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Sustainable Development in Russia

edited by
Sergei Bobylev and Renat Perelet

Sustainable Development in Russia

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Forewords

Dear readers,

you hold in your hands a study into sustainable development in Russia, published by the German-Russian Exchange Berlin and the Russian-German Bureau for Environmental Information and prepared by a team of three editors and over 20 authors from different regions of Russia. The study includes a variety of topics, from a review of the political, legal and institutional frameworks for the development of a "green economy" in Russia, to concrete practices of separate waste collection, the development of renewable energy sources and aspects of environmental education. We tried to look at the process of sustainable development in Russia from different perspectives, including the political and economic background, the legal situation, existing practices of sustainable development and how environmental information circulated, including journalism and education on sustainable development. The result is a broad study, which includes a collection of articles written by both theorists and practitioners of sustainable development in Russia.

We are happy to see that over the last few years the issue of sustainable development has become increasingly important in Russia. This is evident from the ongoing reform of environmental legislation in Russia, civil society initiatives and new, greener, business practices. And yet, in many ways, the situation in Russia today is far from perfect in terms of sustainable development and green economy. All too often statements made by top officials remain only statements, green initiatives developed by civil society groups do not receive state support or are suppressed and new infrastructure projects are developed without ecological aspects being taken into consideration. This is why we feel it is very important to take a systematic approach to understanding the practice and perspectives of sustainable development in Russia, given that the very idea of sustainable development covers so much, including economic, ecological and social components.

All the same, considering the vast number of studies into a wide range of social aspects of sustainable development in Russia (including demographics, quality of live and welfare) that have come out recently, we intentionally left such topics outside the scope of this study, so that we could concentrate on environmental-economic issues. International and domestic aspects of climate change are key topics for this collection, from analysis of Russian climate policy at UN talks to forecasts on the impact of climate change on the country's sustainable development. Finally, in almost every section of the study special attention was paid to issues linked to civil society participation in developing and promoting ideas and practices of sustainable development in Russia.

We are confident that the study will be of interest to a wide range of readers, both in Russia and further afield, so we have decided to publish it in English as well as in Russian. We hope you enjoy reading and are always open to hear your questions and comments.

Angelina Davydova and the editorial team

"Sustainable Developtment in Russia", a challenging study with an appealing title, is being published at the right time – namely two years ahead of the 2015 UN general assembly which is expected to decide upon a new set of global sustainable development goals, paving the way for a great transformation towards a more resource efficient global economy.

What are the national circumstances for a transition to sustainable development in Russia? How to address key economic, social, political and environmental factors best? Which are the current legal framework conditions, business practices and respective approaches of key stakeholders towards a "green economy" and environmental integrity? More than 20 experts representing science, media and civil society, have made this study possible by contributing with all their knowledge. I believe it is worth reading it!

As the world's largest country hosting immense stocks of natural resources, Russia has an important role to play. Accordingly, Prime Minister Dmitry Medvedev's speech at the Rio plus 20 was internationally followed with great interest, when he pointed to the steward's role of Russia for globally important forest and water resources – and the country's potential to greening its economy.

Sustainably managing rather than exploiting natural resources, maintaining instead of destroying ecosystems, develop collective liability for global commons – these are key elements of a paradigm shift towards sustainable development in Russia and beyond. Sharing respective efforts must not only be an economic burden but can also lead to important benefits.

Despite notable improvements since the early nineteen-nineties, Russia's energy intensity is still very low (three times lower than in the EU) and its potential for improvements is one of the highest in the world. If the government's energy strategy is successful to increase energy efficiency by 40% by 2020, Russia could almost half its energy consumption – and instead safe its natural gas to sell it on international markets as the perhaps most important energy source to bridge the transition from fossil to renewable energies.

If renewable energies like wind, sun and water are promoted in Russia like in China or Germany, additional jobs and income could be generated in rural areas in particular. That could help to develop rural Russia and keep it alive, avoiding further migration to the cities. If atmospheric pollution in urban areas is improved for the sake of air quality, if waste treatment is being strengthened, if fresh water and soils become less contaminated, people's health and well being could be improved, leading to higher life expectancies and a better ranking in the world's Human Development Index (HDI). A country with the potential of Russia deserves a better HDI position (currently place 55 between Kuwait and Romania) and life expectancy must not go down from 69 to 67 since 1960, while it has increased by a decade in countries like South Corea (to age 84) or even three decades in China (from 44 to 72) in the same period of time.

Fostering sustainable development largely depends on favorable legal and political framework conditions – and on attitudes of actors and the society as a whole. The study thoroughly takes stock of major trends in the key policy areas, provides a good overview on related risks and opportunities and concludes with valuable policy recommendations. While the focus clearly is on Russia, the international context is never forgotten but well reflected. I thank the editors – the German-Russian Exchange Berlin and the Russian-German Bureau for Environmental Information for compiling this study and wish you all a good reading.

Thomas Hirsch

Development Policy Representative of the Development programme "Bread for the World"

Bread for the World, a faith-based German development cooperation organisation, has supported the study financially.

The preservation of Russia´s natural richness and diversity is of crucial importance for the Russian Federation and for the world. Facing the global economy´s excessive use of resources including the most vital ones such as water and O2, Russia's ecological wealth is becoming more and more valuable for Russians as well as for the mankind. In order to secure this richness for future generations and to distribute its benefits equally it is now time to act on the various levels by raising awareness, formulating respective policies and shaping legislation.

This is even more necessary as we are currently on the eve of a fourth industrial revolution with the "greening" of the world economy by developing resource efficient and low carbon technologies. In order to maintain its economic strength and to extend its competitiveness, a green industrial policy is in the immediate self-interest of Russia and would further contribute to overcome the dependency on fossil oil and gas.

Considering this background the study "Sustainable Developtment in Russia" is of highest relevance as it comprehensively investigates the current conditions for ecological sustainability in the Russian Federation and outlines ways how to support the greening of Russia´s economy. Therefore, this path breaking compendium, written by leading scholars and experts as well as journalists, is highly instrumental for an insightful discussion of Russia´s respective political and economic course.

The Friedrich-Ebert-Stiftung (FES) with its Moscow office thankfully co-sponsored this study as part of its program on ecological and social sustainability and as a contribution to the existing partnership of modernisation between Russia, Germany and the EU.

We hope that this volume, composed by the Russian-German Bureau for Environmental Information and the German-Russian Exchange Berlin, will help to find answers to the challenging question how to make Russia more sustainable in the future. For this purpose, the study deserves broad attention and as many readers as possible.

Darya Efimenko,
Jan Henrik Fahlbusch
Friedrich-Ebert-Stiftung

Careful stewardship of the natural resources at mankind's disposal has concerned increasing numbers of politicians, scientists and in particular ordinary active citizens, since the 1970s. World population growth, rising living standards and increased mobility have led to a jump in demand for energy resources. Meanwhile, the constant growth of cities and the accelerating rate of urbanisation pose one of the most serious challenges to conservation and sustainable development today. Cities account for 75% of global carbondioxide emissions. More than half of the world's population now lives in urban centres. In Russia and around the world, the question of lessening cities' impact on the climate and ecosystems and supporting their sustainable development is becoming more and more pressing.

A particular problem facing politicians and urban planners is how to re-organise large cities along sustainable lines amid constant urban expansion. In this regard, previously over-looked "grey urban zones", are becoming central to urban planning. Regeneration of former industrial areas on the outskirts or outside of cities is becoming increasingly important. Germany is rich in such environments, one of the which, the Rhur region, is a prime example of how industrial areas can be regenerated to play a new role in sustainable development of the city space. Success here was largely down to public engagement: local people were involved from the very beginning of the planning process and played an active role in the changes.

Finding new roles for industrial areas will be crucial for sustainable development of cities and regions in Russia as well. The constructive involvement of the public, NGOs and civil initiative can bring a lot to the process. For this reason the German Federal Environmental Foundation (DBU) is contributing to training NGO staff and members of civil society groups for future collaboration on the regeneration of industrial areas. The articles published in "Sustinable Development in Russia" present important and fundamental informantion about this topic outside the framework of the project.

The DBU is the largest environmental foundation in Europe. Outside Germany it mostly operates in neighbouring countries in central Europe. In supporting projects in Russia, the foundation would like to demonstrate the importance of unity and mutual responsibility for conservation and environmental protection in Europe.

Dr. Ulrich Witte

Head of the department for environmental communications
and protection of cultural property, responsible for international contacts.

German Federal Environmental Foundation (Deutsche Bundesstiftung Umwelt – DBU)

1

Economic, political and institutional frameworks

1.1. Sustainable development and the "green economy" in Russia: the current situation, problems and perspectives

Sergei Bobylev, Renat Perelet

A variety of recent crises have demonstrated the instability of the prevailing model for global development. An important disadvantage of this model is the absolute prioritisation of economic growth at the expense of solving social and environmental problems. Mankind is now seeking new ways of developing. In the late 1980s and early 1990s, new conceptual approaches were developed within the UN agencies for the development of society and the economy and in particular a new theory which was to have a huge impact on the discussion of new models: sustainable development. The June 2012 UN Conference on Sustainable Development in Rio de Janeiro (Rio+20), the largest United Nations conference of the twenty-first century, actually summed up twenty years of efforts to change the traditional approach to human development and move towards sustainable development. The critical need for such a transition was first declared in Rio de Janeiro in 1992. Unfortunately, the overall results of the past two decades have been disappointing, with negative trends only continuing and intensifying.

The reports and documents released by various UN agencies before and during Rio+20 state that one key condition for the transition to sustainable development is the formation of a "green economy". The nature of the transition to a "green economy" will differ from country to country, depending on each nation's natural, human, physical (artificial) and institutional capital, its level of development, its socio-economic priorities and public attitudes to the environment. The final document produced in Rio de Janeiro, "The Future We Want" (2012), stresses that each country may choose its own path of transition to a "green economy" in accordance with its national plans, strategies and priorities for sustainable development and that there should be no rigid set of rules dictating the process.[1]

According to the definition given in the reports by the United Nations Environment Programme (UNEP), a "green economy" is one that enhances the welfare of the people and ensures social justice and thus significantly reduces environmental risk and degradation.[2] The main features of such economies are efficient use of natural resources, the preservation and increase of natural capital, reduced pollution, low carbon emissions, conservation of biodiversity and ecosystem services and the growth of income and employment.

The concept of a "green economy" is not a substitute for the concept of sustainable development. However, it is now increasingly widely recognised that achieving sustainability is almost entirely dependent on the formation of the "right" kind of economy. Over the past several decades, humanity has created new wealth on the basis of an environmentally damaging "brown" economy.

Russia also recognises the need for radical changes in both the model of global development and the country. Representing Russia at the Rio+20 Conference, Prime Minister Dmitry Medvedev said that "society, economy and nature are inseparable.

That is why we need a new paradigm of development which is capable of ensuring the welfare of society without excessive pressure on the environment. The interests of the economy, on the one hand and preserving nature, on the other hand, should be balanced and should focus on the long term. And there must be innovative growth and the growth of the energy-efficient, the so-called "green economy", which is unquestionably beneficial to all countries".[3]

The concept of a "green economy" is a new one for Russia and the term is not actually used in official documents. Nonetheless, the country's stated strategic goals over the next 10 to 20 years largely correspond to those of transition to a "green economy". General policies on resource use and preservation of the natural environment for the future, and the legal and economic instruments that come with them, all to some degree reflect this. Indeed, the main goal of the Russian economy at its current stage of development, according to documents laying out the country's medium and long-term targets, is to move away from its current natural resources-based model. This goal is also central to the concept of a "green economy". Such objectives are largely included in basic strategy documents, including the Concept of Long-Term Development of Russian Federation (2008), the Concept for Long-Term Socio-Economic Development of the Russian Federation through to 2020 ("Strategy 2020") (2012), and the Basic Principles of State Environmental Development Policy of the Russian Federation through to 2030 (2012).

To implement its sustainable development goals, however, the country will have to make a great effort to bring under control the growth of its natural resources-based economy, a tendency that has been accumulating more and more momentum. It is becoming increasingly clear and the global economic crisis has confirmed, that the rawmaterials exporting economic model that has taken shape in Russia has exhausted itself. Environmental sustainability must be an important feature of the new economic model. Unfortunately, "unsustainable" trends have emerged in the country, including depletion of natural capital as a factor of economic growth, serious impacts on human health from environmental pollution, structural shifts in the economy, an increase in the proportion of extractive and polluting industries in the economy, growth of environmental risks due to intense physical wear and tear on equipment, high levels of resource intensity, a natural-commodities heavy export portfolio and environmentally unbalanced investment policies leading to an increase in disparities between the extractive industries and the processing, manufacturing and infrastructure sectors of the economy.

The emergence of these tendencies is largely due to underestimating or misreporting of environmental factors in macro-economic policies, thus leading to further environmental degradation and depletion of natural resources. These trends can in large part be linked to the restructuring of the economy in the 1990s in favour of raw materials and other polluting sectors and a consequent decline in the "environmental quality" of physical capital, all of which took place against a backdrop of degradation in the more resource efficient and high-tech manufacturing sectors.

This "weighting" of the structure of the Russian economy contributed to high energy prices and a huge increase in the price of oil and raw materials in the 2000s. Overall, the economy saw a significant shift in favour of extractive industries, a process the Russian President has described as "large-scale de-industrialisation".[4] The rest of the world, meanwhile, has observed the opposite trend: the vast majority of OECD countries

and countries with economies in transition in 1990s and 2000s saw the share of the economy accounted for by the extractive and other high environmental impact sectors shrink. In Russia, environmentally damaging structural changes were exacerbated by the global financial crisis, which on the whole the raw materials exporting industries survived better than other sectors, partly thanks to governmental support.

The crisis has demonstrated the enormous dependence of the Russian economy on the exploitation and marketing of natural raw materials. Few people in Russia may have expected such dependence. Despite much theorising about innovation, modernisation and diversification, in recent years the country´s economy has actually become increasingly dependent on the export of raw materials, the proportion environmentally damaging industries in the economy has grown and in a number of sectors so has pollution. High technology production is confined to the military-industrial complex, which is still based largely on old Soviet technology.

Ensuring inertial economic growth that is connected to increasing pollution and environmental degradation and environmental imbalance actually leads to a deterioration of human health and hinders the possibility of further development of human potential/capital. This means that solving the extremely important task of improving the welfare of the population does not necessarily lead to improvements in quality of life. Approximate estimates suggest the economic costs of the health impacts on the Russian population from air and water pollution. They are equivalent to at least 4-6% of GDP. In some regions, especially in the Urals, health problems caused by environmental factors can reach 10% of Gross Regional Product.[5]

A question needs to be asked about the future development of the country. The answer to this question will determine the measures that need to be taken. Under existing approaches in economics and the current unsustainable trends the Russian economy may finally turn into a fully fledged raw-materials exploiting economy at the periphery of world development, with dwindling natural resources, vulnerable to any, even minor, falls in prices for raw materials. A small export and processing sector, combined with massive imports of engineering products, shows Russia's growing technological dependence on developed countries, which may increase the country's economic vulnerability. This is reason enough for early and large-scale modernisation.

Unfortunately, these new environmental and economic realities are not taken into account in the government's long-term economic development papers. For example, even a document as ambitious as "Strategy 2020" only takes environmental factors into account to a minimal extent and is based on the traditional paradigm of increasing GDP.

The new economy should focus on qualitative, rather than quantitative, measures of development. The country should not strive to increase its production and use of natural resources, further impacting on the environment – rather, it needs to make better use and eliminate losses of raw materials what are already involved in the economic cycle. Russia has vast reserves of natural resources associated with modernisation. In energy consumption alone, efficiency measures could lead to savings of 50%, a fact that is emphasised in the official Energy Strategy of Russia until 2030. There is no need, therefore, to chase after quantity, whether in economic indicators like GDP, or physical volumes of oil, gas, metals or other commodities. Quantitative indicators of economic growth such as GDP growth should yield to the realisation of the importance of the social and environmental quality of growth.

From the point of view of environmental sustainability the economy of the future should have the following important features:

- include directions set forth in the documents of the UN and the OECD devoted to "green" growth and low-carbon economy in conceptual plans for economic strategies/programmes/plans,
- recognise the importance of environmental factors for the existence and maintenance of the population,
- give priority to the development of knowledge-intensive, high-tech, manufacturing and infrastructural industries with minimal impact on the environment,
- reduce the presence of the extractive sector in the economy,
- radically improve the efficiency of natural resources use, leading to a sharp decrease in the cost of natural resources and the amount of pollution per unit of outcome (reduction of environmental capacity and pollution intensity indicators),
- reduce pollution.

In Russia, the paths of transition to an innovation based and socially oriented economy and to environmentally sustainable development more or less coincide. To give just one example, the need to radically improve energy efficiency (the goal is a 40% saving by 2020) will also have huge environmental benefits. Thus, both social and economic policy and environmental policy in the next 10 to 20 years should be guided by a principle of seeking "win-win" outcomes.

These opportunities for huge savings in natural resources will demand the development and implementation of an effective technology policy that would allow scientific and technological developments to be translated directly into the technology, products and services markets. This in turn will require a shift to a policy of so-called "best available technology". Today, some measures are already in place, including laws on payments and fines for pollution, compulsory monitoring, eliminating the practice of temporary emission permits and cleaning up past environmental damage, as well as a law defining zones "in environmental trouble". The state should promote such technological up-grading and provide support using the full range of economic and legal instruments available. The Ministry of Natural Resources and Environment has already submitted a bill on "best available technologies" to the State Duma.

Russia's transition to a "green economy" will require a long period of economic trans-formation and modernisation, structural and technological change and formation of a new economic model. As such, a key task will be to reduce the costs of the transition and dramatically raise efficiency of use of natural resources. This can be done in two ways.

First, we need to make state regulation more effective in both the extraction and use of natural resources. Economic and legal instruments (taxes, fees, tariff policies, penalties, regulatory compliance and so on) should be used to compel public and private companies to improve efficiency of resource use, prevent losses and adequately compensate for external costs and environmental damage inflicted on society and the natural environment. The principle of "the polluter pays" should be made to work in practice – as opposed to purely formal implementation of this principle seen at the moment.

Secondly, the creation of a competitive environment could play an important role in the transition period. Increased competition between manufacturers and a departure from the prevailing model of monopolies in the energy sector and other parts of the economy would lower costs and encourage enterprises to innovate, diversify

production and adopt deep processing of raw materials, thus increasing energy efficiency and reducing the environmental intensity of production due to the introduction of new technologies. The fact that Russian petrol prices are sometimes higher than those in the United States, an oil-importing country, is a sign of a monopolized market. And the creation of a competitive environment is in any case conducive to Russia´s accession to the WTO.

The state could ease and accelerate the transition to a "green economy" with the help of environmentally sustainable/balanced economic reforms and the creation of an appropriate economic environment on the macro level. When the state sets "environmental rules of the game", private businesses have no choice but to recognise and make use of the genuine opportunities offered by the transition to a "green economy" in a number of key sectors. They also tend to respond to adjustments in public policy and price signals by increasing the amount of financing and investment in greening the economy.

An important objective of macroeconomic policy should be to support environmental economics, or so-called "green growth". The raw-materials based economy and especially the energy sector, plays a key tax and revenue generating role in Russia: about half of the state budget currently comes from oil and gas revenues. In the future, we plan to reduce this share. But such structural changes in the economy are hindered by a tax burden that places more demand on the relatively low-environmental impact manufacturing sector than on the extractive industries and "brown" economy. It is clear that the tax system must be transformed to facilitate sustainable development, diversification and modernisation of the economy: maximum level of tax should be imposed on extractive and polluting industries, while minimising the burden on the manufacturing, processing, high-tech and infrastructure sectors.

The country's current system of subsidies is another hindrance to the transition to a "green economy", especially in the energy sector. State support for oil and gas producers is particularly significant. In 2010, subsidies to the oil and gas industry were estimated at $ 14.4 billion, equivalent to more than 14% of the value of all the tax and other payments the sector contributed to the federal budget that year.[6] The bulk of these perks came in benefits from the tax on mineral extraction tax (MET) and export duties: $ 9.8 billion or 68% of the total. Direct government subsidies to oil and gas producers are primarily aimed at stimulating the development of new fields, including the Arctic.

In its principles of transition to a "green economy", UNEP makes special note of the need to control costs in areas of depleting natural capital. For Russia, that means ceasing to force through high-cost mega-projects for exploiting new natural resources deposits, especially oil and gas, with unpredictable consequences for nature and man (cases in point include off-shore drilling on the continental shelf and development in the permafrost zone and areas lacking transport infrastructure). We should refrain from accelerating the development of capital-intensive new fields. If we want to increase output of the final product, it should be done on the basis of improved recovery of deposits, better equipment and deeper processing of raw materials.

Besides making use of economic regulation to push the transition to a "green economy", the state should also make greater use of legal and institutional mechanisms in the fields of nature conservation and environmental protection. New laws are not needed, but the state should make an effort to enforce and implement in practice the country's already extensive environmental legislation, for example by strengthening penalties for violation of the law of Nature and Environment.

Russia's most important priority in greening its economy can be summarised as follows: do not use more natural resources than you have to, as they are limited and additional exploitation will lead to additional stress on ecosystems, depletion of natural capital and environmental pollution. Resource-intensive technologies also lead to over-consumption, huge losses of natural resources and increased pollution. It is necessary to invest in improving the use of already exploited natural resources and protecting the environment through modernisation of the economy, support for innovation, replacement of resource intensive technologies with resource and energy efficient ones, use of the best available technology and the deepening and diversification of raw materials processing methods. This is the road to sustainable development in Russia and the formation of a "green" Russian economy: investing in resource-saving restructuring, radically changing the technological base, greening the economy and reducing environmental intensity, thereby conserving natural capital, will make it much cheaper to address the negative environmental impacts of anthropogenic economic activity in future. Such a path could double or even triple GDP compared to the present levels achieved by extraction and exploitation of natural capital, as well as reducing pollution.

But how do we measure progress towards sustainable development and the "green economy" and how do we assess the rate at which different sectors and activities are "greened"? To do this, we first need to change the views of the vast majority of politicians, businessmen and scientists on the development of the problem itself. Sound bites like "economic growth is the key to progress", or "first economic growth and then addressing environmental problems", have until recently seemed like immutable truths.

The currently prevailing stereotype equates economic growth with the growth of gross domestic product (GDP), the maximisation of profits, cash flows and other financial indicators. The quality of that growth and its costs, both environmental and social, are usually ignored. Thus the economic indicators that are widely used in financial and economic decision-making – including the decisions that led us into the global economic crisis – do not fully reflect real economic, social and environmental processes. An example of such an "incorrect" (at least from the point of view of sustainability) economic measure is the most widely cited indicator of them all – GDP. Until now, the vast majority of countries, including Russia, have measured the success of development in terms of GDP growth. GDP, which first began to be used in the early 1950s, is adequate for most traditional industrial economies. But the current realities of the world economy, with the demands it places on emerging economies to modernise and transition, are quite different. For example, for countries with large natural capital, GDP growth on the back of the commodities sector has mixed results. The easiest way to achieve this growth is through over-exploitation of oil and gas fields, mineral deposits, forests, land and so on. In Russia's case, impressive pre-crisis GDP figures were largely based on the depletion of natural capital, transforming the Russian economy into a raw materials exporter and making it directly dependent on the global economy.

The delegates at Rio+20 noted that measures of progress based on GDP need to be corrected. The UN Statistical Commission has already developed new approaches for greening of the System of National Accounts, including forms of global environmental accounting that would cover the most important aspects of resource efficiency and environmental damage.

All over the world, economists are developing criteria and indicators for sustainable development, containing often very complex system of indicators. International organisations involved in these efforts include the United Nations (Integrated Environmental and Economic Accounting), Goal 7 "Ensure Environmental Sustainability" (part of the Millennium Development Goals), The World Bank (Adjusted Net Savings) and the OECD (a system of environmental indicators). The fundamental point in all these approaches is to subtract the damage from pollution and depletion of natural resources from traditional macroeconomic indicators, effectively adding an environmental correction to key socio-economic indicators of development. Among the purely environmental indicators, the most methodologically integrated and statistically advanced are the World Wildlife Fund's Ecological Footprint and Living Planet Index.

These formal indicators (in particular the UN's human development indices and the World Bank's adjusted net savings) reveal significant environmental a social problems facing Russia's development. For example, in 2006 Russia posted an especially successful GDP growth rate of 8%. Adjusted net savings, however, suggest the economy actually shrunk (with a rate of -13,8%), largely due to the depletion of natural resources.

Russia can play a crucial role in the formation of sustainable development and the new global economy. It has vast natural capital and critically important ecosystem services that contribute to the sustainability of the biosphere and provide economic benefits to all mankind. Its vast areas untouched by economic activity, colossal forests and wetlands, freshwater resources and biodiversity are all major potential contributors to the formation of the new economy in the world. Indeed, Russia could well be described as a net environmental donor to the world. It is only right that the country play a more active role in the greening of the global economy and seeking economic benefits and to capitalising on its unique environmental status. The concept for long-term development (2008) identifies just such opportunities. To realise them, Russia must coordinate its na-tional efforts with international organisations such as the WTO, integrating the principles of international agreements into legislation and practice of economic decisions.

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1.2. Legal Aspects: The state of legislation and legal practice

Ekaterina Khmeleva

An analysis of Russian legislation shows that several principles of sustainable development are reflected in the Constitution of the Russian Federation and have been embodied in a number of environmental laws. Environmental interests are laid out in the first part of Article 9 of the Russian Constitution, which stipulates that land and other natural resources are to be used and protected in the Russian Federation as the basis of the lives and livelihoods of the people living in the country. These constitutional provisions are fundamental to the legal regulation of natural resources and protection of the environment, which is also covered in the first paragraph of Article 72 of the Constitution of the Russian Federation. However, a consistent focus on sustainable development in Russian environmental legislation has yet to be seen.[1]

In 1996, a presidential decree approved the basic concept of Russia's transition to sustainable development.[2] Six years later, government resolution No. 1225-r of August 31, 2002, laid out the country's official Environmental Doctrine. Despite the fact that these acts include the basic principles of sustainable development, they remain declarative documents. Their adoption did not lead to the development of concrete legal norms in this area. We have to admit that between 2000 and 2010 Russian legislation was actually consistently "de-greened", with the removal of laws directed at protecting the environment and its components. This process can be traced chronologically via a few key moments.

In May 2000, the main federal environmental watchdog the State Environmental Commission (Goskomekologi by its Russian acronym) was dissolved and its responsibilities taken over by the Ministry of Environment and Natural Resources, making it simultaneously responsible for both control and use of natural resources.

In 2002, a new federal law "On Environmental Protection" was adopted. Despite being largely based on the previous law "On Protection of the Natural Environment", the exclusion of the world "natural" reflects the essence of this law. Many of the norms laid out in this law are only referenced and require the adoption of normative acts to become reality.

In 2006, a new Forest and Water Code was adopted, which sees forests and bodies or water primarily as resources and does not establish mechanisms necessary for their protection as elements of the natural environment.

Also in 2006, changes to the Town Planning Code of the Russian Federation resulted in the abolition of compulsory state environmental assessment (SEA) for most buildings, including the especially dangerous ones and its replacement with unified state assessment. This changed the concept of environmental impact assessment – instead of assessing the admissibility of the environmental impact a proposed building or activity, the purpose of assessment became to check compliance with technical regulations and standards. These changes also reduced the opportunities for public participation in environmental decision-making.[3]

The Russian leadership recognised the need to correct this situation and in 2008 a special session of the Security Council was convened in which then-President Dmitry Medvedev set the goal "to create the necessary preconditions so that in future the growth of the Russian economy will be balanced with high environmental standards".[4] The need for an improved system of environmental protection was established in a presidential decree.[5] But in fact, development of legal amendments to fulfil this goal came into force only after the adoption of decisions on the results of two State Council sessions devoted to reform of state environmental regulation on May 27, 2010[6] and June 9 2011[7], which took the form of lists of presidential orders to the government.

These orders can be grouped into several main areas of environmental legislation: Improving and expanding the list of objects and activities subject to state environmental assessment and environmental impact assessment; the instruction of strategic environmental assessment into Russian government's system of decision-making; the creation and development of economic instruments for environmental protection, including the possible re-establishment of environmental funds; protection of the seas from oil pollution; the development of legislative support and funding for protected areas; creation of legal mechanisms for cleaning up accumulated environmental damage; and the adoption of the basic elements of the state environmental policy until 2030.

The most important decisions are the order on ratifying the UN Economic Commission for Europe´s (UNECE) 1991 convention "On Environmental Impact Assessment in a Trans boundary Context" (commonly known as the Espoo Convention), the Protocol on Strategic Environmental Assessment to the Convention (Kiev, 2003) and the 1998 UNECE convention "On access to Information, Public Participation in Decision-making and access to justice in Environmental Matters" (the so-called Aarhus Convention).

On April 30, 2012, the Russian president approved the Foundations of State Policy in the Field of Environmental Development of Russia to 2030.[8] The strategic goal of the Russian Federation's environmental policy reflects both the need to preserve and restore natural ecosystems and the sustainable development of society and the improvement of quality of life as a result of maintaining a high quality environment. The foundations of environment policy include basic tasks and principles of environmental policy, its priorities and key mechanisms for its realisation and the document the president approved is structured according to this logic.

The conceptual provisions laid out in the Foundations are directed at developing modern mechanisms for managing the environment and economic mechanisms for its conservations, the use of global standards in conservation and environmental responsibility, the stimulation and development of voluntary and market-based mechanisms for environmental protection, making it advantageous for market players to use higher environmental standards, ensuring publicity and making information about environmental impacts openly accessible. The document is broadly in line with the principles of sustainable development. Given the experience of the un-fulfilled 2002 environmental doctrine, which remained a declarative document, the Foundations originally incorporated a provision stating that their effective implementation would require achievement of targets based on environmental impact and environmental conditions, as well as assigning environmental responsibilities.

This document was quickly followed by approval of the Plan of action for implementing the foundations of state policy in the field of environmental development of the Russian Federation for the period until 2030 (approved by the Decree of the Government of the

Russian Federation of December 18, 2012 No. 2423-r).[9] The plan includes a list of measures mainly aimed at changing the law on the protection of the environment. However, it does not set high-quality environmental indicators to be achieved by 2030.

Pursuant to the presidential orders, in July 2011 the government submitted five bills to the state Duma, respectively concerning the improvement of standardisation in the field of environmental protection and the introduction of economic incentives for businesses to adopt the latest technology, legislative consolidation of the requirement for all oil production installations to have oil spill response plans, waste, environmental monitoring and environmental control. It also submitted amendments to the previously adopted law on specially protected areas.

By December 2012, two of these bills had been passed: Federal law No. 331 of November 21, 2011 "On amendments to the Federal law 'On Environmental Protection' and other legal acts of the Russian Federation", directed at improving regulation of the system of environmental monitoring (this law came into force on January 1, 2012)[10], and Federal law No. 287 of December 30, 2012, "On amendments to the Federal law 'On the Continental Shelf of the Russian Federation' and the Federal law 'On internal seas, territorial waters and contiguous zone of the Russian Federation'" (which entered into force on July 1, 2013), laying out requirements for the prevention and elimination of oil spills.[11]

We must admit that the delay in passing these bills directed at including such important measure as the creation of sustainable development and "green growth" in the Russian economy, as a stimulant for the rapid transition to improved access to technology and the completion of legal arrangements of negative impacts on the environment. Legal projects of crucial and principal importance for the sustainable development of Russia include changing not only the system of laws on environmental impacts, the adoption of an integrated approach to negative environmental impacts and offering economic benefits to businesses using improved technology, but also classification of buildings and installations according to their level of impact on the environment and establishment of state environmental assessment of especially environmentally hazardous installations.

Besides reform of the state environmental regulation in Russia, it is also crucially important to "green" other processes connected with exploitation of natural resources. Primarily this concerns the development of civil society institutions, including environmental NGOs; raising environmental awareness – and by association environmental responsibility and activity – amongst both individual and institutional con-sumers; introductions of voluntary market mechanisms to encourage environmental responsibility among businesses and so on.

In this connection it could be useful to look at the experience of other countries. In the EU environmental requirements are written into public procurement policies but European Parliament Directive 2004/17/EC of March 31, 2004 and green procurement policies also exist in most of the European member states (including Austria, Belgium, the United Kingdom, Germany, Greece, Denmark, the Netherlands and France). Similar policies exists in other countries including Canada, Japan, New Zealand, Mexico and the United States. In 2008 the United States adopted a special amendment – the revised Lacey Act – concerning illegally logged Russian timber. The EU also decided to close its markets to illegally logged or processed timber and also banned illegal reprocessing of wood. Adoption and implementation of similar laws in Russia could be an effective mechanism for improving the environmental efficiency of the economy.

Another necessary condition for the completion of Russia´s environmental legislation is legal provision for the effective participation of the public in environmentally significant decision making. This could be achieved by swift ratification of the Aarhus convention on access to information and the Espoo convention on cross-border impact assessments. Preparation for ratification began in 2011, but as of September 2013 the necessary bills had still not been submitted to the State Duma.

We propose that adoption of the legal mechanisms listed above would make possible the sustainable development of Russia.

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1.3. Certification and standardisation

Semyon Gordyshevsky, Yulia Gracheva, Anna Matyagina

International Experience in Development of Environmental Certification Programmes

Global demand for environmentally friendly products and services is growing every year. These changes began in the 1970s and became a clear trend in the 1990s. By 2009, the global market for environmentally friendly goods and services was worth $ 230 billion (of which $ 76 billion was in sustainable economy, $ 27 billion in healthy lifestyles, $ 30 billion in alternative medicine, $ 10 billion in personal growth and $ 81 billion in environmentally-friendly living). By 2015 it is set to grow to £845 billion, making it one of the fastest growing markets in the world economy.[1]

In Europe, the market for environmentally friendly goods was worth 10.3 billion euros in 2010, 56 billion euros in 2009 and is forecast to grow to 114 billion euros by 2015. Organic food now accounts for 3 % of all the food bought in Europe. Experts predict a doubling of sales of green products in Europe by 2015, despite the fact that they are more expensive than non-green alternatives.[2]

In the United States demand for green building is growing at 5–10 % a year, for eco-tourism at 5 %[3], and for environmentally friendly food products at 6.6 %.[4] 72 % of U.S. supermarkets have organic produce sections.[5]

A range of standards and third-party verified certification procedures in the sector have been developed to protect consumers from unscrupulous producers. Logos for voluntary certification systems are used to distinguish products and services that have successfully passed certification ("eco-labelling").

Nowadays, environmental labelling programmes are widespread throughout the world and there is no universally accepted classification. For the purposes of this article the authors will classify eco-labels according to the International Organisation for Standardisation's 14,000 series of standards.

International standards ISO 14021, 14024 and 14025 and their Russian equivalents set requirements for three basic types of voluntary environmental certification scheme depending on the level of involvement of independent third parties in the certification process.

TYPE I ENVIRONMENTAL CERTIFICATION (ECO-LABELS) These are voluntary, multiple-criteria-based, third party programmes that award a license that authorizes the use of environmental labels on goods and services indicating overall environmental preferability within a particular good or service category based on life cycle considerations (Life Cycle Assessment, LCA).[6]

The credibility of these programmes depends on trust in the organisation and transparency and openness of the criteria for assessment and the clarity with which they are defined.

Most Type-I eco-labelling programmes are united within the Global Eco-labelling Network (GEN). This association was founded in 1994 to increase the effectiveness of promotion of eco-labelling at the inter-governmental level. The network currently includes 27 different programmes.

Consumers in Russia may come across the following foreign Type I eco-labels on their shopping: the Blue Angel (Germany, fig. 1), the European Flower (the European Union, fig. 2), the Nordic Swan (Scandinavian countries, fig. 3), Ecologo (Canada, fig. 4), Green Seal (United States, fig. 5) and EcoMark (Japan, fig. 6).

Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5

Fig. 6

TYPE II ENVIRONMENTAL CERTIFICATION (ENVIRONMENTAL SELF-DECLARATION) These labels are environmental self-declarations made by manufacturers, importers, distributors and suppliers, without third-party certification (ISO 14 021).[7] However they may be defined by a regulatory body. The standard describes the composition of such statements, the use of certain terms, as well as the requirements for confirmation of such claims by third parties.

TYPE III ENVIRONMENTAL CERTIFICATION (ENVIRONMENTAL DECLARATION) These labels provide quantified environmental data on goods or services according to pre-established parameters based on ISO 14040, but with additional environmental information provided by Type III environmental declarations (ISO 104025).[8]

Type III environmental declarations are a voluntary process, in the course of which an industry or some independent body develops requirements for Type III declarations, including the establishment of minimum requirements, a choice of parameters, the role of third parties and the mechanism for exchanging information with third parties. Type III declarations use information based on the life cycle performance of pre-defined parameters and serve as a benchmark by which to compare products of different categories.[9] They have become increasingly popular around the world in recent years.

An **ENVIRONMENTAL PRODUCT DECLARATION (EPD)** is essentially an independently verified comprehensive report on the composition and environmental characteristics of a product based on evaluation of its life cycle. Table 1 provides a comparison of Type I and Type III environmental labeling programmes.

Table 1. Comparison of Type I and Type III Environmental Certification

	Type I Environmental Certification	Type III Environmental Certification
ISO Standard	**14 024**	**14 025**
What does an applicant get after completing the certification process?	The right to use eco-labelling indicating environmental certification	The right to publish detailed reports (Environmental Product Declarations, or EPDs) on the composition and environmental status of goods and services
Criteria for certification	Environmental criteria for a range of specific products included in the organisation's internal standards	Product category rules (PCR)
Goal of certificiation	To identify environmentally friendly products as a homogenous group distinguished by eco-labelling	To provide detailed information about consumer products to allow customers to make an informed choice
Field of application	All forms of products and services	
Form of interaction	Business-to-customer (B-to-C)	Business-to-business (B-to-B)
International association	Global Ecolabelling Network (GEN)	Global Environmental Declarations Network (GEDNET)
Third party participation	Third party verification by certifying organisations	Third party verification and certification of EPD by independent experts or organisations

The most popular providers of EPD verification are IBU (The Institute of Construction and Environment in Germany) and the International EPD System (Sweden) in Europe and UL Environment (Independent Testing and Certification Centre) in the United States.

Legal Aspects of Voluntary Environmental Certification in Russia

According to Article 2 of the Federal law No. 184 of 27.12.2002 "On technical regulations", certification is defined as "a form issued by certifying bodies confirming conformity with the requirements of technical regulation, standards, codes of practice or conditions of contract". Article 20 of the same law defines two forms of conformity: voluntary and obligatory.[10]
There is currently no specific definition of environmental certification in the Russian law. The Federal law No. 7 of January 10, 2002, "On Environmental Protection" only mentions that "environmental certification is to ensure the environmental safety of economic and other activities on the territory of the Russian Federation" (Article 31) and the fact that it is "in accordance with the provisions of Article 21 of the Federal law No. 184 of December 27, 2002, 'On Technical Regulation'".[11]

Thus environmental certification in Russia is done on an entirely voluntary basis in the form of "verification at the initiative of the applicant under a contract between the applicant and the verifying body". It may be done "to establish compliance with national standards, an organisation's standards, codes of practice, voluntary certification systems, or contract conditions" (Article 21 of the Federal law 184 of December 27, 2002 "on Technical Regulation").
Furthermore, "objects of certification within a voluntary certification system may use symbols of their compliance with this system for marketing". But "objects whose compliance has not been verified in line with the conditions described in the Federal law may not be-marketed under such symbols of compliance" (Article 22 of the Federal law 184 of 27.12.2002 "On Technical Regulation").
Besides the Federal laws mentioned above, voluntary certification in Russia is also regulated by :

- Rule on Certification No. 26., established by the Federal Agency on Technical Regulating and Metrology (Gosstandart) in Decree No. 2284 of May 10, 2000,[12] and
- Rules of the State Registration System for Certification and Marks of Compliance in the Russian Federation, established by Gosstandart decree No. 18 of April 22, 1999, and registered by Ministry of Justice Decree No. 1975 of June 14, 1999.[13]

Development of a System of Voluntary Environmental Certification in Russia

The first example of environmental certification in our country was "Greenpeace Russia´s" logo "Free from Chlorine" which was approved by the Gosstandart in 1998 (GOST P 51150-98, fig. 7).[14]

Fig. 7

Fig. 8

The presence of the logo on goods guarantees that no chlorine-based pollutant was released into the environment at any stage in the manufacture, processing, reprocessing and recycling of the product.[15] It went down in history as Russia's first domestic eco-label, although it was never actually applied.
It should be noted that developed countries tend to be very wary of Russian certification bodies due to a lack of faith in their verification procedures. The only internationally recognised Type I voluntary certification system in Russia that meets ISO 14024 today is "Vitality Leaf" (fig. 8). It was developed in 2001 by the "St. Petersburg Ecological Union", an NGO.

In 2007 the "St. Petersburg Ecological Union" (since 2013 simply Environmental Union), was accepted into GEN and after an external audit of the "Vitality Leaf" programme it was accepted into he Global Ecolabelling Network´s Internationally Coordinated Ecolabelling System (GENICES) in 2011. "Ecological Union" certifies non-food and food products and services.

One rapidly developing area of environmental certification of non-food products is so-called "green building". "Vitality Leaf" certification can be applied to building materials including insulation materials, gypsum and gypsum sheets, dry mix, products made of sheet glass, floor coverings and so on. Client organisations already include major companies such as the multi-national TARKETT corporation and the Saint-Gobain group (France).

"Ecological Union" is the official representative of the Italy's independent Environmental and Ethical Certification Institute (ICEA). It offers organic certification of plants, animals and products derived from them according to European, American and Japanese standards. Its staff include accredited organic certification inspectors. Independent Russian organic standards are being developed as a part of the Russian-Finnish project ECOFOOD (ENPI), which will lead to certification of products not only for the domestic market, but also for export to Europe.

Voluntary Environmental certification is rapidly expanding into new sectors in Russia. Thus in 2009, a programme was launched for certification of hotels. A successful example is the Corinthia St. Petersburg, which won the right to use the "Vitality Leaf" logo in 2012.

In 2010 a programme for certifying of office buildings was launched. Four offices have so far received the right to use the "Vitality Leaf" logo: Ingosstrakh´s building in Sochi, the Strelka Institute of Media, Architecture and Design in Moscow, Pricewaterhouse Coopers' office in Krasnodar and the Olympic Organising Committee´s office in Sochi.

But Ecological Union does not only offer Type I eco-labelling. In 2013 the organisation became a partner of several international organisations in the United State, Sweden and Britain accredited to carry out life-cycle assessment (LCA) and issue EPD declarations (Type III eco labelling). Thus, with the help of "Ecological Union", Russian companies may obtain EPD without having to appeal to overseas organisations. The collection of data for life cycle assessment is carried out by experts from "Ecological Union", but the final review and certificate is issued by the overseas partners.

As such, the country is gradually recognising the competitive advantages of green goods and services and eco-labels are becoming a tool for promoting business, reducing pollution and increasing the quality of life of the population. We can say with certainty that "Vitality Leaf" is a worthy example of green economic principles being put to use in Russia.

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1.4. Oversight and supervision of compliance with environmental legislation and environmental standards: a summary of judicial practice

Nina Popravko

Environmental Law

With the development of urban and rural settlements, various industries, especially metallurgy, chemicals, mining and processing, oil and gas and energy generation, have given rise to anthropogenic threats to the natural environment. Furthermore, the environmental situation at both the national level and in individual regions and municipalities continues to deteriorate. The natural environment in 15% of Russia's territory, which is home to about 60% of the population, is considered to be unsatisfactory.[1]

In the Ministry of Natural Resources and Environment´s state report "On the condition and protection of the natural environment in the Russian Federation in 2011", 27 cities with a combined population of 16.3 million people were listed as having excessively high levels of atmospheric pollution. A further 119 cities, representing 58% of the country's urban population, are exposed to high or very high levels of air pollution.

The volume of un-treated or inadequately treated waste water released into surface waters remains high. In almost every region of the country, soil and land quality continues to deteriorate, with an intensification of processes that lead to the loss of fertility in agricultural lands and their withdrawal from the economic cycle. Twenty-seven regions suffer from desertification to one degree or another, with a total area of 100 million hectares affected by this process. The volume of waste sent to landfill rather than being recycled is growing. And the conditions of storage and disposal of waste do not correspond with environmental safety standards.[2]

As noted in the Concept for long term socio-economic development of the Russian Federation to 2030, approved by Government resolution No 1662-r of November 17, 2008, Russia has seen the development of several "poles" of environmental damage over the past several decades (and not only in the European part of the country). The national priority of transitioning to a new, post industrial society by 2020 requires reforming environmental policy.

Solving environmental problems requires environmental legislation in line with global standards, an effective system of management for conservation and environmental protection, an improved system of state environmental oversight and supervision at both the federal and regional level and independent courts.

