Moscow, with its vast financial resources, is close to a full solution. Flexible forms of pre-school education are less costly, and include small private
nursery schools and groups in converted premises (as practised in Kazakhstan) or additional payments for mothers to care for children who are more than 3 years old (practised in Perm Region), but these approaches have not become widespread.

In rural areas, steps have been taken since the mid-2000s to optimize the network of small schools and healthcare facilities. Fewer and larger schools and hospitals were supposed to improve the quality of education and health services, but the main criterion for optimization has been to match what regional budgets can afford, and this had been the criterion by which the efficiency of actions by the regional authorities was judged by Federal Government until 2012. Major reduction in the number of health and education facilities reduces the availability of basic social services, particularly in rural areas. In Tambov Region, the number of schools decreased by four times in 2000-2010 and the decrease in Lipetsk and Omsk Regions, the Republic of Bashkortostan and Mordovia was nearly twofold (mainly by reclassifying small schools as branches of larger schools). The rural populations of these regions have declined by 2-13%, and their settlement system is dominated by medium-sized and large villages. Similar rates of reduction in the number of schools in Pskov, Tver and Ivanovo regions are more understandable, since these regions are characterized by predominance of small rural settlements, with long-running depopulation and low birth rates. The process of consolidation and reduction in the number of schools will continue due to depopulation, but it must be linked to settlement features in each region to ensure that health and education services remain accessible to the maximum possible extent.

Higher education institutions are concentrated in large cities. The number of universities increased by 2.2 times in 1990–2010 and the number of their branches increased by many times, but the quality of education offered at many universities is low, as acknowledged by the Ministry of Education. Kursk and Magadan are among the 10 leading regions by the number of students per 10,000 population (their figures are 30% higher than the national average), although these regions have never been major centers of higher education. Indicators for Kamchatka, Orel Region and the Republic of Chuvashia are also above average, although these regions are also not centers of higher education. A reduction of the number of universities and university branches in order to improve the quality of higher education is long overdue, and decline in the number of young people of university age tends in the same direction. Consolidation of higher education by the creation of federal universities has not solved the problem, and plans of Federal Government to reduce the number of regional universities need to be based on adequate and transparent criteria for assessing the quality of education, which various institutions offer.

Social spending by Government contributes to the development of human potential and therefore also to sustainable development. Social spending by consolidated regional budgets has increased rapidly in the past three years: social policy and benefit spending rose in the crisis period, and spending on health and education was increased in 2011 (Figure 7.5).

Social spending has priority for the budgets of most regions: in 61 out of 83 regions the total share of spending on education, health, social policy, culture, physical education and sport is higher than the average for all regions (59%), and the share in Zabaikalsky Territory, Kurgan Region, and the Republics of Tyva and Karelia is up to 71% (Figure 7.6). The scale of social spending in most regions is close to the maximum possible level, so there needs to be at least as much emphasis on spending efficiency as on absolute volumes of financing. Efficiency can be improved by taking more account of regional differences in management of the social sphere. Best approaches for optimizing the social service network, providing qualified personnel, meeting needs for medical equipment and specialized medical centers, etc., vary significantly between regions with different settlement systems and different levels of development. The choice of priorities for the funding of federal programmes should be carried out jointly with regions, although this is not an easy task. Optimization of the network of social services is a task, which regions can resolve on their own initiative, choosing the optimal combination of different alternatives (‘teacher’s house’, which downsizes schools by converting part of the school building into a home for the teacher or teachers,

a system of general medical practitioners, school buses, mobile and remote forms of teaching and healthcare, integration of facilities, etc.), taking account of the degree of public access to services and the capacity of regional budgets.
Figure 7.5. Spending by consolidated regional budgets, % to the level in 2008 (the healthcare item consists of budget spending together with territorial funds for compulsory medical insurance).

Source: Author’s calculations based on Federal Treasury data

Figure 7.6. Structure of spending by consolidated regional budgets in 2011, %

Source: Author’s calculation based on Federal Treasury data
7.3. Environmental Sustainability

The environmental status of Russian regions depends on the specialization of their economies. Regions specialized in oil & gas, coal and steel making have the highest levels of atmospheric emissions. The Siberian Federal District accounts for almost a third of all polluting emissions in Russia, including 13% in Krasnoyarsk Region alone (Figure 7.7), while the Urals Federal District accounts for 27%, including 11% in Khanty-Mansi Autonomous District. The share of atmospheric emissions from Krasnoyarsk Region, Khanty-Mansi and Yamal-Nenets Autonomous Districts, Kemerovo Region and the Komi Republic in total national emissions is 4–10 times greater than their share of the total Russian population.

The environmental situation improved in 2006-2010, when 60% of Russian regions reduced their total pollutant emissions. Two thirds of regions with the highest volumes of air pollution achieved reductions, helped by output declines during the crisis. However, negative trends continued in Siberia, where the emissions problem is particularly acute, and the worsening was particularly noticeable in Kemerovo and Irkutsk regions. Russian big business, including state-owned companies, often minimize their investments in environment-friendly technologies. Tougher government action on the environment is needed, particularly with respect to Siberian regions.

Figure 7.7. Shares of federal districts and some regions in emissions of atmospheric pollutants from stationary sources in 2010 and emission trends in 2006–2010, % (the % share of federal districts and regions in total population of the Russian Federation is shown for reference purposes)

Statistics for air pollution by regions is misleading, since the main sources of pollution are concentrated in specific cities. It should also be noted that road transport is becoming a major source of pollution in addition to industry. If all emission sources are taken into account, the geography of the unfavourable areas changes to some extent, although Siberian regions remain the worst offenders. According to a report by the Russian Ministry of Natural Resources,³

³ Report by the Ministry of Natural Resources for 2010, ‘Part V, The Environmental Situation in Regions’.
the priority list of Russian cities with the highest levels of air pollution includes 14 cities in the Siberian Federal District, 5 cities apiece in the Urals, Volga and Southern Federal Districts, and 4 cities in the Far East.

The degree of pollution by wastewater is mostly dependent on population concentrations. Moscow accounts for 10% of all Russian wastewater discharge, St. Petersburg for 7%, and densely populated Krasnodar Territory contributes 5% (Figure 7.8). Presence of water-intensive petrochemical, pulp and paper and steel plants increases the relative share of Samara, Kemerovo, Sverdlovsk and Chelyabinsk regions (each of them accounts for 4–5% of the total volume of Russian wastewater). Discharge of wastewater declined by 7% in 2006–2010, matching the decline of air pollution from stationary sources. Declines were registered in two thirds of regions and in all federal districts, except for the Urals and Far East. Among regions with high levels of wastewater discharge, only Samara, Kemerovo and Chelyabinsk regions are still showing increases.

Solid waste from industry is another major source of pollution. As many as 10 of the 23 worst-off towns and cities in this respect are located in Kemerovo Region, and there are two highly polluted towns and cities apiece in each of Sverdlovsk, Murmansk and Belgorod regions and Krasnoyarsk Territory. All of these regions and cities specialize in production of coal or ore.

The overall conclusion from the statistics is that Russian regions, which have economies focused on the extraction of raw materials, production of metals and chemicals have the worst records for all types of pollution. These regions are integrated into the global economy as suppliers of raw materials and semi-finished products, the production of which pollutes the environment. The worst figures for pollution by wastewater and road transport are in the largest metropolitan areas of the country. Russia’s environmental problems are typical of catch-up countries, which are afflicted by a highly-polluting, resource-based economy and environmentally disadvantaged metropolitan areas.

Figure 7.8. Shares of federal districts and some regions in discharge of polluted waste water into water bodies in 2010, and trends in 2006–2010, % (the % share of federal districts and regions in total population of the Russian Federation is shown for reference purposes)

Source: Author’s calculations using Rosstat data
7.4. The Human Development Index in Russian Regions

The Human Development Index (HDI) for regions of the Russian Federation is calculated using the previous UNDP method due to the lack of official statistics on average and expected years of schooling. Measurement of the sustainability of regional development using HDI shows a positive picture: the Index rose substantially in all regions during the 2000s. In Russia as a whole, the Index rose slightly in 2010 compared with the previous year and growth was observed in 71 out of 80 regions (the Index is not calculated for the three autonomous districts, which constitute Russia’s remaining administrative units). HDI grew faster in Sakhalin Region and Krasnoyarsk Territory, where the regional economies expanded quickly due to oil & gas production. Life expectancy and other components of the Index increased in the Republic of Tyva, while better Index dynamics in far northern regions (Magadan, Murmansk, Komi Republic) and in Ingushetia was due to statistical factors: the 2010 Census revealed a significant reduction in the size of their population, so the indicators of per capita GRP and enrolment in education grew. The same statistical mechanism operated in the opposite direction in Moscow, where lower HDI values were due to a significant increase in its population according to the latest census. The HDI reading in Chukotka was pulled down by a decline of one and a half years in life expectancy.

St. Petersburg took second place in the ranking after Moscow (Table 7.2), since the formula used in the old calculation method limits the economic contribution to HDI in Russia’s leading fuel and energy region, Tyumen. In addition to the two federal cities, the HDI top-10 include regions specialized in fuel and metals exports. But, of these, only Belgorod Region, the Republic of Tatarstan and (to a lesser extent) Tomsk Region have a high rating for all three HDI indicators, i.e. their development of human potential is better balanced. Regions with depressed economies figure more often than previously at the bottom of the table, due to further pressure on their economies as a result of the crisis and associated low life expectancy. The least developed republics, which previously dominated the lower end of the table, have not experienced severe economic downturn as a result of the crisis, enjoy massive aid from the federal budget, and have more favourable social HDI components.

Regional differentiation of the HDI is almost unchanged: a little over 20% of Russia’s population live in relatively prosperous regions (including 8% in Moscow), about 10% in outsider regions, and more than two thirds live in regions with an average level of human development. These proportions have not changed during the 2000s, i.e. inequality is well-established.

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Conclusions and Recommendations

The reduction of differences between development levels of Russian regions in the 2000s, particularly as regards inequalities in living standards, has played an important role in Russia’s transition to sustainable development. Regional differentiation in incomes, poverty levels and per capita GRP decreased in 2005-2010 due to the Government’s large-scale redistributive policies, and social inequality declined more sustainably. Measurement of the sustainability of regional development using the HDI also presents a favorable picture: the Index rose substantially in all regions during the 2000s. Significant increase of life expectancy had been an important social achievement over the period. However, long-term sustainable development depends on effective social and regional policy, taking account of the specificity of different regions of the Russian Federation.

Several groups of Russian regions can be identified with particular combinations of sustainable development problems and priorities for addressing them. In other regions the specifics of the problems are less clearly expressed, as they occupy an intermediate position between the groups. The identifiable groups and their priorities are as follows:

- **Federal cities and their agglomerations.** Environmental and infrastructure problems caused by rapid growth of vehicle numbers and large-scale migratory inflow, social problems due to a high level of income inequality and the problem of migrant adaptation.

- **Main resource extraction areas** in the north and east of the country. Acute environmental problems, depletion of the resource base and long-term economic risks of reliance on a single industry, outward migration in most regions, strong income inequality, higher risks of unemployment.

- **Metal industry regions of the Urals and Siberia.** Bad ecology, poor infrastructure and difficult living conditions, marginalization of people living in small industrial towns and rural areas, high risk of rising unemployment, particularly in single-industry towns.

- **Regions of the Far East and the Trans-Baikal area.** Poor infrastructure, low incomes accompanied by increasing cost of living, high unemployment and long-term outward migration.

- **Central and north-western region, parts of the Volga territories.** Aging population and depopulation, low incomes, shrinkage of social services, degradation of rural areas, low investment attractiveness.

- **The least developed republics.** Dominance of the informal economy, low investment attractiveness, high levels of unemployment, poor education and health care.

Russian regional policy is focused to a large extent on support for the two most problematic groups of regions – those which are geographically remote and those which are the least developed. Federal programmes are being implemented for development of regions in the Far East and around Lake Baikal region, and also for the North Caucasus republics, and the federal budget invests substantial sums in these programmes. There have been some positive results from anti-crisis measures to support single-industry towns, which are concentrated in the Urals, Siberia, the North-West and along the Volga. The recent territorial expansion by the city of Moscow is supposed to help mitigate traffic and other problems of the metropolis. But the priorities and support measures, which have been listed, must produce much greater results if the sustainable development problems of the different groups of regions are to be successfully addressed.

Focus of regional policy on specific territories is insufficient, for want of broader institutional reforms. The institutional reforms, which are most required, are as follows:

- Improving the efficiency and transparency of the redistributive policy implemented by the Federal Government, increasing the share of transfers allocated through a transparent formula that takes account of the level of development and living conditions in the regions. Similar changes are needed to the redistributive policies, which regional authorities exercise towards municipalities in their regions.

- Deregulation and decentralization of management, the transfer of responsibilities and tax revenues to regions and municipalities. This approach involves considerable risks: regional inequalities will increase and efficiency improvements will not be achieved everywhere, since the quality of management in different regions and municipalities differs. However, decentralization will facilitate the develop-
- Feedback to improve management quality, public assessment of management decisions. The best feedback mechanism could be achieved by direct election of mayors and governors.

- Social policy adapted to regional conditions and not designed using a single template for the whole country. Sustainability increases when a variety of ‘best practices’ are applied that take account of regional conditions. Federal Government policy should encourage the spread of ‘best practices’ to reduce the cost of optimizing social service provision to the general public in areas contending with depopulation.
Environmental responsibility of producers, environmental friendliness and energy efficiency of goods will be among the main factors of competition in the 21st century. This can already be seen from the incorporation of environmental responsibility indicators in ratings of investment attractiveness (notably in the Dow Jones Sustainability Indexes, which have existed since 1999), as well as the development of voluntary environmental certification, mechanisms for tracking the legality of products, etc. Environmental factors are also playing an ever greater role in public procurement policy in the EU and at the largest global corporations, in the investment policy of private and public pension funds, and elsewhere. But not all countries have shown a commitment to produce environmentally responsible products, and to introduce the latest international standards. Many companies in emerging and developing economies attempt to increase their profits and competitiveness through ‘environmental dumping’, i.e. lowering their costs through disregard for the environment. Such practice is most prevalent where governmental environmental regulation is inadequate, as is the case in transition countries and developing countries, including Russia. As a rule, such practices are observed on the domestic markets of countries where the middle class is relatively small, and where consumers with low purchasing power are dominant. In markets dominated by middle-class consumers, a high degree of environmental responsibility of goods becomes a competitive advantage.