Environmental legislation includes laws and other normative legal acts governing public relations in the spheres of conservation, sustainable use of natural resources and the provision of environmental safety for individuals, the state and society. As such, such laws may concern both the use of natural resources and preservation of the natural environment.

The rules governing the exploitation of natural wealth are contained primarily in natural resources legislation – specifically the legal codes on land, water, subsoil, forestry and several other areas.

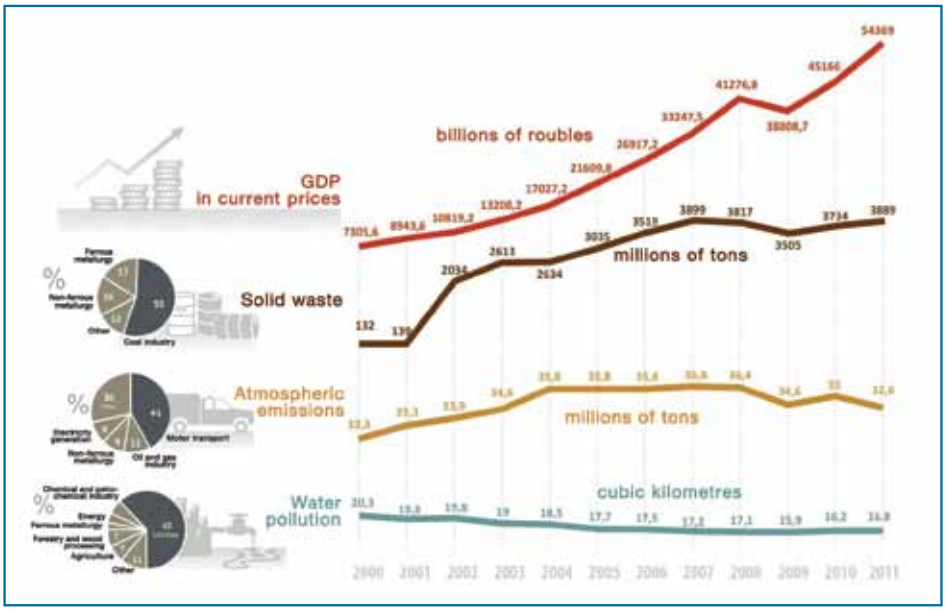

Fig. 1. The Environmental situation in the Russian Federation (from Natural Resources and Environment Minister Sergei Donskoi's report on the state programme "Environmental Protection 2012–2020".

Accordingly, environmental legislation contains rules and laws directed at preserving natural resources and environmental conditions. They set and regulate maximum acceptable concentrations of land, water and air pollution and so on.

For this legislation to be effective, its implementation and execution must be subject to oversight and supervision. In Russia today there currently exists state environmental supervision, as well as industrial self-regulation and public oversight in the field of environmental protection.

Control over the implementation of environmental legislation

State supervision

There has been no special independent body for environmental protection in Russia since the State Duma Environment Committee was disbanded, effectively destroying the system of state environmental oversight. Municipal environmental control, which was introduced in 2002 and wound up for no apparent reason in 2008, proved to be one of the most effective systems of environmental protection while it lasted.

In practice, there are cases of duplication of powers and control between various enforcement agencies at some sites and a complete absence of oversight at others.

In a bid to optimize state environmental supervision, the government passed resolution No. 717 of September 13, 2010, which transferred a number of environmental oversight functions from the Federal Service for Ecological, Technological and Nuclear Supervision (Rostechnadzor) to the Federal Supervisory Resource Management Service (Rosprirodnadzor). The division of powers between these two agencies, both of which answer to the Ministry of Natural Resources and Environment, does little to help more effective state management in the field.

Federal law No. 242 of July 18, 2011, "On Amendments to certain legislative acts of the Russian Federation on the implementation of state control (supervision) and municipal control" introduced amendments to Federal law No. 7 of January 10, 2002 "On Environmental Protection". The broader concept of state environmental control was effectively replaced with environmental supervision. State environmental supervision, which includes 14 different forms of supervision, refers to the prevention, detection and suppression of environmental violations by authorized federal and regional agencies and executive authorities.

Based on these forms of supervision, it is clear that we not talking simply about environmental control and supervision of installations and organisations with a detrimental impact on the environment, but also rational and sustainable use of natural resources. In this case there is no clear division of powers and responsibilities for environmental control and supervision between federal and regional state agencies. For example, the power to exercise oversight over state land belongs to a sole federal agency (the Federal Service for State Registration, Cadastre and Cartography). But the right to carry out environmental supervision is shared by the Federal Fisheries Service, the Federal Service for Veterinary and Phytosanitary Supervision, the Federal Forestry Service and others.

There is currently a trend to transfer powers from the federal level to regional agencies, with the goal of saving the federal environmental authorities money on support for regional local agencies. But not all regions are able to fulfil these new responsibilities without the simultaneous transfer of funds for their realisation.

Government resolution No. 285 of March 31, 2009, "On objects subject to federal state environmental control," was meant to define which installations and organisations were subject to federal or regional control. The Russian executive authorities noted that most often they took control of problematic objects which do not have the financial resources to implement environmental measures.

It is becoming obvious that legislative-level measures are needed to tighten the criteria and procedure for assigning enterprises and other objects of state environmental oversight to regional or federal level supervision. In almost all areas of state environmental supervision decisions have been taken that are contrary to the provision of state supervision in the field of environmental protection (government resolution No. 53 of January 27, 2009).

Most Presidential Decrees and government orders devoted to reforming the system of state management in environmental protection have been either partially fulfilled or not fulfilled at all, according to data included in the results of sessions of the State Council in 2010 to 2012.

It was envisaged that a special federal law "On Amendments to Certain Legislative Acts of the Russian Federation (the empowerment of officials carrying out state environmental control)" would be adopted in 2012. However, in its review of the bill the Ministry of Economic Development stated that implementation of the law in its current form would lead to an increase in corruption, impose significant unjustified spending by businesses and create unnecessary administrative constraints.

A key document in the field of state environmental supervision is Federal law No. 294 of December 26, 2008, "On protection of the legal rights of small businessmen during state environmental control (supervision) and municipal control". This law, which is meant to reduce the number of administrative barriers faced by businesses,

in practice simply makes state environmental oversight less effective, as it does not consider specific forms of supervision and enterprises subject to such supervision. Thus, for example, a number of the small and medium sized businesses try to evade control and supervision by liquidating companies, re-structuring, creating new legal entities and transferring assets liable to control to contractors under temporary leases. These tactics take advantage of a loophole in the Federal law No. 294 of December 26, 2008, which sets the deadline for a company to be included in the annual inspection timetable at no less than three years after a company is registered or since its last planned inspection.[3]

The need to give prior notice of unscheduled inspections and agree unplanned inspections with the prosecutor's office, also set out in law No. 294, significantly reduces Rosprirodnadzor's ability to respond to reports of violations of environmental law and consequently reduces the effectiveness of federal state environmental supervision. For these reasons, there is no possibility of carrying out a survey of sources of pollution, water treatment plants, including measurements of excessive or accidental discharges or discharges of pollutants, unless it can establish a cause-effect relationship between violations of environmental law and environmental damage.

Thus, in practice, certain provisions of law No. 294 effectively defend the rights of legal entities and lead to infringements of the constitutional right to a clean environment. There are a number of other problems in the organisation and implementation of state environmental oversight, especially the insufficient number of inspectors and under-funding. State environmental control and supervision can only really be effective in conjunction with other environmental legal tools, including environmental assessment, fines for harming the environment, environmental monitoring, environmental regulation, compensation for environmental damage and so on.

The current absence of laws on obligatory environmental insurance, environmental auditing, regulation of environmental conditions, adoption of best available technology and gradual reduction of environmental impact, makes it difficult to persuade natural resource-consuming industries to pay more attention to the environment and also makes state oversight less effective.

Many of these environmental instruments are being developed in the draft Federal Law No. 584587-5 "On Amendments to certain legislative acts of the Russian Federation in terms of improving standardisation in the field of environmental protection and the introduction of economic incentives for businesses to implement the best technology", which is currently being prepared for its second reading in parliament.[4]

The question of eliminating accumulated environmental damage, which will require its own law, today remains unresolved. The current regulatory framework also lacks any mechanism for targeted use of federal budget funds for regional or federal level environmental oversight or payments for environmental damage. Currently, the funds raised from fines for violations of environmental law do not go to compensation for damage or other environmental spending, but to repay the deficits of respective budgets.[5]

Indicators	Units of measurement	2011
Pollutant emissions from stationary sources per unit of GDP	Tons per million rubles	0,41
Waste of all classes of risk per unit of GDP	Tons per million rubles	91,3
Number of cities with high and very high levels of air pollution	Units	130
Number of people living in areas affected by past environmental damage	Thousands of people	927
Number of people living in advese environmental conditions (in cities with high and very high levels of air pollution	Millions of people	55

Table 1. Key environmental indicators.

Federal law No. 216 of 03.12.2012 "On the federal budget for 2013 and the planning period for 2014 and 2015" assigned only 0.2 % of the budget to environmental spending. This is a negligible figure.

According to Rosprirodnadzor, 16,125 inspections were carried out coving 220,706 pro perties used by businesses in 2011, down from 17,169 inspections at 227,231 properties in 2010.

At the same time the number of unscheduled inspections rose in 2011, including 2,289 inspections on behalf of prosecutors and another 5,110 planned inspections. Inspectors identified 33,470 cases of administrative violations and issued 764 million roubles worth of fines, of which 560 million roubles were paid.[6]

It should be noted, however, that the courts do not always issue the finding on administrative violations that Rosprirodnadzor asks for and fines are not always collected from the violators.

Prosecutorial Supervision

Due to complications in the environmental situation in the country, the weakening of state control over environmental protection and use of natural resources makes the role of prosecutors in enforcing law and order in this sphere all the more important.

An analysis of the number of registered environmental crimes in the past five years is testament to the absence of any clear trend. Thus, 41,833 environmental violations were registered in 2006; 41,242 in 2007; 44,883 in 2008; 46,607 in 2009; and 39,155 in 2010. As such, the number of cases is more or less consistent, with the exception of 2010.

The number of case documents submitted by prosecutors for preliminary investigation for prosecution under clause 2, part 2, of article 37 of the Criminal Code fell 10% from 1,837 in 2010 to 1,650 in 2011. The number of prosecutions launched on the basis of these materials also fell from 1,411 in 2010 to 1,242 in 2011, a drop of 12%.[7] This is indicative of weak protection for the environment under criminal law and insufficient attention to these issues on the part of law enforcement agencies.

Industrial Control

Article 67 Federal law No. 7 of January 10, 2002, "On Environmental Protection" regulates industrial self-regulation in the sphere of environmental protection. It is aimed at ensuring the compliance of enterprises' economic and other activities with environmental protection, rational and sustainable use of natural resources and also in order to comply with the requirements of environmental protections established by environmental legislation.

There are no normative legal acts on industrial self-regulation in the field of environmental protections. Effective industrial self-regulation of environmental control depends largely on interaction with state agencies responsible for environmental oversight. So far, such interaction is only weakly developed. Furthermore, business leaders and their environmental services generally see their task as to defend the interests of enterprises at any way possible, including by concealing violations of environmental legislation, presenting state agencies with false information and sometimes with direct connivance in wrong doing.

Public oversight

According to a survey conducted by the Levada Centre pollster on August 10–13, 2012, three quarters of Russians are concerned about the environmental situation. The survey sampled 1,601 people aged 18 years and older in 130 urban and rural localities in 45 regions.

It seems that one of the most effective forms of control in the field of environmental protection at the current stage is public oversight of environmental problems, but there are not yet any normative legal acts or mechanisms that would allow the full realisation of its potential.

To this end, it is necessary to:

- adopt a special federal law "On public environmental oversight", which would grant citizens and environmental organisations full-fledged powers of public environmental oversight and make it obligatory to take into account public opinion when making planning decisions;
- amend legislation with the goal of joining the UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (popularly known as the Aarhus Convention);
- improve public access to environmental information, especially regarding the possibility of obtaining objective monitoring data on air and water quality, as well as access to statistics gathered by supervisory agencies during inspections of businesses and obtaining the results of such inspections.

Positive solutions for the natural environment, preserving people's health and creating of decent living and working conditions for them, will all depend in large part on the public's involvement in environmental protection.

Jurisprudence of Prosecution

Violations of environmental legislation can lead to civil, administrative and criminal prosecution. Consideration of environmental cases in civil proceedings generally involves complaints against normative legal acts by government departments and transactions and activities that have a negative effect on the environment and the environmental rights of members of the public. However, the judiciary's lack of independence from the authorities means decisions are often made against the interest of environment.

Difficulties also arise upon presentation in court of claims for compensation for environmental damage. Despite a clear legal right to compensations, difficulties most often arise proving a cause-and-effect link between environmental pollution and the occurrence of the damage in question.

When prosecuting administrative violations of legislation on environmental protection and use of natural resources, it should be noted that the fixed penalties are not comparable to the scale of the damage caused by harm to the natural environment and its components.

When analysing the rules of criminal law on environmental crimes, the assessment and formal composition of certain provisions (articles 251, 252 and 254 of the Criminal Code) should be noted. As an example, one can cite the following case: in a residential area in Nizhny Tagil air pollution from the Nizhny Tagil Iron and Steel Works was found to be 8 to 16 times in excess of the maximum permitted concentration of ethyl benzene and 1.7 to 3.6 times the level for methylbenzene. Any unlawful release of pollutants into the atmosphere is punishable under article 251 of the Criminal Code. However, a criminal prosecution was denied based on a decision not to institute criminal proceedings of 30.03.2006 (archive of the Nizhny Tagil inter-district environmental prosecutor's office).

Similar practice can be seen in prosecutions for acts committed under article 254. In one case, an inspection of an oilfield revealed 5 to 250 times the acceptable level of oil contamination over a 30,000 square meter area of land. But a criminal case was denied on the grounds that soil contamination by oil products did not cause significant environmental harm (exemption material No. 580, Police Report Database No. 4019/ archive of the Strezhevoi city Internal Affairs Department, Tomsk region).

Another problem is that if the natural environment is dirty, but there are no clear signs of mass deaths of animals or plant life, damage to human lives and health, or other serious consequences, applications of open a criminal case are denied and when one is opened it is terminated.

For this makes it necessary to introduce clearer criteria of criminalisation to the relevant articles of the Russian Criminal Code. This problem was partially addressed in Supreme Court decision No. 21 of October 18, 2012 "On the application of legislation on liability for violations in the field of environmental protection". Defining the criteria for opening criminal or administrative proceedings for environmental violations, the court specified the terms "significant harm" to human health and the environment, "complete combustion" in the destruction of forestry plantations, "major damage" in cases of illegal hunting and so on.

The exclusion from legislation of the rules that would best protect the public's right to a healthy environment means it makes little sense to talk about full environmental oversight through legal or judicial protection.

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7. Ibid.

2

2. Economic prerequisites for sustainable development and environmental economics

2.1. The energy sector in the context of sustainable development. Greening of the oil and gas sector: problems and perspectives

Alexei Knizhnikov

Russia's economic development is to a large extent dependent on its hydrocarbon-based fuel and energy complex. Russia has about 6% of proven global oil reserves and 24% of natural gas deposits. The government's Energy Strategy for Development of the Fuel and Energy Complex by 2020 envisages preserving current levels of production and export of crude oil in the medium term and an increase in natural gas production.

Historically, extensive exploitation of oil and gas reserves has entailed massive damage to Russia's natural environmental (including pollution from oil spills and flaring of associated gases) in traditional centres of production (especially Western Siberia) and the current development of off-shore projects on Russia's Arctic shelf carries new risks and threats. Although the number of serious accidents has fallen in recent years, the total number of emergencies and failures, mostly from on the pipeline network, number in the thousands. Russia's oil and gas industry burns more associated gases than any other country in the world (www.wwf.ru/resources/publ/book/837) and new projects being developed today are in such difficult environments and climatic conditions (including the permafrost zone and the Arctic sea shelf) that environmental risks are significantly increasing.

Exploration and development work in the Arctic increases the likelihood of oil spills from drilling platforms, pipelines and oil reservoirs and also as a result of unloading oil onto tankers. At the same time, changes in arctic ice conditions are opening up new sea routes in the region. For existing shipping routes this means more vessel traffic during a longer navigational period than before. New sea routes will bring with them the risk of shipping accidents and the associated danger of oil spills.

Most technologies proposed for cleaning up oil spills in the Arctic are adapted from techniques and equipment used in open water and land-based oil fields in more temperate climates and they must be proven in practice before any decision is made about whether they should be adopted. The environmental and climatic conditions in the Arctic are an obvious factor significantly reducing the effectiveness of most existing oil spill response techniques. Typical arctic conditions impacting anti-spill operations include various forms of sea ice, extremely low temperatures, limited visibility, heavy seas and strong winds. These conditions significantly reduce the effectiveness of spill cleanup technology and systems.

Any development of natural resources in the Arctic in coming decades will carry significant risks. Although the retreat of sea ice is making the region more accessible in the long term, unpredictable short-term change will present serious problems for the development of action plans for emergencies.

It is not only the Arctic Ocean that is attracting special attention from oil companies. The Sea of Okhotsk is one of the richest marine biospheres in the world, providing about 60% of Russia's fisheries production. But areas of high biological productivity and traditional fishing grounds often overlap with rich oil and gas deposits on the sea shelf. Hydrocarbon reserves are already being exploited on the Sakhalin shelf.

"Rosneft" is planning to open up new fields on the Magadan shelf and "Gazprom" on the West Kamchatka shelf. The estimated resources of these fields are equivalent to only a few percent of Russia's total oil reserves, but developing them will put the future of a full third of the country's fisheries – i.e. the country's food security – at risk. There is a threat that Kamchatka's fisheries will cease to be considered environmentally clean, which will in turn impact the investment attractiveness of the region's fisheries and tourism industries. Compensation for damage incurred by the fisheries in the course of oil and gas development will take the form of building fish farms, which carry further threats for the wild salmon population.

Development of offshore fields today is irrational because of unacceptably high environmental and economic risks - especially the economic risks associated with massive fluctuations in the world oil prices, which were vividly demonstrated by the global economic crisis that began in 2008. A new reality has taken hold of global energy markets as a result of a sharp growth in shale gas production and the use of liquefied natural gas, the stabilisation of energy demand in many countries and so on. Taken together, these factors may well make oil and gas from Russia's new fields unprofitable, "freezing" vast investments. As such, it would make sense to postpone further development of these fields until advances in technology make it possible to do so safely and zones closed to oil production and transport can be created around the most valuable fishing grounds, for example on the West Kamchatka shelf.

Exploitation of land-based oil and gas fields carries its own risks. Among the most pressing problems facing Russia today, along with leakage from oil pipelines, is the flaring of associated petroleum gases (APG). Russia's APG flaring outdoes the rest of the world in scale, environmental damage and energy waste. According to various estimates, Russia burns off between 20 billion and 30 billion cubic metres of APG every year, an amount comparable to the entire annual energy needs of Moscow. The largest volumes are flared in the "oil and gas bread basket" of the Khanty-Mansiysk autonomous region, but it is already almost matched by Eastern Siberia and indicators are also getting worse in The Yamalo-Nenets autonomous region, the Komi republic and the Nenets autonomous region.

The World Wildlife Fund (WWF) has been campaigning to reduce Russian gas flaring since 2009. Data from oil companies about the scale of production and use of APG in recent years shows clear leaders and stragglers in the field.

When assessing the dynamics of APG production amongst Russia's largest oil companies, it should be noted that it has grown steadily over recent years. The index for rational utilization of APG has not improved, remaining stubbornly at about 75%. This can be attributed to a number of factors:

1. The continued growth of oil production on the back of development of East Siberian fields despite an absence of the infrastructure necessary for rational use and transportation of APG;
2. Growth of the gas factor at Russian oil fields, including in Western Siberia – the largest oil producing region in Russia, accounting for about 60% of national output (in six years the gas factor has grown across Russia by 9% and by 11.2% in Western Siberia);
3. The beginning of commercial production at the Vankor field, the largest of the newly developed fields in Eastern Siberia.

Table 1. Growth of APG production amongst oil cmpanies working in Russia, 2006-2011 (billions of cubic metres). Based on oil company figures and publically available data.

Company	Associated gas production (billions of cubic metres)						Associated gas utilization (as a percentage of volume produced)					
	2006	2007	2008	2009	2010	2011	2006	2007	2008	2009	2010	2011
Rosneft	8,600*	10,100*	10,900*	11,700*	13,800*	15,300*	59,0*	60,3*	63,2*	67,0*	56,2*	53,6*
TNK-BP	11,300*	12,400*	12,200*	12,500*	13,100*	13,997*	79,8*	68,4*	79,6*	84,4*	84,6*	82,8*
Surgutneftegaz	15,630*	14,990*	14,780*	14,030*	13,930*	13,229*	93,5*	94,3*	95,4*	96,9*	95,9*	97,8*
Lukoil	6,700*	7,600*	7,400*	8,200*	8,600*	7,941*	75,0*	70,0*	70,4	71,1	76,8	79,3*
Gazprom Neft	4,532*	4,885*	4,569*	4,282*	4,736*	4,716*	45,0*	35,7*	46,8*	48,1*	55,2*	60,4*
Slavneft	0,925	0,928	0,899	0,905	0,851	0,845*	62,5	68,1	69,5	71,1	71,9	75,0*
Tatneft	0,739*	0,738*	0,762*	0,757*	0,770*	0,833*	95,1*	94,0*	94,6*	93,7*	94,7*	94,9*
Bashneft	0,389	0,370	0,362	0,377	0,436	**	78,2	82,1	84,5	85,7	83,1	81,9
Russneft	1,634	1,546	1,488	**	1,461*	**	71,0	70,3	61,0	68,9	70,0*	**

* Data provided by companies on request
** Data unavailable

The most efficient companies in 2011 were "Surgutneftegas" and "Tatneft" which achieved utilization levels of 97.8% and 94.9% respectively.

The state-controlled giants "Rosneft" and "Gazpromneft" are the worst performing and "Rosneft's" utilization levels significantly deteriorated in the five years up to 2012 (from 67% to 48% in 2012). Over the same period, almost all private sector companies improved their utilization rates.

"Rosneft's" deteriorating record on utilizing APG is a typical example of a common situation in Russia when a state-owned company, confusing its own interests for those of the nation, seeks to be held to lower environmental standards in order to gain a one-sided advantage over its private-sector competitors, who are obliged to abide by the law. Thus, for example, "Rosneft" did not take into account the high gas-oil ratio in the Vankor field when it accepted a loan from the China Development Bank for development there and when the time came to pay off the loan with deliveries of oil from the fields, it became politically "convenient" to ignore the environmental indicators. "Rosneft" itself admits in its sustainable development report for 2011 that the decrease of its utilization of APG to just 53% is due to the increase of production at Vankor, while at the same time stating an intention to raise gas utilization to 95% in response to the crisis.

Efforts to resolve the problem of gas flaring issue are hindered by a number of factors, including:

- out of date legislation;
- an absence of transparent and reliable data;
- a shortage of flares equipped with metering devices.

In an address to the Russian Parliament in November 2009, then-President Dmitry Medvedev singled out associated gas flaring as a flagrant example of inefficient use of energy resources. "It pollutes the environment and literally sends tens of billions of roubles up in smoke. We must act decisively and quickly and we will not accept any excuses from the producing companies," he said. Yet the problem is still far from being solved and instead of "acting decisively" the Ministry of Energy, under pressure from the oil lobby, has once again postponed the deadline for achieving 95% utilization from 2012 to 2014.

Deadlines for banning low-quality fuel have also been repeatedly postponed. The ban on Euro-2 has been put back to 2013, on Euro 3 to 2015 and on Euro 4 to 2016. The government takes decisions in favour of state corporations. As a result, Russia is lagging 10 to 13 years behind the EU in banning low-quality Euro-2 and Euro-3 grade fuels, which contribute 90% of atmospheric pollution in large cities like Moscow. At the same time, the government is effectively punishing those who have thrown millions of dollars into new technology and modern equipment in order to meet environmental standards – especially the privately owned "LUKoil" and "TNK-BP".

Domestic factories and refineries that carried out modernisation to deadline now find themselves in a worse competitive position and investors have received contradictory signals about the wisdom of modernisation and greening of production capacity. The Ministry of Energy gives in the wishes of state-sector companies with the support of the government, in as far as the speed of the switch to new standards is meant to be correlated with the ability of Russian companies to meet them. But data about the dynamics of APG utilization clearly shows that privately owned oil firms, which need to compete openly on both the domestic and global markets and are obliged to produce management and development strategies that conform to international environmental standards, have successfully achieved the targets for both AGP utilization and introduction of Euro-4 and Euro-5 grade fuel. Yet state corporations are either unable to achieve such environmental standards, or purposefully ignore them. We can also say that lobbying by state corporations for amendments to the timetable for adopting new environmental standards are either attempts to cover up mistakes in strategic corporate planning or the result of a conscious focus on unfair competition.

In 2012 the Government resolution "On calculating payments for emissions of pollutants from the flaring and (or) dissipation of associated petroleum gas" set a target of limiting flaring to not more than 5%, but only a few companies and regions have managed to improve their APG utilization.

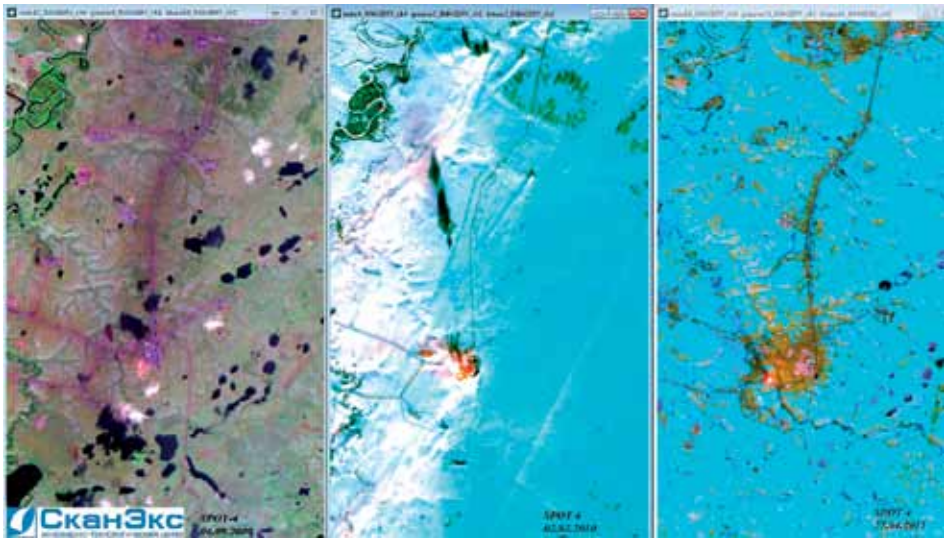

Fig. 1. An example of the use of remote earth sensing for monitoring APG flaring. Vankor oil field.

The absence of continuity and consistency in government action on this question makes it difficult to concentrate financial resources on state support for companies tackling this important problem of energy efficiency and atmospheric pollution.

Another important problem in Russia is the absence of objective information about the scale of flaring, including the very small number of oil fields with the equipment to measure it. WWF Russia and the ScanEx centre have completed a pilot project in two regions – the Nenets Autonomous Region the Krasnoyarsk Region – using remote earth sensing to measure flaring. This work is set to continue with the support of federal and regional environmental protection agencies and in the near future should provide an additional tool for monitoring flaring.

For ubiquitous and reliable accounting of APG it is appropriate to use economic incentives for organising auditing and control. That means responsibility for the reliability of accounting, the accuracy of final figures and the calculation of fees to be paid, should be handed to the tax authorities and not Rostechnadzor, the federal technological, environmental and nuclear watchdog that currently administers these things.

In the field of international cooperation there has been a jump in applications to tender for joint implementation projects under the Kyoto Protocol, but Russia's refusal to take part in the second implementation period of Kyoto means this source of financing will soon dry up, at least in its current format.

A more effective use of oil-producing land is possible with the help of large scale development of gas chemistry. This requires an integrated approach, allowing the formation of conditions for realising investment projects to equip oil fields with flare-monitoring apparatus and to build facilities for the processing, storage and transportation of APG.

The problems facing the oil and gas sector could largely be resolved with a change to state subsidies policy. Instead of providing tax perks and over privileges for high risk off-shore projects in the Arctic (such as "Gazprom's" "Prirazlomnaya" project in the Pechora Sea and the Rosneft-Exxon joint venture in the Kara Sea), it is appropriate to provide state support for increasing efficiency at existing fields. The environmental and economic risks and costs of developing the Arctic shelf today are so high that it is necessary to change the vector of priorities in the oil and gas sector in the next 10 to 15 years.

2.2. Energy efficiency: legislation, state policy, economic and business practice

Yevgeny Gasho, Maria Stepanova

Improving energy efficiency is imperative for many reasons. It ensures the competitiveness of the national economy and is an essential element in sustainable development and the fight against global climate change. There is no doubt that the state has an active role to play in reducing the energy intensity of the economy. But a significant barrier to turning these energy efficiency policies into practice is the impossibility of accessing the support offered by the state because of the poor quality of public services.

Relevance

A proper understanding of energy use in various sectors of the Russian Federation, free from myths and inaccuracies, is only just beginning to take shape. Despite some difficulties, energy audits and the compilation of meter readings are beginning to give us a more complete picture of the actual losses and scale of energy efficiency in industry, municipal services, energy networks and energy generators.

Without going into the sectoral and regional subtleties, it is safe to say that the underlying reasons for energy inefficiency in Russia are quite different from those in other countries. Loss of efficiency in the energy and generating sectors mainly occurs due to under running, inefficient working regimes and heavy wear and tear on equipment. Grid infrastructure is inappropriately run, worn out and outdated. Cost-benefit overruns and various other forms of "inefficiency" are the combined result of a whole range of factors contributing to a sharp decrease in the reliability and safety of cities' power supply systems.

At the national level, there remains huge potential for energy efficiency (according to various estimates, energy losses alone amount to 50 % of consumption) and it should be more than cost efficient: 1 kWh of saved energy costs between a quarter and half the price of the same one kWh produced from newly built generating facilities.

For a number of regions the case for energy efficiency is made even more urgent by a severe shortage of generating capacity for factories and industrial centres. This is no less than a matter of survival for existing and newly emerging markets for various products, especially following Russia's accession to the WTO. For large cities, it makes upgrading long-neglected utilities and reorganising the housing sector essential.

In any case, energy efficiency and the use of renewable energy are intimately linked with questions of energy security and energy supply and thus to sustainable development. This nexus of issues demands planning and development and should be reflected in government policies and programmes.

The Regulatory Framework

The legislative and regulatory framework is one of the main instruments of state policy in this field and also the main target of criticism by the expert community.

The law laying the foundations for regulation of energy efficiency, Federal Law No. 261 "On energy saving and energy efficiency improvements and on amendments to certain legislative acts of the Russian Federation" (2009), came into force more than three years ago. Practical implementation of the measures it outlined was regulated at first by an action plan approved by Government Decree No.1830-r of December 1, 2009 and then by a successor document, the action plan to improve state regulation in the field of energy conservation and energy efficiency (decree No. 1794-r), which came into force in September 2012. The appearance and content of the latter greatly influenced expert discussion and the emergence of a consolidated position in the regions, which is a positive precedent.[1]

A multiplicity of conflicting opinions and persistent problems in realising state energy efficiency policy has made finding consensus difficult, however and there have been multiple attempts to change law No. 261. The table of amendments is by now much longer than the text of the law itself, to the point that in places they are even mutually contradictory.

The long-awaited Federal Law No. 190 "On Heat Supply" was passed and came into force in July 2010. It seriously changed the scope of heating sector regulation and the sector has yet to fully assimilate all the changes it introduced. Another Federal Law, No. 416 "On Water Supply and Sanitation" came into force on January 1, 2013. Along with a series of lower level by laws, these pieces of legislation form the legal framework for a vast task – the development of municipal heating systems in cities, towns and villages.

A 2011 review of progress of the State Programme "Energy saving and energy efficiency for the period up to 2020" (Government Degree No. 2446-r of December 27, 2010) revealed a number of shortcomings and gaps in its realisation so far. A final bill, the draft State Programme "Energy Efficiency and Energy Development for 2013–2020", is currently being finalized.

Experts have repeatedly criticised and continue to make recommendations for the improvement of the regulatory framework. However, one thing is clear: three years is a relatively short time for clearly establishing and stabilising such regulations and as long as they continue to mutate the key to success will be attracting input from the expert community.

Problems of Practical Implementation of State Policy

The main barriers to implementation of energy efficiency policy include:

1. A lack of **coordination and consistency,** which can be explained by the short-term nature and breadth of coverage required. Opportunities and incentives proclaimed in high-level laws and regulations were not developed according to the procedures and mechanisms of the lower-level legislation, which effectively prevents them being used.

Instruments of state policy were tailored for regional authorities and municipalities rather than for businesses, especially industrial enterprises. At the regional level and below there are no indicators for monitoring and analysis of energy efficiency in industry, no data and no instruments for gathering data or influencing the situation. At the same time, polls show that the vast majority (about 85 %) of industrial companies are interested in using real mechanisms of state support.[2]

The support that has been proposed is difficult to use because of incomplete legal mechanisms and a focus on large enterprises, of which there are generally no more than five or seven in each industry. While banks are interested in large projects, lending rates are still too high for most prospective borrowers, preventing the mass development of modernisation and energy efficiency projects in industry.

At the same time, heavy industry and the private sector in general remain the most motivated to implement energy efficiency measures. Metallurgy, building materials and a host of other industrial sectors have already seen upgrades to production cycles, the application of best available technologies and the introduction of energy management and certification systems in accordance with ISO 50001:2011 aimed at reducing energy intensity per unit of output to the global average. These measures not only reduce the role of energy in production costs and improve competitiveness, but also contribute to lowering the carbon footprint of entire industries.

2. **A lack of reliable data.** While meter readings and energy audits are finally helping us put together a true picture of energy use in different sectors and regions, there is still a lack of reliable data for forming state policy.[3] Standard forms do not meet the new requirements. A system for aggregating information from various entities (businesses, public institutions and so on), including meter readings, has not yet been established. The quality of data from "energy passports" is questionable and in any case has not yet been processed (the Ministry of Energy began collecting passports in electronic form after a campaign for compulsory energy auditing).

3. The campaign for **energy auditing** yielded some results in terms of certification of facilities and initial information about them, but did not, unfortunately, prove a stepping stone to a real increase in energy efficiency or more practical energy services. Energy servicing activity stalled for a variety of reasons.

4. Slack **monitoring** of state energy efficiency programmes and regional programmes, means the control loop is not closed, there is no feedback and thus no room to adjust.

5. In the domestic sector, a campaign to develop and rebuild **municipal heating networks** in towns and cities presents all numbers of challenges and difficulties.[4]

Over all, the key issue is chronic under-funding of public infrastructure due to continued low availability of financing. The few exceptions only prove the rule.For example, the Arkhangelsk region has experience of financing energy efficiency projects with financial credit.

Table 1. Typical financing scheme for energy efficiency projects in the Arkhangelsk region

<table>
<tr><td rowspan="5">Total investment 100%</td><td>Self funding 30%</td><td colspan="2"></td></tr>
<tr><td rowspan="4">Outside investment and borrowed funds 70%</td><td rowspan="2">Financing from Russian sources 17%</td><td>Loans 0%</td></tr>
<tr><td>Federal or Regional government budget 17%</td></tr>
<tr><td rowspan="2">Financing from foreign sources 53%</td><td>Loans 25%</td></tr>
<tr><td>Grants 28%</td></tr>
</table>

Over the last ten years more than 60 energy-saving projects have been developed and implemented, most of which have followed the model below (table 1).
These projects include renovating street lighting, upgrading school boiler rooms, a pilot project to re-lay heating systems, experimental wind turbines and wood-chip fired boilers. An important issue is the financing of energy efficiency projects (table 2). The existing lending system in Russia allows only for short-term, quick payback projects, which are insufficient for the mass up-take of energy efficiency projects. It is necessary to develop a system of long-term, low interest loans for energy saving projects similar to the system of mortgage lending. This would create opportunities to develop the energy services market, as well as large-scale use of performance contracts, which, in turn, would create an opportunity to attract investment for energy efficiency projects in the residential and the public sectors, which, as a rule, currently rely on tax payers´ money.

Table 2. Project donors

Among foreign companies, international agencies and associations, project donors include:	
EU	European Union
NEEG	Norwegian Energy Efficiency Group
NEFCO	Nordic Environment Finance Corporation
STEM	Swedish National Energy Administration
SIDA	Swedish International Development Agency
WWF	World Wildlife Fund
BASREC	Baltic Sea Region Energy Cooperation
TACIS	Technical Assistance for the Commonwealth of Independent States
IFC	International Finance Corporation
GEF, UNO	The Global Environment Facility (GEF), United Nations

6. Steps are being taken to establish a legal framework to promote energy efficiency in apartment buildings, but the creation of a transparent and **genuinely workable procedure** is still a long way off.

7. There is still not enough education and training in energy efficiency to support wide-spread adoption of such technologies and practices. Government departments are creating a layer of "informed energy auditors", who will train specialists in heating systems and other energy saving subjects.

Principles of Policy Making

It is possible to identify a number of key principles for making successful energy efficiency policies.

1. **Prioritise the rights and interests of consumers.** If we lose sight of the ultimate goal of any aspect of socio-economic policy – the welfare and quality of life of a country's citizens – talking about sufficient state influence over any industry becomes meaningless. Experts have repeatedly called for the reinstatement of a special chapter on consumer rights in law No. 261; for the interests of energy consumers to be reflected in targets and performance controls; for the performance of both generating and distribution companies organisations to be gauged in terms of the price paid by the end customer; and for recognition that energy conservation, as important as it is, must be secondary to creation of comfortable conditions and compliance with health standards.

2. **Involve all stakeholders.** In modern society, any government policy should be based on the support of professionals, businesses, experts and citizens. Bringing all interested parties into the process of formation and implementation of energy efficiency policies establishes consensus and its absence implies opposition to the state's direction and the failure of the entire policy. This also involves information and publicity work and creating a system of motivation for all stakeholders, which is so far lacking. For example, only about a third of the EU's Best Available Techniques Reference Document[5] on the subject is dedicated to actual technology issues. The rest of the hand book concerns information and management advice on matters like how a company should announce its goals and objectives, staff training, incentive systems, energy management and so on. Awareness and confidence in the necessity and safety of the proposed measures and mechanisms is essential in business, the public sector and amongst the general public.

3. **Coordinate** energy policy at the federal, regional and inter-branch levels with the plans and development programmes of state-owned and private energy companies, potential investors and others. This means linking various goals, objectives, benchmark targets and implemented measures. A united national policy should, at the same time, highlight regional and sectoral priorities and technological and innovation pathways and keep national strategic documents in alignment with regional and sectoral development plans – in terms of targets, areas of actions and specific measures.

4. **Balance** public policy measures across geographic regions, amongst industries, between energy consumers and along the links of the generation – transmission – distribution – final consumption chain. Implementation of policy should also be balanced from year to year and according to the largest developed generating capacity; between building new energy capacity and making existing installations more efficient; between traditional and alternative sources of energy; and amongst various measures to ensure each of these complements the others.

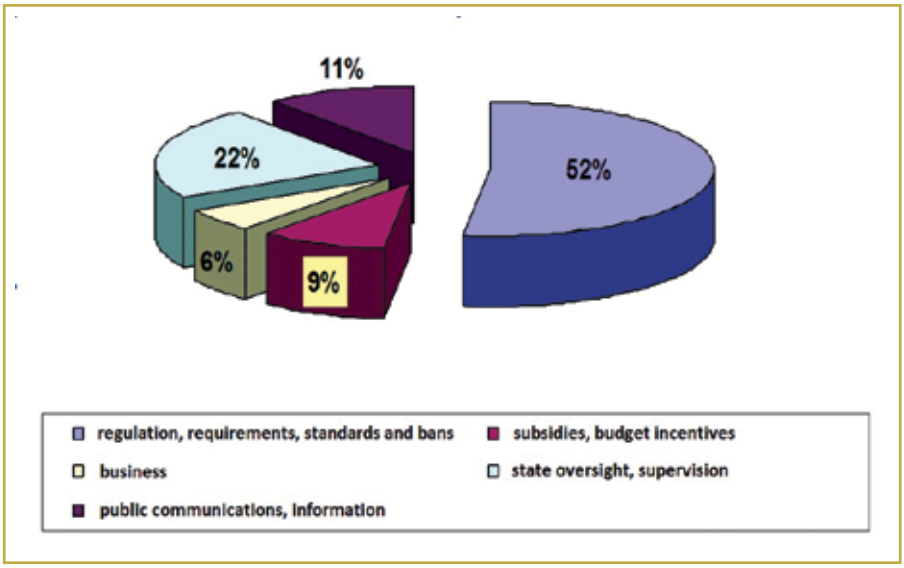

Fig. 1. Energy efficiency incentives by sector.

Today, the mechanism of incentives includes more than 100 different measures,[6] distributed between sectors as shown in fig. 1. Characteristically, the structure of incentives in the Russian economy reflects the need for more stringent regulatory systems (requirements and standards) at the current stage of the resource and energy efficiency drive,[7] as evidenced, in particular, by previous European experience. With the introduction of strict mechanisms and the emergence of a new institutional environment, "soft" measures (cash benefits, publicity and so on), will become more important. After clear "rules of the game" have been established, the scope of effective business projects may be broadened.

5. Maintain **unity** and integrity of policy while at the same time taking regional specifics into account. This was discussed at the beginning of the article. The situation is qualitatively different from region to region and that requires different approaches to energy policy.[8] Fig. 2 shows a visualisation of regional differences in available power and energy intensity of gross regional product (GRP). For the 15 regions with fuel and energy consumption rates of 1 to 3 tons of coal equivalent (TCE) per capita, we should not yet be talking about energy efficiency at all, but rather about elimination of energy poverty and improving the economy's energy supply.

The two dozen regions with consumption rates of 3 to 5 TCE per person also require some increase in power supply for both commercial and domestic consumers, but here there are also opportunities to reduce losses. In the sixteen regions with average rates of consumption (5–7 TCE per capita), energy-saving potential in various sectors varies from 15 to 25 %. Regions with high consumption rates tend to have developed energy infrastructures that can be redirected to new production. Regions that consume more than 8 TCE per capita have an unacceptably high level of energy intensity per unit of GRP. Due to energy-intensive processes with low surplus

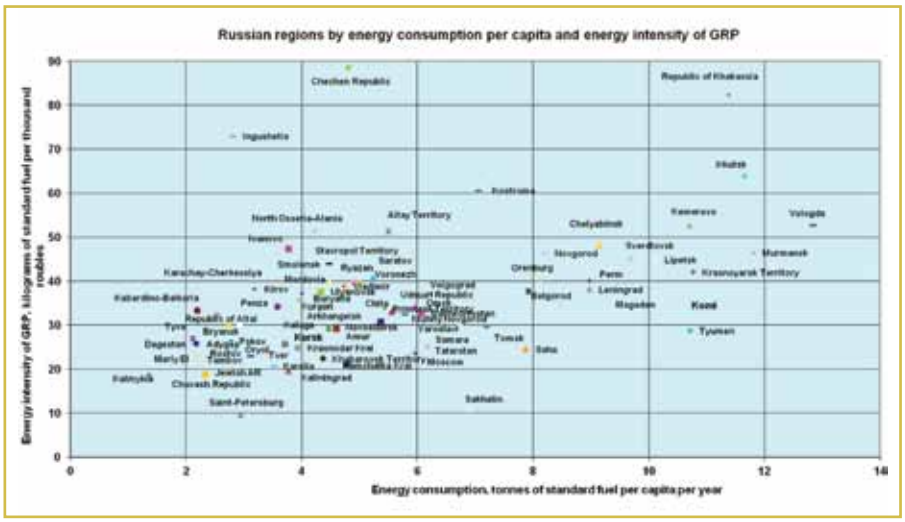

Fig. 2. Russian regions by energy consumption per capita and energy intensity of GRP

values, it is possible to register energy-efficient and profitable manufacturing outside of the region. The key methods for reducing the energy intensity of GRP are well known (GRP in formula 1): reducing losses and waste of energy resources in various sectors of the regional economy (reducing the numerator); growing the regional economy on the back of low-energy and high-value-added sectors such as services, small business and tourism (increasing the denominator); and developing new energy-efficient technologies and renewable sources of energy. The exact combination of these three components of energy efficiency strategy is determined by local conditions and will vary from region to region.

$$GRP = \frac{\sum_{i=1}^{n} V_i}{\sum_{j=1}^{m} (O - C)_j}, \text{ where}$$

- **i** energy resources (oil, gas, electricity, etc.)
- **Vi** volume of consumption of energy resource i
- **j** productivity of residents of the region
- **O** gross output
- **C** intermediate consumption

Formula 1. GRP.