The Rio +20 Conference included independent certification of natural resource management in its list of development paths to the ‘green’ economy.¹ This shows recognition by the international community of the importance of voluntary certification. Refusal to accept the global trend towards international standards and independent (‘third-party’) confirmation of compliance with such standards may well lead to the exclusion of products and manufacturers, which do not meet adequate environmental standards, from world markets, or at least from developed markets.

The Russian economy and business are increasingly integrated with the global economic space. Russia’s accession to the WTO (on August 22, 2012, following 18 years of negotiations)² and to the OECD will accelerate the country’s introduction of advanced international standards for reducing environmental risks. Voluntary environmental certification and non-financial reporting, certified by an independent third party, are becoming important competitive advantages.

Voluntary mechanisms of environmental responsibility are efficiently used by companies, which are both market and environmental leaders. Such companies view the high environmental responsibility of their goods and services as a competitive advantage on the market. State regulation is necessary, primarily, for ‘laggard’ companies, which try to maintain or even expand their market presence by unashamed ‘environmental dumping’, which reduces their costs in comparison with competitors. So a proper framework of regulatory requirements and standards, enshrined in national legislation, is needed to achieve market-based mechanisms that ensure compliance with voluntary international environmental standards. This is the best way to prevent competitive ad-

¹ The term ‘green economy’ as used by the WWF refers to an adaptive economy that is able to ensure growth in the quality of life for all people within the environmental capacity of the planet. The task of the green economy is to reduce the dependence of economic growth on increased consumption of natural resources, i.e. to provide constant reduction in consumption of energy and raw materials per unit of output or per capita.

² 'On August 22, 2012 Russia became the 158th member of the WTO' (Rossiiskaya Gazeta, 22.08.2012), http://www.rg.ru/2012/08/22/vto-anons.html)
vantages accruing to companies, which deliberately pursue a policy of environmental dumping and reject voluntary mechanisms of environmental responsibility. In some cases, independent environmental audit can supplement or replace inadequate government control.

The modern international economy is already global and is globalizing further, so the rules of global competition with respect to environmental responsibility and environmental factors have increasing importance. Companies that are forced by the requirements of consumers (primarily the middle class) and the governments of developed countries (reflecting the preferences of the middle class) to bear increased environmental costs want to ensure equal and ‘fair’ terms of competition in the field of environmental and social responsibility.³

Experience has shown that the lack of adequate and modern environmental regulation in countries with transition economies and developing countries, including Russia, is not a competitive advantage in the battle for investments and new markets. The absence or weakness of the government environmental regulation in developing countries is often perceived by the consumers and governments of developed countries as a deliberate policy of environmental dumping. This leads to the erection of non-tariff barriers in global markets against goods and producers with low levels of environmental responsibility. For example, a large number of developed countries, including the EU, USA, Australia and Switzerland, have passed legislation over the past 2-3 years to resist illegal logging and trade in wood of dubious origin in their markets.

Contrary to what is claimed by a number of developing countries, tariff and non-tariff barriers introduced out of environmental considerations are not aimed primarily at protecting national producers in developed countries. Measures to raise environmental requirements for goods consumed in developed countries potentially favor the export of energy-efficient and environmentally responsible products from developing countries to the US and EU markets. For example, following the ban on traditional incandescent bulbs in the EU and other countries a large share of world supply of various types of energy-efficient bulbs are now made in China, as are a large proportion of the solar panels used in the EU.

State environmental regulation in most developing countries is based on lower or selective environmental standards, is vulnerable to corruption and has high corruption risks. Clearly, the achievement of general (unified) rules of global competition for environmental indicators requires progress to international environmental standards imposed on the basis of a balance of interests of stakeholders. Ideally, the standards should ensure observance of the interests of the three main sectors (business, environmental and social organizations), and products made using these standards should be economically viable, environmentally sustainable and socially responsible.

In some cases, the best industry practices can be used, taking account of the requirements of environmental and social organizations and of government. In some cases, a high level of industry requirements is supported by companies themselves, which have already invested in their achievement and implementation in response to pressure from their consumers (the standards of the World Green Building Council are a case in point).

Participation in voluntary mechanisms for validation of compliance with international environmental (and, in some cases, social) standards, will be increasingly used as quantitative and qualitative measures of the management competence and investment attractiveness of companies. Criteria will include participation in independent environmental certification and labelling as part of international indexes and rankings of investment attractiveness, etc. Such voluntary mechanisms should provide independent third-party assurance, transparency and publicity for non-governmental organizations and other independent parties, including an equal degree of openness for competitors.⁴ Due attention should also be paid to compliance with national and local legislation while minimizing risks of its manipulation to obtain illegal ‘administrative rent’ (corruption risks) and other use of ‘double’ standards in the use of legislation (political risks, see Box 8.1). These principles


⁴ See instructions issued by D.A. Medvedev following presidium meetings of the State Council in 2010 and 2011.
are effectively implemented to the full as part of the International Social and Environmental Accreditation and Labelling Alliance (ISEAL). ISEAL is a membership organization, built on the above-mentioned social and environmental standards and verification of their application. ISEAL has 12 full members (including the Forest Stewardship Council (FSC), Marine Stewardship Council (MSC), FairTrade International, International Organic Accreditation Service (IOAS), etc.) and 7 associate members (including Bonsucro (Better Sugarcane Initiative), Responsible Jewellery Council (RJC), Aquaculture Stewardship Council (ASC), etc.).

The question arises, whether the benefits from voluntary compliance with international environmental standards confirmed by an independent third party (certification) repay the costs of obtaining such an ‘entry ticket’ to environmentally sensitive markets? The answer is definitely yes, as confirmed by the rapid development of voluntary certification in many countries with relatively high rates of economic development, including China, the present-day ‘workshop of the world’, where certification to the ISO 14001 environmental management system has obtained currency (Box 8.2). Russia ranks second in the world after Canada by the area of its forests, which are certified for economic use under FSC voluntary forest certification, and is in second place after the USA by the number of issued certificates for forest management.

Box 8.1. The Challenges of Development Voluntary Environmental Responsibility Mechanisms

Consumers in developed countries and many global companies often lack confidence in national certification systems. There are various reasons for scepticism and limited consumer demand with respect to mandatory or even voluntary national certification systems. Standards that are operated by government (in practice, by government-related companies) and/or lobbied by privately owned national companies that are uncompetitive in international markets may fail to meet international standards of environmental and social responsibility and may amount to an attempt to legalize environmental dumping.

Non-participation of Russian oil&gas and mining companies in the the Extractive Industries Transparency Initiative (EITI), which is a major international initiative to ensure business transparency of such companies and transparency of their payments to the governments of countries where they work, may reduce the competitiveness of Russian resource companies. The 72 international companies, which are EITI ‘shareholders’ and have assumed the appropriate disclosure obligations, include Alcoa, Anglo American, BHP Billiton, Chevron, ConocoPhillips and Shell, as well as a number of players from BRICS countries, such as Petrobras (the Brazilian equivalent of Rosneft), Africa’s Rainbow Minerals (ARM) from South Africa, etc. The absence of Russian companies among EITI participants limits their access to funding from the World Bank and, in the future, possibly also from the European Bank for Reconstruction and Development (EBRD). EITI not only requires transparency and openness from the companies themselves, including as regards their payments to governments in countries where their work, but also requires those governments to subscribe to the Initiative. Countries that apply EITI in full include Azerbaijan, Kyrgyzstan, Mongolia and Norway. Candidates for full participation include Kazakhstan, and on September 20, 2011 the US President Barack Obama announced that his country would also join (US Government agencies are currently working on accession to EITI).

5 http://www.isealliance.org/
7 http://eiti.org/supporters/companies?page=3
Another case in point is the failure of repeated attempts to establish a national system of voluntary forestry certification in Russia. Such a system would enable the country’s membership of the PEFC (Programme for the Endorsement of Forest Certification), which provides mutual recognition of national forestry certification systems. But lack of consumer confidence on markets in developed countries towards national voluntary forest certification, has meant that only 180,000 hectares of forest has been certified. That is just 0.6% of the area of Russian forest, which has been certified to the FSC international system of voluntary certification. The FSC system has been successful in Russia, despite the lack of Government support. Over a period of 14 years about 33.2 million hectares of forests have been FSC-certified (about 20% of all forests that are leased for timber operations), 120 certificates have been issued for forest management and 237 companies in the supply chain have received certification (as of 31.08.2012) (Box 8.4). FSC has achieved even more impressive results in the Russian pulp and paper industry: 40% of office paper, 70% of newsprint and over 90% of saleable pulp is now produced by FSC-certified companies.

When making public policy decisions on development in Russia voluntary environmental responsibility mechanisms and compliance with international environmental standards, it is important to grasp the fact that natural resource use can now be independently monitored, particularly by the use of satellites. Such monitoring data are used by NGOs, academics and experts, both in Russia and in other countries. ‘Transparent World’ is one Russian environmental NGO, which makes use of independent satellite monitoring and which is actively involved in the projects of other environmental organizations. Degrees of environmental responsibility and environmental sustainability will be determined using principles and approaches that are based on modern scientific concepts and supported by a consensus between the representatives of environmental organizations, the social sector and business (as is the case, for example, in FSC and MSC certifications). It is also clear that, in order to enjoy the confidence of consumers and of society, certification systems cannot be based on what business owners or managers view as environmentally acceptable.

Failings in the environmental responsibility of Russian business compared with other BRIC countries leads to difficulties when Russian goods, particularly goods with high value-added, seek outlets on foreign markets where consumers are highly environmentally aware. For example, exports of motor fuels from Russia are limited, because foreign markets have much more stringent technical and environmental requirements for such fuels.

Russia’s economy and Russian business are increasingly integrated with the global economic space. The country’s accession to the WTO and the OECD will accelerate introduction of the latest international standards for reduction of environmental risks. So voluntary environmental certification and non-financial reporting, with verification by an independent third party, will become important competitive advantages (Box 8.3).

8.2. Applying International Standards. Russia in the World

WWF Russia has carried out studies on the trends and scale of application by Russian companies of such mechanisms as the ISO 14001 environmental management system (Box 8.2), non-financial report-
ing to standards of the Global Reporting Initiative (GRI), voluntary forest certification (FSC) (Box 8.4) and the voluntary certification of marine biological resources (MSC) (Box 8.5).

Consideration of what Russian companies have done to obtain ISO14001 international voluntary certification enables conclusions about the nature and trends of environmental responsibility at Russian companies.

Box 8.2. The ISO Environmental Management System

ISO14001:2004 certification specifies requirements for environmental management systems. ISO14001:2004 does not define specific environmental management actions, as the certificate is universal across industries. Its purpose is to provide a basis for an integrated, strategic approach to corporate environmental policy. ISO14001:2004 sets out general requirements for the implementation of environmental management, which are the same regardless of the specific industry. Because the certificate does not contain industry-specific requirements, it can be approved at companies from various business sectors (http://www.iso.org/iso/iso_14000_essentials).

We compared a number of parameters to define Russia’s global position with respect to ISO14001:

1. Countries that are world leaders by ISO14001 certification in absolute terms.
2. Countries that are world leaders by rates of growth of ISO14001 certification.
3. Comparison between Russia and the BRIC countries (Brazil, India, China) by numbers of ISO14001 certificates obtained.

Table 8.1. World leaders by number of issued ISO14001 certifications

Source: The ISO Survey of Certifications 20

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Table 8.1, which uses the ISO Survey of Certifications 2010 by the ISO, shows that 4622 certificates were issued in 2010 in Sweden and 5251 in France, but Sweden is placed 10th, while France is placed 11th by the number of certificates issued in 2010.

As can be seen, China is the world leader by the number of ISO 14001 certificates obtained. This can be explained by the fact that China is experiencing rapid economic development and its goods are winning ever greater market shares in the USA and EU. Consumer markets in these countries are sensitive to the environmental responsibility of goods, so, in order to maintain and increase their market share Chinese companies must meet international standards of environmental responsibility. This is particularly important in view of distrust towards Chinese goods: consumers suspect that goods from that country are produced in violation of environmental regulations, and that lower prices for Chinese products are partly due to unfair competition as regards environmental responsibility, i.e. to ‘environmental dumping’. Chinese companies need to improve the reputation of their products, and environmental management is one way of doing this.

It also makes sense to compare countries by rates of growth of issued certificates (Figure 8.1).
Russia is not among the Top-10 countries in terms of growth of certificates in absolute terms, but is close to the group, taking 18th place, and the percentage increase in the number of certificates in Russia is higher than in leading countries. This shows that Russia is now introducing ISO 14001 more actively than it was five years ago. It can be concluded that the Russian economy and Russian companies are becoming aware of increasing environmental demands on competitive global markets, and are reacting by faster relative growth in the number of ISO 14001 certificates obtained.

This conclusion is confirmed by the fact Russia is at the bottom of the BRIC table by absolute number of certificates issued, but is second only to Brazil by the rate of growth of issuance. At the same time, countries that have led the expansion of voluntary market-based mechanisms of environmental responsibility, such as the United States and Canada, saw a decline in their absolute numbers of certificates in 2010 (by 11% in Canada and 14.4% in the USA), probably reflecting the fact that government...

We have singled out three sectors, which do the most harm to the environment – mining, oil&gas, and power generating, – and analyzed the development of voluntary international environmental liability mechanisms in those sectors in Russia. The analysis was carried out for two international voluntary mechanisms: ISO 14001 and GRI non-financial reporting (sustainable development reporting).

As of 2010, Russia had obtained 1953 ISO14001 certificates. Their distribution by sectors of the economy is shown in Table 8.3.

Table 8.3. ISO14001 certificates held in various sectors of the Russian economy in 2010

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<th>Sector</th>
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<td>Metallurgy and metal goods</td>
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<td>Manufacture of machinery and equipment</td>
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<td>Oil&amp;gas, mining</td>
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<tr>
<td>Aerospace</td>
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<tr>
<td>Transport and communications</td>
<td>87</td>
</tr>
<tr>
<td>Manufacture of food products, beverages and tobacco</td>
<td>83</td>
</tr>
<tr>
<td>Manufacture of electrical and optical equipment</td>
<td>79</td>
</tr>
<tr>
<td>Manufacture of rubber and plastic products</td>
<td>68</td>
</tr>
<tr>
<td>Production of coke and petroleum products</td>
<td>66</td>
</tr>
<tr>
<td>Pulp and paper</td>
<td>51</td>
</tr>
<tr>
<td>Production of non-metallic mineral products</td>
<td>47</td>
</tr>
<tr>
<td>Production of concrete, cement, etc.</td>
<td>38</td>
</tr>
<tr>
<td>Other services</td>
<td>37</td>
</tr>
<tr>
<td>Manufacture of other transport</td>
<td>35</td>
</tr>
<tr>
<td>Electric utilities</td>
<td>35</td>
</tr>
</tbody>
</table>

Source: ISO data

10 The ISO Survey of Certifications 2010 states that 1953 certificates in total were issued to Russian companies in 2010. But breakdown by industries in the same report (see the Table) gives a count of 1825 companies.
The situation in the highlighted sectors (oil&gas, mining and power utilities) was assessed by reviewing the number of leading companies (defined by production volumes), which hold ISO14001 certification. The sustainable development reporting guidelines developed by the Global Reporting Initiative (GRI) are also becoming popular in Russian and worldwide, gaining the status of a reporting standard. A recent study by KPMG\textsuperscript{11} found that 80% of companies in the G250 rating and 69% of N100 companies use GRI guidelines.\textsuperscript{12} Analysis of non-financial reporting in Russia was carried out by viewing the number of companies which follow the GRI reporting guidelines in the same three industries – mining, oil&gas, and power utilities. The study was carried out using publicly available information as of February-April 2012.

**Mining**

The mining sector includes the extraction of iron ore, non-ferrous metal ore, gravel, sand, clay, and minerals for chemical and fertilizer production, as well as mining and production of salt, mining of other minerals, and quarrying for stone. The analysis focused on the biggest companies in the sector (Table 8.4).\textsuperscript{13}

<table>
<thead>
<tr>
<th>Sector</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wood processing and production using wood</td>
<td>33</td>
</tr>
<tr>
<td>Vehicle wholesale and retail, repair of vehicles and motorcycles</td>
<td>29</td>
</tr>
<tr>
<td>Pharmaceuticals</td>
<td>28</td>
</tr>
<tr>
<td>Production of nuclear materials</td>
<td>27</td>
</tr>
<tr>
<td>Water distribution</td>
<td>24</td>
</tr>
<tr>
<td>Information technology</td>
<td>23</td>
</tr>
<tr>
<td>Financial mediation, leasing, real estate</td>
<td>19</td>
</tr>
<tr>
<td>Other social services</td>
<td>19</td>
</tr>
<tr>
<td>Other production</td>
<td>18</td>
</tr>
<tr>
<td>Textiles and textile products</td>
<td>14</td>
</tr>
<tr>
<td>Printing</td>
<td>14</td>
</tr>
<tr>
<td>Agriculture, fishing and forestry</td>
<td>12</td>
</tr>
<tr>
<td>Healthcare and social services</td>
<td>10</td>
</tr>
<tr>
<td>Gas distribution</td>
<td>9</td>
</tr>
<tr>
<td>Water transport</td>
<td>7</td>
</tr>
<tr>
<td>Education</td>
<td>6</td>
</tr>
<tr>
<td>Government</td>
<td>4</td>
</tr>
<tr>
<td>Processing</td>
<td>3</td>
</tr>
<tr>
<td>Hotels and catering</td>
<td>3</td>
</tr>
<tr>
<td>Manufacture of leather, leather products</td>
<td>2</td>
</tr>
<tr>
<td>Publishing</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1825</strong></td>
</tr>
</tbody>
</table>


\textsuperscript{12} The 250 biggest global companies listed in the Global Fortune 250 for 2010, and the 100 biggest national companies by turnover from 34 countries.

\textsuperscript{13} Based on the review by PwC, The Metallurgy and Mining Industry in Russia and the CIS http://www.pwc.ru/en_RU/ru/energy-utilites-mining/publications/assets/Mining_in_Russia-the_CIS_rus_2011-1.pdf
### Table 8.4. ISO 14001 certification and GRI reporting at mining companies

*Source: Compiled by the authors*

<table>
<thead>
<tr>
<th>Company</th>
<th>ISO14001</th>
<th>GRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>OJSC Severstal</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>OJSC Norilsk Nickel</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>RUSAL</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>OJSC Eurochem</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>OJSC MMK</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>OJSC NLMK</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>OJSC Polymetall</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>OJSC Polyus Gold</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>OJSC Uralkali</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Representation of Kinross Gold Corporation</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Petropavlovsk plc</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Evraz Group</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>OJSC Mechel</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>OJSC Chelyabinsk Zinc Plant</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>ENRC</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Ferrexpo plc</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>OJSC Metallinvest</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Kazakhmys (Kazakhmys plc)</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Coke Group</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>KazAtomProm</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>OJSC TMK</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>ALROSA</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Highland Gold Mining Ltd.</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>OJSC ARMZ</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>CJS C Raspadskaya</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Central Asia Gold</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>OJSC Akron</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>OJSC Kamchatka Gold (Renova)</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

The table shows that 20 of 28 leading companies (the biggest mining companies in the country) have ISO14001 certification, i.e. 71% of companies use an environmental management system.

GRI social reporting is practised by 11 of the 28 companies, representing 39% of their number.

**Oil&gas**

In the oil&gas sector we considered companies with oil and gas condensate production in excess of 3 million tons inside Russia in 2010. The table below shows which of these companies had obtained ISO 14001 in 2010 and which of them were reporting their business results in accordance with GRI guidelines.
Table 8.5. Russian oil&gas companies with ISO 14001 certification and GRI non-financial reporting

<table>
<thead>
<tr>
<th>Oil companies in Russia</th>
<th>ISO14001</th>
<th>GRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lukoil</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Rosneft</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>TNK-BP Holding</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Gazprom Neft</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Tatneft</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Bashneft</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Novatek</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Sakhalin Energy</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Surgutneftegaz</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Slavneft</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Salym Petroleum Development NV</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Rusneft</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Gazprom</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>

From Table 8.5, it follows that OJSC Surgutneftegaz is alone among the 13 largest companies in not having ISO 14001 certification (Surgutneftegaz has limited presence in international markets, which may explain its limited participation in international mechanisms of environmental and social responsibility). So 92% of Russia’s leading oil&gas companies have implemented environmental management systems.

Compliance with the GRI non-financial reporting standard is also widespread in the Russian oil&gas sector: 77% of companies use GRI guidelines as a framework for their reporting.

These findings reflect large-scale access of Russian oil&gas companies to the international market for sale and processing of raw materials, and to international debt markets.

**Power generating**

Use of GRI and ISO environmental certification by Russia’s leading power generating companies is shown in Table 8.6.

Table 8.6. Russian power generating companies with ISO 14001 certification and GRI non-financial reporting

<table>
<thead>
<tr>
<th>Company</th>
<th>ISO14001</th>
<th>GRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>OGK-1*</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>OGK-2</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>OGK-3</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>OGK-4 (E.ON)</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Enel OGK-5</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>OGK-6</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>RusHydro</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>TGK-1**</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>TGK-2</td>
<td>Yes</td>
<td>No</td>
</tr>
</tbody>
</table>
Among the seven companies doing business on a national scale (the OGKs and RusHydro), only two are ISO 14001 certified (29% of the total). Of the other 15 companies (TGKs and Eurosibenergo), which do business in limited territories, four have implemented environmental management (27% of the total). So only 28% of the 22 biggest Russian power generators are ISO 14001 certified.

Only three of the biggest Russian power generators (i.e. 13%) use GRI reporting standards, which is the worst result of the three analyzed sectors.

Oil&gas emerges as by far the best of the three sectors by numbers of certificates. Reasons for this include dependence of the sector on Western consumers: a large share of Russian oil&gas outputs are supplied to Europe and the USA. Another reason is the rapid development of business partnerships between Russian oil&gas companies and multinational companies such as Shell, BP, Exxon, etc.

*OGK = Wholesale generating company  
**TGK = Territorial generating company

<table>
<thead>
<tr>
<th>Company</th>
<th>ISO14001</th>
<th>GRI</th>
</tr>
</thead>
<tbody>
<tr>
<td>TGK-3 Mosenergo</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>TGK-4 Quadra</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>TGK-5</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>TGK-6</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>TGK-7 Volga</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>TGK-8 Lukoil Energy</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>TGK-9</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>TGK-10</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>TGK 11</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>TGK-12 Kuzbassenergo</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>13 Yenisei TGC</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>TGK-14</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Eurosibenergo</td>
<td>No</td>
<td>No</td>
</tr>
</tbody>
</table>

*OGK = Wholesale generating company  
**TGK = Territorial generating company
Conclusions and Recommendations

The analysis shows a trend towards increasing adoption of international standards in sectors of the Russian economy with the largest environmental impacts. This trend is led by the oil & gas sector. Ongoing integration of Russia with the global economy and its accession to leading international economic organizations suggests that this trend will continue. In the foreseeable future leading Russian companies in the sectors considered above (and also in other sectors), which have business that transcends national boundaries and which need international finance, will be forced to introduce these practices into their corporate governance. It will therefore be important in the future to raise the level of audit, public assurance, and other forms of verification of how well these tools are being applied. Sample surveys conducted by WWF in 2009-2012 show that the quality of implementation of the environmental management system, and the completeness and (particularly) the accuracy of information in GRI reporting are far from perfect.  

Further implementation of international environmental standards and better verification are key drivers for improving the competitiveness of Russian companies in world markets and for reducing environmental risks and negative impacts on the environment in the Russian Federation. Environmental legislation and the practices of its enforcement in Russia leave much to be desired and the implementation of declared plans to reform legislation and bring it into accord with that of the OECD needs to be speeded up.

The following steps are needed in order to improve the environmental responsibility and competitiveness of Russian companies:

1. Incentives to implement international, market-oriented voluntary environmental standards and mechanisms of environmental responsibility, including the greening of public and municipal procurement, and also of corporate procurement at companies, which are in full or partial public ownership.

2. A regulatory framework for greening and energy efficiency gains in the system of government and municipal procurement by removing restrictions on treating certificates of international systems (with involvement of a third independent party) as a point justifying selection of the holder’s offer, if its prices are equal to those of competitors, or as a condition for admission to the tendering process.

3. Make the obtaining of international environmental certification (e.g. for sustainable forest management and use of marine biological resources) within the same period of time into a condition for all tender participants.

4. Assist the greening of procurement by corporations in full or partial public ownership through the design, by the Russian Ministry of Economic Development and the Russian Ministry of National Resources jointly with non-governmental organizations, of specific recommendations to government representatives in the management bodies of such corporations.

5. Recommend government corporations to hire various auditing companies for verification of financial and non-financial reporting, in order to maximize the objectivity of auditor opinions on non-financial reporting.

6. Contradictions between requirements under voluntary FSC certification and Russian national forestry regulation should addressed as a matter of urgency, since forestry is particularly sensitive to demands on overseas markets for environmental responsibility.

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15 The instruction was given by D.A. Medvedev on 9 January 2013.
Box 8.3. Environmental Risks Jeopardize the Profitability and Competitiveness of Russian Business

Research has shown that there is an increasingly strong link between observance of sustainable development principles and the economic and financial performance of companies. This represents an opportunity for Russian business, for which the installation of better technologies and business processes can provide major productivity gains, while also reducing their environmental, energy and resource footprint. External environmental costs, which are often not reflected in the financial statements of companies, grew by 50% in 11 key industries over eight years (from 2002 to 2010), from USD 566 billion to 846 billion. Full accounting of costs, including environmental costs, in the price of resources, products, works and services is expected to gain increasing currency in the next 20 years. Business therefore needs to prepare for the growth of payments to compensate environmental costs. The share of external environmental costs may rise significantly relative to earnings (EBITDA), jeopardizing business profitability: in 2010 average costs per dollar of earnings in the 11 key sectors were about 41 US cents. Global sustainable development factors present considerable risks for the food industry, oil&gas, electric power, mining, metallurgy, and air transportation, while the automotive industry, telecommunications and Internet business are relatively well prepared. So global sustainable development factors will greatly complicate business conditions, and inactivity and lack of strategic planning will lead to a major increase of risks and to missed opportunities. Companies are beginning to realize that a responsible approach to business can bring additional benefits and opportunities, and that activities with positive impact on the future of the planet can also be important for long-term profitability and shareholder value.

In line with global trends, Russian companies are paying increasing attention to the disclosure of information about their sustainable development activities (non-financial reporting).

The Chamber of Commerce of the Russian Federation has issued Standard CCI 09/06/10, ‘Social reporting by companies and organizations registered in the Russian Federation’. It is intended that any interested party will be able to conduct the assessment, which it needs, by using the information provided in such a social report. Social reports are usually prepared using the guidelines formulated by the international non-governmental organization, the Global Reporting Initiative (GRI), which aspire to make reporting on economic, environmental and social performance as widely practised and as comparable as financial reporting.

The Russian Ministry of Economic Development acknowledges non-financial reporting, or reporting in the field of sustainable development, as a tool for the management and disclosure of information on implementation by companies of their voluntary commitments. Non-financial reporting offers a fuller picture of the main aspects of a company’s achievements and results, including economic, social and environmental components. The preparation of non-financial reporting is only recommended, and its publication is mainly a voluntary initiative. However, the laws of a number of foreign countries include non-financial reporting requirements for public companies (Sweden and China are examples) or for large companies, regardless of the form of ownership (this is the case in South Africa, Malaysia, Denmark and France). Reporting on sustainable development is a requirement for participation in some projects of the European Bank for Reconstruction and Development (EBRD).

Many companies publish non-financial reporting, and they may do so in order to facilitate access to capital and to obtain government contracts. Most companies that have high capitalization and are active on international markets now produce voluntary non-financial reports on a regular basis. This practice is developing rapidly in Russia, using both Russian and international reporting systems, which include the Global Reporting Initiative (GRI) guidelines, the standards of the International Institute of Social and Ethical Accountability, and recommendations developed...
by the Russian Union of Industrialists and Entrepreneurs for use of basic performance indicators that combine international approaches with the Russian system of accounting and reporting.

Non-financial reporting includes a list of economic, environmental and social performance indicators that characterize a company’s contribution to sustainable development. Environmental indicators show results relative to inputs (raw materials, energy, water) and outputs (including emissions, effluents, waste). Social indicators are associated with society and responsibility for products, labor practices, and human rights. And economic indicators reflect the flow of capital between the different stakeholders and major economic impact of the company on society (economic efficiency, market presence, and indirect economic impacts, such as services provided primarily for public benefit and the impact of investments on infrastructure). Non-financial reporting also includes all information about shortcomings that have been identified in the company’s operations (fines, complaints by the general public, accidents, leaks, etc.).