As practice shows and as noted above, in the current environment and with existing development strategies most regions will find it extremely difficult to achieve 40 % reduction in energy intensity by 2020. And as fig. 1 shows, the strategy of simply reducing energy consumption cannot be applied in every region: for many, a 40 % reduction in energy use would be extremely painful. But the growth of gross output

and reduction of intermediate consumption by promoting economic sectors with relatively low rates of consumption (for example the services sector), generally invigorating the economy and adopting new energy efficient means of production and renewable sources of energy, are all far more effective measures. Each region will find its own combination of these elements depending on local conditions (table 3).

Besides these conditions, there exist a number of important factors affecting regional energy efficiency concepts. In particular, industrial regions need more focus on fully utilizing the potential of existing energy resources, energo-technological integration and the use of secondary energy resources, while in agricultural and sparsely populated areas the priority should be on development of remote settlements and transport infrastructure.[9]

6. Emphasise **new technology and modernisation,** use of technological corridors and road maps. Without going into the sectoral and regional subtleties, it is safe to say that the underlying reasons for energy inefficiency in Russia are quite different from those in other countries. Loss of efficiency in the energy and generating sectors mainly occurs due to under running, inefficient working regimes and heavy wear and tear on equipment, all of which carry high costs and environmental risks for new developments and frequently lead to the exhaustion of traditional deposits of energy resources.

Table 3. Energy efficiency measures and their impact on energy intensity, GRP

General measures and activities	Energy Consumption	Gross regional product	Preconditions
Modernisation of energy-intensive processes in metals, oil and gas and chemical industries	Significant reduction in the numerator	–	Guaranteed sales of new products to pay off modernisation costs
Reducing losses and energy waste in various sectors of the regional economy	Slight reduction in the numerator	–	A payback period of three to five years on power-saving equipment (in various forms of compensation)
Economic growth through low-energy, sectors including services, small businesses, tourism.	Slight increase in the numerator	Significant growth of the denominator (GRP)	The possibility of attracting investment for the development of small businesses*
Development of new energy efficient equipment (lighting, appliances)	Slight increase in the numerator	Significant growth of the denominator (GRP)	Identifying equipment, working with consumers, tax credits
Active development of (local) renewable energy sources	Reduction in the numerator (consumption of fossil fuels)	Growth of the denominator	Potential for local renewable energy, economic incentives, tax credits, etc.
Improving mobility and public transport and development of remote settlements	Slight increase in the numerator	Significant growth of the denominator (GRP)	Adoption of regional programmes to promote energy efficient transport
Statistical audits of regional energy consumption and taking full account of their share in GRP	Possible significant reduction in the numerator	Possible significant growth of the denominator (GRP)	Measures for recording supply-demand balance in the region and optimizing statistical work

* In some cases additional conditions include grid connections for new producers and the availability of space power capacity.

At the same time, those market actors who are motivated to improve energy efficiency are already looking for ways to modernise and they are employing a fairly wide range of technologies to do so (fig. 3).

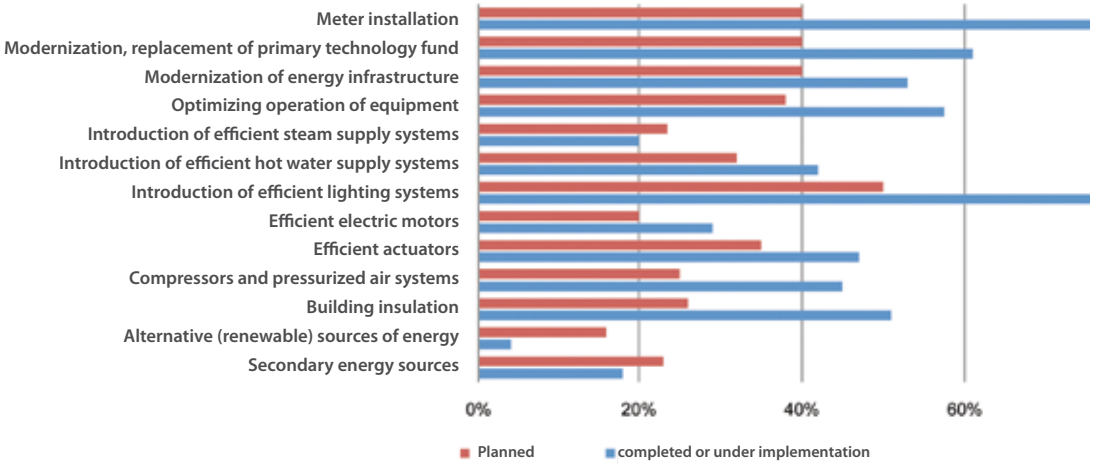

Fig. 3. Energy efficiency measures in industrial enterprises.

7. **Introducing energy planning at all levels.** Existing legislation requires businesses, municipalities and regions to adopt a range of new tools for monitoring and analysis of energy consumption, including fuel-energy balances, heat supply schemes, integrated development programmes for municipal infrastructure, energy efficiency programmes at various levels and so on.

   The introduction of energy planning practices allows us to balance projected inputs and modernisation of energy sources with long-term projects and the dynamics of the industry and regional development, including selection of innovation parks, intense home building schemes, the priorities of modern industrial policy and other important government tasks.

8. **Having a constant cycle of improvement.** The ongoing nature of energy efficiency policy requires both consistent and sustained introduction of new measures and their constant improvement. To do this, it is necessary to fulfill all parts of the cycle (data collection, goal setting, planning, implementation, monitoring, adjustment) and close the loop so feedback is effective.[9]

9. **Using Electronic Documentation.** Today, demand for transparency, openness, mobility and flexibility means that data must be aggregated, stored, updated and processed in electronic databases and automatic control systems. It is necessary to modernise and revitalise the State Information Systems for Energy Efficiency and the Fuel and Energy Complex (GIS-EE and GIS-TEK), synchronise them, take metering data in the nearest future from so-called Energy Passports and synchronise it with regional segments. It would also be helpful to add filters at the lower levels, so that the regions conduct their own verification of data as they pass information to the federal level.

On the positive side, the state, in setting the strategic objective of drastically reducing the energy intensity of GDP, has taken upon itself an active role in the development and implementation of these policies. Despite differing opinions about their quality, the government's policies on increasing energy efficiency in Russia continue to improve. Yet the full tapestry of effective energy policies in Russia is currently made up of fragments of regional modernisation projects in the energy sector and public utilities. It is in dire need of a systemic and interdisciplinary "energy modernisation policy" which would unite energy saving, technical innovation, human progress, a set of incentives for implementation and effective state control.

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2.3. Renewable energy: legislation, state support and business initiatives

Ivan Yegorov

Russia has enormous potential for renewable energy. The technical potential of the country's renewable energy resources is equivalent to five times annual demand for primary energy resources and in terms of economic potential, they could provide one third of the Russian economy's annual energy needs. Until recently, however, this vast potential has been almost completely untouched. Nonetheless, several factors may contribute to the formation of a Russian market for energy-saving and renewable energy sources in the coming years.

The total inefficiency of the centralised energy and gas sectors, rising utility tariffs and problems with connecting to utility networks, contribute to the rapid development of small-scale energy distribution, including renewable energy-based sources. In the coming years, the mass rejection of centralised power services by energy consumers in favour of their own, independent power projects may become irreversible.

The future success of large-network renewable energy projects is dependent on state support measures that are expected to be adopted in 2013. These measures will stimulate the development of both large projects working in the wholesale market and smaller projects working in the retail market.

A key condition for the appearance of a truly functioning system of support for renewable energy in Russia is the presence of large investment projects by major industry-leading companies. Such companies have both the ability to articulate their proposals and be heard and are also ready to give guarantees of investment in real projects.

Companies that have already identified renewable energy as a key area for future development and have the resources to influence market formation include "Renova", "Russian Technologies", "Rosatom" and "RUSNANO".

The alternative energy market in Russia is one of only a few sectors of the Russian economy set to grow rapidly in coming years. It is attractive enough to have produced an abundance of small-sized investment projects providing access to investment – including for small and medium-sized companies – and contributing to the establishment of the market environment. The government's interest in the development of this market is evidenced by its extremely liberal attitude to the investors and equipment suppliers involved.

Problems of Centralised Energy Services as a Factor in Development of Renewable Energy

The most significant difference distinguishing Russia's renewable energy sector from those of other countries lies in the spontaneous emergence of renewable energy projects in response to the challenges faced by the traditional centralised energy sector.

While in the late 1990s and early 2000s the Russian energy sector was in a relatively good state compared to other industries, by 2005 it had suffered the worst depreciation of fixed assets of any Russian industrial sector.

If generating and network companies' modernisation programmes do not succeed, the coming years will see wide-spread compulsory restrictions on power consumption, similar to the rationing in many Russian regions in the winter of 2005 to 2006.

The deterioration in the quality of power supply comes amid a sharp rise in tariffs, especially in the retail electricity market. Since 1999 Russia has seen an increase in energy prices unprecedented by global standards, with the rouble and the dollar equivalent of electricity more than quadrupling and prices rising at rates 50% above inflation.

Particularly sharp increase occurred after the liberalisation of the electricity market in 2011, when the price of 1 kWh for small consumers (up to 5-10 MW) connected to the low voltage networks exceeded 3 to 4 roubles and in some regions of central and southern Russia reached 6 to 6.5 roubles. Thus, for a large category of Russian consumers electricity rates are already comparable to or higher than in the United States and Eastern Europe.

A number of factors suggest prices will continue to grow at rates above inflation, by at least 15% in the next 5 years and not less than 10% in the medium term, eventually bringing tariffs to Western European levels.

The main reason for the price jump was an increase in network fees, which now account for 60% of the final tariff, largely thanks to the need to pay for investment in large-scale grid reconstruction programmes. But an important fundamental reason for the increase in prices was the ill-fated break-up of Unified Energy Systems (RAO UES). Market liberalisation has not led to the emergence of competition and lower prices in either the energy generation market or the energy retail sector.

A third reason for the rise in prices is the inefficiency of Russian power plants. The technological backwardness of Russian thermal power plants poses a particular threat given the country's heavy reliance on gas-fired power stations. Gas consumption per unit of electricity generated in Russia is more than 50% higher than in developed countries. Today, Russian power stations turn relatively cheap gas into expensive electricity and any increase in gas prices will significantly increase the prices of generating companies across the wholesale market.

In turn, the government plans to make domestic gas tariffs as profitable as European ones over the next four years, which will mean an increase of 250%. With soaring costs and falling export earnings, this measure is the only way to maintain stability in the Russian gas industry.

As a result, Russia's centralised energy system, once the basis of the country's energy security and – thanks to economies of scale – a guarantee of cheap electricity, is in the midst of a deep strategic crisis. That crisis could lead to partial or complete rejection of centralised energy services by low and medium-level (from 1 MW upwards) power consumers in favour of their own generating plants. As a rule, demand for non-network generation grows rapidly once tariffs rise above 3 to 4 roubles per kWh.

The situation is exacerbated by the problem of access to networks by established enterprises. For example, in the Moscow, Leningrad and Krasnodar regions and a number of other energy-deficient parts of the country, companies are facing the problem of high prices for grid connections. On average, 30% of applications for grid connection go unsatisfied and many face shifting deadlines.

Finally, two thirds of the country, where about 20 million people live, are located outside the district energy networks. These areas have the highest production cost for fuel and energy (more than 25 roubles per KWh). Federal, regional and municipal budgets are forced to subsidise diesel generation, setting a price of 2 to 4 roubles per kWh for the public. Fuel costs account for up to half of the regional budgets.

Of course, the mass adoption of alternative energy projects in Russia still faces many obstacles. Not all renewable energy sources can provide the reliability and continuity of supply required by autonomous power systems. A major shortcoming of most types of renewable energy is the relatively low utilization of capacity compared to conventional energy sources and an associated volatility of energy flow. Consequently, there is a certain scepticism and mistrust of these new technologies on the part of Russian consumers.

Russian power engineering firms are able to provide only half of what the renewable energy sector needs. In particular, there is no production of automated control systems, generating equipment for wind energy, equipment for installation of wind turbines, wind turbine blades, fermenters for bio-gas plants, or low-to medium power co-generation plants.

Despite the obvious economic benefits, far from all companies interested in switching from centralised power to renewable energy are able to fund such a move themselves. For many, such investments are not a priority, because they see energy generation as a non-core asset. There is also a shortage of experts in renewable energy who understand the criteria for successful projects in Russian financial institutions.

Nor has state-regulation of the sector gone entirely smoothly. The government is expected to adopt measures promoting the use of renewable energy this year. At the same time, some segments of the renewable energy industry are already quite competitive in the current environment and can provide high returns for investors

State Support for Renewables

The first legislative support for the development of renewable energy appeared in Russia in November 2007 with the adoption of Federal Law No. 250 "On Amendments to Certain Legislative Acts of the Russian Federation in Connection with the Implementation of Measures to Reform the Unified Energy System of Russia". This law remains the main legal basis for support of renewable energy in Russia.

Originally, it included:

- Iintroduction of price premiums paid on top of the equivalent wholesale market price for electricity;
- federal subsidies to compensate for the cost of connecting generating facilities with an installed capacity of not more than 25 MW to the grid;
- obliged network and distribution companies to prioritise purchases from renewable energy sources to compensate for their losses in transmission.

Price premiums should be paid to approved generating companies operating on the basis of renewable energy to ensure a volume of renewable energy on the market. At the end of 2009 the government adopted a decree setting a deadline for developing regulations that would set the size of these premiums, but it was never enforced. At the beginning of 2010, the system of premiums was abandoned altogether and in the spring of that year the Ministry of Energy proposed a new approach to supporting alternative energy.

The basic idea was to replace the mechanism of price premiums with a system of compensating generating companies for power output. In accordance with the mechanism of long-term energy markets, generators using renewable energy sources would be set preferential tariffs, as is already done for nuclear and hydro-electric power generators. The main reason for this change was the ministry's desire to monitor and coordinate the

volume of installed renewable energy capacity in order to achieve long-term targets for renewable energy set out in Government Resolution No. 1-p of 08.01.2009. According to those targets, renewables should account for 2.5 % of Russia's energy consumption in 2015 and 4.5 % in 2020.

In 2010 Government Resolution No. 58 introduced a further condition for qualification as a renewable energy generator. Any facility that wants to be included in the system now has to be part of the General Plan for the development of renewable energy, which is essential if the market is to be supported through the mechanisms provided for long-term capacity market contracts. Because of this requirement and an effective absence of programmes to build renewable facilities, the first renewable energy generators were approved only in 2012.

If this incentive mechanism actually goes into operation, it will work as follows: an operator of a project selected by tender concludes a kind of power delivery contract that includes an obligation to bring a given installed capacity online in a particular year. From the month the power station is commissioned it gets a fixed monthly fee set out in the contract, calculated on the basis of the capital expenditure for which the project was chosen. The value of fees is set according to a special formula similar to that used in current power supply contracts. It will be calculated in such a way that this fee will be only one of the sources of revenue needed to regain the investment. Energy production is a prerequisite for being paid fees, as is meeting requirements to source a certain proportion of equipment from local producers. In the case of non-fulfilment or only partial fulfilment of the contract, the operator of the station will be fined. The contracts will last 15 years.

These support measures will only apply to participants in the wholesale electricity and power market in pricing zones. Non-price market zones, isolated energy systems and the retail market will not be involved for now. Neither will other types of renewable energy including biomass, tidal and geothermal energy.

The Ministry of Economic Development set strict conditions for approving this support system for renewable energy sources, including on the total cost of the programme. As such, an annual limit was set for the amount of input from renewable generation facilities, as well as the amount of state support for renewable energy projects. Under the final agreement the target for total installed capacity by 2020 is 5.97 GW, including 3.6 GW of wind power, 1.52 GW of solar power and 25 MW to 0.75 GW of hydropower capacity.

Renewable energy investment projects are expected to compete for input volumes on the basis of total capital costs, including the cost of connection. Contracts will be distributed by Dutch auction, with the government lowering price indicators stage-by-stage and setting limits on technology indicators above which bids will not be accepted. The tender will be administered by a commercial market operator, a trade system administrator. Each year, investors will be able to submit applications for up to four years in advance.

An important element of the Russian approach is the localisation requirement. Operators of renewable projects will have to source a certain proportion of their equipment from local producers. Tables showing the percentage of localisation required for each piece of equipment or work will be published for every individual technology.

But for all the advantages of competitive project selection, the system of state support for large renewable energy projects on the wholesale market holds a number of disadvantages and potential risks for investors:

1) The stimulation package is aimed only at supporting grid-based electricity generation using renewables. The structured system of support does nothing for the development of renewable energy in isolated areas and decentralised electricity generation by households, businesses and consumers;
2) It does not include support for the generation of heat from renewable energy sources, which means it effectively excludes bio-energy and, partially, geothermal energy projects, the profitability of which depend on opportunities to market generated heat;
3) At the qualification stage projects may not observe market principles and therefore it carries additional risks for project implementation. In addition, for small projects the costs of qualification will be more than the amount of support they stand to receive.

To eliminate some of these gaps, a system of measures designed to support small and medium-sized renewable energy projects that operate on the retail market is expected to be adopted in 2013. On October 4, 2012, Prime Minister Dmitry Medvedev signed Government Resolution No.1839-r, which approved a package of measures stimulating the production of electricity from renewable sources. If these measures a fulfilled according to deadline, a system of laws and regulations governing the development and operation of renewable energy in Russia should be in place by the end of 2013.
The most important incentive for the use of renewable energy will be contained in an anticipated Federal Tariff Service decree on approved methods for calculating tariffs for "green" electricity purchased on the retail market in order to compensate for losses in electric networks. This would solve the main problem of most renewable energy projects – allowing businesses to market "excess" energy generated by their installations once they have taken care of their own energy needs. Such a development would significantly improve the economics of such projects. The Ministry of Energy has proposed that tariffs for renewable energy projects developed to compensate of network losses should be set at a level "which provides an economically reasonable return on invested capital".
Other measures expected this year include development and approval by the Government of the rules of issuance, circulation and redemption of certificates confirming the volume of production of electricity from renewable sources when calculating electricity or power.
New legislation is also expected to close regulatory gaps in differentiating targets for the development of various kinds of renewable energy by 2020, simplify the procedure for approving renewable energy generating facilities and design a scheme for distribution of renewable facilities across the country.

Important changes relate to:

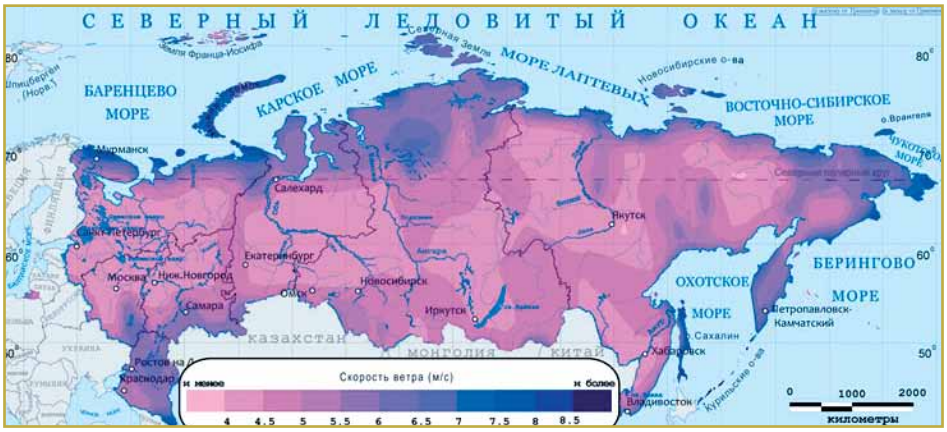
- part-payment of the owner's costs on connection of renewable energy facilities to the grid. On February 16, 2013, Prime Minister Dmitry Medvedev signed a decree approving amendments to the government's programme for energy saving and energy efficiency up to 2020. The amendments include providing compensation for the costs of connecting renewable facilities of up to 25 MW to the grid;
- compensating distribution companies for losses by allowing them to build their own renewable energy sources (until recently, network organisations were prohibited from simultaneously owning assets in competitive parts of the energy sector, i.e. both generation and distribution).

Prospects for wind energy

Russia's wind energy potential is estimated at 200 million tons of oil equivalent a year and is largely concentrated in coastal areas and the southern part of European Russia. The potential has been little studied, however, and may be significantly underestimated. Russia's wind potential is currently practically unused.

The oldest operating wind farm in Russia is the 1.5 MW Vorkuta wind power station in the Komi republic, which went into operation in 1996. The largest to date is the 5 MW Kulikov wind farm in the Kaliningrad region, which was launched in 2002 as an experiment into wind energy by "RAO UES". The Bashkir and Chukotka wind farms, both with a capacity of about 2.5 MW, were set up in the same period. There are also smaller capacity wind farms in Kamchatka and the Rostov Region. Kalmykia boasts the 1 MW Raduga-1, the largest single wind power unit produced in Russia.

Map 1. Wind energy potential of Russia. *Source: The laboratory for renewable energy and energy efficiency, the Joint Institute for High Temperatures, Russian Academy of Sciences*



Regional generating companies and subsidiaries of "RusHydro" also own several wind farms, though most of them do not work for either technical (problems with maintenance and repair) or economic (problems with the sale of electricity) reasons.

Despite the stagnation in the industry, recent years have seen the launch of production projects turning out megawatt-class wind-power equipment, restoring the optimism of market participants:

- a joint venture between "Russian Technologies", "Siemens" and "RusHydro" for the production of wind turbines in Volgograd, with a capacity of 500 MW per year;
- a wind power equipment manufacturing project launched by "Atomenergomash" at the "Petrozavodskmash" factory.

The rising cost of electricity in isolated areas is leading to the emergence of a growing number of "points of growth" for the wind power industry in Russia. Even in densely populated areas of the European part of the country there are many places that have good prospects for the use of wind farms. Primarily, they lie in the north-western regions of Murmansk, Arkhangelsk and Leningrad and the southern regions and republics of Krasnodar, Karachay-Cherkessia, Rostov, Volgograd , Astrakhan regions and Kalmykia.

In 2012, the Russian Wind Industry Association (RAWI) provided an overview of wind power projects in the country. Approximately 13 companies are now engaged in about 50 such projects. The total capacity of these projects is between 2 and 2.2 GW. Start dates are directly related to the adoption of state support measures by the government.

Prospects for Solar Energy

Solar is one of the fastest growing segments in the Russian renewable energy sector. This is largely down to the availability of significant solar resources, the presence of the human resources and technological base needed for production and the activities of "RUSNANO".

The economic potential of solar energy is estimated at not less than 120 million tons of oil equivalent. The most favourable natural conditions for the development of solar energy are in the Zabailkalsk, Khabarovsk and Primorsky regions and the Buryatia and Sakha republics in the East of the country and in the southern part of the European Russia. The usefulness of polysilicon-based solar photovoltaic panels in the country's central belt is limited by long, cloudy winters, but amorphous silicon-based technology has good prospects in most regions.

Map 2. Solar energy resources in Russia.

Source: The laboratory for renewable energy and energy efficiency, the Joint Institute for High Temperatures

At the time of writing, total installed solar capacity is no more than 1 to 2 MW. There is also some experience of decentralised generation of heat using solar energy in the southern regions of Krasnodar and Rostov, as well as Buryatia. A number of projects have been implemented under the Federal Target Programme "Energy Efficient Economy".

The most important factor in the future development of Russian solar energy will be the presence of a domestic technological and industrial base, including production of polysilicon and photovoltaic panels. Russia is planning polysilicon production projects with a total capacity of 36 thousand tons per year (annual global production is 80 to 100 tons).

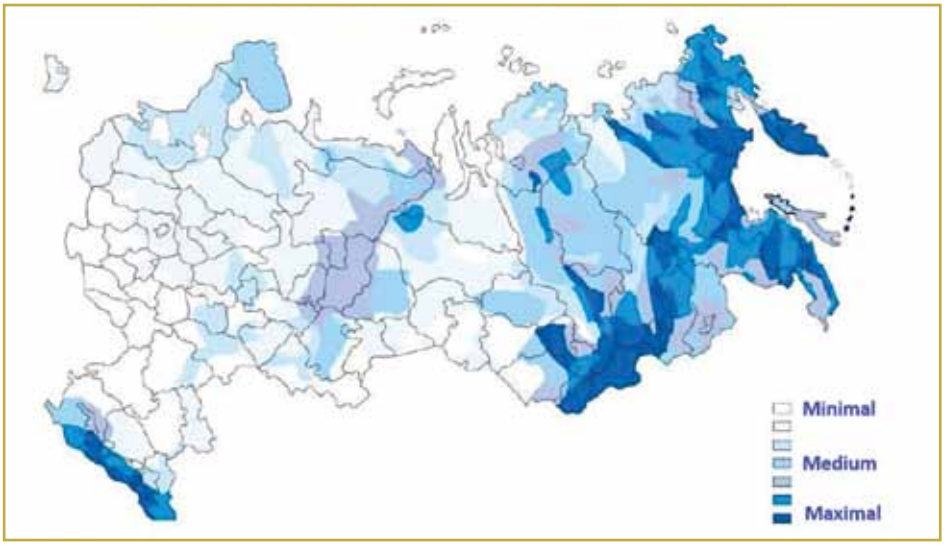
Many of these projects will be devoted to export-oriented products (at least 90 % of production will be exported to the EU, primarily in Germany). Among them is a joint

venture between "RUSNANO" and "Renova" in Novocheboksark. The two companies intend to strengthen the vertical integration of production in order to realise solar power projects within the country.

Prospects for small-scale hydropower

In the early 1950s, the Soviet Union led the world in the field of small-scale hydropower. Several hundred small hydropower stations on small rivers provided as much as 25% of electricity demand in rural areas. With the development of the centralised energy system, however, the number of small hydropower plants declined. Today, about one hundred small hydropower stations are still in use.
The greatest potential for hydropower lies in the North Caucasus, the Urals, East Siberia, North-western European Russia and the Far East.

Map 3. Resources for the development of small-scale hydropower



The potential future development of small-scale hydropower depends on:

- projects with short investment cycles (no more than 7 years) and quick construction times (no more than 2–3 years);
- the enormous economic potential in replacing of diesel generators with small hydropower plants in isolated areas in the North Caucasus, Siberia and the Far East;
- the presence of numerous ready sites (former hydro-power plants) and related energy infrastructure on small rivers in the European part of Russia; rebuilding these plants is generally much cheaper in capital expenditure than construction of new facilities.

Prospects for Biogas Energy

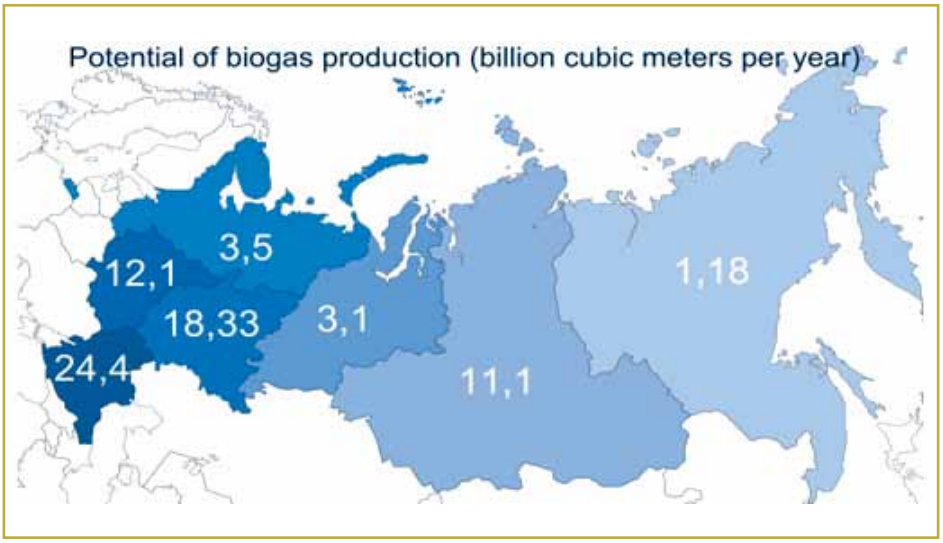
Biomass is the most promising renewable energy resource in Russia, which has a huge potential to make use of agricultural waste and the by-products of wood processing, food processing and municipal wastewater treatment plants. The most attractive of these segments for investors is the production of biogas, which can provide additional sources

of revenue from the sale of organic fertiliser and pay for safe disposal of organic waste. An integrated approach to the implementation of projects with mandatory solutions not only to energy problems, but also environmental issues, guarantees unprecedented growth in the biogas industry in coming years.

For Russia, biogas has several advantages over other renewable and conventional energy sources. The main advantage is the sheer availability of raw materials for the operation of the plant, which means fuel costs simply don't come into the structure of operating expenses. In 95% of cases, the owner of a plant can acquire waste to fuel it for free. And the availability of raw materials also translates into geographic flexibility: biogas plants can be placed in any area and do not require the construction of expensive pipelines or grid infrastructure, allowing the new enterprise to save on the cost of connectivity and power distribution.

In this regard, it should be emphasised that the biggest potential for biogas is in energy-deficient regions. Out of Russia's total potential biogas production of 75 billion cubic meters per year, the Southern Federal District accounts for 24.4 billion cubic meters, the Volga Federal District for 18.3 billion cubic meters and the Central Federal District for 12.1 billion cubic meters. In this regard biogas stands out from other renewable energy sources, which in Russia tend to be at their most profitable in regions that do not actually need the energy.

Map 4. Potential of biogas production (billion cibic meter per year)



Biogas also brings technological flexibility, allowing users to simultaneously obtain several types of energy, including gas, motor fuel, heat and electricity.

Perhaps biogas' most important feature, especially in comparison to other renewables such as wind and solar power, is the constancy of generation and the maximum utilization of installed capacity.

Hence a lack of incentives and other state support to stimulate development is not an insurmountable obstacle for biogas energy. Already, in current conditions of high electricity tariffs and increasing environmental costs, there are hundreds of sites where it is possible to implement highly profitable biogas projects.

The most noticeable drawback of biogas energy is its high capital cost per unit of power. The second key flaw is the narrow range of cost-effective projects, which in most cases range from 1.5 to 5 MW of installed capacity. European experience has shown that installations only become profitable when they have a free and uninterrupted supply of waste. Not all installations have such amounts of raw materials at their disposal. The most promising projects from the point of view of guaranteeing continuous, uninterrupted supplies of electricity are those based on urban water utilities and food processing plants. Where this isn't possible, a "cluster" approach is required, in which a facility is set up to use raw materials from several companies at once.

The adoption of a legal framework that would allow the owner of a biogas plant to supply surplus electricity to the grid at retail rates would significantly expand the economic potential of the biogas industry. Until such legislation is passed, the most promising projects will be those in self-contained energy networks.

Besides the need for more energy, the Russian biogas market is also being driven by environmental concerns. A significant number of Russian companies produce a large amount of waste that is prohibited by law in Western countries. In the absence of reprocessing facilities, organic waste annually releases more than 30 billion m^3 of methane, a greenhouse gas 21 times more powerful than carbon dioxide.

A lack of water recycling makes water supply and treatment many times more expensive. The existing Russian system of accumulating liquid effluents from agriculture (annually more than 500 million tons) leads to uncontrolled contamination of drinking water and soil pollution.

Violations of manure and waste management regulations alone are estimated to have caused 11 billion Euros worth of environmental damage. If the targets for an increase in the number of livestock and poultry set out in the national food security doctrine are achieved, we can expect such waste to reach 1.2 billion tonnes per year.

Against this background, Russia has seen a growing awareness of the need to tighten control over organic waste in recent years. Several factors contribute to this:

- environmental charges and penalties are set to become an important tool for plugging the national budget deficit;
- the large scale of Russian agricultural companies compared to most European farms leads to huge damage to the environment;
- the cost of environmental damage is much greater than cost of investing in non-waste technology. In particular, the lack recycling options for agricultural waste leads to deterioration in the quality of land, reduces property values near agricultural enterprises, places a great burden on sewage systems and treatment plants and results in mass depopulation as people move out of the area.

Accordingly, biogas plants should be centres for full recycling of organic waste to produce clean water and complex microbial fertilisers.

Including technology for complete reprocessing of solid waste can reduce the costs of recycling to zero and halve the payback period of biogas projects. In such cases, comparing biogas plants to other types of renewable energy in terms of cost per kilowatt of installed capacity becomes meaningless. The plant is actually a recycling facility that pays off investors in terms of environmental savings: all other sources of revenue, including energy, are simply a "bonus".

European experience suggests that this integrated approach will come to dominate the biogas sector. On June 1, 2013, a new European law came into force which requires owners of biogas plants in the EU to process solid waste into fertiliser. Attention to the environmental component of biogas projects should also be the starting point for legislation in our own country. It is feasible to include biogas plants in the list of the best available technologies for agricultural businesses, the food industry and water-processing utilities.

Also necessary are a set of measures to tighten control over businesses' organic waste emissions and improve collection of fines and charges for environmental damage in accordance with Government Decree No. 344 of 12.06.2003.

If a package of environmental incentives is adopted in coming years, the rapid growth of the biogas market in Russia is virtually guaranteed. The payback period for biogas projects in Russian is about three to seven years. The capital expenditures involved are in some cases comparable to the costs of connecting to the grid or building waste disposal facilities.

Main findings

The development of renewable energy in Russia depends not so much on the development of state support for the sector, as on problems in the centralised energy supply system pushing energy consumers to embrace local energy systems.

By 2014–2015, retail tariffs for end-users will outstrip the costs of self generation in all renewable energy sources except solar, prompting a massive shift toward decentralised generation amongst consumers. This process be almost spontaneous in character and will be expressed first of all in a growth of interest in bio-energy projects. Unlike in Western countries, the Russian renewable energy sector will be characterised by small-scale, fragmented distribution.

In the centralised generation sector, however, wholesale market prices are unlikely to exceed the costs of renewable generation in the foreseeable future, making the development of a central renewable energy network dependent on the introduction of a system of state support. Legislation in this area has improved only very slowly in the past few years. In fact, several deadlines for achieving renewable energy development targets have already been missed. The "green certification" system has been abandoned and renewable energy projects will now be subsidised through the long-term capacity market. The procedure for qualifying a generator or installation as renewable has been complicated by the requirement that it be included in the General Plan for the development of electricity from renewable energy sources, which is still being drawn up. Many industry experts worry that the number of facilities included in the new general plan will be significantly limited.

In the end, the scale of support for "major", network-level renewable energy projects will be determined by the balance of power between two interest groups – lobbyists for state support for the sector and lobbyists who oppose the emergence of such a system.

2.4. The industrial sector and problems of economic development

Alexander Shabaldin

The insuffiency of state environmental and energy policy in Russia is one of the key factors in the low environmental performance of the economy. The purpose of this article is to analyse problems and identify key barriers to active greening and decarbonization of the Russian economy.

Russian Industry

Russian industry makes up more than a quarter of the country's GDP and more than 95 % of exports.[1] In accordance with the National Classification of Economic Activities (NACE), industrial production includes the following economic activities: mining and quarrying, manufacturing, production and distribution of electricity, gas and water. Below are statistics for the period from 2008 to 2012.[2]

Table 1. Dynamics of Russian GDP and industry in 2008-2012 (billions of roubles)

Index	2008	2009	2010	2011	2012
GDP					
Russia's GDP in current prices	41276,8	38807,2	46308,5	55799,6	62599,1
GDP deflator	118,0	102,0	114,2	115,5	108,5
Dynamics of GDP compared to the previous year	105,2	92,2	104,5	104,3	103,4
Share of industry in GDP (in current prices)					
Section C. Mining and quarrying	3 284,6	2 885,4	3 842,8	5 157,3	5 801,4
Section D. Manufacturing industry	6163,9	5 005,3	5 934,7	7 385,5	8 091,7
Section E. Production and distribution of electricity, gas and water	1 034,0	1 388,7	1 527,1	1 814,5	1 845,8
Sections C, D, E	10 482,5	9 279,5	11 304,6	14 357,3	15 738,9
Industry share in GDP (in percent)					
Section C. Mining and quarrying	8,0 %	7,4 %	8,3 %	9,2 %	9,3 %
Section D. manufacturing industry	14,9 %	12,9 %	12,8 %	13,2 %	12,9 %
Section E. Production and distribution of electricity, gas and water	2,5 %	3,6 %	3,3 %	3,3 %	2,9 %
Sections C, D, E	25,4 %	23,9 %	24,4 %	25,7 %	25,1 %
Industry dynamics (in relation to the previous year)					
Section C. Mining and quarrying	97,17 %	86,13 %	116,6 %	116,16 %	103,72 %
Section D. manufacturing industry	103,99 %	79,62 %	103,8 %	107,71 %	101,02 %
Section E. Production and distribution of electricity, gas and water	102,41 %	131,69 %	96,3 %	102,84 %	93,80 %
Sections C, D, E	101,60 %	86,79 %	106,7 %	109,92 %	101,08 %

From 2007 to 2012, the manufacturing's share in GDP decreased by 6.45 %, which means that the entire increase in the last five years in industry has been achieved in the sectors of mining and energy production. Given that oil production in Russia (as a key export resource)

has increased by 5,4% since 2007 (from the level of 491 million tons in 2007 to 518 million tons in 2012),[3] the overall growth of the industrial sector in 2007 amounted to only 4.53%.[4] It can be assumed that the increase in oil production can no longer be the engine of economic development and its potential has been exhausted. The crisis in the manufacturing industry can be considered protracted and there are no visible prospects for recovery in the sector.

Table 2. Share of different product groups in Russia's exports in 2011

Goods	Export Volume (thousands of USD)	Percentage of total exports
Calcium phosphates, t	337308	0,07 %
Iron ores and concentrates,t	3184889	0,62 %
Coal, t	11384612	2,21 %
Coke and semicoke, t	549273	0,11 %
Crude oil, t	179140097	34,71 %
Oil products, t	94698991	18,35 %
Petrol, t	2642246	0,51 %
Diesel fuel, t	34012914	6,59 %
Liquid fuels, t	43667543	8,46 %
Natural gas, mln. cubic metres	63782072	12,36 %
Electricity, mln kWh	1289294	0,25 %
Anhydrous ammonia, t	1627246	0,32 %
Methanol (methyl alcohol), t	339834	0,07 %
Ferrous metals, t	23818646	4,62 %
Pig iron, t	2094567	0,41 %
Ferroalloys, t	1719494	0,33 %
Semi-finished products of iron or non-alloy steel, t	7725475	1,50 %
Flat-rolled products of iron or non-alloy steel, t	5399943	1,05 %
Refined copper, t	1620336	0,31 %
Unwrought nickel, t	4495588	0,87 %
Unwrought aluminium, t	7211039	1,40 %
Total	490741405	95,10 %
Total export volume, 2011	516040000	

How important is ecology is important for investment?

According to the author, there are three groups of factors that motivate companies to implement measures to improve the environment.

1. Economic mechanisms. First, these are incentive mechanisms: subsidies, tax breaks or other economic mechanisms (such as the mechanism of joint implementation projects under the Kyoto Protocol). Secondly, it is discouraging mechanisms: carbon taxes, taxes and penalties for the release of pollutants. All these measures are designed to make the projects to improve the environment favorable to business and projects which are unfavorable for the environment – unprofitable.
2. Regulation. This group may include prohibitions or restrictions on certain activities, for example through licensing.
3. Mechanisms that do not relate directly to any economic mechanisms or to management: the image of the company, corporate policy and relations with shareholders, relations with non-governmental organisations and the public.

Different mechanisms have different motivations. Environmental policy and policy on greening of industry should consider all factors and possible impact on the real sector. The lack of integrated regulation, taking into account all the factors of motivation for greening, will not be absolutely effective.

The role of environmental policy

In Russia, consciousness of the role of environmental issues and environmental policies is much lower than in developed countries and even in some developing countries. However, at the present time, despite the huge ecological potential the situation in the environment in the country remains extremely tense. Environmental issues have evolved from a purely environmental issue to problems of economic security. The financial and economic crisis has helped to further exacerbate the problems associated with the environment.

The ecological orientation of the developing global economy demands that Russia revise its economic policies not only in order to avoid losing its place in the updated world economy but also to get it a stronger position.[5]

In Russian economic science questions about the development of the theory of sustainable development in relation to environmental issues are fully described. However, there are few comprehensive studies on environmental economic issues. A long period of relatively little attention to environmental protection in our country, during which people related to the environment (and still do) "as a residual" when handling economic issues, led to a shortage of publications on this topic, especially on the formation of new trends in environmental protection policy as well as on issues related to environmental activities and policies of multinational companies, the formation of new markets, environmental technologies, environmental investment and innovation.

The impact on the environment in Russia is estimated to be moderate, but only because of the fact that more than 60 % of the country´s territory is not affected by human activity.[6] The vast forested areas make Russia an "ecological reserve" for the world. However, the environmental situation in Russia remains very acute and the country is close to last place in the world[7] in many areas of environmental protection. Environmental problems have ceased to be purely environmental and directly affect the economic security of the country. The financial and economic crisis has contributed to the deterioration of not only the economy but also the environment.

The main factors in environmental degradation are the dominance in the Russian economy of resource-intensive and polluting industries, the high degree of depre-ciation of fixed assets, the relatively unefficient use of resources and production as a whole due to the low technological level of the economy, the clearly insufficient development of the environmental market and the problems of Russia's environmental policy.

The acute situation in the field of environmental protection is largely associated with Russian environmental policy. Among the main insufficiencies in Russian policy, one can identify the lack of environmental priorities in economic strategy, including the lack of a clearly articulated strategy in the environmental field, weak environmental management, problems in the legislative arena, the lack of a comprehensive system of state environmental monitoring, the low level of funding for environmental measures, weak innovation in the environmental area, the low level of environmental awareness and the clearly inadequate awareness on the part of companies of the role of environmental factors in their activities and some others.[8]

Despite the broad range of environmental laws, the legal system is characterized by the lack of a comprehensive approach to its structure, numerous contradictions and the presence of many gaps, imperfect enforcement, poor control and very limited use of modern economic tools, as well as high levels of corruption.

The country's leadership is moving forward with new legislative and other initiatives in the field of environmental protection. As part of building an innovative economy in Russia, goals have been set to create a new system of environmental safety and to ensure conditions for a "green economy". Several Russian companies have come to realise the necessity of taking into account international environmental principles for doing business and this is especially true of large companies operating in the global market, particularly in the oil, gas and metallurgy industries. There has been some growth in the Russian environmental market.

However, these measures are not enough to keep up with the key areas of global development, moreover, they are inconsistent. The result of the backlog in the greening of economic policy may be the loss of even the existing position of our country in the world and the emergence of additional obstacles in the form of environmental constraints on access to export markets for Russian goods and services. The creation of barriers based on environmental regulation is becoming more and more common. Unfortunately, the environmental protection is little studied in Russian science.

In addition, the problem of environmental protection as a mechanism for climate policy is beginning to be studied more and more active. In recent years, a number of developed and developing countries have intensified climate policy: the European Union, the USA, Japan, the Republic of Korea and, increasingly, China. Virtually all of the tools of environmental protection can have a direct or indirect impact on access to markets for goods from Russia and other countries. Furthermore, a number of possible internal trade policy measures, including climatic measures, especially border compensatory measures may directly affect the exports of competitor countries, reducing export earnings and, consequently, their economic development.

The immediate threat is the EU´s expected introduction of a carbon tax on a wide range of imported goods; part of their criteria for inclusion in this list is not contrary to WTO rules. So far, the only precedent was the EU´s creation of carbon tax for aviation services, but in the future there is a high degree of probability that carbon taxes will see broader use, at least in the EU and the U.S. Other countries still have not commented on the possible use of carbon taxes on imports, but we can not exclude such a possibility, for example, after the launch of their trading systems.

The consequences of the introduction of import taxes on foreign trade and the Russian economy is currently difficult to assess due to the uncertain prospects of restrictions and the lack of specifics. However, the essential role of exports in the Russian economy determines the significance of the possible application of import compensation measures for Russian regions and Russia in general.[9] Lack of a clear policy in the regulation of greenhouse gas emissions poses risks for Russian business and the economy as a whole.

The dissimilarity of the problems

In different regions of the country, there are specific environmental problems associated with specific economic activities. To create and implement an effective policy on greening industry in Russia, it is necessary to take into account regional characteristics and the nature of the regional economy. Most likely, Siberia and the Far East regions are most vulnerable due to lack of monitoring and because of the structure of the economy.

As the major players in the east of the country are state-owned companies sucha ss "Gazprom", "Rosneft" and "Transneft", in order to improving the quality of environment

in the region and reduce the environmental risks of cooperation with China, we should strive to improve the environmental responsibility of these companies that, as shown by observations of the World Wildlife Fund (WWF), do not have a high degree of environmental transparency. A substantial increase in the transparency of these companies is necessary to increase their degree of compliance with the law and publicity, including by joining various international voluntary mechanisms to ensure environmental and social responsibility.

It is necesssary to seek the adoption of more stringent government regulations on the quality of petroleum products and ensure their oversight of oil companies, in particular, as well as seeking to modernise the eastern refineries and their production of Euro-4 and Euro-5 oil.[10]

Despite all the difficulties and the lack of clear incentives and policies of the state, a large number of environmentally oriented projects are implemented in the private sector and savings are the key motivation for such projects. One example is the company "Fenice Rus", which realised a number of projects to reduce energy consumption at the "AvtoVAZ" plant. The projects were implemented by energy service contracts, which, although often discussed in Russia, have been done only in a few cases. Three projects were implemented: the optimization of reactive power, optimization of heating systems and optimization of the compressed air system. The total investment for the period 2009–2012 amounted to 23.75 million euros. Energy savings in 2012 amounted to more than 200 million roubles.

The role of civil society

To realise environmental potential, a culture of ecological awareness needs to be instilled in the population and in companies, raising the level of education in this area. There is a need for a broad public awareness about the benefits of environmentally friendly products and environmentally responsible behavior. Demand from the community can be one of the main drivers in the greening.

There is no need to overestimate the role of society in politics in Russia, but its impact on investors in a company is significant. If you create and maintain a culture of environmentally responsible investing, you can encourage companies to engage in issues of sustainability in their activities more intensively, as this will directly concern their capitalisation. In different industries, there are particular problems associated with the improvement of the environmental situation. This means that, in addition to the territorial approach in the implementation of policies on greening the industry, it is necessary to use a sectoral approach.

Market Regulation

Investors´ expectations or the requirements of the financial authorities about the presence of environmental reporting and sustainability reporting is also an important driver of environmental improvement. If there is a company policy requiring voluntary certification of buildings and industrial processes or requirements for energy saving, measures have already been applied by default and do not require any incentive from the state.

To create such mechanisms, it is necessary to make changes to the reporting standards of companies, which can make these statements one of the tools to influence the share price. In this case, economic incentives will already be created directly by the market,

which will make them more effective in the long run than government regulation. The results of the application of industry standards and the widespread use of voluntary certification should not be overestimated, but must be taken into account and used to create environmental policies.

Barriers

There are many problems that prevent active steps towards greening industry from being carried out. Some of the key problems are:

- the predominance of resource-based industries and industries with high amounts of waste;
- the low level of awareness on the part of business and government about the benefits and opportunities offered by the eco-oriented policy of the company;
- inadequate regulation and the lack of an adequate regulatory framework;
- corruption and bureaucracy.

Criticism of forecasting and planning

The quality of forecasting and planning creates a big problem for the Russian economy, affecting the ability of industry to improve environmental performance. The level of politicisation in economic forecasts is very high and the depth of consideration not always of good quality. Given the structure of the Russian economy, with its bias towards mining, as well as a high proportion of government involvement in the sector, there is a conflict of interest. The state itself actually (through its ownership) carries out activities negatively affecting the environment and at the same time monitors and implements environmental policies. Paradoxically, the issues of natural resources and the environment in Russia are the responsibility of one ministry – the Ministry of Natural Resources and Environment.
When we see that the level of planning by the state institutions often suffers from a lack of quality, it becomes obvious that this is not the best way to affect the development of the economy and industry in particular. Questions about greening in state programmes are often only nominally addressed or simply not answered.

Findings

To solve environmental problems in the Russian economy, cooperation in this field should be developed with technologically advanced countries and companies, given their experience and level of technological development. Smart investment and innovation policies in the environmental field will be an incentive for companies to implement environmentally oriented investments and enables the development of the relevant market.
The strengthening of environmental governance and the transfer of environmental protection functions to one independent body could be a real impetus for positive change. The goal of protecting the environment and aims to improve energy efficiency in the economy and reduce emissions must be integrated. Regulation should be clearly allocated and preferably transferred to a single agency. The functions of protection and use of nature must be separated and must not be controlled by one agency.
The economic policy of the state can be changed in accordance with the objectives

of improving the environment. The basic tools that can be implemented are of a fiscal nature: tax breaks and subsidies. The introduction of a carbon tax with a gradual increase in its magnitude can yield positive results in the long term. The development of voluntary self-regulation and market mechanisms such as environmental certification or reporting to investors can be an effective tool but require initiative by the state.

The development of civil society institutions and educational programmes aimed at increasing public awareness can stimulate politicians towards acceptance and, most importantly, implementation of adequate environmental legislation. A differentiated and comprehensive environmental policy, as well as adherence to it by all economic agents and the political will of the government in the implementation of the "green economy", are the key factors for the necessary changes.

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2.5. The waste management sector: the current situation, legislative framework, regional experience and perspectives

Marina Asadcheva, Anna Sycheva

Introduction

Initially, the problem of waste disposal was generally examined in the context of ensuring public safety and protecting the environment. As a result, the most widespread practice of waste disposal was landfills and trash dumps.[1] Such an approach ensured the removal of waste from populated areas, which reduced the risk of contamination and the spread of infections. During the second half of the 20th century, however, this system proved to be untenable. The rapid growth of the volumes of waste formation and the appearance of slow decomposing materials, such as plastics, led to a rapid filling of landfills, which required that all new territories were decommissioned.

At the same time, the composition of household wastes saw a rise in the content of secondary resources, mainly packaging materials that can be used to make new products or generate energy. These conditions have led to the fact that in developed countries, the priority has shifted from dumping waste to recycling it. The waste hierarchy adopted by the European Union is one example of this.[2]

In Russia, the vast majority of waste is currently dumped at landfills. Nevertheless, the issue of waste management is very important for Russia, as the planned changes in federal legislation demonstrate. In the meantime, a comprehensive waste management system has been implemented in only a few municipalities and it is mainly nonprofit organisations that are engaged in promoting the idea of recycling.

Current situation

In 2011, on the territory of the Russian Federation 52.9 million tons of household waste was formed.[3] The average per capita amount of household waste formed is 400 kilograms,[4] which corresponds to that of the countries of Central and Eastern Europe and is about two times lower than members of the OECD.[5]

At the moment, not a single Russian region has an established comprehensive system for waste disposal that would ensure the minimisation of potential harm to the population and the environment and stimulate the use of waste in economic turnover. Even the simple removal of waste from the territory of villages in the regions is not implemented in full. For instance, in the Yaroslavl region, the portion of residents who are not covered by the system for the collection and disposal of waste is over 10% in urban areas and 50% in rural locations.[6] According to the Ministry of Regional Development of the Russian Federation, in 2010 one-third of urban districts and more than half of rural settlements lacked schemes for sanitary purificaiton.[7] All of this leads to the formation of dumps at designated natural areas close to populated areas and in abandoned quarries.

The main method for disposing of household waste is burying it in landfills (92–94%), though a small portion of the waste is recycled (4–5%)[8] and burned (2–3%)[9]. It should be noted that the dumping of waste is often carried out without compliance with standards of hygiene. With that in mind, in the entire country there are only 1,399 landfills specially equipped for solid waste and the number of authorized and unauthorized dumps are five times greater – 7,154 and more than 17,500, respectively. The total area of these objects is more than 50,000 hectares.[10]

Authorized landfills are not licensed and do not meet the requirements of environmental protection legislation. Landfills are also not equipped properly: they lack waterproofing layers, truck scales and electricity. Nevertheless, in the absence of a sufficient number of polygons, they continue to be used. Throughout the country, the need for landfills is 75% higher than the available capacity.[11]

Both authorized and unauthorized dumps pose a significant risk, since garbage dumped at them is not isolated from the ground, which may lead to groundwater contamination and they are also not protected against fires.

The processing of domestic waste is underdeveloped despite the fact that in large cities the proportion of secondary resources in waste is more than 50%, which is comparable to that in developed countries (fig. 1).[12] In the residential sector, with a few exceptions, there is no practice of separating the collection of household wastes, which creates significant obstacles for further processing.

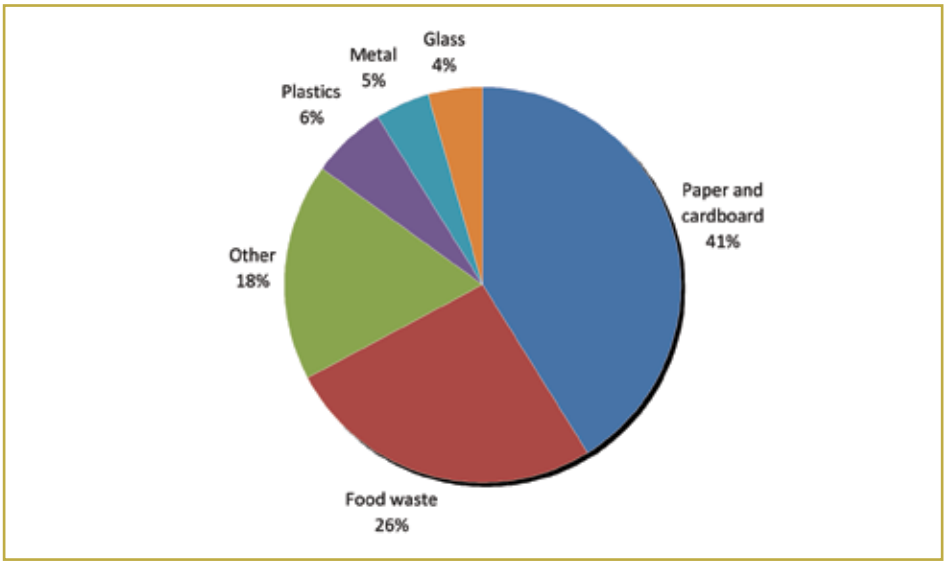

Fig. 1. Morphological composition of household waste in Moscow,[13] data for 2001.

A number of secondary resources can be removed during the sorting of mixed waste at the waste processing plant of authorized landfills and dumps. As a rule, the sorting of useful components is conducted manually. Employees engaged in this activity are subjected to significant risks due to the presence of mercury, toxic substances and infectious agents in mixed waste.

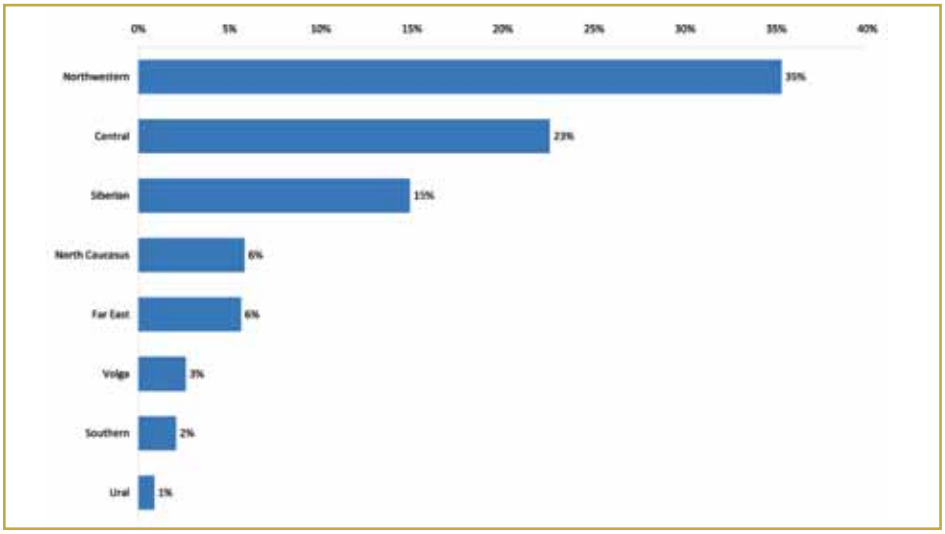

Fig. 2. Processing of domestic waste of cities in federal districts (in percent by volume)[14]

Fig. 2 shows the levels of processing of household waste from urban populations by federal district. A small part of household waste for recycling comes from the collection points of secondary resources. In Moscow in 2011, for instance, these collection points received 27.60 million tons of waste, or 0.5 % of the total volume of the city's waste.[15]
Incineration of waste is the least common way of disposing of it. At waste incineration plants, mixed waste from the residential sector is disposed of and it risks entering into the exhaust gases of mercury and toxic organic compounds, such as brominated flame retardants, as well as the formation of cinder slag with a high content of heavy metals. Incinerators that are located in close proximity to residential areas are of particular concern.

Analysis of current legislation

The main reason for the current state of affairs in the field of waste management is flaws in the legal framework and imperfect economic mechanisms.
Gaps in the current legislation can be divided into two groups: obstacles to organising a system of collection and disposal of household waste and a lack of incentives for recycling. In contrast to that of major cities, the system for the collection and disposal of waste in rural areas is often lacking. One reason for this is the ineffective separation of powers between the municipal and regional authorities. In accordance with federal laws 89-F3[16] and 131-F3,[17] the organisation of the collection and disposal of household waste is categorised under issues that hold significance for the local population, but these obligations do not receive appropriate financial support. Similarly, according to the law, the organisation of recycling of household waste is the prerogative of municipalities. In practice, however, only constituent entities of the Russian Federation have sufficient authority and resources to achieve these goals, including to attract investment.
Another important aspect of the problem is the lack of responsibility placed on individuals for failing to come to an agreement on waste removal. In practice, this leads to residents of residential estates and gardening associations leaving waste in accidental dumps.
For large cities, the most acute problem in waste processing is processing resultant waste,

although this practice is not supported by the current legislation.
Thus, the extraction of mineral waste is not encouraged. In particular, there is no ban on the dumping and incineration of secondary resources. In addition, there is no tax on waste incineration or the placement of waste in landfills, leading to the establishment of low tariffs for waste burial. Under these conditions, it is more profitable for waste disposal companies to export waste to landfills than to transfer them to processing plants.
Companies engaged in the processing of waste into secondary raw materials or goods do not currently receive state support. Article 14 of the Federal Law "On Environmental Protection", which mandates the provision of tax incentives for businesses using recycled resources and waste, is not actually used in practice. There is no state order for products made from waste processing.

Planned measures

As far back as in 2008, the task of creating a waste processing industry in the shortest possible time was set at the highest level of government. It was only in the last two years, however, that steps have been taken that indicate the state's intention to create a comprehensive system of effective waste management.
At the time this article was written, a project was prepared for the second reading of draft law No. 584399-5 "On amending the federal law on production and consumption of waste", containing amendments aimed at improving the management of waste streams and environmental protection, as well as the development of economic mechanisms to encourage recycling.
In addition, at the moment, the Ministry of Natural Resources and Environment has prepared a project on the "Integrated Strategy for the Treatment of Municipal Solid Waste in the Russian Federation" and a plan for implementing the strategy. The strategy sets the main goals, objectives, principles and priorities of state policy in handling municipal solid waste, as well as the main areas of its implementation. A bill on compensation for damages to the environment has also been drafted and it defines mechanisms for establishing, evaluating and repairing environmental damage from past and current business operations.
Below are the most significant changes (concerning municipal solid waste), stipulated in the abovementioned documents:

- it is proposed to reallocate the powers of subjects of the Russian Federation and local self-government by the organisation of the management of solid waste. In particular, the powers for the organisation, sorting, treatment, disposal and dumping of waste is meant to be transferred to the level of subjects of the Russian Federation;
- a hierarchy of methods of waste management has been introduced, according to which priority is given to waste prevention and recycling;
- a gradual ban on the disposal of a number of secondary resources (paper, polyethylen-eterephthalate, metals, glass etc.) and the establishment of separate collection is also planned;
- a mechanism for a deposit container system has been introduced;
- it is proposed to replace the licensing for the creation of self-regulatory organisations of operators handling waste management;
- it is planned to implement the principle of extending responsibility to the producer and the importer of goods to ensure the use, disposal and (or) storage of their products that have lost usability for consumers. The manufacturer (importer) may implement its responsibilities independently or by making contributions to a special reserve fund.

It should be noted that currently, manufacturers, processors and independent experts are not in agreement on the proposed amendments.

Most issues and disputes stem from the changes to licensing for the creation of self-regulatory organisations and the creation of mechanisms for the implementation of extended producer responsibility (importers). There is a great deal of controversy surrounding whether or not to introduce self-regulation of the industry as a whole, whether to create a target reserve fund (which will receive royalties of manufacturers (importers), as well as who should manage the fund (the state or a union of processors), etc.

A significant amount of concern has arisen from the fact that many important details are not spelled out clearly in the amendments,[18] and instead are left for the discretion of the government of the Russian Federation or the Ministry of Natural Resources and Environment. For instance, the government will determine the list of products (the production and importation of which would be subject to fees), the sizes, the procedure for the calculation and payment of royalties, etc. The conditions under which a company will be able to dispose of waste on its own are also not fully explained, nor are the conditions for a company to not have to contribute money to the fund; these details are left up to a federal agency.

Experience of the regions

Although the country as a whole has not yet created the proper conditions for the development of waste management, there are examples of municipalities that have managed to create a functional scheme for competent waste management.

The company "L & T" has created an integrated system of waste management in Dubna (in the Moscow region); the system is based on the separate collection of waste. In the residential sector, containers for waste collection were set up in two categories: processed (dry) and unprocessed (wet) waste. Waste from the first category is sent to a sorting company, where the valuable components are chosen manually: scrap paper, plastic, metal – all of which is then sold to processing companies. The "tails" of sorting and waste from the second category are supplied to one of the city's two landfills under the company's management. In 2012, the company was able to sort and pass on the processing of about 8% of household waste. Such a low level of use is connected to the lack of regional processing enterprises of a range of secondary resources.

The company aims to encourage residents of Dubna to participate in the separate collection of waste by introducing a differential tariff for processed and unprocessed waste and conducting educational activities. In the future, it is planned to use that experience to build similar waste management systems in other small towns.[19]

The experience of "L & T" demonstrates that an integrated system of waste management in a municipality is only possible with support from a large company that controls all stages of collection and processing of household waste: separate collection in the residential sector, transportation, sorting and disposal.

Similar programmes for the separate collection of household waste are also being realised in Kirov,[20] Zarechny in the Penza region,[21] and Kamenniki in the Yaroslavl region.[22]

The collection and disposal of hazardous waste is one extremely important aspect of the waste management system. Since 2010, in St. Petersburg, the project "Ecomobil" has been in effect; it is a mobile collection point for hazardous waste from households.

"Ecomobil" takes mercury from lamps and thermometers, batteries, household appliances and office equipment, as well as paints and varnishes.
In addition, since 2012, the city has had stations for receiving hazardous waste, as well as ecoboxes – terminals for the collection of mercury from lamps and batteries. The project has been implemented by the Municipal Committee for the Use of Natural Resources, Environmental Protection and Ecological Safety and the "Ekostroi" state unitary enterprise. In 2012, thanks to the work of the "Ecomobile" and stations for hazardous waste, more than 32,000 energy-saving lamps were collected and sent for disposal or recycling, as well as more than 4,000 medical devices containing mercury and more than 100,000 batteries.[23]

Initiatives of nongovernmental organisations

In recent years, the problem of waste disposal has been getting more and more attention from the public. The reason for this is to raise awareness about the dangers that waste poses for human health.
In the Russian Federation, there are both international and Russian non-governmental organisations that work to promote proper waste disposal: "Greenpeace", "Musora.Bolshe.Net", the "PRO Waste"-coalition, "Separate Collection" and the ECA. The main areas of activitiy of these public organisations include the elimination of land fills, promotion of separate collection and awareness campaigns.
The inability of municipalities to organise the collection and disposal of waste results in landfills appearing in recreational areas, near populated areas and in abandoned quarries. The "Musora.Bolshe.Net" movement fights this problem by organising cleaning campaigns that involve both tourists and local residents. In 2012, the group organised a nationwide campaign called "Make" in which more than 70,000 people cleaned up more than 1,900 pieces of garbage from natural areas.
One alternative way of tackling the problem of landfills was proposed by the "Ecofront.ru" project. The project offers an application that you can use to send a complaint to the authorities by attaching photos of littered areas.
A vital part of the work of NGOs is to promote the separate collection and recycling of waste. "Greenpeace", for example, has created a map showing receiving points of secondary resources for a number of Russian cities. The "Separate Collection" movement and the ECA regularly hold campaigns to collect waste from the public. The "Razdelyai and Zdravstvui!" project organises the separate collection of waste at public events, such as festivals and fairs. The goal of these actions is to draw attention to the problem of waste disposal and educate the public on the issue. In various cities, the collection of scrap paper in public places has been held at the initiative of various groups and non-profit organisations: near supermarkets (by the "Green Leaf" foundation, Volgograd),[24] at libraries (by the "Musora.Bolshe.Net" movement in Kaliningrad).[25]
Non-profit organisations also serve as a crucial source of information for the public on the issue of waste disposal. In 2008, "Greenpeace" published a study by I. Babanin called "Waste Revolution",[26] in which the advantages and risks of various methods for waste disposal were analysed. In 2012, the "PRO Waste" coalition opened an environmental educational centre in Moscow, the "Centre for Saving Resources", where seminars on proper waste management are regularly held and there is a station for the collection of secondary resources. The coalition has developed and published a series of informational materials on the problem of waste disposal.[27]

Conclusion

Currently, in Russia a large part of household waste is still disposed of at landfills. In recent years, however, there have been positive changes in the field of waste management. For the third year in a row now, we are working to reform federal legislation on waste management. Despite the fact that the country has not yet created the necessary conditions for the development of waste management, there are already some examples of municipalities in Russia that have managed to create a functional scheme for competent waste management. In addition, the social movement in support of finding a solution to the problem of waste management is gaining momentum, actively fighting to liquidate unbridled landfills and promote the separate collection and recycling of waste. Thus, there are promising preconditions in the country today for the establishment of an effective system of waste management. Whether or not they will be implemented, only time will tell.

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3

Sustainable development of cities and regions

3.1. City and regional planning: problems of city growth, urban ecology, perspectives for sustainable urban development and civil society initiatives

Daniyar Yusupov

It has been repeatedly observed that the post-Soviet urban landscape is something akin to the medieval: a number of major cities and regional capitals have emerged as centres for management of resources in the surrounding territories and have become the focal points for opportunities to realise development strategies in post-Soviet economic conditions. This has led to an influx of the most economically active and promising segment of the population into just a few cities and a consequent impoverishment of the social landscape of small towns and territories.

This process of "re-urbanisation" comes amid a sharp (almost doubling in two years), long-term (over a period of more than 12 years) and widespread fall in the natural population growth in Russia.[1]

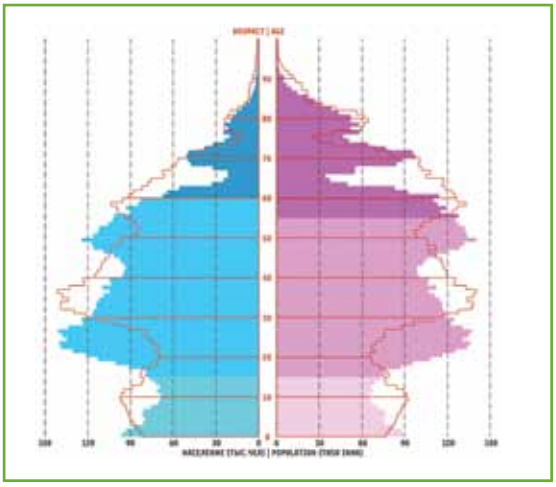

Fig. 1. Comparison of Russian population structure in 2010 and 2020.[1] The collapse of natural population growth by more than half during the 1990s created a deficit of social resources that will linger well into the mid 21st century.

At the end of the first decade of the new century, we can say:

- Against the background of de-industrialisation and diversification of city economies, a few large (with a population of one million or more) cities in Russia have both the resources and perspectives for strategic development, as well as a certain amount of human capital that is ready for a qualitatively different (yet not quite conceptually defined) way of life in changing economic conditions;
- The same processes lead to the "erosion" of the resources and development prospects of smaller cities and territories, except those that are located in the proximity of large urban agglomerations. This view has found its clearest expression in much-quoted remarks by Economic Development Minister Elvira Nabiullina;[2]
- For the natural environment this situation means a pronounced decrease in the intensity of land use (even within urban agglomerations), which on the one hand leaves room for

the natural regeneration of ecosystems in large areas after a period of intense industrial use, but on the other hand to the loss of key components of managed ecosystems on unused land, leading to ecosystem imbalance and non-renewable natural self-regulation;

- In general, the key processes and opportunities for sustainable development projects in the field of urban planning in Russia now and for a long period to come, lie at the intersection of the social and economic spheres, with very little involvement of the natural environmental sphere. The natural environmental sector in planning, just as in the Soviet period, has two poles – the protection of natural objects (Special Protected Natural Areas projects are multiplying in quantity, though not making much progress in quality) and the use of resources (and also in the development of tourism projects). Neither is significantly expressed in either social or economic development projects.

The priority that combines all three spheres of sustainable development in the long term is design, planning and analysis on a territorial and long-term scale (consulting on area development, preparation of territorial planning schemes, strategies and concepts of development for regions and areas of forecasting, etc). It is this feature, which is connected with assessing the efficiency of resource use, which really distinguishes development projects from the implementation of specific projects for private sector interests.

However, the recommendations, draft visions, abstracts of reports and concepts generated by the professional and expert community, planners, forecasters and consultants, are for a number of reasons not supported by the real agents of change and remain "pretty pictures of an unattainable future".

The most frequent fate of projects of this kind is a situation where a proposed vision of sustainable development includes no possibility to be configured to or attract the interests of real participants. This is due to the limited resources, tools and powers at the disposal of the various participants, their level of influence and the connectivity and interdependence of their interests (which seldom overlap and are often extremely short-term - that is, they do not intersect even over time). The only relatively successful species of project in this situation is the so-called "concept of sustainable development", as for the area of urban development, factors of sustainability here are unevenly developed across the various areas of work and decision-making, which in essence is not a project at all, but a series of activities and educational events (in fact a combination of social engineering, design-thinking workshops, participatory planning, game-storming, business games and other interactive formats) to engage, train and cultivate the right type of project participants and their interests. However, since such projects are usually long-lasting, they are not especially popular among customers and the number of contractors capable of providing such services in Russia is in the single figures. The few well-known projects have been initiated in exceptional situations of stale-mate, where customers (usually regional administrations) have exhausted all other conceivable resources and development prospects.

As for the area of urban development, factors of sustainability here are unevenly developed across the various areas of work and decision-making. Thus in the field of base-level development (land development), the industry is not currently dependent on natural or social factors, but rather is controlled at the level of direct personal contacts between the officials and business leaders (so-called "administrative resources"). In the absence of effective safe-guards against land speculation in the interests of both sides, the practice has spread in the immediate vicinity of large cities (and even attracted capital

on an international scale). This phenomenon is characterized by a well-known but difficult to avoid effect when cities are surrounded by vast patches of land whose value is so high that construction on them makes no economic sense. In the vicinity of St. Petersburg this effect is compounded by another phenomenon: the creation of high-value land through reclamation of new territories in the shallow waters of the Gulf of Finland. This phenomenon not only has negative socio-economic impacts and a questionable role in urban development, but also directly affects the unpredictable natural environment. While land reclamation could have a positive impact on the development of individual components of the damaged natural ecosystems of the suburban landscape, the fact is that assessments for that are not included in such projects.

At the level of property development the picture of sustainable development factors looks radically different. For a long time (15 to 20 years) after the transition to a market economy, the task was to preserve the essential assets of the construction industry, convert it into a business format and develop the real estate sector as a form of capitalisation and primary industry. This led to the emergence of property development as a natural system with vast (even, it seemed, virtually unlimited) and untapped resources. But at the same time, the government either lost or never quite developed control and oversight of the development of the industry and thus missed the moment when such control could have ensured the harmonious and balanced development of the urban environment as well as of the industry itself. The results of this "wild", uncontrolled development can be seen today in the exponentially escalating number of qualitatively indistinguishable projects in obvious (by a factor of dozens) disproportion to the actual growth of market volume (a key sign of a development "bubble").

The positive effect of all this is that, having exhausted its internal resources, the industry begins to demand that government formulate a relatively long-term strategy for development, set the provisions of planning policy and in general establish clear rules of urban development that did not exist before due to the circumstances of the "wild" period of development. The negative effect is that the natural conditions of the market and socio-economic landscape means the only economically profitable form of building is the high rise apartment block (usually about 22 storeys tall). A similar effect also occurs in the warehouse sector, but the negative effects here can easily be addressed within the framework of normal market activity.

With undeveloped forms of ownership and property management (there are virtually no neighbourhood associations, community managed developments, or condominiums), use of property (almost the entire rental housing market is part of the shadow economy) and the established trend to invest in end-user purchased residential property, this means building to extremely low expectations in terms of quality of construction and urban surroundings and lays the foundation for socio-economic difficulties in the future (for example, deterioration of the building, the discrete distribution of unoccupied or unused flats using engineering infrastructure, a pronounced imbalance in social services infrastructure, the inability to consolidate inefficient or inappropriately used properties and so on). It is significant that as the market slows, developers looking for ways to make their project stand out from the crowd are increasingly promoting the environmentally-friendly and socially-oriented qualities of their buildings. This is especially characteristic of developers seeking out new markets for themselves in a bid to overcome the current stagnation on the property market. However, these features are almost always exclusively promotional in nature and they usually disappear when such projects are actually built.

Stripped of these supposedly special features, the essential basis of the project is revealed to be indistinguishable from any other.

However, in the field of construction engineering there are signs of positive change. New and emerging engineering companies in the phase of development new markets for themselves are aggressively promoting complex "green" engineering solutions in the plans for new residential developments. But for a number of reasons these solutions are not aimed at long-term economic and environmental effects, but at reducing start-up costs (as well as reducing the estimated required amount of resources for connecting to centralised infrastructure networks). For this reason, such solutions do not actually have pronounced benefits for the environment.

With regard to sustainability in the social landscape, in some large cities there are signs of positive change. They are mostly related to the fact that the provision of basic housing and urban infrastructure, which was the priority in the last half-century of urban development in Russia, is gradually (but not universally) being replaced by demand for quality in this provision. The growth of this demand for quality is being driven by a small, relatively wealthy stratum of young and middle aged people (young entrepreneurs, creative professionals and students) and is mostly associated with the need for them to plan their own future, even if only for the immediately foreseeable future. This demand is to a large extent associated with the natural environment, prospects for social development, diversity of ways of life and the role of cultural heritage in preserving and developing of the identity of a place. It is mainly focused on the improvement of the urban environment of post-Soviet cities with a view to their future post-industrial transformation.

A significant role in the formation of this demand is played by the "import" of ideas that are not always applicable to the conditions and socio-cultural characteristics of the post-Soviet landscape. The failure of city administrations and developers to adequately respond to such demand (mainly because this demand is considered to be de minimis – it is unrecognisable with the indicator-scoring systems inherited from Soviet times and still in use today) creates a vacuum, which is filled from below by a colourful variety of movements: so-called "tactical urbanism", urbanist activism, urban partisanism. Because members of the media community also tend to hail from this environment and because it makes good content, such activity receives extensive media coverage (especially online), which in turn leads to ever-closer engagement in this exercise of local autonomy.

Two positive recent developments can be traced back to this trend. Despite the fact that the vast majority of the country´s city inhabitants do not have direct experience of this phenomenon – living as they have lived with the scanty opportunities available to them[3] – it is in this area that a new conditional standard of urban life is being formed, which to a large extent (because of the need to plan for the future) includes sustainable development factors. Due to widespread media support this standard, which formed mainly in the largest metropolitan areas, can now be found in smaller towns surrounding the big cities and, eventually, will spread to the rest of the country.

Another positive consequence of this trend is that the participation of local businesses and local governments in these "small" development projects to improve the urban environment has revealed the lack of a role for – and the overall uncertainty of – the concept of local self-government and the inability of local authorities and local communities to participate in and support these projects "from below". In some parts of the professional and administrative sphere appreciation has been growing of the benefits of transitioning away from the resource-intensive, vertically organised, Soviet-

era approach to development projects in favour of more sustainable development through a stream of discrete but widespread projects in various areas supported "from below" and organised "horizontally".

The last and most profound aspect preventing the spread of sustainable development, including in urban development, is the almost total and universal absence from contemporary Russian society of the institution of inherited achievement. This is manifested in the way that any undertaking, whether administrative or entrepreneurial, effectively stops (or loses much of its capacity) with the departure or diversion (for various reasons – re-election, reappointment, distraction by new projects, a change of tactics or development targets) of its pioneers. Almost every remotely significant development project is the product of the personal development strategy of a specific stakeholder who designs strategies based on either generally recognised opportunities or those he has created out of his personal understanding of the context. This phenomenon occurs on every scale: it applies to major development initiatives by administrative, public or private corporations and to much smaller ones by groups, families, or collectives. During the lifetime of one generation several development projects can arise and disappear without a trace (which is just as well, if it means no adverse effects), regardless of scale. This is not specific to Russia – it is indeed typical and very common all over the world – but for Russia it is still new and not well understood and society has not yet thought of, developed, or imported the appropriate instruments and institutions and not has mastered or maybe not even created the suitable social culture.

In such a situation the most developed notions about the effects of sustainable development, even including socio-economic forecasts or urban development projects, remain simply without an audience. There are simply no such agents of change who could see themselves or their benefit in the distant future. The most stable (long-term) customer for sustainable development in such a situation is the community (see fig. 2). Regardless of how specific members of the community come and go, common goals remain relevant over time for the community as a whole. At the moment this tendency is most pronounced in professional communities, though there are some sporadic examples of such activity in local, regional communities.

At the moment it is safe to say that the prospects for sustainable development in Russian cities and regions are concentrated less in specific projects, plans, technical and

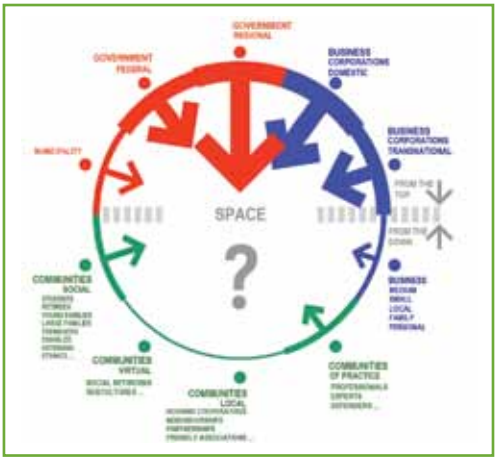

Fig. 2. Use of urban space in the Moscow metropolitan area.[4]

government decisions, than in the creation, cultivation, education and promotion of those interested in the effects of sustainable development in all spheres and strata of society – in other words, the creation of an internal social customer for sustainable development.

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3.2. Greening the transport sector

Ilya Reznikov

Greening the Russian transport sector is about reducing the impact of transport on the environment, including people's daily activities and health. It is not enough to understand this term as just about coordinating efforts to reduce harmful emissions into the atmosphere, protecting plants and animals, or reducing the usage of certain resources, including land. It is widely known that any transport route, for example a railway or major motorway, demands huge land resources as well as construction of junctions and crossings for pedestrians, cattle and wild animals.

Greening is also about increasing safety and reducing risks. For example removing dangerous loads from within city limits is also an element of greening; or securing safe passage to the nearest bus stop or clinic, including for less mobile groups within the population, such as the disabled as well as parents with small children. In other words clearing ice and snow from the roads in good time and removing harmful de-icer products which have accumulated on the streets in spring, are links in the same chain as efforts aimed at humanizing space, which includes the comfort of both people and all other living beings equally, both today and in the future.

The ecology of space corridors is a future trend which has not yet been given major significance in Russia. But studying this aspect is crucially important, for example when constructing new high-class roads. The A-121 "Sortavala" is a highway of federal importance currently under construction in the Leningrad region. The road has been long-awaited by both inhabitants of the Leningrad region and St. Petersburgers leaving to relax outside the city. However, the project lacks sufficient options for crossing the new road on different levels, including underground and overground pedestrian crossings, as well as crossings for local trains. In this case normal crossroads and pedestrian crossings are not provided for safety reasons. However the new road cuts through tourist trails that have been used for decades, forest roads, which may be used by foresters, fishermen or mushroom pickers. The lack of such crossings may lead to accidents in future, when people try to cross the road at places unintended for the purpose. As a result a paradoxical situation develops, in which caring for the safety of a user leads to a worsening in the quality of the space and also to the appearance of new potentially dangerous places. And the issue is not that building necessary infrastructure would impact too much on the price of construction of the new road – it is simply that there is not currently a clear understanding of its necessity.

The process of greening the transport sector in Russia is still on the whole developing quite slowly. The main problem is the general lack of a distinct state policy in the transport sector in Russia, including one aimed at its greening.

It would be incorrect to say that the state is doing nothing in this area. It's simply that the bulk of these efforts either do not harmonize with each other or they are purely superficial in character. Furthermore contradictions exist within greening, both from private business,

in whose hands significant transport assets are concentrated in Russia today and from the population. In conditions of continuing economic difficulties, it is not easy to find volunteers willing to incur voluntary additional costs, without receiving tangible results.

Intercity cargo transportation

It is well known that automobile transport is one of the main environmental polluters. Railways, a network of which links all significant locations in Russia, are recognised as a greener form of transport. Therefore it would be logical to expect an integrated state policy aimed at increasing the role of railways in transporting cargo and passengers and reducing the share of automobile transport. However, in the last 10–15 years, the reverse has been observed.

Cargo transportation

In winter 2013 on the Saint Petersburg-Moscow highway, which is one of Russia's main roads, there was an unexpected road blockage. For a distance of several hundred kilometres, heavy-duty vehicles blocked the road and were unable to move due to heavy snowfall. It took several days to clear the snowfall.

This scenario is easy to imagine in Steppe regions where similar emergency situations occur regularly. But the St. Petersburg–Moscow highway is in the forested zone, where such incidents are uncommon. Reasons cited for the incident were the delayed reaction of road services responsible for clearing snow and the lack of winter tyres or chains in usage. Meanwhile the fundamental question – why such a huge quantity of cargo vehicles were on the road at the time – was not asked.

There has been a similar situation in recent years on the Moscow ring road (MKAD), which suffers from traffic congestion, where heavy-duty automobiles account for no less than 30% of the transport flow. At the same time only a small number of these vehicles serve Moscow and the Moscow region, the rest are in transit. A similar situation also occurs in other regions in the country.

Earlier it was considered inadvisable to transport normal cargo distances of over 600 kilometres by road, but currently cargo is regularly shipped several thousand kilometres according to cargo transporters' notices. Earlier such shipments were transported by rail, which was more economically efficient and, more importantly for this article, greener.

Russian Railways (RZD) is a state company, but never the less follows a policy aimed at, for the most part, increasing its own profits. Within this policy the most profitable are shipments of bulk freight, such as oil and oil products, coal, metals and containers. Tariffs and conditions of transport of other types of cargo are such that it is more profitable for cargo shippers to use road transportation, even when shipping long distances.

Until 2007 all rolling stock was owned by the Traffic Ministry and then by RZD. As a result of reform of RZD, cargo companies were formed – operators of cargo railroad shipping, between which the rolling stock was divided. This led to a significant increase in the operational kilometres of unloaded wagons, which seems unnatural from the point of view of green policy. Earlier a wagon which had carried a load from point A to point B could be used to carry some other sort of cargo on the return journey within a unified system of wagon turnover. After dividing rolling stock between private companies, competing against each other, communal wagon turnover became impossible, because companies are not interested in passing on cargo to each other.

Passenger transport

RZD says that all passenger transport on railways, conducted in line with regulated state tariffs, is loss-making, with the exception of certain trendy projects. The state-owned company demands that the state covers certain losses through special subsidies, which the state does. The system of formulating tariffs for passenger transport is extremely opaque. This leads to a gradual reduction, of so-called loss-making routes on long-distance trains and the gradual movement of passengers from the railways to other, often less green, forms of transport.

Intracity transportation

It is well-known that many electric transportation systems, including trams and trolleys as well as underground and commuter trains were created in most major cities in the USSR. These systems were advanced for their time, including from an ecological point of view.

It would be logical to suppose that considering the international recognition of the need to protect the environment, Russia's systems of urban electric public transport would be maintained and successfully developed. Green credentials are not the only advantage of electric transportation, which is acknowledged by the many towns in developed countries, where quite a lot of new systems have been opened in recent years.

However, the real picture does not meet expectations. In many Russian towns electric transport was deemed obsolete and unable to meet the requirements of the time. As a result, there is almost no tram network in the country that maintains the rates in terms of carriage numbers and network length that it held in 1990.

Moreover, in the 2000s the following tram networks were closed entirely (in brackets are the number of carriages operating on the systems in 1990): Voronezh (290), Astrakhan (125), Arkhangelsk (100), Ivanovo (80), Shakhty (45) and Ryazan (40). A significant reduction in the tram network has taken place in the following towns (in brackets are the reductions in the number of carriages in operation): St. Petersburg (by 2.5 times), Kaliningrad (by 3.2 times), Yaroslavl (by 2.8 times), Lipetsk (by 2.8 times), Dzerzhinsk (by 3.4 times), Rostov-on-Don (by 3.8 times), Omsk (by 2 times), Vladivostok (by 3.2 times).

The situation with trolleybus networks in Russia is only slightly better. Most cities have managed to keep their trolley system and currently 86 networks are in operation. Exceptions include Tyumen, Arkhangelsk and Shakhty, where trolleybus networks were closed in the 2000s, as a result of which, these cities have completely lost their environmentally friendly electric transport. At the same time new trolleybus systems have opened in towns in the Moscow region including Vidny, Khimki and Podolsk. However, the vast majority of operating trolleybus systems have not seen development over the last 15–20 years, even in cities where there has been active construction of new residential areas.

In most Russian cities, the population uses buses and private commercial minivans as public transport. This is both because of the lower cost of buying and running buses, as well as the existence of a lobby of motor carriers in the administrations of many cities.

Suburban transportation

The current transportation situation in suburban areas of major Russian cities is characterized by the same features. Passengers are increasingly moving away from greener railway transport to less environmentally friendly personal transport and buses. This situation is aggravated by insufficient capacity of Russian roads, causing traffic congestion.

Open sources normally cite two main reasons for the drop in the usage of suburban transportation in Russia.
The first reason is the unprofitability claimed by transportation companies themselves. In this case, the railways have not taken real steps towards improving transport efficiency and reducing these losses. For example, most of the trains used on commuter routes in Russia are dilapidated and are not being replaced by more modern and efficient models.
The second reason is the decline in passenger traffic. Such processes are really fixed. Analysis of the St. Petersburg passenger rail hub showed that over the past 15–20 years, passenger traffic on commuter trains has fallen by from 1.5 to 3.5 times, depending the route. Meanwhile daily commuting between St. Petersburg and its suburbs during this period only increased.

The reasons for passengers moving towards motor transport include the following:

- Regularity of movement. Bus and minivan activity on the majority of suburban routes is higher than suburban trains. Buses also usually do not have breaks in daily operations;
- Comfort and image. Suburban trains are often dilapidated. Passengers associate them with wooden benches, pushy traders and other stereotypes, but not with comfort and speed. Furthermore there are frequent timetable changes and cancellations for various reasons and a low level of service;
- Tariff policy. Suburban trains are not linked to the tariff system of urban public transport in St. Petersburg, in contrast to urban bus routes which carry all reduced fares and also carry passengers using monthly passes (and similar schemes), allowing them to use all public transport in St. Petersburg.

The above indictes that passengers have switched to road transportation as a result of railway and city policies, which are unsatisfactory.

Projects under development to green the transport sector

Despite the problems outline above, the topic of increasing the green credentials of transport in Russia is constantly raised both by the government and in the media space.
In particular, many talk about the prospects for greater use of electric vehicles. The development of public transport is a bigger priority in terms of ecology, as public transport can transport more passengers for less energy usage. So from an environmental point of view the government should be directing its efforts at developing and promoting public transport.
But this point aside, let's look at the prospects for development off electric vehicles in Russia based on a few current examples. A few years ago Russia's AvtoVAZ plant, following international trends, started developing its own electric vehicle, which it called El Lada. The project is currently in the final stages, a price has already been decided, which will be in the region of Rb 1 million. In 2012 the plant signed a deal with the administration of Stavropol Krai, promising to deliver 100 electric vehicles to the region in 2 years, which will be used as taxis. It is unclear how vehicles that require charging for around 8 hours every 140–150 kilometres can be used as taxis.
But the virtual absence of electric vehicles on Russian roads is not due to a lack of infrastructure, but something much more simple. Car buyers are not willing to pay 1.5–2 times more for the lower rates of the vehicle. This situation will remain the same until an

electric car is created that has the same price and technical indicators as modern cars with internal combustion engines. For Russia, it is especially important to adapt such vehicles to the cold climate of Russian winters.