Unlike financial reports, non-financial reporting includes information on the company’s contribution to sustainability of the broad economic system. Major financial institutions that use the GRI guidelines include the EBRD, Citigroup, KfW, Rabobank, Deutsche Bank, Asian Development Bank, the Development Bank of Japan and the State Development Bank of China (more than 400 banks in total). Russian publicly owned corporations with experience of non-financial reporting include Rosatom and Vnesheconombank, which are currently preparing to publish their first reports on sustainable development.

The Russian Ministry of Economic Development believes that mechanisms of corporate social responsibility, including environmental responsibility, and their reflection in non-financial reporting by Russian companies to generally accepted international standards will help to:

– Improve the investment climate in Russia by making companies more open and transparent and, as a consequence, improve terms for access to long-term investments and credit.

– Reduce costs for business by setting goals for sustainable development and implementing measures to achieve those goals.

– Improve management efficiency at companies in full public ownership and public corporations, and build effective mechanisms for cooperation on sustainable development with customers, suppliers and government.

– Enable dialogue between government and business, on the one hand, and the general public, NGOs and the media, on the other hand.

– Strengthen Russia’s position as an environmentally and socially responsible member of the international community.

Sustainable development projects can yield tangible results in many spheres. In particular, they can help to increase energy efficiency, which is of crucial importance in a context of record prices for energy and concerns about climate change. For example, the financial gains from LUKOIL programmes to save 1.6 billion kilowatt-hours of energy in 2006–2010 are estimated at 1.7 billion rubles (USD 71.5 million). These programmes offer major reduction of CO₂ emissions and affect overall environmental performance. Most companies are unanimous in their opinion: corporate social responsibility (CSR) and sustainable development provide competitive advantages and help to strengthen a company’s brand. Some 70% of companies in Russia (more than in other countries) believe that CSR helps to promote companies in emerging markets.

The globalization of the economy contributes to the development of an international system of technical regulation, audit and certification, which includes environmental standards. The voluntary standards of the International Organization for Standardization (ISO) represent a fundamentally new
tool of international competition. They are almost guaranteed to help a company develop its business, precisely because their adoption is voluntary. The requirements for an environmental management system are defined in the ISO 14001:2004 standard, which corresponds to the Russian standard GOST R ISO 14001-2007, ‘Environmental Management Systems. Requirements and Guidelines for Use’. For example, Lukoil reports to the ISO 14000 environmental standard and the OHSAS standard, regulating health and safety in the workplace, which is accepted practice for companies listed on the London Stock Exchange. In general, business on foreign markets, particularly developed markets, imposes requirements on companies to increase their transparency and their corporate governance structure. Between 1,000 and 2,000 companies in Russia are certified to ISO 14001:2004 standards and the number of issued certificates rose by nearly 800 in 2009. In June 2011, the RSPP Committee for Technical Regulation considered promotion in Russia of the ISO 26000 international standard for social responsibility.

The development of a global market for environmental goods and services certificates is an important aspect of the globalization and greening of the economy. This market is one of the fastest growing in the world, despite the current financial and economic crisis, with annual turnover of at least 1.4 trillion euros, according to expert estimates.

So assessment of environmental risk helps companies to:

– Avoid discrimination due to environmental factors when working on foreign markets.
– Avoid discrimination in work on markets for specific commodity groups (nickel, copper, oil, etc.).
– Be more attractive to investors for the purposes of stock market placements and IPOs.
– Raise credit scores when applying to financial corporations and banks.

O.N. Shtemberg, Candidate of Biological Science,
Deputy Chairman of the Committee for Natural Resources and Ecology,
Chamber of Commerce and Industry

Box 8.4. FSC Certification for Russian Forests

In business terms, certification is a mechanism to reduce non-commercial risks for buyers. Such risks arise in the forestry sector when forests are used in an environmentally and socially irresponsible manner, i.e. when harvesting and processing of timber is carried out illegally, in violation of environmental or social norms. FSC certificates are issued for forest management and also for the supply chain from procurement of raw materials in the forest, through processing and marketing companies to the final sale of wood products.

The FSC (Forest Stewardship Council) dates back to a meeting between forestry companies, traders, and environmental and human rights organizations, held in California in 1990. The parties agreed on the need for a fair and reliable system of certification, which could reward products deriving from forests, which are managed using a responsible system of forest management.

The FSC was formally established in 1993, and the first FSC certificates for forest management (in Mexico) and supply chain (in the USA) were issued in the same year. The first products bearing the FSC trademark appeared in stores in 1996 (in the UK). Today nearly 174 million hectares of forest and forest plantations around the world have obtained FSC certification. A total of 1,200 certificates for forest management and more than 25.5 million supply chain certificates have been issued in 112 countries around the world.

Russia is one of the world’s largest producers of timber, the first forest certification initiatives in the country date from 1998, when WWF launched its first programme to support voluntary certification of
forest management in Russia. The first FSC certification, relating to an area of about 32,700 hectares, was granted in 2000 and Russia’s FSC-certified forests are now in excess of 33 million hectares (Figure 8.3).

The first FSC certificate in Russia was issued in 2000 to Kosikhinsky Forestry Enterprise, based in Altai Region. The Kosikhinsky and Nalobikhinsky sawmills, which received timber from the Forestry Enterprise, obtained supply chain certificates in the same year, enabling them to deliver products made from wood to the well-known UK company, The Body Shop. This first example of FSC certification dispelled the doubts of sceptics, who believed that voluntary forest certification was in principle impossible in Russia. However, progress has not been easy, due to various factors: lack of information and experts, and conservatism on the part of Russian forestry agencies.

Only four FSC certificates were issued in the three years from 2000, and the total certified area did not exceed 300 hectares (it is interesting to note that none of these early certificates have survived to the present day). The situation changed dramatically in 2003, when three new certificates were issued, immediately raising the area of certified forests to more than one million hectares. Preparations for the certification of two of these forest areas (Priluze Model Forest in the Republic of Komi and the Pskov Model Forest in Pskov Region) were carried out as part of WWF projects in Russia.

The FSC certification process in Russia has been accelerating since that time, although the crisis of 2008-2009 caused a slowdown. Nearly 20% of all Russian forests leased for timber are now FSC-certified and forecasts suggest that certification will continue to expand at similar rates in the future.

The first FSC certifications in Russia reflected the nature of demand in environmentally sensitive markets of the European Union, the USA and Japan. However, until recently FSC-certified products were not widely available or sold in substantial quantities inside Russia. The campaign was initially focused on large corporate customers, mainly in Moscow. Various wood products with FSC certification appeared on the Russian market, from building materials to furniture and ready-made wooden houses. But the biggest results were achieved in the pulp and paper industry: 40% of office paper, 98% of newsprint and over 85% of market pulp in Russia is now produced by FSC-certified companies. Russia has also begun to import FSC-certified products (flooring, office furniture, paper products, etc.)
from other countries. FSC certification of printers, in response to the emergence of demand for certified printed materials, represented a significant step forward. In 2012, certified packaging for liquid products (Tetra Pak), made-in-Russia for Russia, also came onto the market.

The second stage of the campaign to promote FSC-certified products on the Russian market began in June 2012. In addition to work with corporate consumers, the new stage also addresses individual consumers, as well as working with the Government to develop a public procurement policy, which gives priority to environmentally responsible products.

A.I. Voropaev, Programme Manager of the Global Forest and Trade Network (GFTN) Russia, WWF Russia

Box 8.5. MSC Certification in Russia

Environmental certification of Russian fisheries was made possible by globalization of the market for seafood products and the important role, which Russia now plays on that market as a supplier of white fish\(^{16}\) and salmon (30% and 25% of world production, respectively).\(^{17}\)

Economic incentives (meeting the needs of buyers in countries with environmentally sensitive demand), were not immediately successful in persuading the Russian fisheries industry to embrace a system of environmental certifications, and attitudes in the industry remain mixed. The first to accept compliance checks and environmental certification were fishery companies that supply products of exclusive quality or type to export markets, have good supply logistics abroad and enjoy a secure market position.

The market positions of Russian fishery companies remained tenuous until 2009, when long-term assignment of catch zones and quotas was finally obtained. The first major part of the industry to obtain MSC certification in 2009 was Siberian salmon and pink salmon fishing around Iturup Island. These fisheries had enjoyed strong export demand even before certification due to their convenient location and high quality, and confirmation of high environmental standards enabled them to obtain a further premium at auctions.

In 2010 Russian cod and haddock fisheries in the Barents Sea, carried out jointly with Norwegian companies and having fully exported production, were the second to obtain certification.

In the summer of 2012 pink salmon fishing in the north-eastern district of Sakhalin won MSC certification. Initially, a group of standard product fishery companies (pink salmon account for the bulk of salmon produced in Russia) opted to obtain a market advantage by addressing the eco-sensitive market segment, and subsequently a group of six small coastal fishing companies were environmentally certified together, enabling each of them to significantly reduce their certification cost.

In September 2012 sockeye salmon fisheries along the Ozernaya River on the south-west coast of the Kamchatka Peninsula obtained MSC certificates. Nearly all of the certified products are exported.

A four-year process for certification of Russia’s largest fishery – pollock – is currently in its final stages. It now appears that only pollock fisheries in the Sea of Okhotsk will be certified, although two other fishery zones were also put forward for assessment.

\(^{16}\) ‘Cod’ in statistics of the UN Food and Agriculture Organization.

\(^{17}\) FISHSTAT 2012.
Certification assessment of cod and haddock fisheries in the Barents Sea began in the spring of 2012, involving another large group of companies, which accounts for at least 25% of the catch. Several small companies producing salmon in the Far East are also undergoing preliminary assessment.

Russian domestic consumers have no acquaintance with the environmental certification brand. In 2011, an international company presented the first MSC-labelled product on the Russian market, but it is limited to the catering sector and its consumption does not involve a conscious choice by the buyer in favor of an environmentally certified product.

The second part of the MSC certification standard – Chain of Custody (CoC) – checks compliance with sourcing practices. It is not in demand in the domestic market, but is nearly always required for export of products from MSC fisheries. This is for the simple reason that an MSC product, which arrives on the store shelf via a non-certified chain, cannot carry the MSC label. Western European and American retailers insist on products that bear a recognizable MSC label in order to meet the demands of environmentally sensitive consumers.

Voluntary environmental certification of aquaculture is being developed globally by the Aquaculture Stewardship Council (ASM) in parallel with the MSC efforts. The increasing role of aquaculture in production of Atlantic salmon and other salmon in Norway and Chile, which is consumed on the Russian market, makes it certain that both types of international environmental certification – MSC and ASC – will see further development in Russia.

The international standards ISO 12877:2011 and 12875:2011, which appeared in 2011, define the information that is required for certification of fishery and aquaculture supply chains. However, Russia did not take part in the development of these standards and they are not yet current in Russia.

Conclusions:

– Environmental certification of the Russian fisheries sector is now perceived as an economic tool to obtain price advantages on the global market.

– Forthcoming MSC certification of the Okhotsk Sea pollock fishery will ensure that 25% of Russia’s annual pollock is in compliance with the highest global environmental standards.

– There is no domestic demand for eco-certified fish, which could alter the buying policy of traders and retailers, so the greening of domestic consumer demand and the system of public procurement is an important priority.

– Russian consumers are not yet familiar with environmental seafood brands.

A.R. Moiseev, Coordinator of the Marine Programme, WWF Russia
A special system of indicators is needed for monitoring transition to sustainable development and the ‘green’ economy, both globally and in specific countries. Such a system can verify that we are ‘moving in the right direction’. The need to set goals for sustainable development, including all its most important aspects, and to provide indicators that measure progress towards achievement of those goals was among the most important conclusions reached by the Rio+20 Conference.\(^1\) Governments must encourage the creation of such goals and indicators in their own countries. What is needed in effect, is a system of goals and indicators, analogous to the Millennium Development Goals – the main indicative’ document produced by the UN to date in the present century.\(^2\)

The global financial and economic crisis has underlined the unsustainability of the current model of global and national economic development. Absolute prioritization of purely economic and financial indicators, ignoring the environmental and social factors, which lie behind them, has proved to be a flawed approach: radical adjustment of the market paradigm of development and a search for a new path are needed. The issue is particularly relevant for countries, which possess large natural resources, since it is very difficult to achieve sustainable development relying exclusively on the exploitation of natural capital.

The transition to sustainable development necessitates the inclusion of environmental factors in the system of main socio-economic development indicators. Failure to take account of these factors in decision-making is largely due to the failure of traditional development indicators to set any financial value on natural capital and to environmental degradation. The traditional macroeconomic indicators (GDP, per capita income, fiscal indicators, etc.) virtually ignore environmental degradation. Economic activity is often accompanied by a depreciation of natural capital because it depletes natural resources or reduces the ability of ecosystems to perform useful functions (provision of food and water, environmental regulation, etc.). This creates the risk of a sharp deterioration of economic performance in the future due to the exhaustion of natural resources and pollution of the environment. Ideally, changes in the value of natural capital should be measured in money terms and be reflected in national accounts.

Exclusive focus on traditional economic indicators can lead to negative outcomes for many countries, including Russia, in the near future. Qualitative indicators that reflect environmental and social issues, rather than undiluted macroeconomic growth indicators, need to come to the fore in the post-crisis period.

The outcome document of the Rio+20 Conference, ‘The Future We Want’, noted the need to apply broader measures of progress in order to make more informed strategic decisions. Unfortunately, there is still no consensus on the best approach for achieving this, and discussions of the sustainability or unsustainability of human development and national progress are still ongoing. The UN Statistical Commission recently developed new approaches for greening of the System of National Accounts (SNA) and in the near future the Commission will be asked to adopt new global approaches to environmental accounting, which include the most important aspects of resource efficiency.\(^3\) It is expected that the new document will suggest methods of accounting in kind and in value terms linked to the existing SNA. This will make is possible to go beyond the traditional concept of GDP, taking account of environmental damage and internalizing external costs.