For the same reason it seems to be a strange decision as part of the Skolkovo innovation centre (which has an expected population of over 20,000 people) to use only electric vehicles within the centre's boundaries. Some kind of electric bus has been proposed as means of transportation between Moscow and Skolkovo.

The following aspects are doubtful here. Can it be an effective solution to create a compact zone with green transport in the suburbs of a large metropolis, surrounded by built-up areas, next to federal highways, on which there is regularly congestion caused by normal vehicles? How will trash removal for example be guaranteed in such a zone – are they planning to create special electric vehicles for utility and emergency services? How much will it cost to launch the proposed electric buses, how long will they be able to run between charging and how much time will charging take? Why was a proposal to lay classic trolley lines, infrastructure for which is well developed in Moscow not considered? How will this electric transport system work in sudden cold spells of -25° -30 °C?

In this wave of enthusiasm for electric and hybrid vehicles, switching vehicles to natural gas has recently received undeservedly little attention. It is well-known that using natural gas in car engines reduces exhaust emissions. A network of gas-filling stations was introduced in Russia before 1990, so a system does not need to be developed from scratch. Modern automobile gas systems have also overcome most of the technical shortcomings, which previously prevented their spread.

To conclude this chapter, we would like to list alongside the problems, examples of greening the Russian transport sector that can really be described as positive.

1. **The state programme subsidising recycling of old cars, which operated from 2010.** This programme is a rare example of a successful solution that was beneficial for both the public and car manufacturers. From the point of view of ecology, recycling old cars that are in poor condition, is unambiguously a good thing;
2. **The gradual transition to environmental standards governing the content of harmful substances in exhaust fumes.** This programme is being implemented in Russia despite certain difficulties, such as complaints from owners of old cars, unhappy about the abolition of production and sale of AI-80 gasoline in 2011. This does not negate the overall positive impact of this decision on the environment;
3. **The development and promotion of cycling in big cities.** This topic demands separate detailed consideration. At first glance, the climate in Russia is not conducive to year-round bicycle use. However, other northern countries such as Finland and Sweden have implemented active and successful policies to promote cycling. There are also cases in the Russian provinces, where bicycles are used by residents year round, although in contrast to the Swedish example this is due to the lack of alternative personal transport.

In St. Petersburg, cycling is supported by an active group of people, who have set up special online resources to popularize this form of transport, work with the city administration and propose programmes to build cycle lanes.

3.3. Housing and public utilities – the specifics of development in the context of sustainable development and the "green economy"

Yevgeniya Kolesova

The structure of the housing and public utilities sector

The housing and public utilities sector holds a significant place in the development and condition of the country's economy. It is a large sector, in which over two million people work. The housing and public utilities sector in Russia is made up of the following sections:

- water supply and wastewater disposal;
- electricity supply;
- heat supply;
- gas supply;
- site improvement;
- waste recycling;
- site cleaning.

Management of each of these sections is carried out separately, which is an important aspect to bear in mind during discussions on further development of the sector.

Main development priorities

The main development priorities for the sector in the context of sustainable development and the "green economy" are laid out in a Russian state programme on energy saving and increasing energy efficiency up to 2020, approved by the Russian government on December 27, 2010. In spring 2013, the Russian government approved a new draft state programme on "energy efficiency and the development of the power sector". The points of development of energy saving in the housing and public utilities sector were defined in this draft, under a subprogramme entitled "Enery saving and increasing energy efficiency". In particular this document specifies that the priorities of state policy in developing the subprogramme include securing the competent and ecologically responsible use of power and power resources, as well as creating a favourable economic environment, developing legal and technological regulation and supporting strategic initiatives on energy saving and increasing energy efficiency.

The document also focuses on the formation of a model of the population's economic behavior. The powers granted to subjects of the Russian Federation within the framework of a programme entitled "Subsidies offered from the federal budget to subjects of the Russian Federation for development of regional programmes on energy saving and increasing energy efficiency".

Key problems in the sector

According to the state programme, over 90% of the current capacity of power stations, 83% of living space, 70% of boilers, 70% of technological equipment used by power grids and 66 % of heating networks were built before 1990. In such conditions, there has to be a discussion about wear and tear on the country's key assets. If we take each sector separately, then, according to experts, the best way to improve the situation is by focusing on power supplies. In the majority of cases, power grids are located above ground, which makes both planned and emergency upkeep and repair significantly simple.

It is also important to note that the housing and public utilities sector in Russia is mostly monopolized. This mainly concerns hard infrastructure, but the smaller an area, the more this impacts other aspects of the sector. In towns, it is relatively common for the same organisation to deal with both water supply and waste water disposal services. In terms of power, heat and gas supplies, this is linked to the way the sector developed historically. Water supply and waste water disposal is currently the most modernised section of the housing and public utilities sector in towns. This is linked to, amongst other things, the fact that wear and tear of water supply and waste water disposal networks is as a rule slightly lower than other networks. This allows companies to direct investment into modernisation and energy saving.

In sectors such as housing, as well as site improvement and site cleaning, there is a degree of competition. Regulation of housing is carried out in line with the Russian Federation's Housing Code. The sector is divided into several different forms of management: direct management by property owners in apartment blocks; management by housing owners' organisations or housing cooperatives or through management deals arranged by them and also by management organisations. By giving citizens the option to choose a management method, the government created competition on the market. If at first this was regarded with skepticism, now citizens have a system that really works.

An important step will be improving systems through which the site improvement and site cleaning markets operate. According to federal law No. 131-FZ "on the general principles of organising local government in the Russian Federation", municipalities run competitions and tenders for services in the two sectors, which do not always have a positive impact. In terms of dumping, companies have won contracts, which do not have the technical ability, or experience to carry out such work.

As the urbanisation of Russia continues, towns face the problem of recycling waste. In Russia today around 3.5 billion mt of waste accumulates. An insignificant amount of such waste is processed, only according to official data is a quarter processed. Large towns find themselves in a situation where landfill sites containing hard household waste are located dangerously close to residential areas and sometimes this constrains development of town areas in one direction or another. Furthermore, dangerous situations develop in rural areas and small towns when illegal dumps appear and local authorities do not have sufficient funds to build new landfill sites, not to mention repair old ones. Overall the number of investment projects in this sector is insignificant and a system has not yet been developed to attract them. While decisions are being taken, the number of both official and illegal dumps is growing. According to official data, dumping sites cover an area of over 2,500 square kilometres. As for the separate collection of waste by citizens, such projects have not attained significant success. The population is not well-informed about the purpose of such projects and how to carry them out and as a consequence, is not motivated to take part.

Problems, linked to implementing energy efficient technology

According to statistics, power consumption on Russia's gross domestic product is 2.5 times higher than the rest of the world, which indicates that there are great opportunities for energy saving in the country. The following are key problems, resolution of which will become critically important in the formation of an energy efficient economy.

1. **MANAGERIAL.** Energy efficient technology when implemented in Russia, should lead to the restructuring of management systems. Without a new approach to managing towns and areas, it will not be possible to formulate new infrastructure technologies in the country. This in its turn will lead to restructuring of budget policy and tariff regulation of the sector.

2. **FINANCIAL.** Considering the wear and tear of infrastructure and key assets, it is most likely that in the near future sufficiently large investments in modernising existing infrastructure will be necessary, which carries its own risks when possible recession in the world economy is taken into account.

3. **INSTITUTIONAL.** Developing systems to encourage companies to take part in transforming the sector is not the best way to do this, companies have to be asked about such transformations.

Key trends towards increasing energy efficiency

Research conducted by the World Bank indicates that Russia could economize up to 45% of its total primary energy consumption and by increasing energy efficiency, could avoid buying quotas for CO2 emissions.
According to data from the Russian Ministry of Economic Development, pilot projects were launched in 2009 aimed at developing economically justified and widespread solutions in future. These include "Energy efficient town" and "Energy efficient social sphere".
In the framework of "Energy efficient town" the Modernisation Commission and the Presidential Council on Science, Technology and Education chose to carry out pilot projects in Tyumen, Anatity, Vorkuta and Kazan. The results of the energy audit of multi-storey housing in Kazan showed that the average pay-back term of certain energy saving measures (including annual bank rates of 11%), on residential buildings was a little over 4 years and on buildings in the social sector, less than 2 years.
As well as pilot projects on a federal level, regional initiatives are also being developed.
The not-for-profit partnership "Energy efficient town"[1] together with regional and municipal authorities created a register of pilot projects dealing with energy saving in Russia. The following are of particular note in the housing sector:

- energy efficiency of street lighting, local lighting and illuminated advertising – implementation of street lighting systems using domestically produced LED light sources in the town of Olenegorsk in the Murmansk region;
- energy efficiency of residential and non-residential buildings – using low-temperature coolant return pipe heating systems for heat supply to residential and administrative buildings in Barnaul; the organisation of systems of heating in residential buildings with horizontal apartment divisions in Khanty-Mansiysk;

- commercial metering of energy resources – the organisation of heat and energy metering after the installation of meters in residential buildings in the towns of Tomsk and Bawly (Tatarstan).

These are just some of the projects either scheduled for development or currently under development in Russia. It is not only regional and local authorities that are implementing projects in this sphere. Large Russian companies are also supporting the trend for energy efficiency in the housing and public utilities sector. For example Russian Railways (RZD) is developing a project called "Intelligent station", under which a solar module system was launched at the railway station in the town of Anapa in June 2012. The system includes 560 solar modules, based on thin-film photovoltaic cells, the nominal capacity of which is 70 kW.

Also within the framework of the project, the company is planning to develop wind generators, with a nominal capacity of 50 kW, which by increasing capacity will allow the system to guarantee full supply to the station.

Research and pilot projects show that financial investment on energy efficiency quickly pays for itself and becomes profitable even small investments. Experts estimate that implementing energy efficiency saves three times more than increasing productions of energy resources.

Looking to the future, formulating a comprehensive and effective management system of energy supply and increasing energy efficiency, on the basis of integrated infrastructure development and new construction standards through development of projects of integrated urban development is becoming vital. It is also important to implement systems, through which new construction, particularly housing, will as a rule be possible only with environmental compliance certificates. This will allow for a significant reduction in the percentage of the country's housing, for which energy audits and implementation of energy saving measures are necessary.

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1. The not-for-profit partnerships of "Russian heat supply" and "the Council of electric power producers and strategic investors in the power sector" founded the not-for-profit partnership "Energy efficient town", which works closely with the coordination council on questions of energy saving and increasing energy efficiency of the United Russia party.

3.4. Sustainable development in the Russian regions: regional inequalities, environmental problems and social challenges

Sergei Bobylev, Yevgeny Shvarts

The transition to sustainable development has become an important aim under current conditions both for humanity and individual countries. The term refers to a high social and ecological "quality" of economic growth, that is pursuing economic growth while ensuring social development and environmental conservation. As a foundation for sustainable development an economy should fulfill the following functions: Increasing the population's prosperity, guaranteeing social justice and reducing the risk of environmental damage. Important characteristics of a sustainable economy include the effective use of natural resources, maintaining and increasing natural capital, reducing pollution and lowering carbon emissions, as well as preventing losses to the ecosystem and biodiversity, amongst other issues.

Russian regions are characterized by very high differentiation in the level of their development, which is linked to the fact that they are sector specific, largely defined by their historical background and the specifics of industrial development in the Soviet period. If, for example, the export orientation of the Tyumen regions, where oil and gas is produced, is a geographical and historical given, then the industrial orientation of such regions as Sverdlovsk, Chelyabinsk and Lipetsk, was defined by the specifics of the country's development during the period of industrialisation in the 1930s.

This means that in many cases the sustainability of ecological development of a region is defined de facto. This cannot be said for all regions of course. The level of "impending doom" of a region on one path of ecological development or another is only predetermined to a certain degree. Each region has a certain amount of freedom, defined by federal and regional economic policy, in its development trajectory.

Russia's regions can be divided into four groups according to the specifics of certain sectors:

1) financial-economic centres (Moscow, Saint Petersburg, the Moscow region);
2) export-oriented regions (the regions of East Siberia and Sakhalin);
3) agricultural regions (mainly the Southern regions of Russia);
4) industrial regions.

Evaluating the sustainability of regions' development is a sufficiently complicated procedure, which requires a large amount of information. But it has to be done in order to identify the concrete aims of socio-economic policy and develop a strategy for future sustainable development.

The first comprehensive development in this area was a system of indicators of sustainable development proposed by the UN Commission on Sustainable Development in 1966. Now practically all large international organisations and most developed countries have official integral indicators, for example: the Human Development Index, the Living Planet Index (WWF), an Adjusted Net Saving (the World Bank) amongst others.

Not one of these indices enjoys the required level of trust and familiarity in Russia, as they are not reliable and effective instruments for monitoring the situation and are not used to increase the efficiency of public administration. For this reason, the Russian branch of the WWF and RIA Novosti developed an ecological-economic index for Russian regions, which calculates the ecological sustainability of development in a broad context, including ecological, economic and social factors.[1]

The results of the ecological-economic index reveal a number of consistent patterns of classification among Russian regions along the lines of their sector specifics. The majority of the index's leaders are agricultural regions. The top ten regions with the highest ecological-economic rankings include nine agricultural regions and one industrial – the Tver region. All export-oriented regions had low ecological-economic ratings. Five of the seven regions in the export-oriented group are included in the ten regions with the lowest ratings. As well as regions from this group, the bottom ten also includes two agricultural regions – the Orenburg region and the Chukotka automous okrug, as well as three industrial regions – the Kostroma, Irkutsk and Kemerovo regions.

One of the main factors behind the poor performance of many regions at the bottom of the ranking is the significant depletion of natural resources, owing to the dominance of the mining sector in their economy, which reduces natural wealth. This explains the low ranking of resource-rich, export-oriented regions. Mining also plays a substantial role in the economy of regions belonging to other groups with low ecological-economic rankings.

Looking at the results of the regions' rankings according to the ecological-economic index, it is important to note that resources mined in outsider regions are an important source of income for the federal budget and the basis of the country's wealth. Significantly improving the situation in terms of sustainability of ecological development here in the near future is therefore not possible due to objective factors. The results of many agricultural regions, which hold high positions in the list, are partly due to their low level of economic development, which leads to minimal harmful effects of economic activity on the environment.

The Altai Republic

The Altai Republic leads the ecological-economic index. The region's forest resources, which are almost 50% higher than gross regional product make a significant contribution to its final result, as do the number of protected nature areas. The republic is third in Russia by volume of spending on human development. The level of depletion of natural resources is also very low, less than 2% of GRP, which is due to the absence in the republic of significant mineral resources.

The Republic of Chechnya

The Republic of Chechnya is 2nd in the ecological-economic index. Gross fixed capital formation, human capital and protected areas make the greatest contribution to the republic's final ranking. Protected areas cover over 20.3% of the republic (7th place among Russian regions). The republic also leads the country in terms of the ratio of gross savings to GRP and expenditure on development of human capital to GRP.

At the same time, this indicator is to a great extent based not on a region's own resources, but on funds granted by the federal government. About 90% of the republic's consolidated budget income is based on non-repayable receipts, that is, the region does not yet have its own sources of financing. At the same time, these funds are directed towards the economy and infrastructure, which helps to increase national wealth.

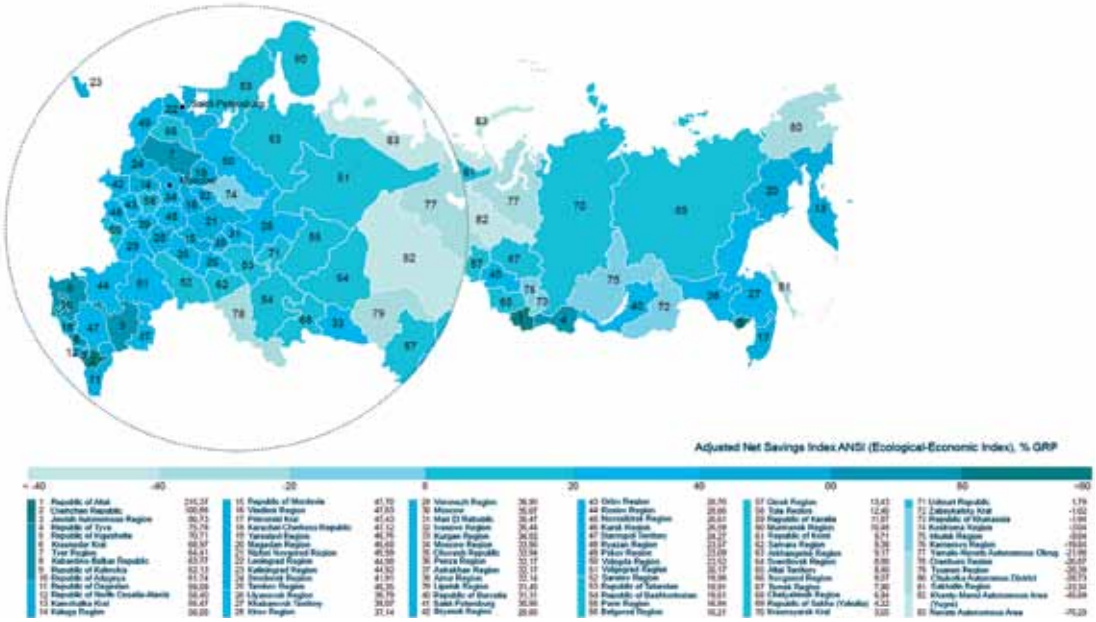

Fig. 1. Map: Ecological-economic index of Russian regions

The Jewish Autonomous Region

The Jewish Autonomous Region is 3rd in the ranking. This is mainly due to an increase in forest reserves, which are estimated at over 50% of GRP, making the region 3rd in the country according to this indicator.

In terms of negative factors impacting the region's ranking, there is a relatively low level of economic activity in the region. Damage from pollution relative to GRP is also relatively high. In terms of this indicator, the region is 78th out of 83 regions. However, to some extent this is linked the low level of GRP.

The Krasnodar Krai

Krasnodar Krai is one of the few leading regions in the ranking, which has a relatively high level of economic development. Krasnodar Krai is one of the leading regions by ratio of gross fixed capital formation to GRP – 5th in Russia by this indicator.

The damage from economic activity linked to the depletion of natural resources and pollution is fully offset by investment in human capital, the presence of protected areas and other factors. Furthermore, this damage is relatively low, considering the high level of economic activity, partly due to the region's specialization in holiday resorts and agriculture, which contribute to attempts to curb the most negative environmental impact of production.

Krasnodar Krai is 6th in Russia in terms of damage caused by harmful emissions in relation to GRP. Furthermore, the region is home to a sizeable amount of protected areas and is 8th in Russia according to this indicator.

The Republic of Kalmykia

The Republic of Kalmykia's strong performance in the index is due to relatively high spending on development of human capital in the region. It is 5th in Russia according to this indicator. Furthermore, the region has a low level of damage from the depletion of

natural resources and environmental pollution levels are around average. The republic is 27th amongst Russian regions by damage caused by harmful emissions. A significant area in the region is also protected – the region is 11th in Russia according to this indicator. The region has a low level of economic development.

The Nenets Autonomous Okrug

The Nenets Autonomous Okrug is bottom of the ranking. Its low position is linked to the resource orientation of its economy, which leads to the depletion of natural resources and the reduction of natural capital. The role of resource mining in the structure of GRP in the Nenets Autonomous Okrug is the highest in Russia, at over 70%. Furthermore, investment is mainly directed towards the mining sector.

The Khanty-Mansiysk Autonomous Okrug

The Khanty-Mansiysk Autonomous Okrug is 82nd in the index. Its poor performance is inked to the significant level of hydrocarbons production in the region. Production of extractable resources accounts for over 60% of the structure of its GRP. The region's position in the ranking is largely due to objective factors. It is home to a significant amount of Russian oil production, which is one of the most important sectors of the Russian economy and one of the biggest sources of income for the state budget. Furthermore, this income is then divided among subsidised regions. Therefore, on the one hand natural resources are being depleted in the Khanty-Mansiysk Autonomous Okrug, but on the other hand, the region is guaranteeing investment and by extension, development, in other regions.

Positive factors in the region include the relatively low levels of damage caused by harmful emissions and significant expenditure on environmental protection and developing human capital. Damage from harmful emissions relative to GRP in the region is 8.05 %, putting it 21st among Russia's regions. The region is also 4th in Russia by budget spending on development of human capital and 2nd in terms of expenditure on environmental protection.

The Sakhalin Region

The Sakhalin region is 81st in the ranking. The region's low position, like most other regions which performed poorly in the index, is linked to significant depletion of natural resources and the high share of mining in GRP. In Sakhalin, mineral extraction accounts for over 50% of GRP. However, damage from harmful emissions is relatively low – in terms of damage from emissions relative to GRP, Sakhlin is 8th out of Russia's 83 regions.

The Tyumen Region

The Tyumen region's low position – it is 79th in the index – is due to significant depletion of natural resources. Mineral extraction accounts for 50.5% of GRP. At the same time the Tyumen region, including autonomous regions located within the region, is one of the biggest contributors to the state budget and income generated by mining in the region is used on a federal level.

The significant income generated by mining is used to create a basis for increasing investment in environmental protection and development of human capital, which to some extent compensates for damage linked to the depletion of natural resources. The Tyumen region is 1st in Russia in terms of overall expenditure on environmental protection and 19th by investment in development of human capital.

The Yamalo-Nenets Autonomous Okrug

The Yamalo-Nenets Autonomous Okrug is 77th in the index. Its poor performance is linked to the significant depletion of extractable resources – mining of which accounts for almost 50% of GRP. Furthermore, the Yamalo-Nenets Autonomous Okrug, like the Khanty-Mansiysk Autonomous Okrug and the Tyumen region, is one of the country's key mining regions and income from production is used on a federal level. In the Yamalo-Nenets Autonomous Okrug, a significant amount is invested in environmental protection. The region is 12th out of 83 regions in Russia in terms of spending on environmental protection.

The Kemerovo Region

One of the main factors behind the Kemerovo region's poor performance is the high volume of harmful emissions, which is one of the highest in Russia. Furthermore, a significant amount of GRP (25%) is based on mineral extraction, which leads to the reduction of natural resources. At the same time protection of natural capital contributes to the amount of protected areas, by which indicator the Kemerovo region is 12th in Russia.

The Irkutsk Region

The Irkutsk region's low position (75th) is mainly due to significant reduction in forest reserves and also the low level of environmental economic activity. The reduction in forest reserves in the Irkutsk region is estimated at 10.8% of GRP, which is one of the worst indicators in Russia. The ratio of damage from emissions to GRP is significantly higher than the national average – the region is 12th in Russia according to this indicator. Positive factors impacting the region's rating include protected areas, which cover around 3% of its territory.

An important conclusion of the ecological-economic index's ranking of regions may be the feasibility of making corrections to their ecological-economic policies. It is obvious that in regions which performed well in the ranking, which have great potential in terms of ecosystem services and biodiversity should avoid damaging projects which would have a significant environmental impact. Current and often bitter debates, for example about the mining of nickel in the black earth in ecosystems in the Voronezh region, the launch of production of small deposits in feeding grounds for salmon in Kamchatka and many others demonstrate the relevance of this conclusion.

Projects for the maintenance of ecosystems and investment in such projects, for example sustainable forestry and agriculture, recreation and eco-tourism amongst others, should be prioritised in regions with high rankings on the ecological-economic index.

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3.5. Sustainable development in Siberia: environmental aspects

Georgy Safonov

More than 250 years ago, Mikhail Lomonsov said "Russia's power will grow with Siberia!" Since then, Siberia has indeed become key contributor to the national economy, a source of practically inexhaustible resources for the country's development and also a "supplier" of environmental services on a global and national scale.

Historically, since Soviet times, exploitation of Siberian natural resources has conformed to the principle famously voiced by the biologist Ivan Michurin: "We cannot wait for favours from nature – to take them from her, that is our task!" Development of resource potential became a state priority under the Soviet Union and the scale of "confiscation" of resources from Siberia reached colossal proportions, especially in sectors such as coal mining, oil and natural gas production and logging.

During the Soviet era the principles of sustainable development had yet to be developed. So no one thought to evaluate economic development strategies in such terms, let along include calculations based on such indicators in their planning.

In this article we will consider modern trends in Siberia's economic development, their conformity to the criteria of sustainable development and how they balance with social, economic and environmental aspects of this development.

The modern concept of sustainable development proposes taking into account economic, social and environmental components in ensuring the well being and further development of current and future generations. Economists divide these components into three kinds of capital – man-made, environmental and social – allow for the exchange of one kind of capital for another. For example, the proceeds from non-renewable sources of energy (e.g. oil or coal) may be invested in other forms of capital, for example education (social) or transport infrastructure (man-made). If spending of one form of capital is offset by investments in another, such development may be called sustainable (economists call this "weak sustainability"). Environmentalists often set more stringent requirements, insisting that certain natural resources should be saved from exhaustion by replacing them with other forms of capital.

In this article we will examine several indicators connected with sustainable development in the Siberian Federal District (SFO) based on state statistical records and reports for the macro-region. It should be noted that a more comprehensive analysis would require a wider appraisal of special sustainable development indicators developed by the World Bank and other organisations, but such figures do not yet exist for Siberia as a region.

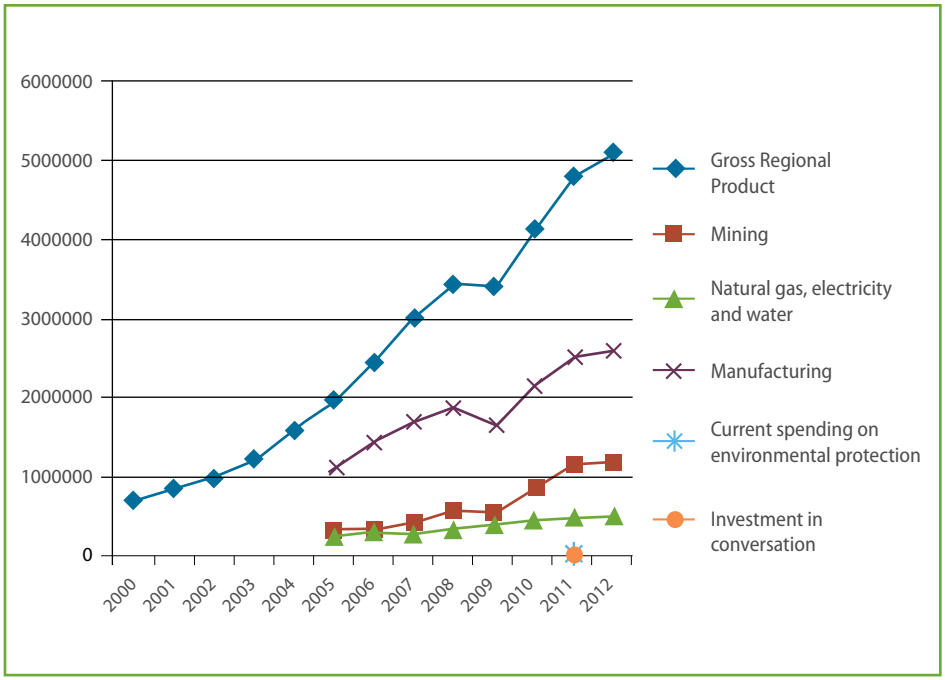

Fig. 1. Economic development in the Siberian Federal District, 2000–2012 (millions of roubles at current prices). *Source: Rosstat*

ECONOMIC COMPONENTS. According to the Russian State Statistics Service (Rosstat), the Siberian Federal District contributed 11 to 12 % of Russia's GDP in the period between 2000 and 2012. In absolute terms, Siberia's gross regional product in 2012 was around 5.1 trillion roubles (at current prices). The vast majority of this production (83 %) was in one way or another connected to mining, manufacturing and other industries that consume natural resources and have an impact on the environment (fig. 1).

Meanwhile, spending for environmental purposes, including current account spending and capital costs, is insignificant. Fig. 1 shows the figures for 2011: current account spending was 0.77 % of GRP and investment just 0.25 % of GRP.

Such figures could mean one of two things: either the environmental situation in Siberia is so perfect it requires no additional spending, or environmental activities are underfunded, despite the fact that extractive industries dominate the region's economy. Below is a more detailed look at the environmental aspect of sustainable development in Siberia.

Production and consumption in Russia produces more than four billion tons of waste every year. The Siberian Federal District accounts for 2.9 billion tons, or more than 70 % of the national total (fig. 2). That is a vast amount of waste!

The leading regional polluters in Siberia are the regions of Kemerov, Krasnoyarsk and Irkutsk. It should be noted that utilization or recycling of waste is almost non-existent, with most waste going to land-fill (including around 50 % of waste at industrial enterprises), but accurate information about the quality of this waste is extremely hard to come by.

Atmospheric pollution is one of the most serious environmental problems in Russia and the Siberian Federal District leads the country in it, producing around 6 million tons of emissions a year (fig. 3). It should be noted that the cocktail of pollutants released into the atmosphere annually includes extremely dangerous "ingredients" such sulphur and nitrogen oxides, carbon monoxide and other carcinogenic compounds, heavy metals and other hazardous particles that can threaten the health and even the lives of local populations. In this sense Siberia's "leadership" signifies high risks to human health and dozens of towns and villages across the region in areas of environmental disaster.

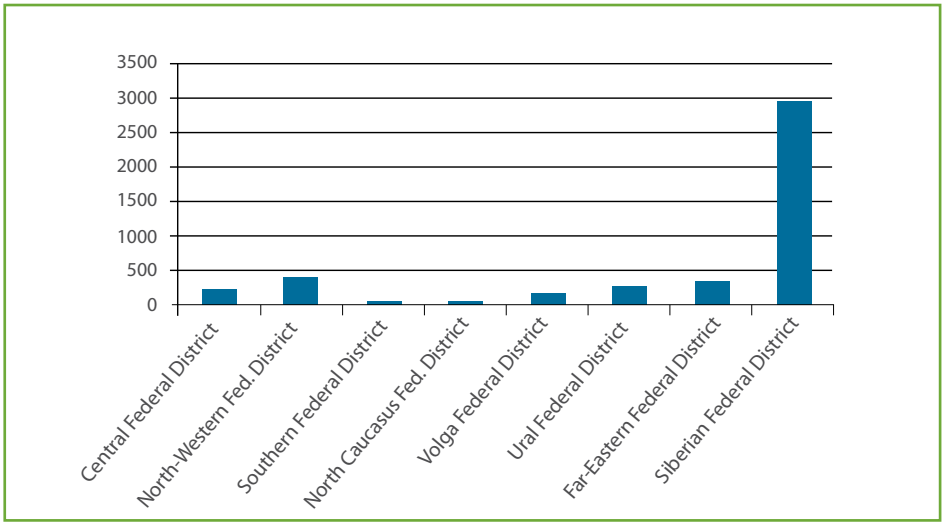

Fig. 2. Waste from production and consumption in Russian federal districts, 2011 (millions of tons per year). *Source: Rosstat*

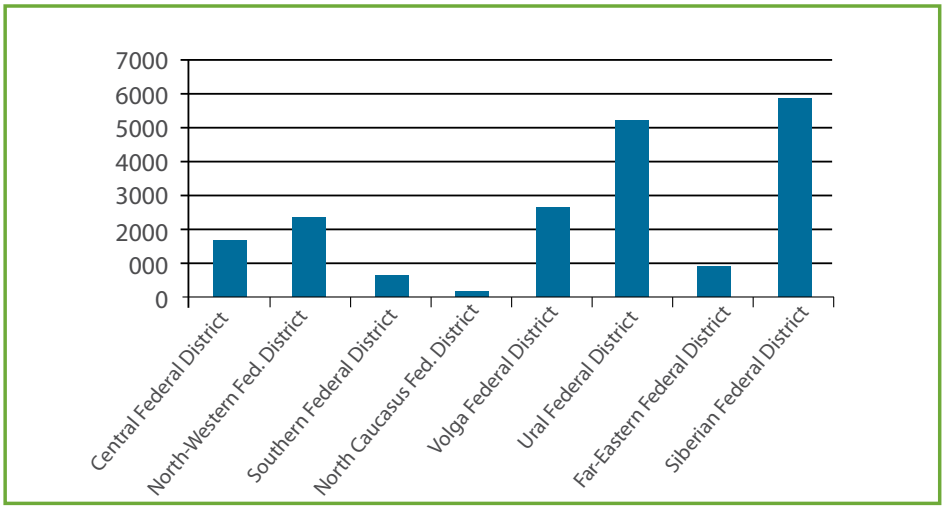

Fig. 3. Emissions of atmospheric pollution from stationary sources in Russian federal districts, 2011 (thousands of tons per year). *Source: Rosstat*

Pollution from surface water discharges from industrial and other enterprises is also exceptionally high in the Siberian Federal District. Despite a decrease in the period between 2000 and 2010, Siberian enterprises still release more than two billion cubic metres of pollution into the region's lakes and rivers every year (fig. 4). Accordingly, there is a high risk of water deterioration in Siberia. The danger lies in the fact that contaminants collect in reservoirs, where their concentration – and hence their impact on health and the environment – increases.

Besides anthropogenic factors, the condition of the environment and its natural resources is increasingly being influenced by global climate change. Perhaps the most "climate vulnerable" sectors in Siberia are agriculture and forestry.

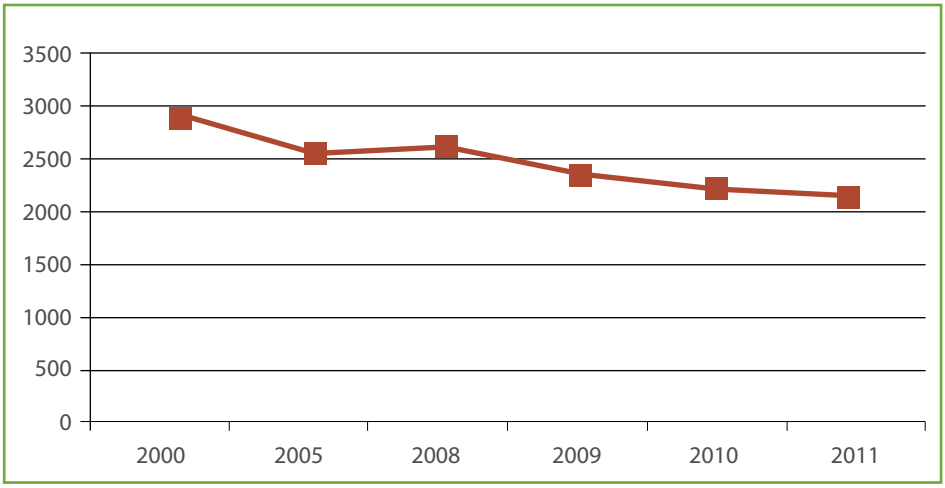

Fig. 4. Emissions of water pollution in the Siberian Federal District, 2000-2011 (millions of cubic metres per year). *Source: Rosstat*

The drought of 2010 to 2012, which caused more than 300 billion roubles worth of damage to Russian cereal production, is a good example. Siberian agricultural producers also incurred significant damage in the form of ungathered harvests, while the public felt the impact through sharp rises in the price of bread and other grain products.

In forestry, the most direct threat from climate is the loss of trees to forest fires, pests and infectious diseases. Siberia is one of the leaders in the country in terms of acreage affected by forest fires, with hundreds of thousands of hectares burning every year. In 2011, fire killed 600,000 hectares of forest (fig. 5).

From the above data it can be concluded that the environmental indicators of economic development in Siberia are not sustainable. The environmental impact of production and consumption in the region is growing, but environmental spending is static at around 1 % of GRP. And the situation is further complicated by the addition of increasingly visible negative effects of global climate change to the "ordinary" anthropogenic impacts on the environment and natural resources. This is not, however, reflected in current plans for Siberia's development.

It should be noted that Siberia has enormous potential for the rational use of natural resources, including renewable sources of energy. Research centres in Siberia have seen some unique developments in this sphere, including several patents for new equipment.

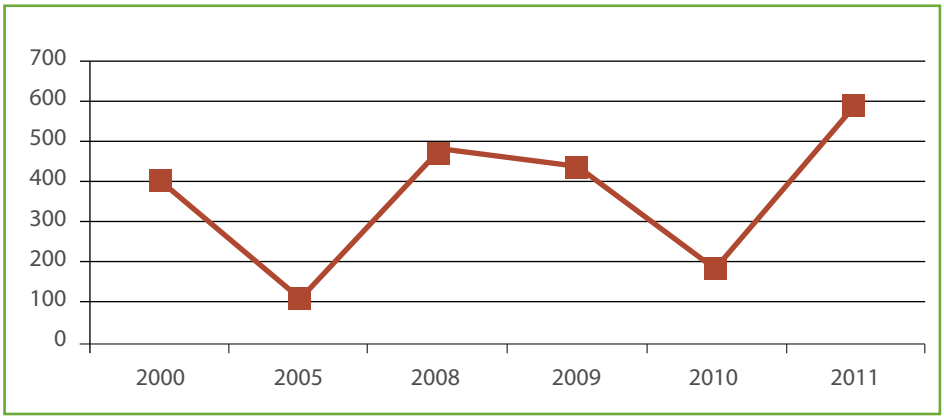

Fig. 5. Area of forest fires in the Siberian Federal District, 2000 to 2011 (thousands of hectares per year).
Source: Rosstat

But neither the technological nor the intellectual potential of the region has yet been tapped.

Discussion of sustainable development has taken on a much more practical character in recent years and attention is increasingly being paid to stimulating the development of the so-called "green economy". This model of economic development, based on the principles of sustainable development, considers the full value of natural capital and environmental services and proposes environmental sustainability, social justice and the development of local production.

There are several basic elements to a "green economy":

- renewable energy;
- environmentally friendly home building;
- environmentally friendly transport;
- water management;
- waste management;
- agricultural and forestry management.

In many of these areas neither Russia nor Siberia has anything to boast about. The main hurdle for development of a "green economy" is underdeveloped markets that offer no commercial incentive for "green" development. And that makes the active involvement of the state and society essential to the transition to a green model of sustainable development.

4

Environmental information and education in the field of sustainable development

4.1. The state of education for sustainable development in Russia*

Maria Zhevlakova

All education is environmental education.
By what is included or excluded,
students learn they are part of the natural world,
or on the contrary, that they are separated from it.
(D. Orr)

The following article contains a brief overview of the state of education for sustainable development (ESD) in Russia.

In accordance with "Agenda 21", the 57th session of the UN General Assembly in 2002 declared the period from 2005 to 2014 the UN Decade of Education for Sustainable Development. The goal of this decade is to promote public understanding of the importance of training and education in sustainable development. General Assembly Resolution 57/254 formulates the basic tasks of the decade:

1) to facilitate the transition to sustainable development;
2) to emphasise and strengthen the leading role of education in the awareness and understanding of sustainable development;
3) to promote interaction and collaboration between all stakeholders in ESD;
4) to improve the quality of teaching and learning in ESD;
5) to develop strategies for implementing and improving the effectiveness of ESD at all levels.

To meet these goals, the following strategies are proposed:

- development of ESD;
- extensive consultation, the development of partnerships and networks of cooperation;
- capacity building and skills development;
- support for scientific and methodological research and innovation and the dissemination of information through information and communication technologies;
- monitoring and evaluation.

The strategy for Education for Sustainable Development adopted by the UN underscores the leading role of education in achieving a sustainable future. ESD around the world, including in Russia, already has a 40 year history, but has not yet produced significant results in environmental education. In 2005, the world started the decade of ESD with an understanding that traditional approaches to environmental education "simply do not work" (Klaus Toepfler, Director General UNEP, 2005).

Russia is one of the countries included in the programme for realising the decade of ESD declared by the UN in 2005. Russian representatives were members of the development group that drew up the United Nations Economic Commission for Europe "Strategy of Education for Sustainable Development". This event raised hopes for a qualitative change in the state of ESD promotion in Russia, inspired by the practitioners of informal

education, scholars and authors who are developing methods for implementing ESD as well as international, inter-regional and local ESD projects in Russia.

The state of education for sustainable development in Russia is very difficult to describe unambiguously. At first glance, one might say that at the systemic state level ESD in its modern sense does not exist Russia. Yet at the same time, one cannot discount the many projects that have been realised, educational programmes created and the large number of other initiatives and developments existing in this field.

For a critical understanding of the ESD in Russia, we must recognise several factors:

- The lack of a national system of ESD supported at the institutional level.
- The absence of a common understanding of ESD and agreement on the methodology, objectives, values, methods and content of ESD.
- The substitution of concepts – from the start of the Decade of ESD, the subject became somewhat fashionable and many programmes of environmental education, practical environmental action, or even the teaching of natural sciences, were called "education for sustainable development", although these are actually quite different things.
- In Russia, the role of government in promoting education for sustainable development is quite small. Practically all the main work at the federal and regional level is carried out by civil society organisations and individual initiative groups in educational and research institutions and organisations.
- At the same time, tens of prominent projects of all sizes have been realised in Russia during the years of moving from environmental education to education for sustainable development, each of which has made a significant contribution to understanding of ESD and changing educational practice. But while recognising the undoubted merits and achievements of these projects and initiatives, it should be noted with regret that the vast majority of them were of a local character, possessed a small amount of resources and could not change the situation at a systemic level across Russia.

The following may serve as an illustration of the above: just in time for the preparation of this article, in July 2013, there was a meeting of the interdepartmental working group on climate change and sustainable development under the Administration of the President of Russia. At this meeting, it was stressed that in the Russian system of education there is not a word on the subject of sustainable development and "green economy". This is easily verified with a visit to the websites of the Ministry of Education and Science and the various regional education committees: nowhere in the lists of target programmes or priorities is there any mention of ESD programmes or implementation of the Decade of ESD). However, the meeting also noted that "the Ministry of Education and Science of the Russian Federation may establish an entity that will be responsible for promoting the theme of sustainable development in Russian education" (www.ria.ru/eco_news/20130705/947933780.html).

It is to be hoped that this new department, if it is created, will take into account the achievements and experience of the creative groups, departments, pilot schools and public organisations that have been developing programmes and models of ESD and promoting the concept of ESD around the country for many years.

Two important documents have now been developed (though not signed into law): the National strategy for education for sustainable development in the Russian Federation and the plan for the formation and development of education for sustainable development in the Russian Federation. A brief overview of the mechanisms for implementation of ESD at different levels is given in table 1.

Table 1. Participants and mechanisms for implementing education for sustainable development (based on the work of D. S. Ermakova, "Scientific and Methodological Support of Environmental Education for Sustainable Development", 2011).

Level of ESD	Participants in ESD	Mechanisms for realisation of ESD	The Situation in Russia
The International Community	Intergovernmental organisations (the UN, UNESCO, etc.) and working groups, international NGOs	• Collection, analysis and dissemination of information on ESD initiatives across the globe • advertising, legal and information support for the Decade of ESD • organisation of bilateral and multilateral ESD partnerships • implementation of ESD in national curriculums and state budgets, research into ESD • inclusion of ESD is on the agenda of the UN Commission on Sustainable Development, organisation of international and inter-regional conferences and training seminars.	• Schools and UNESCO departments are involved into the implementation of ESD programmes • Russia participated in the development of the ESD strategy for the UNECE • Community organisations and educational authorities in St. Petersburg, Tomsk, Omsk, Novosibirsk, Vladivostok, the Sakhalin Region and Yekaterinburg, in partnership with non-profit organisations from the UK, Finland and Denmark, have implemented international projects, aimed at improving knowledge ESD among Russian teachers and the developing teaching materials and educational programmes
Regions and the state	The Ministry of Education and Science, socio-political organisations and movements, media and news agencies, business associations.	• Development of national policies in the field of ESD; • budgetary and extra-budgetary funding for ESD; • public education in the field of sustainable development • dissemination of information about the sustainable development experiences of enterprises, organisations, communities and regions • organisation of public forums for the exchange of experience and knowledge and to identify problems of sustainable development and ways to address them, including through education • research and joint projects in the field of ESD • development of sustainable development indicators, objective monitoring of ESD	Examples of the promotion of ESD at the regional level are the activities of the environmental education department at the St. Petersburg Academy of Postgraduate Pedagogical Graduate Teacher Training and the department of environmental education and sustainable development at the Moscow Open Education Institute, which involve schools in the region in experimental work on ESD programmes, looking for ways to integrate ESD into the existing school education system. Similar work has been carried out at the municipal level by Baikal Environmental Wave of Irkutsk region, as well as in the city of Vladivostok, where the main "driving force" for promotion of ESD in the formal education system is the social organisation ISAR – DV.
The local community	Public (children's, young people's, women's) groups, cultural organisations (libraries, houses of culture, clubs), local government committees, religious communities.	Identify local examples of sustainability, sustainable methods of management; exchange of practical experience in the field of ESD	Examples of leading non-governmental organisations working in ESD methodology and implementation include: The St. Petersburg Public Organisation for the Promotion of Environmental Education (in 1996-2010 this organisation trained 5,000 teachers from different regions of Russia in ESD), Baikal Environmental Wave, The St. Petersburg Federation on Environmental Education
Schools and universities	Teachers, pupils, students	Integrating ESD into existing curricula and programmes	A number of universities have created departments for sustainable development where courses in "Sustainable Development" are included in the curriculum. As a rule, this is down to the initiative of interested teachers at the level of departments and faculties. These proponents of ESD training are often also involved in international projects. Courses and programmes in sustainable development are only included in the curriculum in schools participating in regional or municipal pilot schemes and experimental work (e.g. in Moscow and the Irkutsk district of the Irkutsk region). In most schools, if ESD is realised, it is only through additional education or students work on projects, organised by non-profit organisations.