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2. For more details on the MDGs adapted for Russia, see: *Human Development Reports for the Russian Federation 2005 and 2010* / ed. S.N. Bobylev.
(externalities) of economic activity associated with negative impact on ecosystems and public health. This, in turn, will enable all countries to develop adequate tools to assess progress in future transition to a ‘green’ economy, just as SNA has provided an assessment of the state of the traditional economy for the past 60 years.

The need for new approaches to measuring progress and sustainability is emphasized by Joseph Stiglitz and Amartya Sen (both of them Nobel Prize winners in economics) in their Report on the Measurement of Economic Performance and Social Progress (2009). The authors note the growing understanding that GDP is not an ideal indicator for measuring well-being, as it leaves out a variety of social processes and changes in the environment – the phenomena, which are commonly referred to as the ‘sustainability’ of development. Excessive focus on GDP can lead to a collision between government and people: political leaders require its maximum growth, while the general public wants more attention to be paid to issues of environmental safety, and the reduction of air, water and noise pollution, even if that means a slowdown in GDP growth.

A degree of theoretical and practical know-how in the creation of sustainability indicators has already been obtained. International organizations and individual countries offer a variety of indicators and systems of indicators, which are often very complex in nature. At least four groups of indicators used to assess sustainability can be identified:

- Integral indicators, which aggregate various indicators (usually of economic, social and environmental performance) to obtain a single index.

- Systems of indicators, combining indicators for specific aspects of sustainability. Such systems may include economic, social, environmental and institutional measurements.

- Specific indicators using figures on natural resource capacity and intensity of pollution (relative pollution), the cost of natural resources and pollution (emissions, waste water, solid waste) per unit of outcome (GDP at the macro level).

- Indicators derived from opinion polls, reflecting the attitude of the general public to specific issues of sustainable development.

The range of different indicators is presented in Table 9.1, compiled by the authors for different countries using data in the Global Human Development Report, Sustainable Development and Equity: A Better Future for All. The table offers a selective comparison of the indicator levels for Russia, developed countries, the countries of Eastern Europe, and the BRICS and CIS countries.

The integrated sustainability indicators (reflecting various aspects of sustainability), which are most used in the world today are:

- The Adjusted Net Savings Index (developed by the World Bank).

- The Human Development Index (developed by UN agencies).

- Ecological Footprint (developed by the World Wildlife Fund).

- The Environment Performance Index (developed by scientists at Columbia and Yale universities).

Systems of indicators often include the specific sustainability indicators, which are presented in Table 9.1: percentage of forest land, fresh water consumption, greenhouse gas emissions, etc. Indicators compiled using the results of public opinion surveys include: general life satisfaction; and satisfaction with actions taken in the respondent’s country to preserve the environment.

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5 For more detail concerning the design of sustainable development indicators, see: S.N. Bobylev, N.V. Zubarevich, S. Solovieva, Y.S. Vlasov, Sustainable Development: Methodology and Measurement Techniques, Moscow, Ekonomika, 2011.

Table 9.1. Sustainability indicators in various countries

<table>
<thead>
<tr>
<th>Countries</th>
<th>Adjusted net savings (% of GNI)</th>
<th>Ecological footprint (hectares per capita)</th>
<th>Environmental performance index (0-100)</th>
<th>Fossil fuels (% of total)*</th>
<th>Renewables (% of total)*</th>
<th>CO2 emissions per capita (tons)</th>
<th>Urban pollution (micrograms/m³)</th>
<th>Natural resource depletion (% of GNI)</th>
<th>Forest area (% of land area)</th>
<th>Overall life satisfaction (0-10)</th>
<th>Satisfaction with actions to preserve the environment (% satisfied)</th>
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<td>16</td>
<td>10.6</td>
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* Share in primary energy supply

Russia has stepped up efforts in recent years to develop various socio-economic programmes, policies and projects. These require their own systems of goals and indicators. The Concept for Long-Term Socio-Economic Development of the Russian Federation up to 2020 (adopted in 2008) is a good example, since it contains targets and indicators related to the transition to sustainable development (see above, Chapter 1). Initiatives, which may not formally use the concept of sustainable development, but effectively implement its purposes include government instructions for assessing performance by government agencies at federal and regional levels. Such positive initiatives include the Government Resolution of March 4, 2011 on the addition of ‘environmental protection’ indicators to the earlier Government Resolution № 322 (April 15, 2009). The addition provides a means of assessing environmental...
performance by executive government in Russian regions.

Work to design sustainability indicators in Russia is being carried out, although the speed and scope of the process are still clearly insufficient. The UN World Summit (2002) called on all countries in the world to adopt and implement their own strategies for sustainable development from 2005. At the official level Russia still does not have such a strategy and associated indicators. However, a number of projects are underway at federal and regional levels dedicated to sustainable development indicators. Several regions of the country (Tomsk, Voronezh, Kemerovo and Samara regions and the Republic of Chuvashia) gained interesting and constructive experience in the development of sustainable development indicators during 2002–2011.

Tomsk Region has gone particularly far in developing a comprehensive system of sustainable development indicators, using such indicators in various spheres, notably strategic planning, with effective institutional support from the regional government. Most of the indicators are used to help with the implementation of socio-economic development programmes and drafting of strategies for the Region (see Box 1.1 in Chapter 1, above).

9.2. Integral Indicators of Sustainable Development

In the opinion of the authors, the integral Index of Adjusted Net Savings (see Table 9.1) is the most usable, since it has a strong theoretical basis and statistical support, and can be calculated at both national and regional level. The Adjusted Index is calculated from traditional net savings by deducting depletion of natural capital (energy and mineral resources, as well as the balance for forest resources) and pollution damage to the environment, including damage to human health (from emissions of CO₂ and particulate matter). Adjusted net savings are particularly valuable as an aggregate indicator of sustainable development because they are calculated annually for all countries of the world and published in the World Bank’s World Development Indicators. Adjusted net savings are now used by some countries as one of their official macro indicators.

The calculations published by the World Bank for all countries of the world using the adjusted net savings approach diverge significantly from results using traditional and even environmentally adjusted indicators. A negative value for adjusted net savings means that the total wealth of a given economy is declining, suggesting that the economy is on an unsustainable course.

Despite achieving economic growth in formal terms, Russia shows negative values for adjusted net savings due to high levels of environmental degradation: the country has a score of 0.8 (Table 9.1). This is an important factor for policy formation in the post-crisis period.

World experience shows that countries with large-scale natural capital depletion can compensate for it by increase of savings and of spending on health, education, etc. Such countries include Norway, Canada and the United Kingdom, which have positive values of adjusted net savings (Table 9.1). Norway offers a particularly impressive example: it has a high score for adjusted net savings (12.8% of GNI) and tops the Human Development Index, despite making large-scale use of its natural capital. The absolute leaders for adjusted net savings among the BRICS countries are China and India with 39.7% and 24.1% of GNI, respectively.

Adjusted net savings are an important measure because they give an aggregate assessment of sustainable development, showing the need to compensate for the depletion of natural capital by increased investment in human and physical capital. In practical terms, the Index shows the wisdom of establishing special funds (‘funds for future generations’), which already exist in Norway, the USA and some oil-producing countries. Such funds are accumulated by fixed deductions from natural resource revenues and provide means for future national development.

Russia created a Stabilization Fund using a part of its natural resource revenue, but the ideology and planned use of the fund were initially different from that just described. In 2007, during the transition to a three-year budget cycle, it was decided that the Stabilization Fund would be divided from February 1, 2008 into the Reserve Fund and National Welfare Fund. The Reserve Fund is designed to stabilize the Russian budget in case of lower oil prices, while the National Welfare Fund should gradually begin to play...
the role of a fund for future generations. However, what has in fact happened is that money from both of these funds is used in times of crisis to stabilize the social and economic situation in the country. There needs to be a clear understanding on the part of the Russian Government that at least a significant part of the National Welfare Fund belongs to the next generation and pressure to spend it should be resisted.

In 2012 the authors worked with the World Wildlife Fund (WWF) and the Russian news agency, RIA Novosti, to design and calculate an environmental-economic index for Russian regions, based on the concept and method used by the World Bank to calculate adjusted net savings. Regions with rapid depletion of natural capital (primarily oil&gas producing regions ) scored lowest (Box 9.1).

Box 9.1. Environmental-Economic Index for Russian Regions

The Environmental-Economic Index for Russian regions is based on the World Bank’s concept and calculation methodology for adjusted net savings, but adds a number of environmental indicators and indicators associated with human development, which the World Bank Index does not use. The revised Index adjusts net savings in Russian regions by: capital investments in the extractive industry; depletion of natural resources; pollution of the environment; budget spending on the development of human capital; spending on environmental protection; and monitoring of nature conservation areas.

The ranking is led the Republic of Altai and most of the highest-ranking regions have economies centered on the agro-industry. The only exception in the Top-10 is mainly industrial Tver Region. All commodity exporting regions score low on the Environmental-Economic Index: Komi Republic, which fares the best of all such regions, is in 61st place, and five of the seven most export-oriented regions are in the ten regions with the lowest Index values. This reflects large-scale depletion of natural resources due to the predominance of the extractive industry, which leads to a reduction in natural wealth and therefore pulls down the Index score.

Another aggregated indicator, which has acquired broad currency worldwide, is the Human Development Index (HDI). The HDI primarily reflects the social dimension of sustainable development and it is calculated using three sub-indexes: longevity, measured by life expectancy at birth; education; and standard of living, measured by GDP per capita at purchasing power parity (PPP).

The longevity component is substantially dependent on the environmental situation. Health professionals estimate that environmental pollution can account for up to 20% of mortality (Chapters 3 and 6). Morbidity and mortality due to pollution are major factors in many regions of Russia, where environmental conditions are bad. Inertial economic growth based on the raw-material industries increases pollution and degrades the environment, causing an imbalance of the biosphere, which leads to the deterioration of human health and limits the scope for further development of human potential. Approximate estimates of the risks from water and air pollution suggest that the economic costs to the health of the Russian population due to these risks are at least 4–6% of GDP on average. The figure is as high as 10% of GRP in some regions, particularly in the Urals.

HDI has been calculated annually since 1990 as part of the UN Development Programme and is published in the global UNDP Human Development Report. More than 100 countries now publish similar reports using the HDI. Russian HDI for all regions is given in Chapter 7.

Table 9.2 ranks countries by HDI. The Index components offer a good picture of Russia’s advantages and disadvantages in the field of human development.

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Russia’s HDI has been rising in recent years and Russia is now among countries with the highest Index score. According to the Global Human Development Report 2013, our country climbed 11 positions in the UNDP ranking in the last year: from 66 to 55. But although Russia has higher levels of education and income per capita, than, for example, Belarus and Montenegro (Table 9.2), it occupies a lower position in the HDI ranking than those countries due to relatively poor performance by the criterion of life expectancy.

In order to ‘green’ the HDI, Russian experts (including the authors) amended its traditional triad of socio-economic components by the addition of an environment index to create the HDIe. This Index can be used for closer study of the outcomes of the policy of sustainable development in Russian regions. Industrialized regions with high HDI fare slightly worse in the HDIe than regions with a better environmental situation, but the high level of income and social sector development in the former regions prevent them from tumbling far in the ranking.

There have been various initiatives to calculate integral indicators of sustainable development, based primarily on environmental parameters. These include the Ecological Footprint (EF) Index, which measure the burden on the environment from human activity, and is calculated and published in the WWF’s Global Report. Country scores for this Index are shown in Table 9.1. EF uses an estimate of the area of bioproductive land on the planet and the amount of such land, which is required in order to meet human needs. EF is expressed in global hectares per capita and shows the number of hectares that are needed to maintain human life at the current level of consumption and waste creation.

EF calculations highlight the critical unsustainability of human development and development of the global economy for the biosphere: the Index currently exceeds the planet’s biocapacity by more than 50%. The EF Index has been rising steadily since 1961 and rose above the assimilative capacity of the biosphere in the mid-1970s. The world’s biopotential has decreased by more than two times during the
measurement period, and complete reproduction of the renewable resources consumed by mankind in one year now requires one and a half years.

Russia’s EF score (4.4 hectares per capita) is substantially lower than in developed countries, where the Index ranges from an average of 5 to 8 hectares per capita. The USA has particularly large impact on the biosphere (8 hectares). Other BRICS countries have a lower environmental impact score than Russia (about 3.1 hectares per person). It should also be noted that the Russian Index score is 1.6 times greater than that for the world (2.7 hectares), due primarily to the high level of Russia’s greenhouse gas emissions.

Russia’s role as ecological donor to the world can be seen in the country’s contribution to assimilation capacity of the biosphere. The country’s biocapacity of 6.6 global hectares per capita is 3.7 times the world average of 1.78 hectares. Russia’s excess biocapacity compared with the world level is especially significant for forests (4.22 versus 0.76 global hectares per capita).

There is a correlation between Ecological Footprint and the Human Development Index (Figure 9.1). The relationship between the two indexes is non-linear and has two clearly defined regions. For the least developed countries, the level of development does not depend on EF. But when development rises above a certain level, there is a dependence and the level of EF begins to grow. At higher levels of HDI a small increase is at the cost of a sharp increase in EF.

According to UN classifications, a high level of human development is achieved when HDI is above 0.8 (Russia meets this criterion). Countries with HDI above 0.8 show huge variations in their EF. Several countries with high HDI have EF matching countries with much lower development levels. This shows that a high level of consumption does not necessarily imply a high level of development and well-being.

Figure 9.1. Ecological Footprint and HDI in 2008
Most countries with high human development have improved the well-being of their people at the price of a large EF. Countries with low levels of human development have a smaller footprint, but they are characterized by a high degree of inequality.

The relationship between the environment and HDI is analyzed in the Global Human Development Report 2011. The authors note that HDI is usually associated with environmental degradation. Emissions per capita are much higher in developed countries than in developing countries, because the greater part of energy-intensive activities takes place in the former: automobile traffic, cooling and heating of homes and institutions, and the consumption of processed and packaged foods. On average one person in a country with very high HDI produces over four times more CO₂ emissions and two times more emissions of methane and nitrogen oxide than the average per person in all countries, and nearly 30 times more CO₂ emissions than a person living in a country with low HDI.

The Environmental Performance Index (EPI), developed by scientists at Yale and Columbia universities, analyzes and compares environmental policy results in different countries (Table 9.1). The Index is based on indicators of measurable results that are understandable to policy makers and reflect the strong and weak points in national performance in comparison with other countries. EDI reflects results achieved in the two key areas of environmental policy: impact of the environment on human health and the vitality of ecosystems. The goals, achievement of which is assessed, combine 10 policies aggregating 22 indicators.

An important advantage of the EPI is that it reflects the impact of the environment on human potential through health indicators. The overall impact of the environment on health is estimated by the indicator of child mortality. Impact on health from air pollution is estimated by particle emissions and pollution of indoor air. The impact of quantity and quality of water on human health is estimated by measurement of access to sanitation and safe drinking water.

Russia has a worse EPI score than developed countries (particularly Norway and France), and than many countries in Eastern Europe (Table 9.1), but scores higher than Ukraine, Kazakhstan, China and India.

9.3. Systems of Sustainable Development Indicators

Systems of indicators are widely used nowadays as a tool of sustainable development. In the most general case such systems combine economic, social, environmental, and institutional aspects, as in the methodology of the UN Commission on Sustainable Development. The UN has also developed and obtained international approval for its Millennium Development Goals (MDGs). The World Development Indicators, used by the World Bank in its Annual Report, are another important point of reference, and the OECD system of environmental indicators, which use a ‘pressure-state-response’ model, have also been widely recognized.

Recent innovations include the OECD’s green growth indicators and the system of indicators used to assess progress of the Sustainable Development Strategy of the European Union. The OECD’s ‘green’ growth strategy emphasizes that focus on GDP as the indicator of economic progress usually fails to take account of the contribution made by natural assets to wealth, health and well-being. The OECD text, Towards Green Growth: Monitoring Progress (2011), presents an overview of indicators used to measure the quality and content of ‘green’ growth, and the impact of such growth on wealth and well-being.

Four aspects of ‘green’ growth have been identified:

• Environmental and resource productivity (shows the need for efficient use of natural capital and those aspects of production that are rarely calculated in economic models and systems of accounts).
• Economic and environmental assets (show that the shrinkage of assets represents a threat to growth, because sustainable growth depends on maintaining assets).

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- Environmental quality of life (reflects the direct impact of the environment on people’s lives based on access to water and the harmful effects of air pollution).

- Economic opportunities and political solutions (show the capacity of policies to provide ‘green’ growth and areas where the greatest effect is achieved).

The Sustainable Development Strategy of the European Union includes more than 100 sustainable development indicators, of which 11 are identified as key indicators. Eurostat publishes relevant statistical updates of these indicators every two years.\(^\text{14}\)

In our view, the most constructive and relatively easy to use (as regards methodology and application) among the recently developed systems of sustainability indicators is the MDG system, put forward by the UN to evaluate progress in various countries in addressing social and human development issues. The MDG system uses a thorough methodology and is relatively simple to apply. Goal 7 in the MDGs adapted for Russia aims to ensure environmental sustainability of our planet and individual countries.\(^\text{15}\)

This goal, its tasks and indicators concern two main issues of environmental sustainability:

- Reducing human impact on the environment and depletion of natural resources;

- Improving the environmental conditions for human development, reducing environmental threats to human security, health and housing conditions.

As already discussed, solution of the second problem – that of the environmental conditions for human health – has special importance. However, this problem is often omitted in considerations of sustainable development, which focus on preserving the environment and use of natural resources. In Russia, growing pollution from toxic waste and relatively high water and air pollution compared to international standards represent a danger to public health. Low life expectancy, particularly for men, is a critical national issue (Chapter 3) and this problem is particularly acute in regions dominated by old industries.

Russia needs to address three tasks in order to ensure environmental sustainability:

- Include sustainable development principles in national policy and programmes in order to prevent the loss of natural resources.

- Ensure better quality of drinking water.

- Improve housing provision and its quality.

The last two tasks are related to human development and health. Eight indicators are proposed to measure progress (Table 9.3), of which two are purely environmental (indicators 1 and 2), two are environmental and economic (3 and 4) and four are socio-environmental (5–8).

Indicator systems often include the specific sustainable development indicators, which are presented in Table 9.1. Russia is the world leader by the size of its forest areas and has a very high ratio of forest cover to total territory (49%). The raw-material orientation of the Russian economy is confirmed by high volumes and rates of depletion of natural resources (14% of GNI, second only to Kazakhstan, which has a rate of 22%).

The indicator systems necessarily include indicators for the energy sector and greenhouse gas emissions. The share of fossil fuels in primary energy supply is relatively high in Russia (91%), although inferior to Australia (95%) and the Netherlands (93%). The contribution to energy supply from renewables (wind, solar, hydropower, etc.) is low in Russia. The leaders in this field are Norway and Brazil, which make large use of hydropower. Russia’s CO\(_2\) emissions per capita are quite high, but much lower than in the USA and Canada (16 and 17 tons per capita, respectively).

The creation of sustainable development indicators using public opinion surveys is a relatively new practice (Table 9.1). Typical survey questions concern ‘degree of satisfaction with life’ and ‘satisfaction with actions to protect the environment’. In Russia ‘satisfaction with life’ matches the world average (5.4 on a scale of 10), but satisfaction with action to protect the environment is low (18% of respondents are satisfied). It is notable that higher HDI is matched by high levels of life satisfaction: the


\(^{15}\) This goal and its indicators are adapted for Russia and considered by the authors in more detail in the chapter ‘Ensuring Environmental Sustainability’ in the Human Development Report for the Russian Federation 2010, ed S.N. Bobylev, Moscow, UNDP, 2010.
Table 9.3. Millennium Development Goal 7, ‘Ensure Environmental Sustainability’.  
Moscow, UNDP, 2010.

<table>
<thead>
<tr>
<th>MDG tasks for Russia</th>
<th>Progress in achievement of the tasks</th>
<th>Indicator level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Task 1.</strong></td>
<td>Include sustainable development principles in national programmes and strategies and prevent the loss of natural resources</td>
<td></td>
</tr>
<tr>
<td>1. Share of territory with forest cover</td>
<td>47%</td>
<td></td>
</tr>
<tr>
<td>2. Share of territory, which is protected in order to maintain biodiversity</td>
<td>13%</td>
<td></td>
</tr>
<tr>
<td>3. Energy intensity</td>
<td>0.324 tons of oil-equivalent / USD 1000</td>
<td></td>
</tr>
<tr>
<td>4. CO₂ emissions (tons)</td>
<td>2193 million tons of CO₂-equivalent (about 70% of the level in 1990)</td>
<td></td>
</tr>
<tr>
<td>5. Number of people living in heavily polluted cities</td>
<td>56.3 million people</td>
<td></td>
</tr>
<tr>
<td><strong>Task 2.</strong></td>
<td>Provide clean drinking water</td>
<td></td>
</tr>
<tr>
<td>6. Share of housing with mains water supply (urban, rural)</td>
<td>89% of urban housing, 46% or rural housing</td>
<td></td>
</tr>
<tr>
<td><strong>Task 3.</strong></td>
<td>Improve housing conditions</td>
<td></td>
</tr>
<tr>
<td>7. Share of urban and rural housing with drainage</td>
<td>87% of urban housing, 37% of rural housing</td>
<td></td>
</tr>
<tr>
<td>8. Share of dilapidated and unsafe housing</td>
<td>3.2%</td>
<td></td>
</tr>
</tbody>
</table>

clear leaders by the latter measure are Norway, Australia, the Netherlands and Canada. But no correlation exists between HDI and satisfaction with actions to protect the environment. For example, in Norway, almost half the population are dissatisfied on the latter count.

### 9.4. Decoupling

As noted above, the transition to sustainable development and the formation of the ‘green’ economy relies to a large extent on the achievement of decoupling. This term has come into common use in the lexicons of scientists and politicians in recent years, and it also receives much attention from international organizations. Decoupling is the strategic basis for progress towards an environmentally sustainable economy, because it breaks the link between growth of human well-being, on the one hand, and resource consumption and environmental impact, on the other hand. Rates of social and economic progress must be based on lower rates of resource consumption and environmental degradation. So decoupling means using fewer resources per unit of economic result and reduction of the environmental impact of resource use in the economy. What is obtained is a ‘dematerialization’ of wealth creation and economic growth.

Human history in recent centuries has seen a growth of well-being accompanied by an absolute increase in the consumption of resources and environmental pollution. Scientific and technological progress catapulted human civilization forwards in the 20th century, but at great environmental cost. Oil production in the 20th century increased by 12 times, that of ore and minerals by 27 times, of building materials by 34 times, and production of biomass rose.

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16 For more detailed analysis it is usual to distinguish relative and absolute decoupling. The first implies a lower rate of growth of resource consumption and environmental impact in comparison with the growth of economic indicators (e.g. GDP). This is what economies in many countries have achieved. Absolute decoupling – an actual reduction of resource consumption and environmental impact, while economic growth continues – is a much rarer achievement. For more detail, see: UNEP (2011) Decoupling Natural Resource Use and Environmental Impacts from Economic Growth. A Report of the Working Group on Decoupling to the International Resource Panel, M. Fischer-Kowalski, M. Swilling, E.U. von Weizsacker, Y. Ren, Y. Moriguchi, W. Crane, F. Krausmann, N. Eisenmenger, S. Giljum, P. Hennicke, P. Romero Lankao, A. Siriban Manalang, S. Sewerin,
by 3.6 times. Such resource-intensive growth led to aggravation and highlighting of environmental issues for the whole of humanity. These problems have become global and represent a threat to civilization.

Massive growth of the world population requires a radical reduction in the amount of resources consumed per inhabitant of planet Earth: UN experts say that a level of 5–6 tons of resources per year needs to be attained in the next decade. This level already obtains in many developing countries, but in developed economies one person may consume 40 tons per year.

Trends in environmental intensity and pollution rates in Russia during 1990-2010 were positive. Stabilization or decline in the use of natural resources and pollution, despite significant growth of GDP in the 2000s, demonstrate an effect of decoupling. This effect was particularly clear in 1998–2008 (Figure 9.2). Energy intensity was reduced by 26% in 2010 compared with 1990, rates of freshwater use declined even faster (by 35%), rates of air and water pollution fell by 42% and 30%, and solid waste creation also dropped.

Nevertheless, Russia’s environment intensity and pollution rates remain high and urgently need to be lowered. Russia’s energy intensity is 2–3 times higher on average than in developed countries. The fact that Russia is a northern country must be taken into account, but the indicators achieved by Scandinavian countries show the huge potential for energy saving in Russia. There was substantial progress in 2000–2008, when energy intensity was reduced by 35% (one of the best results in the world), mainly due to rapid growth of GDP. However, the easiest, ‘structural’ potential for reduction of energy intensity has already been used up and the country must make substantial efforts to reduce this indicator further.

Achievement of decoupling requires considerable changes in state policy, behaviour by privately owned companies, and models of consumer behavior. Economic modernization and innovation, and resource-saving technologies also have a major role to play.

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17 Ibid.
Conclusions and Recommendations

Traditional socio-economic indicators poorly reflect the challenges of sustainable development. This is particularly true of the much-used GDP indicator, growth of which can mask the deterioration of natural and human capital. It is therefore important to create indicators of sustainable development in Russia and worldwide, which reflect the ‘price’ of economic growth for nature and for people. Traditional development indicators require environmental adjustment to enable adequate assessment of natural resources and ecosystem services, and due account of damage from environmental pollution (particularly damage to human health) in making economic decisions at macro and micro levels.

Work has already been carried out worldwide and in specific countries to create indicators of sustainable development. Four groups of indicators are used to assess sustainability: integrated indicators, aggregating different indicators to obtain a single index; systems of indicators that combine specific indicators, each reflecting some aspect of sustainability; specific indicators (primarily environment intensity and pollution rates); and indicators derived from opinion polls. The concept and methodology of adjusted net savings represents a promising integral indicator for use in Russia. The Millennium Development Goal system (particularly Goal 7, ‘Ensure Environmental Sustainability’) and its indicators should be more widely used at the federal level and in Russian regions. The most important specific indicator for Russia is energy intensity (energy efficiency).

Russia needs to officially publish and use statistical reporting indicators for environmental capacity and pollution rates in order to monitor the transition to sustainable development and the ‘green’ economy. Falling levels of these indicators will be evidence of decoupling, breaking the link between economic growth and burden on the environment. Environmental capacity and pollution rates in Russia were on a positive trend in 1990–2010. However, both of these indicators remain significantly higher than in many developed countries and countries with transition economies, highlighting the need for Russia to move away from raw material dependence and a nature-intensive economic model.
CHAPTER 10.
Sustainable Development and Civil Society

10.1. The Role of Civil Society: Generating Public Demand

The mechanisms for implementation of sustainable development are apparently no different in principle from the mechanisms, by which any other political idea is carried out: the conceptual foundations are designed by experts, decisions are made by government, and practical implementation is mainly the responsibility of business. But the success of this process is determined by the attitude of civil society, its activity and its level of culture. And this is true at all stages, from when the issue is first raised to the implementation stage and to the task of ensuring proper supervision of the entire process. The role of civil society is especially great with respect to sustainable development because the essence of the idea is the interest of each and every individual in ensuring long-term successful development. This position is reflected in the outcome document of the UN’s Rio+20 Conference on Sustainable Development (2012), entitled ‘The Future We Want’, which states: ‘We acknowledge the role of civil society and the importance of enabling all members of civil society to be actively engaged in sustainable development.’ So the success of progress towards sustainable development effectively depends on the level of development of civil society.

The current state of affairs in Russia and priority directions for action can be summarized on the basis of an analysis of public opinion.

At present the majority of Russians (80%) are concerned about the environmental situation at global, national and local levels, and they recognize the importance of environmental issues, particularly climate change and environmental pollution. However, the task of achieving a balance in the relationship between man and the environment does not make the Top-10 priorities among the general public, being crowded out by high levels of concern about other important socio-economic problems, which need to be urgently addressed.

In assessing prospects for activity by civil society in the field of sustainable development and the environment it is fundamentally important to remember that environmental concerns and willingness to participate in the solution of environmental problems increase with levels of income and education. This point is emphasized by the results of a survey in Russia of people’s readiness to pay for improvement of the environmental situation: it was found that while about 30% of all respondents are in favour, the share of those with high-incomes and the self-employed who are in favour is above 40%.

Most of the population (80%) believes that the measures being taken in Russia to address environmental problems are inadequate. People have actively protested against environmental issues, which amount to a violation of their rights (new construction without proper control, construction without prior ecological studies). Some 84% of respondents say that they should be given a role in solving environmental problems and 59% are willing to participate in environmental actions. However, more than half of respondents believe that they cannot factually have any influence on the solution of environmental problems. The theme of sustainable development and the environment remains among the least publicized topics in the media. Even the UN’s Rio+20 Conference on Sustainable Development – the most representative international forum on the subject in recent years – went almost unnoticed by the Russian media, and therefore by the Russian general public.