The organisation of education for sustainable development

There are three main organisational and pedagogical approaches:

1) ESD as a topic of study within one academic subject (usually one of the natural sciences);
2) ESD as an inter-disciplinary topic approached through several academic subjects (the "whole school approach");
3) ESD as a principle of the educational system as a whole, including the teaching and training of students.

In our country there is a place for the first approach (in three versions: the multi-discipli-nary model, where ESD topics are explored in various subjects; the single-disciplinary model – a separate course of study in the field of sustainable development; and a mixed model – a combination of single-and multi-disciplinary approaches). Pilot projects in the field of ESD, as possible elements of a future ESD system, are currently being implemented at all levels of education in the Russian Federation.

Pre-school education

Since 1992, a number of kindergartens have worked on a project called "Agenda-21 day for Twenty-first Century for Pre-school Educational Institutions". The idea is to look at pre-schools along with their territory, premises, inhabitants and resource flows as a system that is designed to be a platform for combining the efforts of local administration and civil society organisations for the implementation of specific measures and actions, the meaning and the content of which will reach out to local residents and improve their quality of life.

Since 2009 the World Organisation for Early Childhood Education (OMEP) has run a project for children from 0 to 8 years of age in the field of education for sustainable development. About 250 pre-schools and other educational institutions, as well as individual families, take part (in Moscow, Volgograd, Kazan, Izhevsk, Toylatti and other cities).

General secondary education and additional education for children

At the school level ESD is seeing vigorous development in extra-curricular education. Such projects are being run in cooperation with foreign partners in the Republic of Buryatia, the Omsk region and so on. According to the conclusions of the plenary session of the Scientific Council for Environmental Education at the Presidium of Russian Academy of Education (2008), the scientific and methodological centre of this area is a consortium of the Children's Environmental Centre run by Vodokanal of St. Petersburg and OSEKO.

Cooperation between these organisations as part of the strategy for ESD in St. Petersburg has produced one of the first domestic teaching manuals for ESD and a multi-year, city wide plan called "Lessons in Sustainable Development" that will see every school in the city hold classes in ESD. Every single school in St. Petersburg has been sent newly-developed teaching-support materials for ESD lessons (titles include "Step into the 21st Century", "Lessons of the Future", "St. Petersburg's Natural Environment", "A Local Agenda 21", "Choose the Future Today", "Water Lessons", "Resource Efficiency at School", "Electricity Saving Projects at School", "Lessons on the Baltic Sea" and many others).

In Moscow, the scientific and methodological centre for extra-curricular ESD is the Moscow Children's Eco-Biology Centre (MDEBTs). The Centre runs extra-curricular education programmes including "OEUR" (the Russian acronym for Fundamentals of Environmental and Sustainable Development), "Social Ecology and Sustainable Development" and other individual modules of 6 to 36 teaching hours long. These courses can be integrated into other kind of educational programmes and also into the general educational course "Moscow's Environment and Sustainable Development".

The Concept for Environmental Education for Sustainable Development in Schools is based on current research and experience in teaching ESD, and was developed by the Environmental Education Laboratory at the Russian Academy of Education's Institute for Education Method and Content and the RAE Research Council for Problems of Environmental Education (the project was led by corresponding academy member R. A. Zakhlebny). It was approved by the presidium of the academy in 2010.

Professional Education

There are currently only 60 universities (less than 5% of the total not counting affiliates and military academies) in Russia running professional educational programmes in sustainable development as either main or additional courses.

One of the pioneers is the Mendeleev University of Chemical Technology, which in 1995 established a department and later (in 2000) a full institute for sustainable development. All courses of study include a compulsory component called "Problems of Sustainable Development". In 2002, one of the first textbooks on the subject was released. An Introduction to the Theory of Sustainable Development, by E. V. Girusov, V. I. Danilov-Danil'yan, E. A. Vinogradov and others (edited by N. M. Mamedov, Moscow, 2002), offered a systematic approach to the philosophical, scientific, theoretical, socio-economic and environmental prerequisites for sustainable development and an analysis of the conditions for transition to sustainable development at the global and regional levels. Special attention was paid to methods of creating of a culture of sustainable development.

In 2003 "Sustainable Human Development" was introduced as a discipline in the environmental component of federal educational standards. This discipline covers the following topics: the historical background to the emergence of the concept of sustainable development and its social mission; main provisions and scientific foundations of sustainable development; geo-environmental, geo-economic, geo-social and geo-political aspects of sustainable development; globalisation and regionalisation; the spatial basis for sustainable development, geographic problems of Russia's transition to sustainable development. The relevant text books are "Sustainable Human Development" by N. N. Marfenin (Moscow, 2006) and "Sustainable Development: an Introductory Course" by L. G. Numova and B. M. Mirkun (Moscow, 2006).

Vocational professional education is generally delivered in the form of short-term training programmes such as "Environmental management and protection of the environment" (Russian Academy of Public Service under the President of the Russian Federation), "Global sustainable development and waste management" (Saint-Petersburg State Engineering University of Economics) and "The Global Economy and Sustainable Development" (the MNEPU Academy).

It should be noted that a number of universities have also launched initiative in informal education. For example, The Russian State Hydrometerological University runs an

educational cruise called "Learn Coast" (an acronym for "Learning network on coastal sustainable living in the Baltic Sea region"). The maritime summer school for students from Russia, Estonia, Denmark and Sweden follows five modules: coastal communities and ways of life; the coastal environment; sustainable tourism; integrated management of coastal areas; and analysis and forecasting of risks.

St. Petersburg State University has been working on sustainable development training for experts in the field who want to increase their qualifications as part of the International Programme for Cooperation in Sustainable Development and Environmental Management. The university has developed a course of the same title, which includes seven modules:

1) the conceptual foundations of sustainable development;
2) key aspects of sustainable development (environmental, social, political and legal and economic);
3) programmes for transition to sustainable development;
4) realisation of the principles of sustainable development in core sectors of the economy;
5) managing processes of transition to sustainable development;
6) professional activities in the field of sustainable development and staff training;
7) practical realisation of sustainable development projects (examples of successful and replicated transition projects in various areas of the economy; master classes; comprehensive workshops on examples of sustainable development projects).

The national strategy for ESD says that "ESD envisages the reorientation of attention in teaching from providing knowledge to working through and searching for possible solutions. Even while maintaining the traditional approach to teaching in individual institutions, there should be maximum support for multi-faceted, inter-disciplinary analysis of real life situations. Such changes facilitate the adjustment of programmes of study and teaching methods, requiring teachers to reject their role as exclusively transmitters of knowledge and students to shed their role as simply receivers of information".

Despite the relatively weak development of education for sustainable development at the systemic state level in Russia, our country has seen the creation of successful elements and examples of high-quality practice of ESD in organisations of all levels. With state support, Russia will make significant progress in extending ESD programmes to the widest possible groups of student on the basis of a common understanding of the methodology and practice of ESD.

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* Based on the work of D. S. Ermakova, "Scientific and Methodological Support of Environmental Education for Sustainable Development", 2011. r.

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4.2. The role of NGOs and civil society in environmental protection

Yevgeny Usov

By way of introduction

Public environmental activism has a complex history in Russia and has made a significant contribution to the development of modern Russia. It is sufficient to recall that the political processes that led to the collapse of the Soviet Union, began with environmental appeals by scientists and cultural figures and public organisations. The sharp growth of the protest movement in the late 1980s and early 1990s was largely a reaction against grandiose, environmentally damaging projects such as reversing the flow of the northern rivers and grave environmental accidents, of which the Chernobyl disaster is only the most infamous. The place and role of Russian non-governmental organisations (NGOs) in national life has changed significantly. During their golden age at the turn of the 1980s and 1990s environmental NGOs could be found at every level of public life, from the federal to the municipal and officials of every rank, all the way up to the president, had to engage with them. It was at this time that an unbelievable thing happened. Activists from "Greenpeace" Russia got a Presidential decree overturned in court. In 1995 Boris Yeltsin signed a decree allowing foreign nuclear waste to be imported into Russia for storage. After a long and bitter struggle with court officials who feared taking action against the head of state, the Supreme Court of the Russian Federation declared the decree illegal (and therefore invalid) in 1996.

By the end of the 1990s the number of environmental NGOs had fallen sharply, but those that remained had become much more professional. This consisted not only in mastering fundamental environmental sciences, but in broadening the array of methods used to influence society and the state. Unfortunately, during this time the development of civil society froze. This has had a negative impact on many community organisations, which have since spent the lion's share of their time, money and human resources not on specific issues but on overcoming the resistance of the state machine. Nonetheless, environmental NGOs continued to occupy a very important place in the life of the country.

The situation in which environmental NGOs must operate

The process of minimising the importance of NGOs in the decision making process on significant environmental issues and the consequent reduction of their ability to effectively defend environmental human rights began after 2000. In particular, a landmark decision was made to abolish the system of state environmental control. This had a particular impact on NGOs that had been working closely with the State Environment Commission, the main environmental watchdog, whose staff included many highly respected experts and dedicated volunteers.

Conflicts between the authorities and NGOs continued, evolving into different forms and methods, up to changing the law in favour of specific, short term business projects that provoked sharp opposition from experts, NGOs and the public. This process reached

its apotheosis in changes to the law to remove environmental barriers that hindered projects (including those connected with sporting facilities) for the 2014 Winter Olympics in Sochi. The situation was vividly illustrated by the remarks of Leonid Tyagachyev, the former head of the Russian Olympic Committee: "If they [environmentalists] show up shaking the constitution, screaming that we can't cut down spruce and pines, it will be simpler for us to change the constitution".

The situation in which Russian NGOs must operate is best described by a quoting from the Presidential Council for Civil Society Development and Human Rights' 2012 report "Ensuring the rights of citizens to a healthy environment: key issues and possible solutions": "Substantial weakening of environmental laws, the abolition of multiple environmental requirements and the relegation of environmental institutions. The widespread failure of existing legislation ... even anti-environmental decision-making (both legal and illegal) to protect personal financial interests (and occasionally the state's) ... the possibility of public participation in decision making on the implementation of environmentally hazardous projects and in many cases even the possibility of obtaining reliable information on planned activities that could be potentially dangerous to the environment and the health of citizens, has been almost completely eliminated".

But it would be wrong for this article to speak only of the conflict between NGOs and the state. There are many organisations that are directly linked to state structures, but none the less run very important programmes. There are NGOs that exist as if by themselves, with little or no ties to either the state or commercial structures. There are a variety of community initiatives that do not require any registration, establishment of an organisational structure, or anything else.

Approximate divisions of NGOs by type

The range of problems facing environmental NGOs is very wide, so they themselves are very diverse, differing from each other in statutory requirements, politics, ideology and methods of work. This is a topic for separate study, however and here we will restrict ourselves to a general analysis.

There is a large layer of NGOs who work in close contact with the authorities. Primarily they are concerned with so-called "non-conflict projects" related to environmental education, eco-tourism, combating littering and so on. The results of these projects are largely ensured by access to the power structures upon which many, if not all of them, depend. They may still face difficulties arising from the peculiarities of bureaucratic structures and how they function. But as long as they do not criticise economic and political decisions and do not demand actual participation in their development, these NGOs are granted fairly wide discretion.

One example is the Maxim Munzuk Dersu Uzala public charity. This NGO, which works in the Republic of Tyva, runs important educational and cultural projects, including some devoted to environmental education and holds environmental film festivals.

Another is the Ryazan regional organisation "List", which is officially included in the list of organisations that receives state support. This NGO engages in "development of a children's movement, instilling in children a sense of patriotism, love of country, the identification and development of managerial skills in children and adolescents, the formation of principles of charity in children, the formation and promotion amongst children of the idea of a healthy way of life" and "development of eco-tourism, environmental education and environmental protection".

Financial support for this kind of NGO by the Russian state is growing. In the spring of 2013, President Vladimir Putin signed a decree "On ensuring in 2013 state support for non-governmental organisations implementing social projects and participating in the development of civil society". The budget for state support runs to about 2 billion roubles and this money will go to "organisations implementing social projects and participating in the development of civil society".

Many of these NGOs are represented in public and government agencies such as the Civic Chamber of the Russian Federation, which tries as far as it can to create a platform for cooperation between business and the state apparatus on the one hand and the public on the other. The assets of this structure include a lot of conferences and presentations with the participation of NGOs and some of the ideas sounded there are eventually adopted by the authorities.

One potentially effective mechanism for NGOs in the region is participation in public councils with the local authorities. Of course, the effectiveness of these councils depends on whether real working NGOs are represented there and how far their opinions are listened to when they are. Unfortunately, the authorities tend to form these councils and clothe them in powers in accordance with their own interests. Therefore there are instances where community councils do not work or only work ineffectively. They are often filled with people with little understanding of real public environmental and human right activism.

The number of NGOs that try to keep as much distance as possible between themselves and authorities and stand "in opposition" is vast and they can be found in practically every region of the country. Since they cannot rely on the support of the state, they try a best they can to be self-sufficient in both professional work and financing and that often creates not insignificant challenges. Nonetheless, such organisations work pretty successfully, achieving significant results. Examples include Sakhalin Environmental Watch (runs programmes connected with oil production, forestry and fisheries); Baikal Environmental Wave (protection of Lake Baikal, environmental education, resource efficiency); the Voronezh-region movement "Save Khopra" (dedicated to fighting the planned development of copper and nickel deposits in the region). The definitive federal-level organisation is, of course, "Greenpeace".

Here it should be noted that conflict does not necessarily rule out the possibility of constructive engagement. Many NGOs that stand in constant opposition to the government on some projects are able to work successfully with representatives of government and business in other areas. Many savvy officials do not hide the fact that when you need to obtain the most adequate, objective picture of what is happening, you need to go to independent NGOs. And such cases are not rare.

In the last decade, associations have appeared that resemble NGOs, but do not have official registration. They have no structure and no controls. An example is the Association of Environmental Journalists of St. Petersburg and the Leningrad Region, which is more of a creative club which gives members an opportunity to communicate, exchange information and experience and so on, all of which is important for both professional journalists and various experts. The Association has worked quite successfully for many years and the lack of a clear "structure" is more of an advantage than a disadvantage.

Governmental Functions of NGOs

It is no exaggeration to say that almost all the work of environmental NGOs at the current stage effectively makes them substitutes for government agencies – primarily those responsible for protecting the environment and human health. From impact assessments of international resource extraction projects to extinguishing peat bog fires and collecting garbage in the woods, it is all work that is either not done at all or is done badly by state institutions. Below are several examples of this kind of NGO activity.

International-scale projects include fighting development on the Arctic shelf and in protected territories listed as UNESCO world heritage sites.

Russian NGOs take a highly active position in the Arctic, making their own contribution to the "common goal". More than two million signatures from around the world have been collected in support of the Arctic. Global celebrities such as Paul McCartney and Penelope Cruz, as many Russian celebrities, support this project. Russian NGOs hold a lot of events such as gathering signatures to assessment projects to direct protest actions. One result is that many companies, Russian and international, are already reconsidering their Arctic development plans. Particularly revealing was a comment by Leonid Fedun, a vice president and co-owner of "LUKoil": "If someone asked me to invest in the Arctic, I would not give them a dime. We still have many opportunities on the mainland that carry less risk and do not require building the whole infrastructure from nothing and import workers".

The system of Russian natural world heritage sites owes its existence to "Greenpeace" Russia, but dozens of NGOs are involved in efforts to protect these sites. Sites like the Virgin Komi Forests, Lake Baikal, the Golden Altai Mountains and the Western Caucasus have be-come areas for an unrelenting struggle between environmentalists and representatives of public and private institutions seeking to "conquer" these territories under various pretexts, be it construction of a pipeline, the Olympics, gold mining, or tourism.

NGOs use the full range of actions available to them in their day-to-day countering of attempts on especially valuable areas: public oversight, appeals to the courts and law enforcement agencies, work with the expert community (including international experts) and with the media. A percent outcome cannot be obtained in all cases, but taken as a whole the work of NGOs looks very effective – so far the network of Russian natural heritage sites is in a fairly stable condition.

In the field of environmental education the state is almost entirely absent from work with the public, starting from school, where the teaching of environmental subjects has been virtually abolished. NGOs are trying to change this situation. Unfortunately public organisations are not able to establish a Russia-wide system of environmental education, though many projects in this area are very successful and they are not confined only to large cities.

For example, "Baikal Environmental Wave's" integrated environmental centre in Irkutsk has been working successfully for several years. Here, pupils and students, teachers and kindergarten teachers can learn about global environmental issues and their local impacts, alternative energy and appliances that help save energy and water, as well as technology that helps reduce families' household waste.

A very interesting and important project that operates throughout the regions is "Greenpeace" Russia's "Let's Revive Our Forest" programme. Designed for students in deforested areas of central Russia, thousands of participants plant 15,000 seedlings each year. More than 300 children from rural schools have been to multi-faceted theoretical and practical classes on annual "environmental expeditions". One result is the creation in more than 60 regions of

"forest teams". These new youth environmental NGOs, who develop and implement their own environmental projects, are spreading their knowledge and skills far and wide.

The Effectiveness of NGOs

Social structures often seem to be more effective than government ones. Dedicated individuals who genuinely care about an issue have a broader range of capabilities than state officials entangled in a pile of rules, agreements and financial and legal constraints and who also often do not have the proper skills and/or desire to achieve the necessary result.

Public activists quickly react to unexpected situations, sometimes even before the Ministry of Emergency Situations. They can reach places that it is almost impossible for state inspectors to get to. A dedicated non-governmental group almost never has a problem with the limits on fuels and lubricants for their vehicles or other financial problems.

NGOs often have more effective relationships with both traditional and new media outlets. Many NGOs have extensive experience with new mediums of information flow, successfully exploiting the potential of online media, social networks and other updated and emerging information resources. All of this allows us not only to promote an environmental ideology and receive help from volunteers and supporters, but also to inform the public of environmental developments and campaigns in real time, conduct mobilization campaigns and much more.

NGOs have already mastered technology that many state agencies are only just beginning to introduce, including Geographic Information Systems (GIS). With their help public organisations can objectively monitor the environmental situation in different areas, from the broadest federal level to individual towns or rural areas. Analysis of satellite images has repeatedly allowed NGOs to detect unknown or hidden oil spills, unknown pockets of peat bog and forest fires and illegal building or natural resource-stripping work. The non-profit partnership "Transparent World" recently located a "secret" quarry and road access to it in the Land of Leopard National Park in the Primorye Region, which was not even known to the park workers. Gravel mining in the national park has now been stopped and the Primorye inter-district environmental prosecutor has taken charge of the situation.

The ability of NGOs to create wide working coalitions (including with their "enemies") is demonstrated by the NGO "Green World", which has for many years worked in one of Russia's most "nuclear" cities – Sosnovy Bor, in the Leningrad Region. This experience is an example to the whole country.

Sosnovy Bor already has nine nuclear reactors (including of the same type that blew up at Chernobyl) and will soon have 13. It is also the site of a range of other dangerous installations connected with the nuclear sector and it could well be considered potentially the most dangerous place on the Baltic Sea. It may be surprising in this city where everyone has a direct connection to the nuclear industry, but Sosnovy Bor has seen the emergence of widespread opposition to "Rosatom". The core of the new opposition was formed by veterans of the nuclear industry who realised that the new projects could have a serious impact on their retirement. They rebelled, began to speak and it proved impossible to hold the veterans to a code of si-lence. To the surprise of many and "Rosatom" most of all, they united with their eternal enemies – the environmental NGOs – and demanded equal dialogue. "Rosatom" was forced to agree.

Advisory councils and working groups subsequently began detailed discussion of plans for a new nuclear power plant and a new repository nuclear waste in the town.

This process revealed numerous flaw and even absurdities in the plans and the projects received deeply critical reviews not only from NGOs, but also from industry experts and even state agencies. For example, the legislative assembly of St. Petersburg and the Leningrad region came out against the plans to build a nuclear repository at Leningrad NPP-2 nuclear plant.

This situation suggests conditions are ripe for creation of a public inter-regional council for the whole of the southern shore of the Gulf of Finland. Such a council would give an equal voice to NGOs, local administrations, parliaments, "Rosatom" and other stakeholders. If this happens, it would be a serious step forward not only for the environmental movement, but for the civil society of the whole country.

NGOs have considerable potential to influence the development and coordination of draft laws and other legal projects at both the regional and federal levels. This aspect of NGO activity faces the greatest resistance from the state machine, but where there is a solid, well-reasoned position, perseverance often bears fruit.

A case in point is the development of the new Forest Code. Thanks to serious lobbying by NGOs and sympathetic professionals, it was possible to remove the most objectionable items from the new Forest Code, including proposals to close forests to members of the public. NGOs also played an important role in the recent development of the Principles of Environmental Policy of St. Petersburg for the Period up to 2030, ensuring paragraphs on waste management and energy-saving were included in the final document. This will give NGOs a more solid administrative and legal basis for specific projects.

NGOs generally achieve the most in cooperation with the authorities when they are working on projects they have initiated themselves. These include educational and methodological work, especially in organisations that lack state support for such activities. Hence "WWF's" tried and tested wildlife conservation projects in protected areas.

Wildlife workers and national park staff gain vital knowledge and skills from numerous annual seminars held by "Greenpeace" Russia experts. The range of "disciplines" is extensive – from analysis of recent changes in the law wild-fire fighting techniques – and the geography of these seminars is vast, being held from Kaliningrad to Petropavlovsk-Kamchatsky. As a result, state inspectors not only feel more confident when dealing with legally "savvy" offender, but can also draw up the necessary documents in such a way as to minimise the burden of paperwork.

NGOs as the seeds of public movements

Environmental NGOs often act as "seeds" around which social forces can crystallise and massive public campaigns are often centred around them. No less important is the personal example of activists whose invaluable experience in the public work of NGOs allows them to bring together a large group of people. It is then that noticeable results are achieved.

The most famous example of the early 2000s was the re-routing of a "Transneft" oil pipeline around Lake Baikal. It seemed as if the original construction could not be undone – the entire "vertical of power" was for it. But this environmentally hazardous project provoked widespread public opposition. An NGO coalition called "For Baikal" united more than 50 organisations from different regions. Protests were held in cities from Kaliningrad to Vladivostok. In Irkutsk, as many as 7,000 people took to the streets. Numerous scientists and cultural figures joined the protests. As a result, the pipeline was re-routed 400 kilometres away from Baikal.

Another typical example is the social movement to combat waste. While the state is inactive, the initiative passes to the public. A single Russia-wide "anti-rubbish front" does not exist, but so many NGOs are involved in similar projects in various formats that a national "anti-rubbish" project has effectively taken shape, just without any kind of central leadership.

Another example of unified action is "Greenpeace's" "people's map" of recycling points. Originally covering only Moscow, this project now allows people to use the internet to find the nearest plastic, paper and glass recycling point in nearly 20 cities. The crucial point is that it truly is a "people's map". It is put together and updated by volunteers who gather new information and post it on the interactive map.

"Do it Yourself", is another interesting cast of united action. In the words of its creators: "Neither a brand, nor a festival, nor an organisation, "Do it Yourself" is the idea of voluntarily improving your city with your own hands. You don't need any kind of permit, agreement or license to share the idea and personally plant flowers, separate the rubbish, or cycle to work".

This project primarily helps like-minded people to find one another, after which they can begin to "change the urban environment" in whatever way seems appropriate. In the past few years, "Do Summits" have been held where participants have shared experiences, learnt various environmental disciplines and developed projects.

As structures defending the fundamental human right to a healthy natural environment, environmental NGOs often form the basic foundations of civil society. Recently, such a structure has been established by years of work by "Environmental Watch North Caucasus" in the Krasnodar region village of Dolzhanskaya. Here the locals have created a kind of "shadow parliament" which manages real municipal projects in this fairly large settlement.

Any account of the influence of NGOs on environmental protection must also mention the implicit, indirect benefits of their very existence.

NGOs usually demand specific solutions to obvious problems like rubbish collection, landfill fires, or the clearing of green areas. This is important, but it is not the main task of NGOs. Their very existence serves the public interest. They show as yet inactive citizens that they don't just have to put up with existing problems, that if someone does something they will become stronger, that solving problems depends on many people and that everyone can contribute to the achievement of a common goal.

The first time ordinary people are faced with an environmental problem, they almost always need skilled help. They seldom know what to do, what their rights are, or what they can and should demand from which state structures. So, even a little help from qualified environmental NGOs can be extremely important and effective. It not only helps to find the most effective way of solving specific problems, but also gives an extra boost to civic engagement, which in itself is of great value in our passive times.

Thus, despite many objective and subjective difficulties, the facts show that Russia's NGOs get results and that they play a great role in the protection of the environment. At least, no one can disprove this thesis: if it were not for the work of NGOs, the environmental situation in Russia would be much worse.

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4.3. The spectrum of environmental issues in the Russian media

Olga Dobrovidova, Angelina Davydova

With the development of civic awareness and growth of the level of material wellbeing in Russian society, questions of protecting and improving the natural environment are becoming more relevant: according to a June 2013 survey by the "VTsIOM" pollster, 56 % of Russians believe that environmental situation in the country is troubled and 84 % consider information about the condition of the environment to be important.[1] But the growing public demand for prompt, quality and objective environmental information is not yet fully satisfied by the traditional media.

At the moment environmental issues are not considered as a topic in their own right by the public-political and non-specialist media. It is revealing, for example, that there is no environmental section on the popular Yandex.Novosti news aggregator or amongst the themes listed on most websites. Only one of the three state-owed federal news agencies (RIA Novosti[2]) has an environmental editorial section and specialist news feed. Of the top quality dailies, "Kommersant" and "RBK Daily" pay the most attention to environmental issues, along with the internet news sites Gazeta.ru and Lenta.ru.

At the same moment it cannot be said that the environmental theme is completely absent from the information field. Since the mid-2000s a relatively small but consistent component of the news flow has been associated with speeches and announcements by the highest state authorities on environmental policy. Furthermore, the media has proven experience in covering the environmental aspects of manmade and natural disasters (one of the most recent examples was the failed launch of a Proton-M rocket from the Baikonur cosmodrome, which resulted in the burning of about 600 tons of highly toxic heptyl in the atmosphere) and also of environmental solution in industry (for example, the government's target of achieving 95 % utilization of associated petroleum gas), transportation (the introduction of higher fuel standards in cities of one million) and city management (the management of "green zones" and parking complexes). The Newsmakers and experts in these cases appear as representatives of environmental NGOs (Greenpeace Russia, WWF Russia, the Russian division of the International Fund for Animal Welfare (IFAW), regional environmental groups and so on), as well as academics and scientists (for example, specialists from the A.N. Severtsov Institute of Ecology and Evolution).

In terms of subjects, the environmental information spectrum can be divided into a number of sections.

1. **ENVIRONMENTAL CONFLICTS.** At the intersection of economic, social and environmental spheres of public and political life, this subject attracts the most attention from the non-specialist media. Most conflicts attracting media attention revolve around plans for intensive industrial development of populated areas or areas of special

environmental value and their participants are public environmental organisations with various levels of popular support on one side and big business (sometimes along with the state or the administration of the city or region involved) on the other. Examples of headline-grabbing environmental conflicts include the construction of the Moscow to St. Petersburg toll road through the Khimki forest, road building in the Khibiny national park in the Murmansk region, proposed copper and nickel mining in the Voronezh region, a planned ferrous-alloy plant in the Krasnoyarsk region, the situation around the Prirazlomnaya oil platform in the Pechora Sea and the closure of the pulp and paper mill on Lake Baikal.

2. **FORESTRY AND PROBLEMS OF FOREST MANAGEMENT.** A traditional seasonal environmental theme for both federal and regional media is the forest fire season, which begins in most regions in March or April[3] and lasts until late autumn and even into winter. A March 2013 survey by "VTsIOM" found that 26 % of the population consider preventing and fighting forest fires to be one of the most pressing environmental problems facing the country.[4] Although the problem of forest fires is more than merely traditional for Russia's Asian regions, the European-centric national media inevitably pay more attention to the European part of the country and especially the central macro-region. For many media outlets forest fires became a priority only after 2010, when smog from forest and peat bog fires practically paralysed the capital and surrounding regions. Somewhat less attention is paid to the problems of forest pests (e.g. the spread of bark beetles in the forests near Moscow), the reproduction of forests and sustainable forest management. For environmental organisations an important aspect of this topic since 2007 has been the reform of the Forest Code and the development of forest-based policy.

3. **WASTE.** Reducing industrial and domestic waste is one of the most pressing issues, facing the country, according to 32 % of respondents to the "VTsIOM" poll – representing almost a third of the population. The problem of reducing the volume of waste is of particular relevance because of its strong regional and local contexts: according to the Federal Supervisory Natural Resources Management Service (Rosprirodnadzor), there were more than 22,500 illegal solid waste landfill sites in Russia at the end of 2011, 16 times more than the number of legally sanctioned sites for storing waste.[5] Just over 70 % of the identified illegal dumps, coving an area of 3,300 hectares, were cleared after a massive campaign against them in 2012.[6] An extensive discussion of a draft law on waste management in conjunction with the public controversy surrounding the closure of illegal landfills and incinerators and construction of waste treatment plants is also reflected in the media. Attention is also paid to the elimination of accumulated environmental damage, including in traditional industrial regions of the Urals and in the Arctic, due to the gradual development of government policy in this area. Another topical issue is the practice and potential of sorting rubbish and recycling, especially in the country's largest cities.

4. **AIR POLLUTION AND URBAN ECOLOGY** According to the all-Russian census of 2010, 74 % of Russians live in cities and 28.6 % live in cities of one million people or more.[7] This makes urban environmental problems, especially air quality, extremely relevant, which is also reflected in the information space, especially in the urban media.

5. **NUCLEAR POWER AND HANDLING OF RADIOACTIVE WASTE.** In Russia as in the rest of the world, this issue is characterized by extremely polarized opinions and the strong influence of "Rosatom", the state corporation responsible for Russian civilian nuclear sector wich provides about 17 % of the county's electricity (by 2030 that share is projected to go up to 25 to 30 %).[8] This topic is covered mainly through conflicts around the construction of new nuclear power plants, spent nuclear fuel and/or disposal of radioactive waste in the regions that have developed nuclear complexes (for example, in the Leningrad region, the Urals and Central Siberia).

6. **PROTECTION OF WATER RESOURCES.** Despite the fact that Russia is one of just three countries that experts believe will not face catastrophic shortages of high-quality drinking water in the twenty first century,[9] the Russian public considers the problem of protecting water resources extremely relevant: 46 % of respondents to the "VTsIOM" survey quoted above considered protecting water resources and sources of drinking water to be a pressing problem, more than for any other environmental issue. Protecting the world's oceans and marine ecosystems did not inspire quite as much concern, primarily because of the regional factor (in the latter case the regional factor mostly concerns the "coastal" regions – the northern territories, the far east and the south of Russia).

7. **PROTECTING BIODIVERSITY, THE FIGHT AGAINST POACHING, SAVING ENDANGERED SPECIES.** This topic is addressed mainly through the work of environmental organisations that implement targeted projects for the protection of animal and plant species threatened with extinction in some regions of the country (the Amur tiger and Amur leopard in the Russian Far East, the snow leopard in the Altai Mountains, etc). Interestingly, the international policy in the field of biodiversity conservation (in particular, the activities of the UN Convention on Biological Diversity) and Russia's participation in it get almost no coverage in the media.

8. **CLIMATE CHANGE.** Several key areas can be identified in coverage of this topic. Due to the relatively low level of public awareness about climate change and its scientific basis, a significant share of media attention to this issue focuses on discussion of the reality of global climate change and the presence of persuasive evidence to support the thesis of significant anthropogenic pressures on the Earth´s climate system. In cases where the hypothesis of man-made climate change is not in question, the subject of the discussion are the consequences of climate change for Russia and the world. Finally and not least because of the prevalence of so-called "sceptics" views about climate change, there exists in both the Russian expert community and public and political circles a very strong belief that this problem can be entirely separated from its scientific (climactic) basis and considered as a problem of fundamental restructuring of the world economy and above all energy.[10] It is in this paradigm that development of renewable and alternative sources of energy and increasing energy efficiency is discussed. As with biodiversity, international policy on climate change has received relatively little attention (the only exception was the 15th session of the Conference of Parties to the UN Framework Convention on Climate Change in 2009 in Copenhagen, since it involved the country´s then-president Dmitry Medvedev). Nonetheless, high-quality print and online media have in recent years begun to pay

more attention to the topic of climate negotiations, low-carbon development, carbon markets and energy efficiency.

9. **THE ARCTIC AND ANTARCTIC.** Industrial development of the Arctic in Russia, which is a member of the Arctic Council, became one of the most popular topics in the second half of the 2000s[11] as assessments of the impact of climate change on the region made it all the more promising, especially for the development of transportation.[12] In addition, the Arctic environment has become an element of deliberate government information policy, for example through the launch of the specialized international forum "Arctic – Territory of Dialogue" and active information support of it in the federal media.

10. **SUSTAINABLE DEVELOPMENT AND THE GREEN ECONOMY.** With the increasing relevance of this topic at the international level (for example in connection with the June 2012 UN Conference on Sustainable Development in Rio de Janeiro) on the one hand and the development of a system of internal environmental regulation on the other, problems of environmental legislation, certification and development of "clean" technology in industry and energy are becoming increasingly important, especially for the business and socio-economic focussed sections of the media.

In addition, it is possible to note a number of other topics that interest the media on an irregular basis, despite their relevance for Russia, including protection of the ozone layer, desertification, soil pollution and erosion, the issue of GMOs and others.

As noted earlier, the coverage of environmental issues in Russia at the federal level is variable and usually subject to some minimum "cut off" according to the importance of the news event. Because of this, regional media play a critically important role in forming environmental awareness in the country, whether working at the regional, municipal, district or even village level.

Of the more than 88,000 media outlets, registered with the Federal Communications Service (Roskomnadzor), most are regional and local newspapers, television stations and online portals. An important advantage of the regional media is their local tie-in, which is important in highlighting environmental issues. In addition, the regional media can focus more on topics that are too narrow to be covered in the long-term by the federal media.

In many ways, this is why environmental coverage is one of the priority areas of cooperation between federal and regional media: for example, between March and June 2013 RIA Novosti pursued a so-called "eco-marathon" in which regional media were invited to cooperate on joint coverage of environmental problems. Federal media rely on the regional colleagues to select stories of potential interest to a wider readership, while regional journalists have the opportunity to improve their skills, master the latest information technologies, learn the tricks of data journalism and ultimately realise the mission of creating a multi-faceted representation of their region to the outside world.

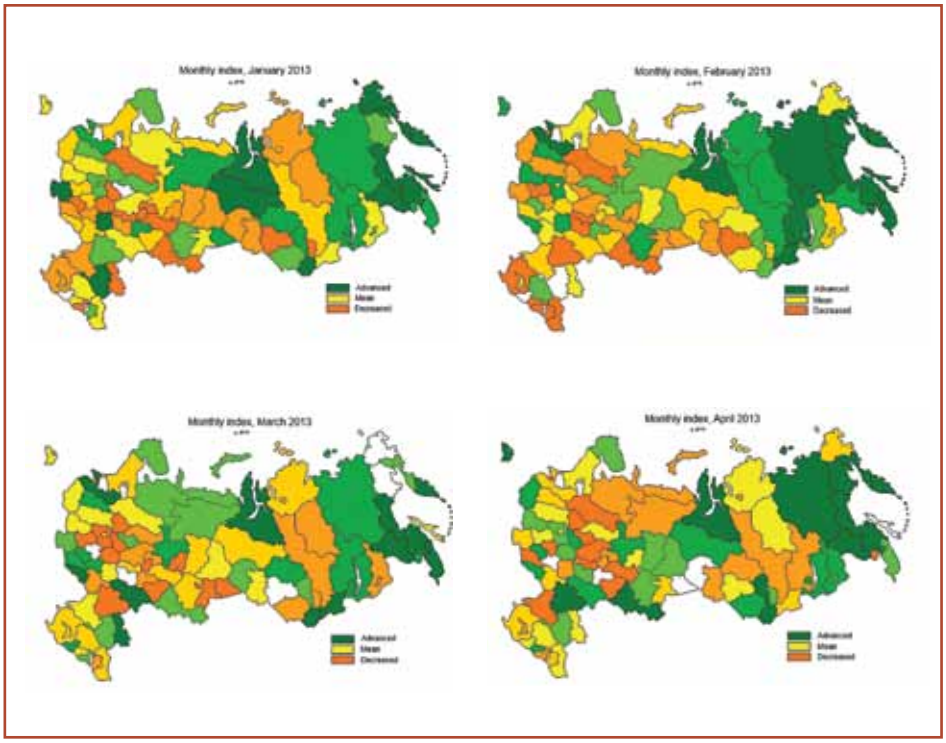
Just as at the national level, the main way of getting environmental issues into the regional media is through conflict. Moreover, the regional media themselves often become active participants in local environmental conflicts, usually acting on the side of local residents or environmental organisations. Local newspapers and television stations often have significant resources and capabilities to put pressure on the local leadership, which can in fact make them key agents of environmental policy "on the ground".

However, the vulnerability of relatively small media working on a small target market, in terms of access to funding and administrative resources of the regional government and big business, poses a significant threat to the objectivity of environmental information. At the beginning of the last decade, the state owned 80 % of the regional print media market and there are no substantial grounds to believe that the situation has significantly changed, which also makes improving the quality of environmental information in the regional media difficult. In addition, it is often journalists working for regional publications and broadcasters who are most vulnerable to pressure or threats from local authorities and big business.

One of the most convenient indicators for monitoring the regional media's attention to environmental issues are specialized maps, prepared by the Independent Environmental Rating Agency (NERA).[13] Regions on the map are coloured according to levels of media interest in the environment defined by an index of environmental quotations developed by the agency.

Below are the maps for January to April 2013:

Fig 1. Index of environmental quotations by month



It is clear from the maps that the highest consistent coverage of environmental issues over these months was in the far east, which has a high concentration of biological resources and large conservation areas. There was also relatively stable interest in the environment in western and central Siberia and in the north of European Russia.

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5

The politics of environmental conservation and climate policy at the national level

5.1. Forest management, problems of forest protection and the contribution of Russian forests to carbon sequestration

Georgy Safonov

It is well known that Russia is home to huge tracts of forest and is considered to be the largest forest nation in the world, with Russian forests playing a vital role in the functioning of the global ecosystem. But if we look more closely at Russia's forestry sector, there are a few points which require clarification to assess more objectively the current status and prospects of Russian forests, both in terms of economics as well as the environment and other factors.

There are many sources of information about Russian forests, many of which differ significantly. Without going into the details of how forestry accounts are carried out, in many regions full inventories are carried out irregularly and are, to put it mildly, often not of a high enough quality. It is difficult to obtain accurate official information on the condition of state-owned forests and even more difficult to obtain accurate official information on forests which are not included in this fund, of which there are quite a few in Russia. Nevertheless, the main source for this article will be data from reports published by Russia's Federal State Statistics Service 'Rosstat', (which is enough for a macro-view on the sector's development and other sources will be used for commentary on individual points).

In Russia there are more than 1.1 billion hectares of forest land, of which 0.8 billion hectares are covered by forest (table 1). Forest cover is over 46 % and timber stock is 83.4 billion cubic meters. These are inspiring enough figures, that should mean that forestry in the country plays an important (if not leading) role in the economy, providing a major contribution to gross domestic product and employment.

Table 1. Russian Forest Resources (as of January 1)*

	2003	2008	2009	2010	2011
area covered by forest and other areas which include forest, million hectares	1179,0	1181,9	1182,9	1183,7	1183,3
of which, areas included in forest zones	883,0	890,8	891,9	892,0	891,8
of which, covered in forest	776,1	796,2	797,0	797,5	797,1
overall wood reserves, billion cubic meters	82,1	83,3	83,3	83,5	83,4
forest cover %	45,4	46,6	46,6	46,6	46,6

* According to data from the Federal Forestry Agency. State inventories of forests were conducted once every five years before 2008 and since then every year, according to the state forest register.
Source: Rosstat, Statistical Bulletin "Agriculture, hunting and forests in Russia", 2011

Surprisingly, this is not the case. According to the Federal State Statistics Service, the forestry and forestry services sector employ only 0.6 million people, accounting for 0.9% of total employment in the country (2011).[1] Its contribution to GDP is even less – about 62 billion roubles (in 2011), or 0.14%!

Analysis of the wood processing industry does not significantly change this picture: production of processed wood and wood products was worth 303 billion roubles in 2011, which is only 0.7% of GDP. Production of pulp and paper products also accounts for about 1% of GDP.

Thus, forestry is not currently making a significant contribution to Russia's economy. Production of commercial timber has fallen more than 3 times on levels in 1990 and forestry businesses have seen both employment and income levels drop. The sector's fixed assets are also not in the best shape, depreciation of which is as much as 50% and full depreciation of these assets is at 17%. Furthermore, 52% of businesses are loss-making and losses incurred amount to over 5.8 billion roubles[2] (table 2).

Table 2. Economic indicators of the Russian forestry sector and services provided within the sector

Indicators	2005	2006	2007	2008	2009	2010
depreciation of fixed assets (at year end; by account value in %)	49,9	49,6	52,0	54,2	52,4	49,4
the share of fully depreciated fixed assets (at year end; by account value; in % of the total volume of fixed assets)	18,7	18,0	19,2	20,3	19,5	17,2
the net financial result (profit minus loss) (in current prices, million roubles)	-2740	-414	1555	-8922	7130	-5833
share of unprofitable businesses (as a percentage of the total number of businesses)	58,7	56,2	41,4	51,2	55,0	52,3

Source: Rosstat, Statistical bulletin "Russian Industry" 2012.

Developments in the forestry sector and related services are interesting from an economic and ecological view. According to available data (fig. 1), in the last 20 years there have been substantial changes in this field. Creation of planted forest (areas which are artificially planted and maintained) had dropped by more than half by 2012. Promotion of natural regeneration (the least expensive method) increased by 20% in the mid-1990s and then decreased by 2.5 times. After a surge in the 1990s, protection from pests and diseases had declined sharply by 2009.

Sector dynamics show that over the last 20 years there has been a significant deterioration in the process of forest regeneration (which means a reduction in quality and value of forest resources for future generations). Risks linked to pests and diseases are also being exacerbated by climate change in Russia.

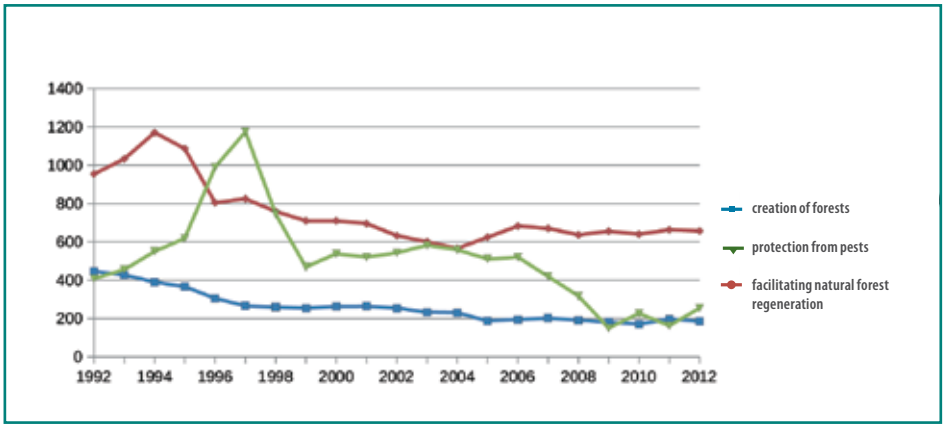

Fig. 1. Forestry and forestry services in Russia (in 1,000 hectares)
Source: Rosstat, 2013, www.gks.ru/free_doc/new_site/business/sx/les1.htm

Data on forestry losses reflects the fact that there has been large-scale damage in the period (fig. 2). Official Rosstat data shows that there were more than 560,000 forest fires in Russia between 1992 and 2012, which covered more than 27.7 million hectares of forest and burned 772 million cubic meters of wood to the root. Independent evaluations, carried out by organisations such as "Greenpeace" and the WWF Russia, show even higher loss rates.