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Financial support has critical importance for the development of civil society action in the field of sustainable development and the environment.

Education and awareness are also fundamentally important: at least a fifth of respondents in public opinion surveys felt unqualified to answer questions about sustainable development and environmental issues due to lack of information about them.

Development indicators reflect the priority interests of the general public, which have been delegated to government for implementation. In Russia, while improvement of the well-being of society remains the evident priority, demand for new development indicators is also taking shape in society. The inadequacy of the commonly used ‘simple’ economic indicators, such as GDP and GRP, is increasingly emphasized and this points to a change of priorities. Society is increasingly demanding to know more about the ‘cost’ of economic success for man and the environment and to ensure its minimization, and there is a new demand for ‘green’ products and services. The indicators, which measure progress in this direction, are now defined as indicators of sustainable development (Chapter 9, above). Interest in them is growing as society develops towards higher levels of well-being and of culture. Experts and civil society representatives have been pointing out for years the importance of due account for energy intensity and environmental capacity indicators in achievement of economic growth. This new course, and the transition to a new form of accountability, has been prepared by the Decrees of the Russian President on improving energy and environmental performance (2008)\(^3\) (Chapter 5, above) and regional accounting of energy efficiency (2010).\(^4\) The knowledge economy, based on innovation, energy efficiency and modernization, has been defined as the basis for national development (Chapter 4, above). These same elements are also the building blocks of the green economy.\(^5\)

The attitude of civil society is decisive for success in formation of a new economy, which meets the needs of sustainable development. Criticisms are increasingly heard of the modern market economy, which ‘fails to provide’ the green products and services, which are needed. But it must be acknowledged that these ‘failures’ of the market are not due to imperfection of the market economy as a mechanism for meeting specific demands of the general public – rather, they are due to the absence of demand for such green products and services. A way has to be found of creating demand for green products and services – both on the part of the general public and of government.

### 10.2. Conditions for Successful Progress towards Sustainable Development: the Role of Culture

Serious discussion of the need for sustainable development has been underway for the past 20 years. But different countries have reacted to this challenge in different ways. Some countries have unconditionally accepted the challenge and joined the process, while other countries have been less ready to commit themselves.

Economic capacities and awareness of the need for action to harmonize the relationship between man and nature are what ensure advancement towards sustainable development. Economic development overcomes the apparent contradiction between technological progress and sustainable development, and propagation of the idea of sustainable development makes the need for harmony between man and nature apparent.

The essence of the problem, it is often thought, is that people do not know what sustainable development is. But the issue is more complicated. Achieving public awareness is obviously important, but how people act on this awareness is at least as important, and it is determined, to a large extent, by the level of culture.

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3 Decree of the President of the Russian Federation № 889 ‘On measures to increase the energy and environmental efficiency of the Russian economy’ (June 4, 2008).

4 Decree of the President of the Russian Federation № 579 ‘On assessment of the efficiency of work by executive government in regions of the Russian Federation and of local government in energy saving and raising of energy efficiency’ (May 13, 2010).

Close consideration of what is happening today shows that the role of culture cannot be overestimated. The choice between a development path based on raw commodities and one based on knowledge depends less on levels of knowledge and much more on levels of culture. Concern about the environment and climate change does not depend on awareness of the threats or on the seriousness of the threat in a particular region – it depends on the level of culture.

Much can be learnt from looking at our ideas about how to solve environmental problems and all the other issues of sustainable development. It is supposed that the problems can be addressed by passing appropriate laws. These laws have been passed, but it turns out that they do not function. Then hopes were pinned on the market economy, the expectation being that people would see that their best interests coincide with solving environmental problems. But this also did not work. It became clear that achievement of a breakthrough depends on inner motivation, on people’s culture.

In any society it is easy to observe how strictly certain rules of conduct are obeyed if they are part of the culture, and how difficult it is to introduce anything new if society has no understanding of its significance.

Laws require mandatory compliance with rules of conduct and a way of life that have been deliberately chosen, but those rules and way of life are determined by culture. Today’s social priorities in developed countries are not focused on creating new legislation (in the hope that all the problems of concern can be solved by government). Instead, many issues are resolved at the level of households on the basis of personal interest (the separate collection of waste, composting of organic waste, the use of wind and solar installations, and much more). What has turned those societies towards sustainable development is not merely government resolutions, but statements of commitment from the most respected members of society and, most of all, the commitment of those who represent the country’s culture.

What we see in the critical situation, which we have now reached in Russia, is that environmental and social aberrations due to wrong behavior are increasingly becoming the ‘norm’, and that only culture can make us embrace sustainable development. Indeed, the representatives of culture usually accept unconditionally the importance of the idea of sustainable development and of the environmental theme: ‘Ecology and culture, by uniting, will provide the foundation, on which the economy and politics of our country will be built in the future.’ This understanding is taking shape in constructive proposals from Russian cultural figures for the solution of environmental and economic problems. Such an understanding confirms the priority that must be accorded to environmental and cultural projects for instilling the ideology of sustainable development and ensuring action towards it on the part of civil society (Box 10.1).

**Box 10.1. The Yasnaya Polyana Agreement (Civil Initiative for Culture and the Environment)**

Understanding the need for partnership in order to make efficient use of the Region’s resources in technology and the humanities, the administration of Tula Region designed and signed an agreement with the Yasnaya Polyana Memorial and Conservation Site (the former home of Leo Tolstoy) and the company Shchekinoazot on joint activities, which they recognize as a sphere of shared responsibility.

Under the Agreement:

– The parties undertake to coordinate their action for the development of socio-cultural heritage sites in Tula Region by modernizing and improving the efficiency of their use.

– The parties believe that relevant legal norms should be worked out, creating an institutional framework for new technologies in the field of regional development.

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– The parties will work to resolve specific issues for the creation of new socio-cultural and other facilities, pursuing programmes to attract investments in regional development.

– The parties will make efforts to build relationships with other Russian regions to expand the scope of programmes and projects.

Shchekinoazot is working with regional and municipal government on socially important programmes in culture, sport, education and careers. Charity financing provided by the company for these purposes from 2005 to 2012 was in excess of 48 million rubles.

Shchekinoazot Chemicals Company

Ecology and Culture – Russia’s Future
(civil society initiatives in the field of environmental culture)

A draft document entitled ‘Strategy for the formation of environmental culture in Russia to ensure the sustainable development of the country’ has been prepared by a group of experts in education, the environment and culture. The document has been discussed and worked through at a series of professional seminars, and at national civil society conferences in the Civic Chamber of the Russian Federation. The strategy has been presented to the general public, submitted to the President of the Russian Federation, and is already widely used in Russian regions.

National school lesson: ‘Ecology and Culture – Russia’s Future’

Schools in 60 regions took part in a national lesson entitled ‘Ecology and Culture – Russia’s Future’, delivered through regional offices of the Center for Environmental Policy and Culture. Teachers were provided with a package of study materials, including videos, a text adapted from the international Earth Charter, and methodological guidance (more than 20,000 packages were distributed). Preparations are now underway for conduct in 2013 of a national lesson concerning Russia’s sustainable development.

Publication of a manual, ‘Formation of Environmental Culture. Development of the Youth Movement’

The publication contains articles by experts on environmental culture and presents the experience of youth organizations in Russia. It is intended as a handbook for activists and experts in environmental education and the youth environmental movement.

Formation of Environmental Culture and Development of the Youth Movement, ed. V.M. Zakharov, Moscow, Akropol, Center for Environmental Policy and Culture, Centre for Russian Environmental Policy, 2008.

Celebrating Ecologists’ Day

Ecologists’ Day has been celebrated in Russia on June 5 every year since 2008, in accordance with a Decree of the President of the Russian Federation. Special events and environmental actions are held by environmental organizations around the country to mark the occasion. Also, 2013 has been named ‘Year of the Environment’ on the basis of a Presidential Decree.

National code of ethics for sustainable development based on the Earth Charter

The Materials of the Earth Charter and the prospects for its diffusion in Russia have been discussed at seminars and conferences. A translation of the Earth Charter, adapted for broad distribution, has been prepared, an Earth Charter working group has been set up, and the website http://www.earth-charter.ru has been launched. The document is increasingly used by civil society for practical work in the field of education and awareness campaigns. Since 2007, the Center for Environmental Policy and Culture has been the official representative in Russia of the Earth Charter International Initiative.

Main Activities of the Russian Social Organization, Center for Environmental Policy and Culture, ed. V.M Zakharov, Moscow, Center for Environmental Policy and Culture, 2009.
What is environmental culture? The concept has followed a path of development. Initially it was through that environmental culture was to be independent of general culture and based on its own principles, and that solutions could be achieved by developing these principles alone. It was understood more recently that environmental culture is part of general human culture. Now it is increasingly apparent that environmental culture is a feature of the level of overall culture in a society. A high level of culture in itself ensures that human behavior is eco-friendly. Practical conclusions follow from this. The ideas of sustainable development need to be more widely diffused, more information needs to be provided to society. It is clear too that high-quality general education, designed to promote culture, is itself a major step towards sustainable development. As shown by experience, people who are well-informed on environmental and sustainable development issues, do not necessarily use this knowledge in their daily life, while a cultured person will be eco-friendly in his behavior, simply because he does not understand how to behave differently. Choice of a behavior model is usually based not on professional knowledge, but on inner motivation and needs.

Support for the development of culture is indispensable if culture is to draw people in the right direction, thereby ensuring future development. If culture is not given the attention it needs, it can have the opposite effect.

A high level of culture can contribute to the success of the economy, technology, and the legal framework, and ensure the long-term resolution of socio-economic, demographic and environmental problems. The basis for such progress is cultural and natural heritage, the attitude to which gives a reliable picture of the development level of any society and its potential for further development.

The preservation of cultural and natural heritage is one and the same task, and cultural workers understand this very well. So a combined museum and nature reserve is a maximally efficient model of for propagating sustainable development, and our museum has hosted a conference, entitled ‘Ecology and Culture’ for seven consecutive years. When following the popular maxim, ‘First put the economy on its feet, and afterwards deal with other problems’ it should be remembered that loss of cultural and natural heritage cannot be put right ‘afterwards’, even if cost is no object, because such heritage is the basis of culture and, consequently, of all future development.

Work to define priorities for the international community in achieving sustainable development, including that done at the UN Rio+20 Conference, underestimates the key role of culture and the fundamental importance of conserving and enhancing cultural and natural heritage. The search for ways forward in development of the economy must harmonize our ever-growing needs with the natural limitations of the planet. Hence the conclusion that what is needed is the green economy (Chapter 4, above). But it has be remembered that the creation of such an economy depends first and foremost on the commitment of society, and that is a function of culture.

10.3. The Road to a Solution: Developing a Broad Movement in Support of Sustainable Development

More than 10 years ago representatives of civil society and the expert community agreed that higher valuation of the natural environment and natural wealth is a priority for sustainable development and Russia’s environmental policy. The truth of this has not only been confirmed in the interim, but its importance has been highlighted. Civil initiatives and scientific proposals have issued in action to realize this priority, which has been used as the basis for action to support sustainable development in Russia and beyond. At the same time, underestimation of this priority has been a cause of difficulties in attaining the goals of sustainable development.

9 Priorities for Russian Environmental Policy, ed. V.M. Zakharov, Moscow, Nauka, 1999.
10 Priorities for Russian National Environmental Policy, ed. V.M. Zakharov, Moscow, Institute of Sustainable Development/Center for Russian Environmental Policy, Russia 2009.
Time has shown the universatility of the environmental imperative which is inextricably linked to the social priority of increasing the value of human life and health. These together determine the path to sustainable development of society. The extent to which people value nature and its resources, as well as their own life and health characterizes the level of development of any society. These values have to be at the basis of a country’s politics and ideology to enable its socio-economic and spiritual development towards harmonization of the interests of economic development and environmental safety, attributing greater value to nature and man in the development of society and culture.

The nature of the development of a market economy and the recent crises in Russia and the world have shown that the achievement of these priorities is a key objective for government and civil society. While the removal of administrative barriers by government and of control by civil society may promote profits and rapid economic growth, crisis-free sustainable development cannot be obtained unless government and civil society take a more active role. It is natural that government agencies should focus on immediate problems, especially in a crisis, but this only adds to the importance of the role of civil society and the expert community (public policy institutes), in addressing long-term objectives, related to the implementation of cultural and environmental priorities. Burgeoning natural and social anomalies are the result of misguided behavior, which underestimates the importance of these priorities.

Their implementation today requires a transition from humanitarian appeals to economic interest, their incorporation as part of the ‘rules of the game’ for business. Putting a higher valuation on the environment is clearly desirable, but it must also be made economically advantageous (by economic levers) and prestigious (by the level of culture).

Energy efficiency and reduction of the environmental capacity of economic growth are making gains worldwide, increasing the value accorded to nature and to man. Environmental and economic interests are combined in this task. Whatever the motivation, the vital outcome is the same: that of increasing the valuation of nature as a condition for sustainable development. Economic priorities that call for broad use of natural resources must take account of the environmental priority of enhancing their value.11 The general trend to higher valuation of the environment in human development is not subject to doubt and unrelated to short-term fluctuation in market prices for certain natural resources.

This new, broader formulation of the problem of sustainable development suggests its priority status not only for the environmental movement, which has been traditionally associated with these issues, but also for civil society. Hence the definition of movement towards sustainable development as a priority for the Civic Chamber of the Russian Federation, which has led to the creation of the Institute of Sustainable Development and to the work of the Social Forum on Sustainable Development (Box 10.2).

Box 10.2. The Movement for Sustainable Development (Civil Initiatives Following the UN Rio+20 Conference on Sustainable Development)

Work in Russia to prepare for the UN Rio+20 Conference on Sustainable Development in 2012 (20 years after the first conference in 1992 in Rio de Janeiro), was mainly driven by civil society through the Civic Chamber of the Russian Federation. It included the design of expert proposals and organization of a social movement in support of sustainable development. Work was carried out to prepare for a broad discussion of national priorities and proposals for sustainable development, the adaptation of green economy concepts in Russia, and assessment of rich experience gained in regional initiatives. At government level, an interdepartmental working group of experts was established to support Russia’s participation in the UN Rio+20 Conference, consisting of representatives of the Institute of Sustainable Development of the Civic Chamber of the Russian Federation.