After forest fires, the second most significant factor damaging forest lands in Russia is the impact of adverse weather conditions, the frequency of which has increased significantly over the last 20 years. In 2010, Russia lost 126,000 hectares of forest due to adverse weather conditions. Damage caused by humans accounted for losses of 16,000 hectares and pests – 36,000 hectares (table 3). The risks to forests from climate change are increasing primarily due to a reduction in rainfall and increasing surface air temperatures, which create favorable conditions for forest fires, pests and diseases to spread.

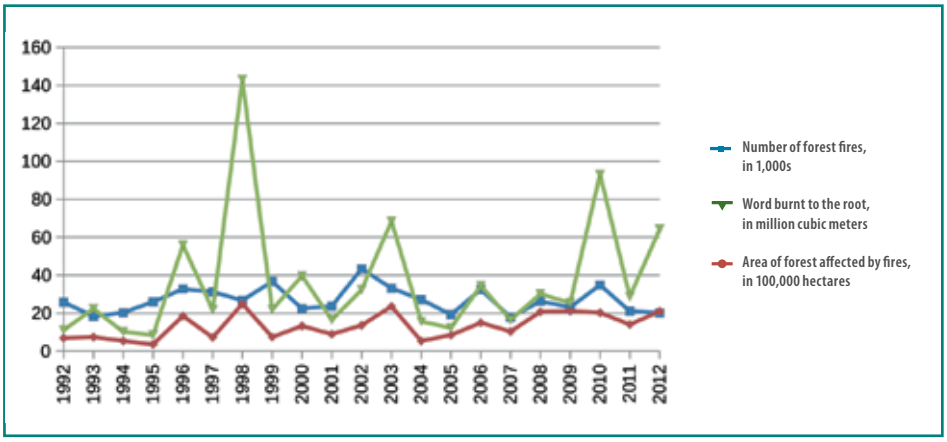

Fig. 2. Forest fires and the effects of forest fires in Russia
Source: Rosstat, 2013, www.gks.ru/free_doc/new_site/business/sx/les2.htm

Table 3. Forest losses in Russia by area (1,000 hectares)

	2000	2005	2006	2007	2008	2009	2010
forest losses – total	777,5	988,2	311,1	319,3	273,4	446,6	804,9
of which:							
due to forest fires	709,7	465,5	174,9	200,2	170,7	346,2	625,6
due to adverse weather conditions	38,2	461,9	56,7	56,7	36,9	63,3	126,7
due to human factors	2,0	5,3	7,5	14,8	17,4	5,5	16,1
due to pests – total	27,7	55,5	72,1	47,5	48,5	31,6	36,4
of which:							
due to insects	20,5	33,6	31,0	24,0	28,8	7,4	9,3
due to other pests	5,8	21,6	40,6	23,4	19,5	23,9	26,9

Source: "Agriculture, hunting and forests in Russia", 2011.

Specialists link many of the problems of Russia's deteriorating forests with the adoption in 2006 of a new Forest Code, which aimed to radically change the system of forest management and improve economic efficiency (particularly in terms of increasing contributions to GDP and commercial development of forests etc.). Issues such as proper forest management, regeneration, conservation and guaranteeing environmental and other functions were transferred to the level of regional authorities, which lack the necessary financial, technical and human resources. As expected, the existing system of forest management was destroyed and its replacement has demonstrated its inefficiency.

Reform of the management system of Russia's forests is being carried out against a backdrop of major forest fires (for example, in 2010 and 2012) and a deteriorating economic and financial situation in the industry. There is an escalating management crisis in this sector, which plays such a crucial role in the economy. This impacts the global function of Russian forests – absorbing carbon from the atmosphere and mitigating climate change.

Are Russian forests absorbing CO_2? At first glance the answer is yes, undoubtedly. But let's look at this issue in more detail. In line with its commitments under the UN Framework Convention on Climate Change (UNFCCC), Russia provides information on carbon absorption in its forests. Which forests are subject to inventories on carbon absorption and emissions? Only those which are specially chosen, so called "managed forests".

Managed forests currently account for 78 % of Russia's forest resources. "Given the huge area of forest resources and the lack of infrastructure in remote areas of Siberia and the Far East, not all forests in Russia can be considered managed. In these other, reserve forests, economic activity is not carried out and measures to protect and preserve the forests are limited. Therefore these areas are not included in Russia's managed forests".[3] In other words, those forests, which it is difficult and impossible to protect from fires and other damage, leading to their destruction and CO_2 emissions, are not included in the accounts of net absorption. And these forests make up over 20 % of Russian total forests.

According to the inventory of greenhouse gas emissions in Russia, submitted to the secretariat of the UNFCCC, the net absorption of CO_2 by forests is gradually increasing (fig. 3). In 2010, the net flow exceeded 700 million mt of CO_2.

Total CO_2 absorption between 1990 and 2010 was 10.6 billion mt! This is a huge amount, more than the annual greenhouse gas emissions of countries such as the U.S. and China.

The common belief that Russian forests will be "the world's lungs" indefinitely is not

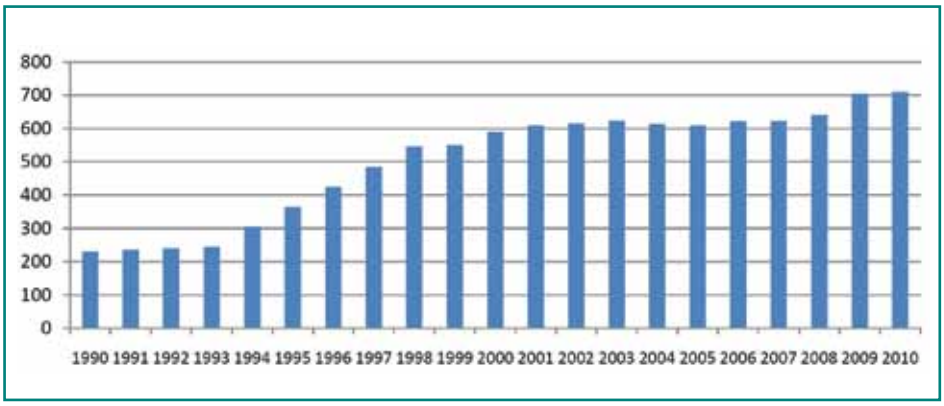

Fig. 3. Dynamics of net carbon absorption by managed forests in Russia in million mt CO_2 /year
Source: Data from Russia's national inventory of greenhouse gas emissions, http://unfccc.int

supported by scientific data. According to estimates using Russian-Canadian models,[4] in the most pessimistic (in terms of climate change)[5] scenario of the Intergovernmental Panel on Climate Change (IPCC), net carbon absorption by russian forests will give way to net carbon emissions by 2043 (fig. 4). More optimistic scenarios envisage that net carbon sink will fall significantly and by the middle of the 21st century will be less than 10 % of current levels.

The reasons for forests' declining carbon absorption abilities are linked to the ageing of existing forests, a drier climate, more forest fires, pests and diseases and changes to the species composition of forests as well as other factors.

Russia obviously needs a special policy on adapting forests to climate change and reducing the risks it poses. This is in line with the aims and objectives included in Russia's Climate Doctrine and will facilitate Russia's shift to sustainable development. However, no such adaptation programmes have yet been approved on either a federal or a regional level.[6]

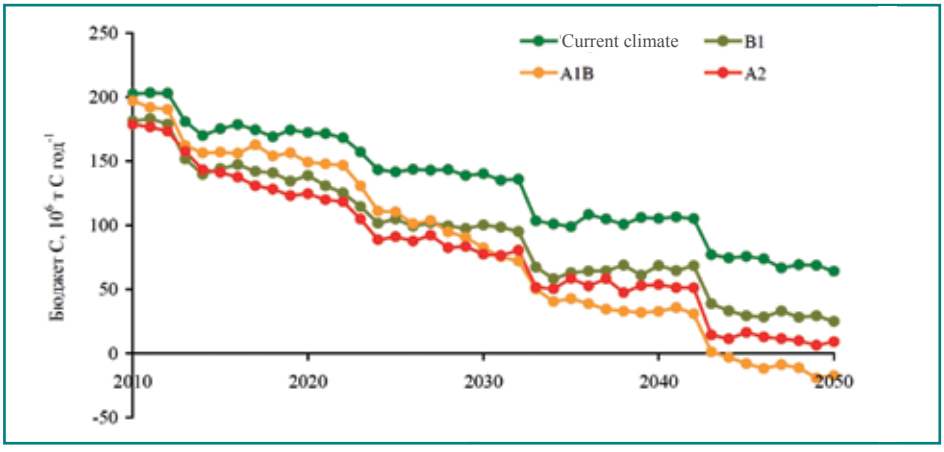

Fig. 4. The prognosis for net carbon absorption in russian managed forests up to 2050, based on IPCC scenarios, in million mt CO_2 per year.

Source: D.G. Zamolodchikov, The Centre for Ecology and Forestry Productivity at the Russian Academy of Sciences, (2012).

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5.2. Legal problems of public policy on management and development of specially protected areas in the Russian Federation

Michael Kreindlin

Russia's network of nature reserves and protected areas began to take shape on January 11 1917 (December 29, 1916, according to the old-style Julian calendar then still in use), with the decree of the Governing Senate of the Russian Empire that created the country's very first nature reserve: the Barguzinsky nature reserve. Despite occasional setbacks (including the abolition of a large number of reserves in 1951 and 1961), Russia's network of protected areas has continued to grow ever since. At the same time, the legislation that governs them has also grown.

The greatest development of protected areas in Russia came in the 1990s, when for the first time a high-level law (the Federal Law "On Specially Protected Natural Territories", commonly abbreviated to the Federal Law On Protected Areas) established special legal regulation in the field and generally ensured sufficient legal protection for the country's nature reserves.

In recent years, however, a number of changes to both the Federal Law On Protected Areas and related legislation has significantly weakened the legal protection of nature reserves, in some areas creating a legal vacuum that has opened the door to destruction of reserves that contain valuable natural sites and eco-systems. Of even greater concern are plans to reform the Law On Protected Areas, which, if ever implemented, we believe would lead to the destruction of the entire currently existing Russian system of protected areas.

The following is a brief analysis of the legal problems of current legislation on protected areas and plans to reform it.

On December 18, 2011, the Russian government issued decree No. 2322-r, approving the Concept for Development of Specially Protected Areas of Federal Significance to 2020. This Concept envisaged the creation of two new state nature reserves, six national parks (including Beringia, already planned in 2011) and one federal sanctuaries in 2012 year. In addition, seven existing reserves were to be expanded.

Of this ambitious to-do list, so far only the Land of the Leopard, Beringia and Onezhskoye Pomorye national parks have been created and 1,700 hectares added to the North Ossetian Nature Reserve. Experts warn that if the creation of new territories is not pushed ahead urgently, many of them will be lost and their land subject to development. For example, the territory of the proposed Bikin federal sanctuaries is already the target of many "bids" by logging companies.

The most urgent case is that of the proposed Ladoga Skerries national park in Karelia. Its territory is still being leased for logging and land has been actively "confiscated" by the local authorities and businessmen by building dachas and enclosing land with fences. The government of Karelia submitted all the necessary documents for establishment of the national park to the Ministry of Natural Resources and Environment at the end of last year, but this "environmental" agency for some reason is unable to send them for state environmental assessment.

The creation of new protected areas is not the only area in which the Concept, which was adopted more than a year ago now, has proved useless. Legal projects contained in the Concept have still not been developed or reviewed. In particular, promised amendments to the Administrative Code have not been made, which means that state inspectors of reserves and national parks (excluding directors and their deputies) still do not have the right to compile legal reports on violations in buffer zones and federal sanctuaries under their protection. Inspectors from regional directorates in particular have almost no rights in this regard. Meanwhile, the Ministry of Natural Resources and Environment is actively lobbying for the transfer of 30 federal reserves to the regions.

The main focus of the concept is on the development of tourism. But it seems to be confused about exactly what this means, referring in some places to "educational tourism" and in others to "eco-tourism". They are not the same thing.

It should be added that neither one nor the other notion of tourism is defined in legislation, an ambiguity that provides a good pretext for stealing land for luxury housing and other development. Especially because the concept (in section 10) expressly provides for the development of networks of mini-hotels and guest houses and the "plan of action" (in p. 43) provides for the development of package tour programmes for each state nature reserve and park. Approached skilfully, these legal details provide great potential for commercial development of nature reserves and national parks.

The concept envisages amendments to legislation, including to facilitate the possibility of changing the boundaries of state nature reserves and converting them to national parks, which have much laxer controls. In fact, many regional and local protected territories can now be abolished by way of "adjusting" their "category".

It must be said once again that the adoption of this concept could lead to the destruction of the entire Russian nature reserve system. Another concept under consideration, on "the strengthening of human resources policy", deserves a special mention of its own. Its basic thrust should be along the lines of "expanding the practice of employing in leadership roles those who already have experience of working in the nature reserve system". While the wording is commendable, the practice is quite different. In the past several years the Ministry of Natural Resources and Environment has consistently appointed heads of national parks and reserves who have no previous connection to the system whatsoever. The most recent round of appointments in 2011 included the deputy head of the Tarumovsky district of Dagestan, the director of forestry in Karelia and a former head of department at the Ministry of Economic Development.

The appointment of such "effective managers" has already caused high-profile scandals, most infamously in the Pribaikalsk National Park and the Prioksko-Terrasny Nature Reserve. In both cases park staff approached the Ministry to demand an end to the high-handedness of the newly appointed directors. Although inspections revealed multiple violations on the part of the management of these reserves, the Ministry of Natural Resources and Environment took no action. The staff members who signed the appeals faced retaliation and most of them have now been sacked. The directors of these two parks remain in their posts, despite criminal investigations being launched against both of them.

Conflict is also growing in the Darwin Nature Reserve, where the new director, M. Makarov, has rehired the former deputy director for security S. Solovyev, who was fired by the previous director for organising illegal hunting and fishing on the territory of the reserve. Advertisements have reappeared on the internet boasting that "one of the

VIP-services of our fishing club is receiving a permit for organised fishing on the territory of the Darwin State Nature Reserve".

Let us now turn to innovations in financing, which is to be provided from the federal budget and "other sources not forbidden by law". Incidentally, the official text published in Rossiskaya Gazeta, the official government newspaper, was accompanied by a graphic showing that total funding for protected areas in 2012 approximated to… four trillion roubles! In fact, we are talking about a budget of billions. This small fact is characteristic of the general careless attitude towardo the fate of our national park system.

Let us now briefly review funding for protected areas in the federal budget for 2013 and the planning period for 2014 to 2015. In all, 6,294,399,000 roubles has been allocated for protected areas. Obviously, not all of this will actually reach the national parks and reserves, but that's another story. Let us instead try to understand whether it is a little or a lot. Russia currently has 102 nature reserves and 45 national parks. According to our calculations, it takes about 18.4 billion roubles to keep all the federal-level protected areas functioning normally.[1] This sum can hardly be considered large, especially when compared to several investment projects of recent years.

About 240 billion roubles were allocated for preparations for the APEC summit in Vladivostok in 2012. Cooperation with the countries of the Pacific Rime is of course important, but it is difficult to believe that it demands that kind of spending on a single meeting with their representatives. The total cost of the Winter Olympic Games in the subtropical resort town of Sochi has now soared to 1.4 trillion roubles. The road from Adler to Krasnaya Polyana alone already allocated 242 billion roubles in 2009. The mere preparation of documentation for the insane Central Ring Road project in the Moscow region (TsKAD) has cost more than 8 billion roubles. The cost of actually building the road has been estimated at 469 billion roubles. Meanwhile, most experts consider the plan economically senseless and given the fact that it will destroy 7 % of the forests near Moscow, it is certainly environmentally dangerous.

Finally, one cannot ignore the plan to build a new high-speed rail link between Moscow and St. Petersburg that President Vladimir Putin approved on August 31, 2011. The projected cost is 1.2 trillion roubles. Yet the government has found it fairly easy to produce vast funding for projects that destroy protected areas. The Lagonaki ski resort in the Western Caucasus World Heritage Site is costing about 7.6 billion roubles, for example. The road to a non-existent weather station in the Caucasian reserve will cost the federal budget 250 million roubles. This road to a new government residence, Lunaya Polyana, will run through unique and endangered red boxwood forests.

Thus we see that dubious rationale and an abundance of zeros are no hindrances to the allocation of budget funds to these projects. But when it comes to issues of national and even world-wide significance, the Russian government cannot find the money. As a result, protected areas are doomed to a miserable existence, compelled to earn their own living as best they can.

Many experts now believe that it was for just this purpose that the Concept for Development of Specially Protected Areas of Federal Significance to 2020 was created.

Legal problems of management of protected areas

A. Combining the functions of managing protected areas and exploiting natural resources.

In accordance with article 3 of the Federal Law on Protected Areas, the organisation and running of protected areas of federal significance is the responsibility of the Russian Government and federal environmental protection agencies.

In accordance with the statute approved by federal government resolution No. 404 (as amended on september 4, 2012) "On the Ministry of Natural Resources and Environment of the Russian Federation", the Ministry of Natural Resources and Environment (Minprirodi in its Russian acronym) is the main federal agency responsible for public policy and legal regulation in the study, use, reproduction and conservation of natural resources including mineral deposits, water bodies, forests, fauna and their habitat; in land relations connected with the transfer of land of the Water Fund, Forest Fund and land of specially protected areas to land of other categories; in the fields of forestry, hunting and hydrometeorology; in monitoring of the natural environment and its pollution, including the monitoring and control of radiation; and in the development and implementation of public policy and legal regulations in the sphere of environmental protection, including issues relating to the treatment of industrial and domestic waste (hereinafter, waste), protected areas and state environmental assessment.

The Ministry of Natural Resources and Environment of the Russian Federation independently sets the following regulations in its established field of activities: **The statute on State Sanctuaries, National Parks and Nature Reserves, Biosphere testing grounds attached to State Natural Biosphere Reserves, Natural Heritage Sites of federal significance.**

As such, the Ministry of Natural Resources and Environment fulfils the state's role in both the management and exploitation of natural resources and the management of protected areas, including approval of provisions for nature reserves of federal significance. The combination of these functions within a single ministry often results in the interests of natural resources exploitation trumping the interests of preserving protected areas.

There have been many examples of this in recent years:

1. The Ministry of Natural Resources and Environment agreed to carve 1,900 hectares out of the Yugyd Va National Park in the northern Urals so geological surveys and mining could begin at the Chudnoye gold deposit (letter of 02.10.2008 No. 05-12-47/10201).

On december 30, 2009, Rosnedra, a sub-division of the Natural Resources and Environment Mini-stry, granted the mining company "Gold Minerals" a license (No. SYK 14832 BE), allowing it to carry out geological survey and mining work at the Chudnoye deposit. Ministry decree No. 3 of january 14, 2010, approved the statute on the Yugyd Va National Park, which set its area, location and boundaries. Point 38 of this statute is accompanied by a map showing functional zoning, according to which the Chudnoye deposit is not part of the national park. In the spring and summer of 2011 "Gold Minerals" began geological survey work, including blasting and drilling, at Chudnoye.

The Prosecutor General's office investigated and concluded that both the decision to cut land out of the park and "Gold Minerals'" activities within it were illegal: "The Ministry of Natural Resources and Environment, in allowing changes to the area and territorial distribution of the national park by removing part of the territory for development of the Chudnoye gold deposit, **failed to provide proper protection, conservation and**

stewardship for future generations of the Komi Forests World Heritage Site, in violation of the requirements of articles 4, 5 and 6 of the Convention on Protection of World Cultural and Natural Heritage. As a result Gold Minerals was in violation of article 15 of Federal law No. 33 of 14.03.1995 "On Specially Protected Natural Territories", and article 59 of Federal law of 07.02.2002 "On Environmental Protection" (letter of the Prosecutor General of the Russian Federation of 31.08.2012, No. 7, 4-2373-2004).

2. The Ministry of Natural Resources and Environment's letter of october 17, 2010, No. 12-46/10633 agreed to geological surveys (regarding them as research) in the Pechora-Ilych Nature Reserve.

3. Ministry of Natural Resources and Environment Decree No. 196 of April 4, 2011, changing the statute regulating the Utrish Nature Reserve, came into force on June 10 of that year, according a publication in Rossiskaya Gazeta (www.rg.ru/2011/04/14/utrish-site-dok.html).

An analysis of these amendments by Transparent World, a non-profit partnership (www.new.transparentworld.ru/ru/news/new64.html), showed that they redrew the reserve's borders to exclude territory proposed as the site of a so called "sports and recreation" complex, which according to official information was initiated by the President of Russia's Department of Capital Construction (although they deny any involvement in the controversial palace on the shores of the Black Sea (www.novayagazeta.ru/data/2011/017/14.html). The Utrish reserve also lost land assigned for construction of an approach road to the complex (specifically, a so-called "anti-fire forestry road", illegal construction of which was halted by public outcry) and also the coastal strip around the east of the village of Maly Utrish, where the government of the Krasnodar region has construction interests.

As such, the re-drawn borders of the reserve excluded the most valuable natural areas for which it was originally created. The fact that so many of the most valuable natural sites were excluded from the reserve and are intended for development is clear from the map published on the website of WWF Russia showing the valuable areas that should be included in the nature reserve (www.wwf.ru/about/where_we_work/caucasus/utrish/).

It should be noted that creation of a nature reserve within such borders contradicts Government resolution No 725-r of may 23, 2001, which says the Utrish reserve should include **natural features of the dry subtropical Black Sea Caucasus coast,** which the new borders exclude.

Ministry of Natural Resources and Environment decree No. 8 of January 20, 2012 (registered with the Ministry of Justice on March 26, 2012, N 23593) amended the statute regulating the Maly Kurils federal nature sanctuary originally approved by Ministry of Natural Resources and Environment Decree No 253 of August 19, 2009, "On Approval of the Statute on the Maly Kurils federal nature sanctuary" (registered with the Ministry of Justice Septermber 28, 2009), in accordance with which (paragraph 3.9) **"in the marine waters of the reserve it is permitted in accordance with Russian fisheries law to carry out commercial fishing of sea urchins and scallops subject to the special protection regime and agreement with the Ministry of Natural Resources and Environment on the scale, methods and areas of fishing for the specified biological resource".** In the previous version of the statute, commercial fishing was banned outright.

The Ministry continues this "development" of reserves today: in 2013, amendments were made to the statute on the Baikal-Lensky Nature Reserve, part of the Lake Baikal World Heritage Site, to allow logging in 36 forest blocks of the reserve with a total area of 50.000 hectares. Such logging is banned under both the reserve's statute and its forestry regulations. In other words, granting permission for it was a direct violation of the Russian Forest Code.
Besides forestry, the amended statute provides for construction of 15 tourist routes on the territory of the reserve. According to Irkutsk branch of the Rosprirodnadzor, the national environment watch dog, there are currently only 3.
All these encroachments on reserves have been either initiated or supported by the Ministry of Natural Resources and Environment, exposing the institutionalized conflict of interests within the organisation responsible for both the exploitation of natural resources and the management of the country's nature reserves and the corruptibility of ministry officials.
These facts stand as incontrovertible evidence that the Ministry of Natural Resources and Environment is not in a condition to effectively manage Russia's national park and nature reserve system.

B. The Legal Implications of the adoption of Federal law No. 365 of 30.11.2011
Federal law N-366 of the November 30, 2011, "On amendments to the Federal law on 'On Special Economic Zones in The Russian Federation' and other legal acts", introduced significant changes to the Federal Law On Protected Areas:

1. In article 7 "The state's role in nature reserves":
   - the words "and development of educational tourism" were added to sub point G;
   - the words "and development of educational tourism" were added to sub point E, point 2, article 9, "the regime in Russian state nature reserves."

In practice, this amendment makes provision of tourism one of the primary tasks of state nature reserves. It allows almost any activity on the territory of such reserves as long as it is directed at the development of **public** tourism.
In this way the amendments provide a legal basis for involving nature reserves (including those included in World Heritage Sites) in intensive tourist activities, including construction of recreational facilities on their land.

2. Points 4 and 5 were added to Article 10 "state natural biosphere reserves":
   - **4.** To ensure the envisaged use and activities of biosphere testing grounds [an area of a reserve with laxer controls where a limited amount of development is allowed in order to test the impact on the biosphere] of biosphere reserves, including development of educational tourism, physical culture and sport, capital buildings and associated infrastructure may be placed on parts of the biosphere testing ground specially designated by the federal agency responsible for a state biosphere reserve, a list of such infrastructure being established by the Government of the Russian Federation for each biosphere testing ground of biosphere reserves.
   - **5.** Plots of land needed for fulfilment of activities defined in point 4 of the current article, may be transferred to citizens and legal entities under lease in accordance with land law.

The procedure for preparing and concluding leases for land within boundaries specially designated by the federal agency responsible for the biosphere reserve and the reserve's attached biosphere testing ground is established by the executive agencies of the Government of the Russian Federation.
In practice this means permission to build sport and tourist complexes on nature reserves' biosphere testing grounds [polygons in Russian], including inside reserves that are part of the international network of UNESCO's "Man and the Biosphere" programme.
These amendments were lobbied by the company "Northern Caucasus Resorts" to legalize construction of the Lagonaki Resort in the Caucasian biosphere reserve, part of the Western Caucasus World Heritage Site (www.ncrc.ru/e/news/index.php?id_4=343). Construction of this mountain resort will not only damage valuable natural sites on the plateau, but also violates Russia's obligations under the Convention on Protection of World Cultural and Natural Heritage – something the world heritage committee already warned Russia about at its 36th session. This project could in fact have a negative impact on all plans to develop tourism in the Caucasus, since environmentally responsible foreign investors may refuse to take part in projects that destroy world heritage sites. However, they are distributed across more than 40 UNESCO biosphere reserves.
On April 27, 2012, the Russian Government issued resolution No 603-r, allowing not only construction of mountain ski resorts in the Caucasus Reserve, but also guest houses, engineering installations and transport infrastructure inside the biosphere testing ground of the Barguzinsky reserve (part of the Lake Baikal World Heritage Site).

3. In article 15, "The National Park Regime":
a) point 1 was rewritten in the following form:
"1. In order to establish a national park regime, a zoning system will define:
в) recreational zones, which are intended to ensure and provide for recreational activities, development of physical culture and sport, as well as the placement of tourist industry sites, museums and information centres";
In sub point D, point 2, the words "not connected with the functioning of national parks" were replaced with "with the exception of buildings, the placement of which is provided for in point one of the current article and buildings connected with the functioning of national parks and of settlements located within their borders".

In practice this means that national parks (except sanctuaries and specially protected zones) are open to any recreational, tourism, or sporting development, along with the construction of any corresponding infrastructure, without any kind of additional permission (the previous version of the law required special approval by the federal government) and also any installation (including linear constructions such as roads and pipelines) required for settlements to function inside the national parks.
In the case of the Losiny Ostrov (Elk Island) National Park, such amendments would mean almost anything could be built in the park, since it is within the city of Moscow. Naturally, this situation could lead to the destruction of the national park's unique natural environment. Nonetheless, similar provisions were entered into the statute on the Losiny Ostrov national park by Ministry of Natural Resources and Environment decree No 82 of March 26, 2012 (registered with the Ministry of Justice on August 20, 2012, registration no. 25218).

C. The legal implications of the adoption at the second reading of the Federal law "On specially protected natural territories" (bill No. 97705-5), developed by the Ministry of Natural Resources and Environment.

The adoption of several of the provisions in this document may seriously weaken legal protection for specially protected natural areas and entail destruction of protected natural environments.
In our opinion, the least acceptable provisions of the bill are the following:

1. Depriving state and local government agencies the right to create other (not explicitly provided for by law) categories and forms of protected areas.

In accordance with article 72 of the Constitution of the Russian Federation, specially protected areas are subject to the joint jurisdiction of the federal and regional governments, which in our opinion means that depriving regional agencies of the right to establish other (not explicitly provided for by law) categories of protected area violates the Russian Constitution. According to the registry of protected areas, more than 250 categories of protected areas of various levels and status existed in Russia in 2003. Of these, the ones included in the law "On Protected Areas (sanctuaries, national and natural parks, reserves, natural heritage sites, arboretums and so on) cover about 8 % of Russian territory, while "other categories" cover about 5 % of the country. If this bill is adopted in its current form, the latter may be lost, especially considering that the bill does not make any mention of a procedure for converting them into recognised forms of protected area.

2. The possibility (albeit with reservations) of changing the boundaries of state nature reserves.

The document states that changes may be made only "in the event of removing land from the composition of the reserve that in view of loss of its environmental, scientific or other special significance cannot be used for its intended purpose". In practice, this means that if for some reason or other (for example arson or illegal construction) areas of a reserve have already lost their value, they can then be removed from the territory of the reserve legally. As such, it amounts to a legislative basis for legalizing illegal activities in nature reserves.

3. The possible conversion of nature reserves into national parks.

In reality this means that any nature reserve can be converted into a national park for no serious reason at all, significantly weakening its protection. For many reserves, especially those in densely populated area or popular holiday and recreation destinations (such as the Caucasus of the Southern Urals), this could lead to the degradation of unique natural sites. In our opinion, implementing these provisions may lead not only to the destruction of natural systems and sites, but also put into question the very existence of Russian nature reserves as a unique category of protected area. The listed amendments, in our opinion, could entail serious consequences for the entire system.
It should be noted that many of Russia's nature reserves and national parks are subject to various international conventions and agreements (primarily the UNESCO Convention for the Protection of the World Cultural and Natural Heritage and the Ramsar Convention on

wetlands). The adoption of the amendments and the subsequent implications for nature reserves and national parks would entail a breach of Russia's obligations under these agreements, which, in accordance with the Constitution of the Russian Federation (Article 15) are an integral part of its legal system. It would also adversely affect the image of Russia as a state that legally allows the destruction of World Heritage Sites.

Amendments to the Law On Protected Areas were prepared in great haste and great secrecy, without consulting experts in the field and without public discussion. It is obvious that those who are behind these amendments are afraid that public discussion of them would unleash a new wave of protests from the environmental community.

This article provides only a small list of the problems that are currently facing Russia's unique system of protected areas. Unfortunately, without immediate action, that system may largely lose its value, which will inevitably lead to a sharp weakening of the resilience of ecosystems and the deterioration of the environmental situation in many regions of Russia.

We propose the following priorities for action:

1. Abandon all plans to remove, change the boundaries, or weaken the protection of the most valuable natural areas and sites, as well as plans to involve them in intensive commercial activity.

2. Do not allow the adoption of the amendments in draft law No. 97705-5 "On amendments to various legal acts of the Russian Federation" in its current form and ensure widespread public discussion of the new version of the Law on Protected Areas and consultations with experts in nature reserve management..

3. To improve the governance of protected areas in Russia and develop appropriate public policy, remove these functions from the Ministry of Natural Resources and Environment. Instead, create a federal agency for specially protected areas directly answerable to the Russian federal government (similar to the Federal Forestry Agency and the Federal Fisheries Agency). Give it full authority to develop public policy and regulate the organisation and running of protected areas and also to directly manage protected areas of federal significance.

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1. Assuming that each park or reserve employs 100 people on a salary of 30,000 roubles per month, maintenance (including accruals for salaries, which increases the sum by about 50%) requires 30,000 x 1.5 x 100 x 152 x 12 = 8,208,000000. In addition, more money is needed for operational costs (fuel, capital construction, repairs and maintenance of property and equipment, procurement of machinery, other equipment, rent, weapons, work clothes, transport, field work and travel for staff). We assume that each reserve spends an average of 50,000,000 roubles a year on these needs (which is probably much more than the actual necessary sum). This amounts to another 7,600,000,000 roubles. We also assume about half (about 75) of the reserves, many of which are in remote areas, need helicopters. Average running costs for a helicopter are 120,000 roubles per hour. For staff to use helicopters six hours a day each week requires another 2,592,000,000 roubles.

5.3. Water resource management, water ecosystem problems

Anatoly Shevchuk

A country's water resources and water economy system largely determines its socio-economic sustainability. Water and environment security, public access to clean water, the reliability and sustainability of water supplies for meeting economy's needs, the condition of water bodies and water resources and the ability to forecast and prevent (or at least minimize) the damage wrought by water-caused emergencies, all play a large part in any state's national security.

Russia is blessed with significant water potential – indeed, in terms of the sheer scale of it water resources it is one of the best supplied countries in the world. Water resources have special significance for the development of the national economy and support for social and economic programmes in country's regions.

Russia's normal annual runoff include 10% of global river runoff (second only to Brazil), amounting to an estimated 4,3 thousand cubic km a year. Overall, Russia has a water supply of about 30,200 cubic meters per person per year. However, these resources are unevenly distributed across the country. The developed regions of European Russia, which are home to more than 70% of the country's population and industry, have no more than 10% of its water supplies. In low flow years a water deficit takes place in areas of intensive economic activities in Don, Ural, Kuban and Irtysh river basins, as well as on the west coast of the Caspian Sea.

Russia's reserves of ground water, which may be used for both drinking water and agricultural and domestic purposes, are unevenly distributed, either.

The water economy system of the country is one of the largest in the world and includes more than 30 thousand water reservoirs and impoundments of 800 cubic km total capacity. It also includes a channel network for interbasin and intrabasin flow redistribution, as well as water navigation infrastructure with the total length of 3 thousand km. This makes it possible to diverse the water flow of 17 cubic km per year.

In order to protect human settlements, economy's units and agricultural lands from a negative water impact, it has been constructed more than 10 thousand km of dams and other engineering protection units.

The total scale of uptake (withdrawal) of water resources from natural water bodies in the Russian Federation is 80 cubic km per year. The economy uses about 62.5 cubic kilometres annually.

Generally speaking, the existing water system effectively meets the water needs of the economy and the population. But the projected development of the Russian economy will require an even greater volume of guaranteed high-quality water supplies for drinking and household use, as well as for industrial, agricultural, energy and recreational purposes.

The modern system of water management was determined by administrative reforms and the adoption of the new Water Code. In 2004 the water management system in Russia was significantly restructured, towards the establishment a specialized federal

body for water resources management and further adoption of regulatory and non-regulatory acts to change water legislation, including such important issues as access to water and payment for water. The Federal Water Resources Agency (commonly known by its Russian acronym Rosvodresursy) was established as the executive agency charged with providing federal water services and managing federal water-related property. In the same year the Russian government approved a document called "Key areas for development of the Russian Water Complex to 2010 and the action plan for their implementation", which set out the functional goals and tasks of development of the water sector and also the role of state agencies in increasing the country's water potential.
A system of water planning was developed to help divide tasks among agencies according to their specialisms (fig. 1).

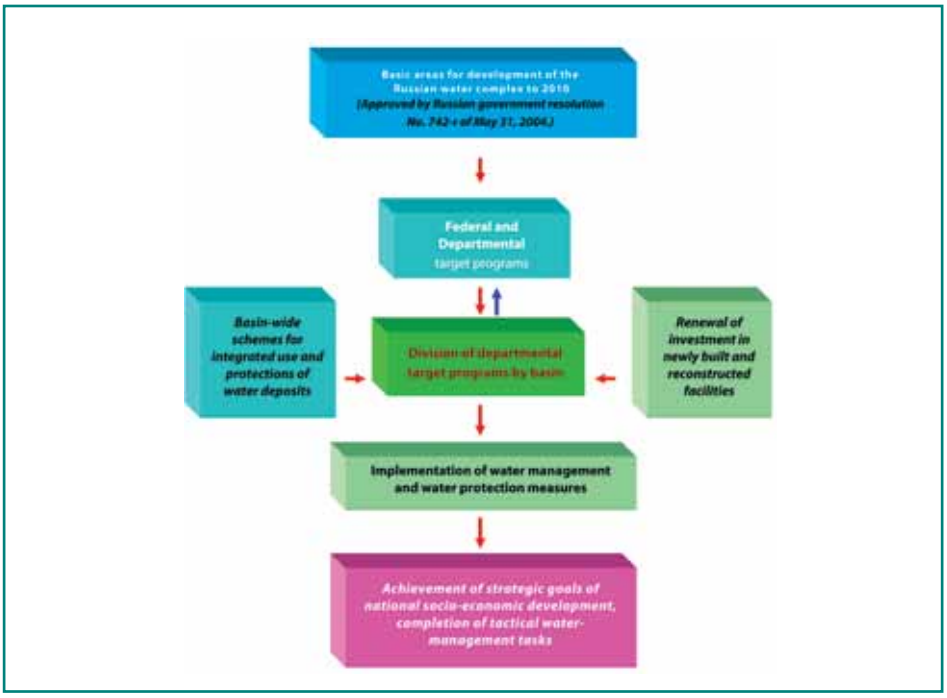

Fig 1. The planning structure for water management and water protecting measures

The new Water Code (2006) invested Rosvodresursy with the following as powers as an executive federal agency: Territorial redistribution of surface water runoff, replenishment of ground-water deposits and enforcement of measures to predict adverse water events and liquidate their consequences in relation to water bodies that are either federally owned or located on the territory of two or more federal subjects of the Russian Federation.
The adoption of the new Water Code changed the rules for using water resources, provided for the creation and maintenance of the a national water register, significantly changed the status of integrated schemes for the use and protection of water bodies, raised and tightened design requirements and introduced a number of significant amendments to regulation of water relations and the fulfilment of water management and water protection activities, further defining Rosvodresursy's field of activity at the current time and into the future.

At the same time, the passing of a federal law on the introduction of a water tax from January 1, 2005, changed the role of the Russian regions in water resource management and transferred the burden of organising the provision of financing for water management and conservation activities to the federal level, but the new budget planning scheme, focussed on end results, required reviewing the whole system of selection of water management measures financed from the federal budget.

Based on the above, the main goal of Rosvodresursy's activities was specified as sustainable water use and preservation of aquatic eco-systems while ensuring the security of people and property against water-related disasters.

To achieve these goals, Rosvodresursy is faced with the following tasks:

- ensure that the water needs of the population and the economy are met;
- ensure the safety of hydraulic installations (primarily water-retaining structures);
- ensure that human activities are protected against flooding and other water damage.

Meeting these goals required development of a system for planning and financing the activities of the water management complex. For many years these tasks were carried out within sub-programmes of the federal target programme (FTP) "Environment and natural resources in Russia (2002–2010)", (such sub-programmes included "Volga Renaissance", "Water resources and water bodies", "Protection of lake Baikal and the Baikal natural area," and "Regulating the quality of the natural environment"). A large number of water manage-ment and water protection measures were also passed over to "related" federal target programmes. For example:

- "The socio-economic development of the Bashkortostan Republic up to 2006";
- FTP "Reconstruction of the economy and social sphere in the Chechen Republic";
- FTP "Economic and social development of the Far East and East to Baikal Regions for the period 1996-2005 and up to 2010";
- FTP "Protection and Restoration of Soil Fertility on Agricultural Lands and agro landscapes to be a National Property of Russia, for 2006-2010";
- FTP "Reduction of Risks and Mitigation of Emergencies' Consequences, Relating to Natural and Technogenic Disasters in the Russian Federation up to 2010", as well as FTP "Housing for 2002–2010".

The goals of the above federal target programmes in Rosvodresursy's areas of responsibility are to meet the water needs of the population and economy, enhance the operation and safety of the water management system and its installations, reduce damage from the harmful effects of water and to protect and restore rivers, lakes and other water bodies.

But water management has not had its own long-term target programme since the programme on "Environment and Natural Resources on Russia (2002–2010)" was closed in 2005. Water management and protection works for a number of years have been carried out mainly through departmental programs or separate projects within other, non-water specific, federal target programs.

In 2005, Rosvodresursy began developing three departmental target programmes (DTPs) devoted to water management (fig. 2).

Designed as "rolling three-year plans", these programmes will unfold over the next three-year time frame with a systematic analysis of earlier efforts in previous years. Federal Water Resources Agency decree No. 100 of July 6, 2005, makes each river basin water authority responsible for drawing up a programme in its zone of responsibility.

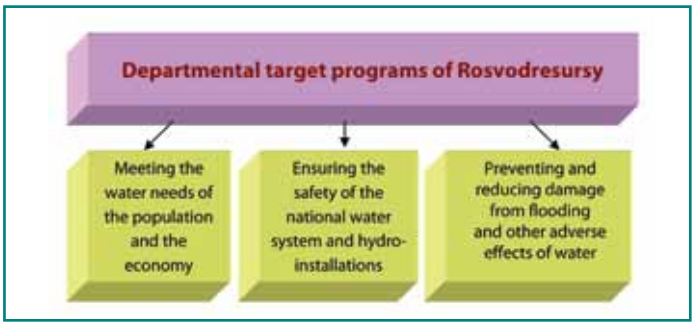

Fig 2. Key areas of Rosvodresursy's water management activities

Various bodies could initiate proposals on water use and water protection works to be included into those programs. Among them: federal state agencies and federal state unitary units subordinate to the Agency, federal governmental bodies and their regional units, state units in the subjects of the Russian Federation, local management bodies, business units and non-governmental organizations.

Departmental Target Programs (DTP) could include as a priority units of infrastructure, projects of federal and interregional importance, and infrastructure units under construction to be nearly completed. Criteria for possible financial support of water development and protection works an the level of Russia's Subjects and basins as a whole should be actual and forecasted figures indicating water tax budget revenues within a river basin water authority responsibility area.

The effectiveness of DTP is assessed by the economic, social and environmental effectiveness to be achieved as a result of program realization. The assessment was made through the comparison of expected program results with expenditures made to achieve those results.

THE DEPARTMENTAL TARGET PROGRAMME "MEETING THE WATER NEEDS OF THE POPULATION AND THE ECONOMY". The goal of this programme is to meet the water needs of the population and the national economy in both quantity and quality. A significant problem in economic and social terms is supplying settlements located a long way from large bodies of water and where using ground water is either limited or impossible. The total deficit of water in the country in dry years, based on water balance, is estimated at 14.3 cubic meters.

This programme also includes state investment in the construction and renewal of weirs and reservoirs, improving the system of water deliveries to areas suffering from shortages in order to create conditions for the sustainable development of sectors of the economy dependent on use of water (industry, energy, transport, agriculture and communal utilities), improving living conditions with preservation of the country's water potential and improving the environmental condition of water bodies.

Some 15.8 billion roubles a year in federal funding are needed for a 10 year reservoir building programme aimed at regulating seasonal and year-to-year river flow.

Furthermore, in a number of regions (the Kalmyk republic, the Stavropol, Krasnodar and Kemerov regions, the Southern Urals and others), these goals cannot be achieved with the construction of reservoirs on existing water courses, but require delivery of water from elsewhere.

Furthermore, almost all surface water and most of the ground water in the country suffers from serious anthropogenic impacts, especially in the European part of the country and areas around large industrial or agricultural enterprises. Insufficient treatment facilities and frequent accidents and leaks from oil pipelines, sludge reservoirs and sewage treatment plants result in the pollution, depletion and degradation of water courses and other sources of water. Water pollution is believed to cause almost 70 billion roubles worth of damage to the public, the economy and the environment every year.
The permanent or periodic water deficits experienced in many Russian regions result in economic losses from reduced productivity and social tensions over interruptions to water supplies. The main task of this programme is to maintain the level and reliability of water supplies, including regulating river flows through the use of cascades and multi-purpose reservoirs, the optimal redistribution of water within and between river basins and using the water management system more effectively.

THE DEPARTMENTAL TARGETED PROGRAMME "ENSURING THE SAFETY OF THE NATIONAL WATER SYSTEM AND HYDRO-INSTALLATIONS" is devoted to protecting people and pro-perty from the danger of disasters caused by technical failure. Its official goal is to ensure the safe functioning of hydraulic structures (primarily water retaining walls) and reducing the risks of accidents associated with manmade disasters.
According to the Russian Federation inventory, there are currently 26,000 potentially dangerous hydraulic structures of various kinds in use today. Most of them have already been in service for 30, 40 years or more, posing a real threat of disaster in the event of accident. At present more than 6000 hydraulic structures are in non-acceptable state.
Providing hydraulic structures safety is one of the key aspects for national security in environmental protection field. This was clearly reflected in the Program of socio-economic development of the Russian Federation for 2006–2008. The acute problem is that the overwhelming majority of hydraulic structures are the dams for small and medium-size water reservoirs. Many of them are under exploitation without maintenance and service for 30 and more years to be sources of increased danger. The most part of hydraulic structures are included into the IV structure class (more than 90% of their total number). They are mainly constructed locally for agricultural purposes.
To solve the problem of hydraulic structures safety it is required 12,8 billion rubles per year from the federal budget during 10 years.