Work to prepare for Rio+20 was launched by the Institute of Sustainable Development (as a joint programme of the Center for Russian Environmental Policy and the Civic Chamber of the Russian Federation) back in 2010. Consideration of issues and proposals was carried out at seminars in conjunction with the UN Information Centre in Moscow and UNEP. These discussions were attended by representatives of the Interdepartmental Working Group of Experts supporting Russia’s participation in the Rio+20 Conference, the Russian Ministry of Foreign Affairs, the State Duma of the Russian Federal Assembly, the business community and experts. Proposals for Rio+20 were prepared jointly with the Chamber of Commerce of the Russian Federation and the Russian Union of Industrialists and Entrepreneurs, which took part in work by the Institute.

Preparatory work for Rio+20 at the level of civil society was coordinated through the Social Forum on Sustainable Development with expert and organizational support from the Institute of Sustainable Development of the Civic Chamber of Russia and an expanding network of regional sustainable development institutes. Such meetings in the framework of the Social Forum were held both during preparations for Rio+20 and after its completion.

The proposals, which were prepared by civil society, were submitted by the Civic Chamber of the Russian Federation to the Russian President and Government, the Interdepartmental Working Group of Experts supporting Russia’s participation in Rio+20, and the UN Secretary General. A number of provisions related to the need to adopt a code of ethics for sustainable development on the basis of the Earth Charter, the development of new indicators and the provision of a broad movement in support of sustainable development, were included in the ‘Proposals of the Russian Federation for Rio+20’.

Broad involvement of representatives from Russian regions is an important aspect of the Institute’s work. Initiative groups, including representatives of the expert community and civil society, provided a basis for the formation of regional sustainable development institutes. Meetings of regional groups by districts and meetings of regional sustainable development institutes at the federal level were held in order to combine efforts. Such institutes and initiative groups are working in more than 30 regions of Russia at present.

Since 1995, combining the efforts of civil society organizations and experts, the Center for Russian Environmental Policy has been issuing the country’s only regular publication on sustainable development: the newsletter Towards a Sustainable Russia. A number of recent issues under the rubric ‘Sustainable Development and Civil Society: Rio+20’ have been devoted to the preparation, results and further development of the movement in support of sustainable development. The series of publications by the Institute of Sustainable Development includes expert works on sustainable development and the green economy as related to modernization, as well as a number of regional overviews under the rubric of ‘Sustainable Development. Experience, Problems and Prospects’.

The issue of sustainable development has emerged as a priority in cooperation programmes between the Russian Civic Chamber, the Economic and Social Councils of Europe and BRICS, which enabled creation of joint proposals for the UN’s Rio+20 Conference, now followed by plans for future cooperation on sustainable development. The Institute has also continued its cooperation with representatives of the Earth Charter International Initiative, and European advisory councils on the environment and sustainable development. Institute experts take part in preparation of the annual UNDP Human Development Report for Russia.

First discussions on this theme with civil society representatives from different countries, and particularly from the CIS and BRICS countries, have shown the promise of an informal partnership to adapt the ideas of sustainable development to the specifics of individual countries and to consolidate civil society and experts at the international level.

A whole new set of priority tasks has now emerged for civil society to address. The first among them is the development of a broad movement in support of sustainable development, which has to become a key area of civil society activity, involving representatives from various segments of the social movement. Special attention should be paid to development of the youth movement (Box 10.3), which is in need of support from government and business.

**Box 10.3. Civil Society Initiatives for Development of the Movement ‘Youth for the Environment and Culture’**

A strong effect can be obtained when youth organizations in the field of environment and culture join forces. Actions of this type include:

**Trainings for leaders of the youth movement, ‘Environment and Culture – Russia’s Future’**
The purposes of the trainings is to prepare groups of active young people from Russian regions as the nucleus of the movement for the environment and sustainable development.

**National youth environment forum, ‘Environment and Culture – Russia’s Future’**
This national forum brought together regional branches of the Center for Environmental Policy and Culture, other NGOs, and youth groups from more than 40 Russian regions. The forum prepared proposals for a resolution and an address to the President and Prime Minister of Russia (http://ecologyandculture.ru/).

**Publication of the textbook, ‘Development of the Youth Movement. Environment and Culture – Russia’s Future’**
The publication presents the experience gained by the youth movement for the environment and culture and is intended for practical use by those helping to develop the youth movement, and to develop cooperation between young ecologists and their instructors.

*Development of the Youth Movement. Environment and Culture – Russia’s Future. ed. V.M. Zakharov, Moscow, Centre for Environmental Policy and Culture, 2009.*

Support for sustainable development involves the creation of awareness and interest among the general public, which in turn requires special education programmes and awareness raising. So the development of education and public awareness concerning sustainable development and the youth movement becomes a priority activity for civil society. Important civic initiatives in this regard include an environment competition, which helps to focus the practical interest of teachers and students in environmental and sustainable development issues. Efficient work is also helped by the creation of informal associations of teachers and ecologists. A number of initiatives are being developed at universities, including the work of the Open Environmental University at Moscow State University, which has attracted a growing number of students. Eco-education activities at conservation areas, and cultural and natural heritage sites are also of great importance to education (Box 10.4). This activity by civil society and experts is enabling the development of basic educational standards, defining the need to approve and implement a strategy for environmental culture to ensure Russia’s sustainable development, and the need for a code of ethics of sustainable development. To this end, the work is making use of ethical documents of the Earth Charter international initiative, and discussions are in progress on the establishment of a national code of ethics for sustainable development (three-quarters of Russians – 74% – now believe that it is important to introduce a national code of environmental conduct). The decision in 2008 to hold an annual Ecologists’ Day in Russia has had a consolidating effect. It is important to make best use of the opportunity offered by Russia’s Year of the Environment in 2013, which was declared by Presidential Decree (Boxes 10.1, 10.3).
Box 10.4. Education and Awareness Initiatives for the Environment and Sustainable Development

**National Environment Competition for Schoolchildren**

Insufficient attention is paid at present to the content of environmental education and education for sustainable development at educational institutions in Russia. The National Environment Competition, which has been held every year for the last two decades, helps to support interest in the subject among teachers and students, thanks to the efforts of civil society representatives and volunteer teachers with the support of the Russian Ministry of Education and Science.

The Competition is an effective form of environmental education at the federal level. Its purposes go beyond identifying gifted students; it also offers a means of communication with various target audiences (students, teachers, university professors, educational administrators), as well as a way of promoting new ideas and knowledge for environmental education in Russia.

Effective promotion of any idea depends mainly on well-designed and organized communication. In 2012, the final stage of the Environment Competition was held in Orenburg, and a general meeting held there with representatives of 62 Russian regions led to creation of the Interregional Association of Teachers and Environmentalists. More than 90 volunteers applied to join the association. Schoolchildren are also encouraged to join, on the principal: ‘no matter what your official status, if you are a promoter of environmental awareness in your circle, you are one of us.’ This approach has been welcomed by both teachers and schoolchildren. Involving schoolchildren in the Association will make a big contribution to promoting knowledge about sustainable development, since children use social networks more than many teachers.

The first meeting of the Association’s representatives from Moscow took place at the Civic Chamber of the Russian Federation.


**MGU Open Environmental University**

The Open Environmental University was established at Moscow State University in 1987 as a programme of free additional education to enable interested students, teachers and researchers at Moscow State University (and other universities and institutions in Moscow) to obtain up-to-date knowledge in ecology, protection of the environment and rational use of natural resources. Leading scientists in these fields (academicians N.N. Moiseev, T.S. Khachaturov, V.E. Sokolov, V.A. Legasov, G.A. Yagodin and others) have been invited to deliver lectures. Several thousand students have taken an active part in the university’s work.

The Open Environmental University marked its 25th anniversary in the 2012–13 academic year by implementing an educational project entitled ‘Challenges for Sustainable Development in Russia in the Light of Decisions at the Rio+20 World Summit’. There was strong interest in the project from many groups, particularly young people.

Moscow State University together with the Ecology and Health Center has contributed to the Open University project by creating the Econavigator portal, which can be used to set up an open internet university to spread knowledge about sustainable development.

Definition of priorities and ensuring the success of civil initiatives depends on expert suggestions from civil society. In this context sustainable development institutions (institutions of public policy, working together with civic chambers) are acquiring ever greater importance. The development of such institutions both at the federal center and in the regions would help to consolidate the efforts of the expert community and involve civil society in identifying ways to achieve specific tasks for modernization of the economy in order to ensure sustainable development.

Civil society today should act as the initiator of a new movement towards sustainable development following the UN Rio+20 Conference, demonstrating the commitment of the general public and delegating government to ensure Russia’s active participation in helping the international community to achieve sustainable development (Box 10.5).

Box 10.5. International Coordination Council ‘Altai – Our Common Home’

The project by civil society in Altai region was supported by legislative and then by executive government and has been in operation for the past 10 years.

Inter-regional cooperation between Russia, Kazakhstan, China and Mongolia in the so-called Great Altai, which unites Altai Territory and the Altai Republic in the Russian Federation, East Kazakhstan Region of the Republic of Kazakhstan, the Xiniang-Uygur Autonomous Region of China, and the Hovd and Bayan-Ulgii aimags of Mongolia, has seen rapid development since the late 1990s. In 2003, in the city of Barnaul, heads of legislative (representative) bodies of the Altai Territory and the Republic of Altai, East Kazakhstan Region, Bayan-Ulgii and Hovd aimags, and a representative of the Office of Science and Technology of the Chinese People’s Government of Xinjiang signed an agreement on establishment of the International Coordination Council, ‘Altai – Our Common Home’.

Since 2006, heads of executive as well as legislative government border regions of the Great Altai have been taking part in the work of the Council. A memorandum has been signed and a new regulation has been agreed on cross-border cooperation within the International Coordination Council. The parties have agreed to proceed to the next stage of cooperation led by executive and legislative bodies of the six border areas of the four countries.

The Council has successfully implemented a number of joint projects for the development of cross-border cooperation in culture, the environment, education and tourism. The projects include: the International Student Summer School ‘Altai – Our Common Home’; the international children’s environmental expedition ‘Start from where you live’; the new international tourist route, ‘Altai – Golden Mountains’, the publishing project ‘Altai – Golden Mountains Guidebook’, as well as exhibitions, conferences and seminars. The Council also maintains an internet site, ‘Cross-Border Altai’ (http://www.altaiinter.info/).
**Conclusions and Recommendations**

The achievement of sustainable development depends on interested participation by civil society. There needs to be a broad movement in support of sustainable development, its prioritization as a theme for civil society, and support from the state and business.

The awareness and interest of the general public can be raised through educational activities, active participation of the media, and through social advertising. Government must make greater use of organizational and economic measures to win people’s commitment to modernization based on sustainable development and the green economy.

The establishment of sustainable development institutions as public policy institutions is of fundamental importance for consolidating the efforts of the expert community and involving civil society in defining and implementing modernization of the economy to ensure sustainable development.

Priorities for joint action and common rules of conduct should be defined in a national code of ethics for sustainable development (the Earth Charter could be used as the basis for the document).

Success in spreading the ideas of sustainable development and winning active participation by the general public depends on adapting these ideas to take account of the interests of civil society actors, assessing successes and challenges on the path to sustainable development at the regional and national level, and the development of international cooperation at the level of civil society and the expert community.
The Human Development Index (HDI) consists of components that have equal weight:

- income as measured by the gross domestic product (gross regional product) in purchasing power parity US dollars (PPP US$);
- education as measured by the adult literacy rate (with two-thirds weight) and the gross enrolment ratio among children and young people between the ages of 6 and 23 (with one-third weight of 1/3);
- life expectancy, as measured by the life expectancy at birth.

Fixed minimum and maximum values are established for each of the dimension indices:

- the life expectancy at birth: 25 and 85 years;
- adult literacy rate: 0% and 100%;
- gross enrolment ratio among children and young people: 0% and 100%;
- real GDP per capita (PPP US$): $100 and $40,000.

The dimension indices are calculated using the following formula:

\[
(1) \quad \text{Index} = \frac{\text{actual value } X_i - \text{min. value } X_i}{\text{max. value } X_i - \text{min. value } X_i}
\]

The income index is calculated slightly differently: it uses the base-ten logarithm of the real GDP per capita. Income is adjusted in view of the fact that, beyond a certain point, increases in income do not lead to a higher level of human development. Taking the logarithm limits the spread of income values and thus decreases the contribution of high income to the HDI.

\[
(2) \quad W(Y) = \frac{\log y_i - \log y_{min}}{\log y_{max} - \log y_{min}}
\]

The Human Development Index is the arithmetic average of the three dimension indices: the life expectancy index, the education index (which consists of the adult literacy rate with a two-thirds weight and the gross enrolment ratio with a one-third weight) and the income index.

Additional procedures are used for calculating the income index for the constituent members of the Russian Federation:

- adjusting (proportionally increasing) the gross regional product (GRP) of each constituent member of the Russian Federation based on the undistributed part of the national GDP;
- adjusting the GRP for the difference in prices by multiplying it by the ratio of the average national cost of living to the cost of living in the region;
- converting it into purchasing power parity US dollars (PPP US$) for the given year.

For the purposes of calculating the education index, the adult literacy rate is taken to be 99.5% of the population. The gross enrolment ratio is taken to be the ratio between the number of students in all the different types of educational establishments (schools and primary, secondary and higher educational establishments) to the total population between the ages of 6 and 23.

The Human Development Index can take values between 0 and 1.
The previous National Human Development Reports for the Russian Federation have been devoted to the following themes:

2011  Modernization and Human Development
2010  Millennium Development Goals in Russia: Looking into the Future
2009  Energy Sector and Sustainable Development
2008  Russia Facing Demographic Challenges
2006 / 2007  Russia’s Regions: goals, challenges, achievements
2005  Russia in 2015: Development Goals and Policy Priorities
2004  Towards a Knowledge-based Society
2002 / 2003  The Role of the State in Economic Growth and Socio-Economic Reform
2001  Generation Aspects of Human Development
2000  Impact of Globalization on Human Development
1999  Social Consequences of the August 1998 Crisis
1998  Regional Differentiation in the Russian Society
1997  Human Development under Conditions of Political and Economic Transformations
1996  Poverty: its reasons and consequences
1995  Human Development concept and its application to the Russian context