THE DEPARTMENTAL TARGET PROGRAMME "PREVENTING AND REDUCING DAMAGE FROM FLOODING AND OTHER ADVERSE IMPACTS OF WATER" is aimed at improving the protection of the natural environment and ensuring the safety of human activity from adverse natural phenomena. There are 400,000 square kilometres of flood vulnerable land in Russia, of which 150,000 square kilometres – including 300 cities, tens of thousands of villages and more than seven million hectares of agricultural land – are vulnerable to catastrophic flooding.
The Federal Water Resources Agency devotes about 70% of its financing to flood defense work – a reflection of the fact that floods and other adverse impacts of water are the most frequent and devastating natural disasters that Russia experiences. One of the most pressing problems facing the Russian water sector today is the flooding of towns, villages, commercial property and agricultural land during the flood season. Floods are amongst most frequent forms of natural disaster Russia faces and in terms of

the sheer area of they affect, they dwarf other kinds of disaster. On average, 50,000 square kilometres of land is inundated every year, while the total area of flood plain in the country is 400,000 square kilometres, of which 150,000 square kilometres is vulnerable to catastrophic flooding. The latter area includes more than 300 cities, tens of thousands of villages and more than seven million hectares of agricultural land.

The regions most vulnerable to flooding include Primorye and the Amur and Sakhalin regions in the Far East, all of Eastern Siberia, Trans-Baikal, the Central and Southern Urals, the lower Volga and the North Caucasus. The problem is compounded by the fact that the water content of the main rivers is growing. Many experts also believe that anthropogenic climate change will lead to significant changes in the hydrological regime of rivers, lakes and other water bodies in Russia over the next two to three decades, increasing the likelihood of flooding.

The cost of building flood flood protection works, as well as measures to broaden river channels (about 14,000 kilometres of river channels need widening, according to researchers), is believed to be in the region of 22 billion roubles per year.

The transition to medium-term planning on based on the development of departmental target programmes allows the creation of a system of planning that is bound not only to specific measures in specific places, but to tangible social changes allowing the efficient use of water to ensure the sustainable development of economic sectors.

Sometime after the three programmes listed above, Rosvodresursy developed a fourth departmental target programme under the title **"EMPOWERING THE SUBJECTS OF THE RUSSIAN FEDERATION IN THE FIELD OF WATER RELATIONS"**, which was aimed at helping regional governments get to grips with the water management that had been transferred to them from the federal government.

Realisation of the measures included in all four departmental target programmes will:

- Provide support for the natural ability of water bodies to cleanse themselves, preventing degradation of lakes and rivers;
- open over a ten year period reservoirs with a total capacity of 15 cubic kilometres in parts of the country suffering from water shortages;
- reduce water consumption and water loss and stabilise the level of water uptake (at 75 billion cubic meters a year) and discharge of waste water (at 55 billion cubic meters a year) and reduce the proportion of contaminated water in the total volume of waste water to an environmentally acceptable 20%;
- increase the reliability of water systems, hydraulic structures and the level of quali fications of service personnel;
- form an effective system for the management of water resources and federal property (doubling income from payments for use of bodies of water by the end of the implementation period);
- expand state monitoring of water bodies, including cross-border rivers, to ensure reliable forecasting;
- improve management of the state water registry and the registry of hydraulic structures to create a unified system of information support for water management;
- improve the legislative and regulatory frame work to ensure the adoption of scientific and technical breakthroughs and the development of scientific potential in the water sector;
- ensure fulfilment of Russia's obligations under international agreements and conventions on the use and protection of cross-border water resources.

In recent years several important strategic documents have been adopted that affected socio-economic processes as well as questions of sustainable development in the water sector. The following documents can be mentioned:

- the RF President's decree of 04.06.2008 No. 889 "Some measures to raise energy and environmental effectiveness of the Russian economy";
- the RF President's decree of 12.05.2009 No. 36 "Fundamentals for strategic planning in RF";
- the Concept for Long-Term Socio-Economic Development of the Russian Federation for the Period up to 2020";
- main activities of the Russian Federation Government for the Period up to 2012";
- complex of measures for protection of environment towards providing environmental and radiation safety in RF;
- development strategies for sectors of the economy, federal regions, regions, as well as branch and regional programs, schemes.

Realization of provisions, included into the above documents by 2020 should provide the solution of ambitious tasks: reduce energy consumption in GDP not less than by 40% in comparison with 2007, as well as reduce pollutants disposal and wastes storage not less than 20% by 2015.

The prospects for strategic development facing the country demanded raising the water management sector to a new, modern level of sustainable development, which would offer effective guarantees of the water needs of the population and the economy, protection from flooding and other adverse effects of water and improvement of the environmental health of water bodies.

To this end the Water Strategy of the Russian Federation to 2020 was approved in 2009, followed in 2012 by the federal target programme "Development of the water management complex of the Russian Federation, 2012–2020". These documents principally changed the situation regarding the development and implementation of water management initiatives, along with scientific, methodological, information and analytical provision. The path to sustainable water use became a new paradigm of development for the water economy and its main participants.

Implementation of the main provisions of the Water Strategy and action programmes will form a comprehensive solution to a number of problems in the water sector, helping to ensure the pace of development set out in the national Concept for Long-Term Socio-Economic Development. Among water problems in the Russian water sector the following are of special importance:

- non-rational use of water resources;
- shortage of water resources in several regions of the Russian Federation;
- non-compliance of the quality of drinking water, consumed by a large part of the population, to hygienic norms;
- providing hydraulic structures safety, as well as raising the protection level for the population and units of the economy from harmful impact of water, etc.

To much extent, the solution of the above problems will depend on conducting an effective water policy, which would be directed towards sustainable water use and the improvement of water ecosystems.

THE FEDERAL TARGET PROGRAMME "DEVELOPMENT OF THE WATER MANAGEMENT COMPLEX OF THE RUSSIAN FEDERATION, 2012–2020", tackles the most difficult challenges facing the sector today: guaranteeing sufficient water supplies for the sustainable socio-

economic development of the Russian Federation; preserving and restoring the enviromental health of water bodies and, consequently, of the population that relies on them; and protecting people and property from flooding and other adverse impacts of water.

The Federal Target Programme lays considerable emphasis on making use of the fruits of original research and past experience, including a packet of measures for developing economic incentives for sustainable water use and adoption of best available technology, increasing the level of target-programme planning and information support for water management activities and developing the system of charges for pollution of water bodies. An important issue in implementation of the FTP is the selection of programme activities. In this connection is important to recognise the mistakes of previous programmes and make sure that any project proposed for implementation under the FTP is subject to peer review. Particular attention should be paid to the development of a methodological framework for the formation of regional water management programmes in conjunction with an array of information and indicators from the Scheme for Comprehensive Use and Protection of Water Bodies (SKIOVO in its Russian acronym) and the Territorial Planning Scheme.

While much of the SKIOVO has already been developed, there remain a number of problems preventing it from being used to its full effect to ensure sustainable water management and environmental rehabilitation of water bodies.

The SKIOVO water management and water conservation measures, which are implemented by federal, regional and local government agencies, are funded from the relevant budget according to which source of financing is specified in the scheme. But the indicators by which the performance of approved schemes are measured take the form of mandatory standards which can lead to inconsistencies in the feasibility of water management and water conservation measures at the regional level. Amendments to the Water Code would help clarify the status of the SKIOVO as a document forecasting costs for development of federal, regional and river-basin level water management and protection programmes.

But the question of financing for the FTP from fees for water use remains fraught with difficulty. Experts estimate that water management and conservation measures require 60 billion to 60 billion roubles each year, while the revenues raised from fees on use of water come to only 14 billion roubles. This requires new methods for calculating tariffs for water use by taking into account how much the state, as the owner of bodies of water, spends on them and how costs show up in various sectors of the economy as a result of water use.

Sustainable water development cannot be achieved without taking the international water sector into account. Russia plays a central role in resolution of water problems within international organisations (including the UN, the OECD, the EU, the EEC, the CIS, the BRICS and the Eurasian Customs Union), as well as in bilateral cooperation.

The restructuring of the world economy due to the threat of a global water crisis creates favourable conditions for water-rich countries as demand and inevitably prices, for water-intensive products grows. Russia's significant water resources give it a distinct competitive advantage and makes its entry into the market for water and water intensive products a necessity. With the increasing importance of water resources in international relations and Russia's accession to the WTO and OECD, the country now needs to carry out an audit and valuation of its water resources to assess their contribution to the national wealth and their relevance to various sectors of the national economy and international trade.

The FTP should be used as a unique opportunity to consolidate water management organisations, scientific research centres and experts to achieve the programme's goals.

The programme may also incorporate major international water forums with the participation of experts from the UN, OECD, UNDP and other organisations.

The strategic goal, which would ensure sustainable water management, should be the comprehensive regulation of the water management sector, i. e. a system of engineering controls on surface water bodies to fully ensure all forms of water use, protection against flooding and other dangers and also to maintain optimal environmental conditions with the minimum possible negative socio-economic and environmental impact.

The creation of an integrated regulation of surface waters is long overdue. At the same time, there is also a need for an integrated Eurasian transport system on the region's waterways in order to prevent the underdevelopment of water-borne transport in Russia. Russian legislation must be amended to achieve both these goals, the principles of integrated management of surface water should either be included in the special law "On comprehensive reconstruction of the river systems of the Russian Federation", or as an addition to the Water Code.

This document should establish the government's strategic objectives with respect to the country's river systems and ways of achieving them (draft plans), the principles of reconstructing river with cascades backed by reservoirs and the construction of waterways linking river basins. It should also follow the Chinese example in setting out the state's responsibility to provide development of water communications and promote the use of rivers' hydroelectricity potential while banning the construction of dams without navigational channels and hydroelectric plants.

The Principles of State Policy in the Environmental Development of Russia to 2030, a document drafted by the Ministry of Natural Resources and Environment with the participation of other federal departments and public organisations and which was approved by the President in 2012, impacts all spheres, including the use of water resources.

It should be noted that state-level documents are increasingly "greener", which is of course important for maintaining the quality of water in rivers, lakes and reservoirs.

One of the key objectives, set in the Concept for Long-Term Socio-Economic Development of the Russian Federation for the Period up to 2020, is a considerable improvement of the natural environment and environmental standards for people, creation of a well balanced environmentally sound model for development of the economy and environmentally competitive productions.

The Water Strategy of the Russian Federation for the Period up to 2020 as one of the key objectives set the protection and restoration of water bodies. Following the Strategy, the Federal Target Program "The Development of Water Economy Complex of the Russian Federation in 2012-2020" includes such objectives and tasks as:

- protection and rehabilitation of water objects up to the state, providing environmentally comfortable conditions for population life;
- raising the level rational water use;
- cutting negative anthropogenic impact on water objects;
- restoration and environmental rehabilitation of water objects;
- raising maintenance reliability of hydraulic structures through the achievement of their safe technical state.

All these questions are important for ensuring the sustainable management, protection and restoration of water resources. One new trend can be seen in the restoration and environmental rehabili-tation of water bodies. In recent years the Ministry of Natural Resources and

Environment, the Federal Agency for Water Resources and other departments, as well as regional governments, have devoted more attention to this issue. An interesting example is the experience of the Don River Basin Authority and the municipal administration of Rostov on Don in cleaning and restoring the water quality of the river Temernik. Similar examples include the environmental rehabilitation of the Voronezh water reservoir by the Voronezh regional government.

In all, the very existence of the federal target programme on Development of the Water Management Complex of the Russian Federation, 2012–2020, opens up new opportunities for water-related businesses and organisations which need to be taken full advantage of if truly sustainable water management and practical improvements in the environmental health of water bodies are to be achieved.

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5.4. The impact of climate change on the Russian economy. Adaptation to climate change in Russia

Georgy Safonov

Climate change affects all regions and countries. Unfortunately its negative consequences are significant and are constantly growing. Damage to the world economy is already estimated at hundreds of millions of US dollars per year,[1] and in future, it may reach 20% of global GDP by 2100.[2]

Climate change in Russia has been more dramatic than elsewhere. Over the 100 year period from 1907 to 2006, overall warming in Russia was 1.29 °C according to the Russian Federal Service for Hydrometeorology and Environmental Monitoring (Roshydromet), compared to average global warming of 0.74 °C[3]. Furthermore the average increase in air temperature between 1976 and 2012 in Russia was 0.43 °C/10 years, which is more than two times higher than similar indicators for global temperatures.[4] In many regions, there has been much greater growth. For example, at Russia´s oldest weather station in the city of Barnaul, records indicate an increase in mean annual temperatures of more than 3.5 °C since 1838. There has been a particularly rapid increase in temperatures in the northern parts of the country. Under the most pessimistic scenarios, temperatures in a number of regions may rise by over 7–8 °C by 2100, according to estimates from the Voeykov Main Hydrometeorological Observatory.[5]

However, temperature increases are far from the only dangerous manifestation of climate change. The most dangerous consequences of climate change are linked to natural phenomena such as floods, melting and disappearing glaciers, landslides and mudslides, droughts, heat waves and cold periods, rising sea levels and coastal flooding, as well as the spread of diseases and habitats of disease-carrying insects, which carry tick-borne encephalitis, malaria and Lyme disease among others.

Data from Roshydromet indicates that incidents of severe weather conditions are happening more frequently. Over the entire observation period, 2012 was a record year, with 469 major natural phenomena and in the last 10 years, the annual average was not less than 310.

One of the controversial aspects of the role of climate change in Russia is linked to agriculture. It is widely believed that the changes are positive for agricultural production. This is partly true, crop yields have increased in recent years, according to estimates produced by the All-Russia Research Institute for Agricultural Microbiology (ARRIAM). However, droughts in 2010 and 2012, which caused over 300 billion roubles[6] of damages in lost crops, undermine this optimistic opinion. Forecasts up to 2030 and 2050 leave no doubt of the need for the industry to adapt to the impacts of climate change: Arid scenarios envisage that yields will decline by 9% and 17% respectively.[7]

A detailed scientific review of the impact of global warming on the economy as a whole and on individual sectors for the period up to 2030 and beyond has been presented by a research team working under Roshydromet.[8] Despite the fairly conservative suggestions, the authors estimate damage caused by natural hazards as a consequence of

climate change at 2% of GDP annually[9] and in some Russian regions, up to 5% of gross regional product. The authors also believe that "in around 2030, climate barriers which stall economic growth may appear", as already in 2011, "signs of such barriers have already emerged".[10]

However, despite the abundance of scientific information, attitudes to climate change in Russia are reserved and tend towards the critical. Doubts about the scientific veracity of climate change, the scale of uncertainty, the minor role of the human factor in climate change and general discussion of a transition to global cooling are widely reported in the Russian media. From this interpretation of scientific evidence, an extremely confused public opinion on climate change in Russia has emerged.

The population is only concerned during periods of particularly obvious natural disasters, such as the heat wave and peat fires in Central European Russia in 2003, the unprecedented forest fires in 2010 and the drought in agricultural areas of the country in the summers of 2010 and 2012. Furthermore, people are demanding less and less that authorities take action to mitigate the severity of the problem.

The government has seems to have a very confused view on climate change. The problem here is not so much about scientific evidence, enough of which is available for decisions to be taken, but completely different considerations. For example, **foreign policy issues:** Who to cooperate with; whose wheels to spoke during international talks; how to fairly (it is very difficult to reach agreement on this "flexible" term at the UN) distribute commitments to reduce greenhouse gas emissions between countries; how to use climate negotiations for the resolution of other political issues (an "exchange of positions" on membership in the WTO, OECD etc.) and many more.

Or economic considerations: the priority of producing and exporting hydrocarbons, increasing output of metals and other energy-intensive industries and the low priority of climate change – why create conditions for a possible restriction of consumption of oil, gas and coal, which we plan to produce, consume and sell in large quantities for many years?

The focus on carbon intensive economic growth is leading to the neglect of global economic trends, especially the boom in sectors of the "green economy", which, according to many experts, is the driving force behind modernisation and low-carbon development of the global economy in the 21st century. This, as well as renewable energy sources and increasing energy efficiency, ecological building construction and management of waste, water and land in line with the principles of ecologically sustainable development. In all these areas, Russia has no cause to boast, in contrast to Germany, the UK, the U.S., Japan, China and many other countries.

Perhaps the problem for the government is the administrative complexity of climate policy. After all, it encompasses issues of economy, energy, environment, health, regional development and foreign policy, among others. It is likely that this has led to the formation of indistinct public opinion on the issue of climate in state media, as well as the difficult and extremely ineffective decision-making on climate issues and restraint in international negotiations on the UN Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol.

There is, however, a formal policy on climate change in Russia. Its general principles and objectives are set out in the Climate Doctrine of the Russian Federation (2009) and its implementation plan (2011), which defines 29 tasks, the timeframes for their

implementation and the ministries and agencies responsible. Russia is quite actively involved in research programs on climate issues – it contributes to the World Meteorological Organisation (WMO) and the Intergovernmental Panel on Climate Change (IPCC), among others. In terms of international processes, Russia is party to the UNFCCC and the Kyoto Protocol, it is a participant of the negotiations on a new climate agreement and supports initiatives under the auspices of the G8 and the G20.

At first glance it seems that everything is correct, formally all the elements characteristic of modern climate policy are in place in Russia. However this impression changes dramatically if we consider the situation from the perspective of outcomes, rather than declarations and decision-making.

Here are a few observations in this area:

- Politically and legally-binding targets to limit/reduce greenhouse gas emissions have not yet been defined. A draft presidential decree on the subject has been waiting for parliamentary approval for over a year and at the time of writing this article, it had still not been approved. Furthermore, the anticipated target of -25% from 1990 levels by 2020 is rather weak (for this Russia should increase emissions by around 15% from current levels). Russia does not formulate more long-term aims.
- The official greenhouse gas emissions inventory is only conducted on an aggregated level in line with international standards (where data is presented in very general categories, which cannot be used for taking management decisions at the level of individual sectors of the economy). Until now, no efforts have been made to create a system for greenhouse gas emissions accounting by source (as is done in the European Union, the USA, Australia, Kazakhstan and many other countries). If it is not measured, it cannot be controlled.[11]
- Data on greenhouse gas emissions is not included in criteria for evaluating the effectiveness of state policy and measures, which are not required in company accounts. This means that choices in favour of one or another policy, programme or investment project is not defined with any "low-carbon" considerations taken into account.
- Targeted support systems for projects and technologies to reduce carbon emissions in Russia do not exist. Until the end of 2012, a system of joint implementation (under art. 6 of the Kyoto Protocol) was in operation, but due to Russia's lack of participation in emissions trading between 2013 and 2020, this system is not available to domestic enterprises. Access to the international carbon market with a turnover of more than $150 billion was closed. But Russia was second in the world after China for design of carbon units, more than 150 projects in various sectors and regions of the country were sold and hundreds more projects are planned through 2020. After receiving about 30 billion roubles of "carbon" income, we left the Kyoto Protocol regime and will not be able to participate in this market further.
- No strategies, programmes or projects to adapt different sectors or regions to climate change have been adopted. Current measures are more often emergency responses to immediately alleviate crisis situations. For example, in 2010, after large-scale forest fires swept the country, more than 15 billion roubles were allocated for forest fire equipment. In 2010 and 2012, after drought destroyed much of the harvest, billions of subsidies were allocated to agricultural producers affected by the drought.

- When Russia announced it was joining the coalition on short-term factors influencing climate (soot, methane, etc.) in 2012, it adopted no obligations and did not even identify departments responsible for work in this area.

Policy on adapting to climate change in Russia also formally exists, but there is no action. It is possible to report that lots of programmes, measures and projects to reduce and prevent the negative effects of climate disasters are in place. In forestry – extinguishing forest fires and buying equipment; in agriculture – subsidising farmers to plant crops, compensation for crop failure; in water – measures to control sanitary-epidemiological indicators and water quality...

At the same time no comprehensive, systematic integration policy has been established in Russia. This can be explained by: the low priority given to climate issues as a whole; the existing structure of power distribution between central and regional authorities (for example since the Forest Code came into force in 2006, full responsibility for forests lies with the regions); lack of funds in times of crisis; and the administrational difficulties of such issues. However, from the point of view of results, the following can be said. The risks of adverse weather conditions (the frequency of which is on the increase – Roshydromet named 2012 a record year in terms of severe weather conditions) lie on producers and the population. There is no long-term strategy for the management of these risks and measures to combat the effects are ineffective. Establishing a system of insurance against climate risks has not yet succeeded. And it is not surprising, because the damage caused by adverse weather conditions can be extremely high and the likelihood that they will occur is constantly growing (as the number of such events increases).

What specific risks are observed in Russia and who pays for them? A few examples:

AGRICULTURAL PRODUCERS. In 2010 and 2012 there were unprecedented droughts. Damage from unharvested crops (and the loss of grain quality) exceeded 300 billion roubles. Debts amassed by agricultural producers exceeded 1.7 trillion roubles! At the same time, grain prices have risen several times over the last 3 years. In essence, losses from unharvested crops were completely compensated by the increase in prices the population paid for bread.

FORESTRY. Forest fires, diseases and pests cause serious damage to timber merchants. When renting areas of forest, businesses run the risk of not only losing standing timber, but also suffer considerable damage in the event of fires (the tenant must assist in extinguishing forest fires and if infrastructure for the export of timber is damaged it must be repaired). As an indicator – debt among forestry businesses is steadily increasing and is already in the tens of billions of roubles. What is the state's strategy? Funds are allocated for the purchase of forest fire equipment. But as always this system turns out to be flawed – the machines are purchased, but there is no money for fuel or employees' wages.

THE POPULATION. In Summer 2010 thousands of people died in central Russia. The cause was a prolonged heat wave, combined with smoke from forest and peat fires, ground-level air pollution and the release of ozone and other pollutants from photochemical reactions. Equally tragic heat waves occurred earlier – in 2002 and 2003, which swept through Western Europe and the European part of Russia. Only then, the effects

were different: in the EU extensive measures were taken to ensure the population had access to sufficient water, air conditioning in public areas, emergency medical care, consultations with specialists etc. In Russia these measures were not taken on such a scale. You may remember the consequences of global warming – spreading habits of disease-carrying insects, which carry encephalitis, malaria, Lyme disease and other illnesses, as well as continuing tragedies during spring floods (such as Lensk and Krymsk) and many others.

In general, Russia can be said to have a dual climate policy: it exists on paper – in the form of decisions, orders, decrees. However, no significant systemic measures to implement this policy have been taken. Neither is there evidence of internal or external conditions for more active measures to reduce greenhouse gas emissions and adapt to climate change. Moreover, the existing strategies and plans (focused on increasing production and consumption of fossil fuels and energy-intensive production) will preserve the current development trend for at least 20 years, which is not motivating authorities and business on all levels to shift towards a "green economy", or implement low carbon technology and wide-scale use of renewable energy sources.

Russia remains outside the current (mainstream) trends of greening and climate neutral economic development. Perhaps, as the risks and actual damage (rather than damage predicted by scientists) to both people and businesses from climate change, as well as a loss of competitiveness in markets in developed countries (which already take into account carbon and environmental factors in the cost of production), there will be a significant incentive in Russia to conduct an active climate policy and cooperate constructively in this area with the world community. But then again, as we say in Russia "A peasant doesn't cross himself until the hears the thunder!"

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9. If such climate-linked damage had occurred in 2012 losses would have been over $ 50 billion (at purchasing power parity).
10. See above p. 174.
11. The inventory of methane emissions of different businesses can be seen as one achievement in recent years, but there are many issues relating to the methodology and organisation of this inventory, as well as presentation and verification of the data.

6

Russia's role in international cooperation on the environment, climate and international development

6.1. Russia as a global energy supplier and Russia's role in global energy security issues

Sergei Agibalov, Sergei Kondratyev

Introduction

The Russian energy sector has undergone significant changes since the 2000s. Some of these changes are visible to the naked eye, but many are only evident to those working in the sector and analysts. Nevertheless, energy consumers can fully appreciate the scale of this change. Since the beginning of the 2000s, the number of gas stations has almost doubled and many of them have evolved from basic gas stations to modern retail and service centres. Meanwhile, the conflict between Russia and Ukraine over natural gas shipments has been more obvious and has provided a very unique insight into the problems of international energy security.

The rapid growth in oil retail is the best reflection of the fact that the oil sector has been the conduit of the key changes in the Russian energy sector and allowed Russia to maintain its status as the world's largest energy supplier. After the recession of the 1990s, reinforced by the crisis of 1998/1999, oil production in Russia fell to 304.8 million mt in 1999. In 2012 oil production in Russia reached 526 million mt, 1.7 times higher than volumes during the crisis. Thanks to the dynamic growth of production in Russia, it accounted for 12.8% of global oil production in 2012.

Because of variations in production dynamics in different sectors – oil, gas and coal – Russia's share of global energy production remained practically unchanged in the 2000s and is currently a little over 11%. At the same time, against the backdrop of large-scale growth in global energy consumption, which rose 1.4 times between 1999 and 2012, Russia has had to increase production to maintain the same share in global production. Russia's role as a major energy supplier to the world market confirms the correlation between the size of the economy (3% of world GDP) and the amount of energy produced (11% of fossil fuels).

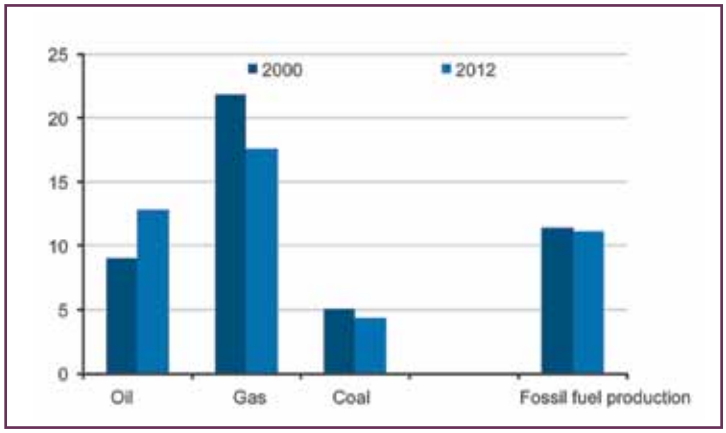

Fig. 1. Russia's role in global production of fossil fuels. *Source: BP Statistical Review 2013, IEF*

Although fossil fuel markets are mostly markets of competing fuels, they have some significantly different characteristics, so we will focus on development trends for the key fuels – oil and gas. The coal market is also important in the global energy mix, but it plays a significantly less important role in the world of international relations than oil and gas and has a largely subordinate role. Less than 5% of world energy trade is in coal, while crude oil accounts more than half and natural gas – 13%. Russia is a leading producer of coal, providing more than 4% of world production and 10% of world exports, making it the fourth largest exporter in the world. At the same time, trends in the coal sector are on the whole determined by trends in the oil and gas sector and because of this we will look at those markets in depth.

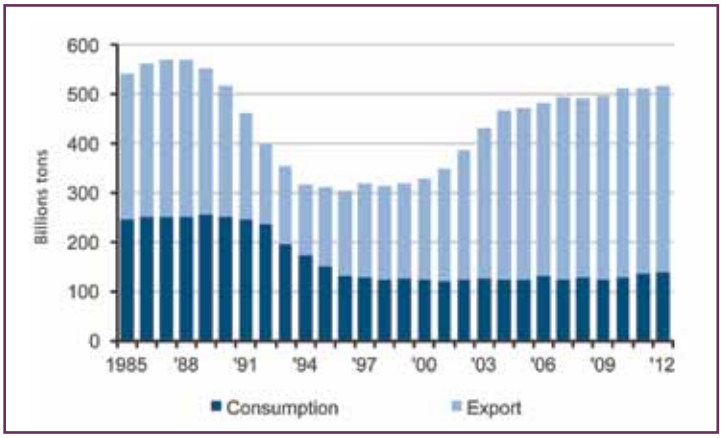

Fig. 2. Oil production and consumption dynamics in Russia. *Source: FSSS, IEF*

Oil

Oil production in Russia declined significantly during the crisis-ridden 1990s, which was due to a substantial decline in domestic oil consumption, from 252 million mt in 1990 to 123 million mt in 2000, as well as a decline in exports. The fall in domestic consumption was due to a decline in consumption in transport due to lower traffic volumes and optimization of fleet vehicles and the replacement of fuel oil with cheaper natural gas in power generation. The fall in exports primarily affected the former Soviet Union, including Belarus and Ukraine, which also experienced a deep economic crisis. Since 2000, oil production in Russia has recovered rapidly.

This growth significantly improved the external economic environment, as evidenced by the increase in oil prices on the world market and a significant increase in demand. At the same time, the economic growth beginning in Russia required practically no growth in domestic consumption of oil, due to continued optimization of fuel consumption in the transport and power generation sectors. As a result, almost all of increased production was exported. From the low starting point of the early 2000s, the oil industry showed rapid production growth – an average of 8.7% annually from 2000 to 2004, when production reached 463 million tons.

From 2005, the sector developed in new conditions. The fiscal burden on oil companies increased significantly, the depletion of the low base effect took its toll and there were significant changes in corporate structure, namely the bankruptcy of oil major Yukos.

The most important of these factors were the changes to the fiscal regime. Up to 2005, all companies aimed to maximise oil production, with companies often selecting too many projects, which would lead to a deterioration of field performance in the coming years. The new tax regime, which included a sharp increase in the export duty on crude oil and the mineral extraction tax (MET) led to a significant redistribution of oil sales revenue to the state and, as a consequence, a reduction in the profitability of oil production and the number of future projects.

As a result, production growth rates in the sector have remained low in subsequent years. In the last five years, the growth rate has been 1.1 % year on year. But due to the high base effect, even an increase in production of just 1% leads to a marked increase in absolute growth – about 8.7 million mt per year, which is comparable to the annual consumption of countries such as Denmark or the Czech Republic.

Despite continued growth, the industry is going through a difficult period. The increase in production is supported by increased production from new fields in East Siberia, primarily Vankor, Verkhnechonsk and Talakan. At the same time, in the traditional production regions, primarily West Siberia, there has been a steady decline in oil production. Maintaining production at mature fields is more expensive and the current system of MET tax discounts is not enough to stimulate development of old fields, resulting in oil recovery rates in Russia remaining at low levels, less than half of those recorded in the U.S. and Norway.

The tax regime in force in the industry since 2005 has led to a shift in profitability from the production sector to the oil refining sector. Russian refineries remain outdated and their main product is fuel oil, because the depth of refining in Russia is only 70%, while in Europe it is over 80% and in the U.S., about 94%. But, as export of oil products is subject to lower customs duties than export of crude oil, petroleum refining and export of base oil products (fuel oil and diesel) is much more profitable than the export of crude oil. As a result of these distorted tax incentives, since 2005 refining and export of oil products has grown actively, while refining depth in recent years has even declined.

In recent years, the government has taken important steps to stimulate modernisation of refineries. Firstly, export duty on fuel oil has been increased and from 2015 it should be brought up to the level of duty levied on crude oil. This should encourage companies

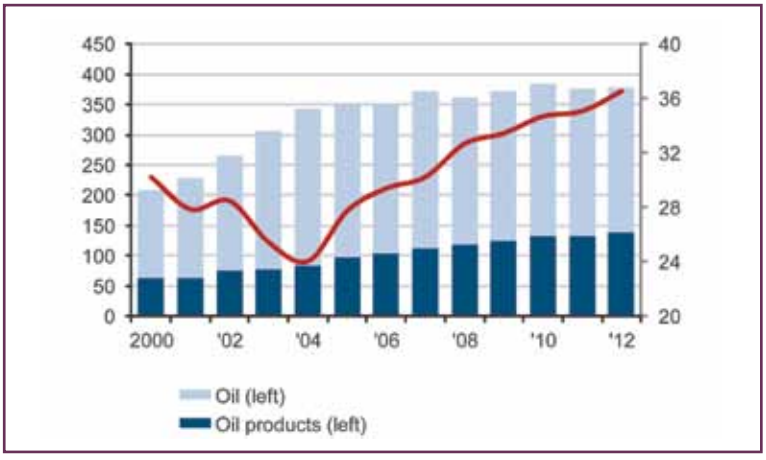

Fig. 3. Dynamics of oil and oil products exports. *Source: FSSS, IEF*

to implement processes of secondary refining, aimed at reducing the production of fuel oil. Furthermore, timeframes for technical regulations on output of euro 3–5 fuels have been approved. A strong incentive to improve the quality of products was the reduction of excise taxes on fuel that meets high environmental standards (Euro 4 and 5). As a result, a real investment boom began in the refining sector. In 2012 investments in oil refining grew 24% to $10 billion. In 2013, against a backdrop of investment stagnation, investments in oil refining grew 25%. Initial plans have been delayed slightly, but by 2016–2017, the level of refining in Russia will be much higher.

Changes in the domestic market will have significant consequences for the global balance of liquid hydrocarbons. Today, Russia is the world's largest exporter of oil products and, above all, fuel oil. Increasing the depth of refining will lead to a decrease in exports of fuel oil, by at least 20 million mt by 2017. Currently much Russian fuel oil is sent for further processing to European refineries. At the same time, Russian refineries will be interested in finding markets for finished products – gasoline and diesel.

There are a number of challenges and risks associated with maintaining a leading position in the supply of crude oil and oil products in the medium term. In terms of production, from 2015 to 2017 a number of major fields are due to be launched, including Russkoe, Yurubcheno-Tokhomskoe and East Messoyakhskoe, which will allow Russia to maintain production at current levels, but beyond 2020, production growth prospects are very uncertain.

A wide range of changes are required for oil production growth. Firstly, the fiscal regime in the sector needs to be changed, to move away from taxation on gross revenue, which is the situation today, to taxation which takes into account financial performance. Active fiscal support for increasing production at mature fields is needed. In addition to fiscal action, infrastructure support is required for projects in the oil sector, in particular more active construction of oil pipelines and transparent tariff setting on oil transportation. In many ways this may be achieved by liberalising pipeline transportation within the sector.

In terms of refining and sales of oil products, international competition is expected to increase significantly. Major refining capacity is planned to be commissioned in the Middle East, particularly in Saudi Arabia, as well as in other developing countries, such as China.

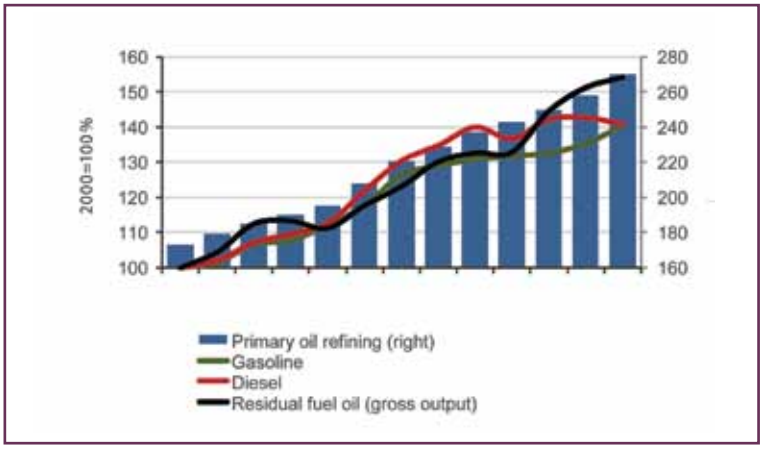

Fig. 4. Oil refining and the structure of oil products output. *Source: FSSS, IEF*

The shale revolution in the U.S. is also expected to have a significant impact on the market, as a consequence of which, not only oil suppliers, but also European refineries are due to lose out, due to the widespread use in recent years of swap trades in diesel fuel (from the U.S. to Europe) and gasoline (in the opposite direction). All these changes in the oil products sector will complicate matters for Russian suppliers, potentially resulting in a significant (more than 50 million mt) decline in oil refining in Russia.

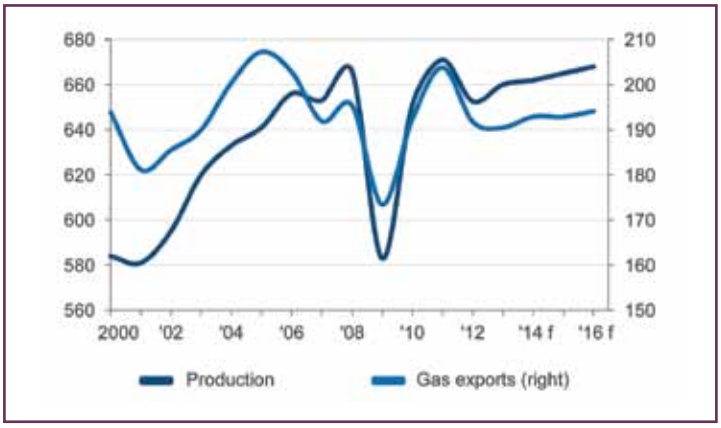

Fig. 5. Production and export of natural gas in Russia. *Source: FSSS, IEF*

Gas

Russia is the world´s second largest producer and consumer of natural gas. Furthermore, Russia has the world´s largest natural gas reserves and is the world´s largest exporter of the fuel, supplying markets in Europe and Asia. Thanks to the shale gas revolution, the U.S. took the lead in gas production in 2009, although it remains a net importer of gas. In 2012, total Russian exports of gas (by pipeline and liquefied natural gas – LNG) exceeded 200 billion cubic meters, or more than 19% of world exports. Thus, Russia is a key supplier of the most environmentally friendly fossil fuel and will retain this role for the foreseeable future.

Development of the Russian gas market in the 1990s and 2000s followed completely different trajectories. In contrast to the oil sector, in the 1990s the gas sector was not liberalised and state-owned Gazprom was the dominant player. Furthermore, the sector escaped the recession that hit the oil industry. On the one hand, Russia retained the preferential terms on exports to the former Soviet Union and at the same time it increased gas supplies to Europe. The most significant project during this period was construction of the Yamal-Europe gas pipeline, which linked the Yamal fields with consumers in Germany, via Belarus and Poland. On the domestic market, an increase in gas consumption in the power sector was helped by lower gas prices.

In the 2000s, the gas sector has undergone changes. After a long period of low prices, Gazprom started to shift to market rates for gas consumers in former Soviet countries and at the same time, expressed interest in their gas infrastructure. Gazprom also began to actively expand its presence in the market for gas sales in Western Europe. Rising world prices for gas, following oil prices, has led to a deterioration in its competitive position relative to other energy sources. Furthermore, negotiations with Ukraine and the Republic of Belarus, which led to interruptions to gas supplies to Europe negatively impacted on the image of Gazprom and the Russian gas sector in general.

But most importantly, negative trends in the European economy have led to a reduction in gas consumption. Thus, compared with the pre-crisis level of 497.3 billion cubic meters in 2008, natural gas consumption in the EU fell by 11% to 443.9 billion cubic meters. This fall has affected Russia, as the EU's largest supplier, the most. The exception was 2009, when, due to severe cold, gas consumption increased dramatically, reaching 502.9 billion cubic meters.

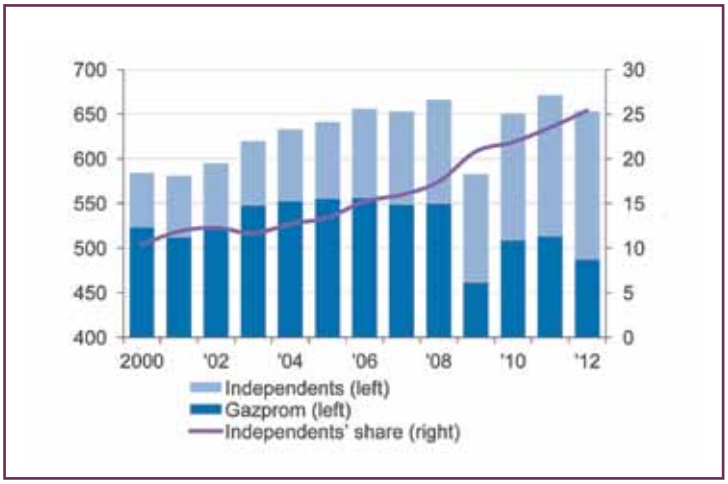

Fig. 6. Gazprom and independent companies' production. *Source: Company data, EIF*

The situation in the domestic gas market is also developing in a different direction to the oil sector. While the oil sector has seen consolidation and an increase in the stake of state-owned companies, in contrast, independent companies are increasing their stake in the gas sector – Novatek has become a key player in this regard. Oil companies have also significantly expanded their role in gas production. At the same time, domestic demand has not grown and new players are actively pushing Gazprom out of the market.

Rosneft's acquisition of TNK-BP was also a significant event, perhaps even more so for the gas market than for the oil market. Rosneft's absorption of gas producers Itera and Rospan has led to consolidation of a major gas business within Rosneft. In fact, in the absence of reform in the sector, the competitive environment has significantly improved.

Given the limited prospects for export growth to Russia's traditional market of Europe, the internal gas market is playing an increasingly important role and in light of planned tariff increases, it will be very attractive. There is also significant potential for growth in exports to the Asian market. Work is actively underway on Yamal LNG, a new LNG project slated to supply the Far East. It is also likely that plans to ship gas to Asia will come to fruition. This will allow Russia to retain a decisive role on the global gas market.

However, competition on the global gas market will inevitably increase in light of new players entering the market. First of all this will come in the form of LNG shipments from the U.S. Large shipments may begin from East Africa, above all Mozambique. Maintaining a competitive position demands not only gas supplies, but also new approaches to price formulation. Gazprom's pricing policy in Europe and Ukraine negatively impacts on supply volumes and results in consumers practically turning away from Russian gas. Gazprom therefore needs to reevaluate its approach to marketing Russian gas.

6.2. Russia's role in food security

Dmitry Shevchenko

There are two main approaches to the definition of food security: to consider the concept as a state of being, or as a process. In the first case, food security is when the economy and the agricultural sector are able to provide the population with immediate physical and economic access to sufficient supplies of safe food for the support of the social and economic activities of mankind. Food security understood as a process means policies that allow a country to achieve the highest possible level of food self sufficiency as a result of integrated efforts to increase production of food products, improve the supply system and food consumption and eliminate malnourishment and famine. The fundamental international documents in the field of food security today are the Rome Declaration on World Food Security and the World Food Summit Plan of Action (Rome, November 13, 1996). The Rome summit produced a list of the basic conditions for food security:

1) physical access to sufficiently plentiful, safe and nutritious food;
2) economic access to the appropriate quantity and quality of food for all social groups;
3) autonomy and economic independence of national food system (food independence);
4) reliability, i.e. the ability of the national food system to minimise the affect of seasonal, climactic and other fluctuations in the supply of food to the population in all regions of the country;
5) sustainability, i.e. that the national food system develops in a renewable way.

Thus, in the international context, food security is seen as a complex of measures designed to effectively meet the challenges not only of agricultural production, international trade, storage and processing, but also equitable distribution of basic foodstuffs and social development of rural areas.

Russia is positioning itself as a major player in the fight against the world food crisis. Thus in October 2010, in the framework of the joint statement on Global Food Security made at the 2009 G8 leaders' summit in L´Aquila, Italy, the Russian government approved an integrated program for the Russian Federation's participation in international cooperation on agriculture, fisheries and food security (approved by Russian government resolution of October 18, 2010 No. 1806-r).

According to the Russian Finance Ministry, Russia spent $ 330 million on various measures to implement the L'Aquila Food Security Initiative between 2009 and June 2012. The ministry has stressed that the key problems in global food security lie in constantly rising food prices, and the ever-growing proportion of expenditure on essential goods in the consumption basket of developing countries (official website of the Russian Finance Ministry: www.minfin.ru/ru/press/speech/index.php?id4=12569).

According to Andrei Bokarev, the director of the department for international financial relations at the Russian Finance Ministry, these problems "are creating a lot of stress

in a number of regions, as is shown by the events we have witnessed in a number of countries in the Middle East and North Africa, where one reason for unrest and disorder was a shortage of food, sharply ising prices and the inability of the local authorities to guarantee the food supply".

Russia's involvement in the L´Aquila Initiative is implemented in three main ways: direct aid and free food deliveries to the least developed countries (Tajikistan, North Korea, Afghanistan, Ethiopia and a number of other poor countries have received such help); via joint programs with the Consultative Group on International Agricultural Research and the World Bank (Russia is expected to have contributed $15 million to CGIAR between 2010 and 2014); and in the form of financing for specialized projects in other countries.

With regard to the latter, in 2010 Russian assistance helped launch a three-year, $8 million project to improve the standard of school meals and provide support to ensure the proper nutrition of school children in Armenia. The Russian Finance Ministry said in 2012 that the project helps provide a balanced diet for at least 50,000 Armenian school children.

Another part of Russia's realisation of the L'Aquila Initiative was the 2011 decision to create the Eurasian Centre for Food Security at Moscow State University (the MGU Centre of Agriculture), which the university management says will focus on "the development of consistent agricultural policy to ensure soil fertility and guarantee the food security of the Eurasian region" (www.msu.ru/info/struct/dep/ecfs.html).

In general, Russia's financial contribution to ensuring global food security looks impressive compared to the other G8 nations and international financial institutions, in so far as besides providing direct assistance, it has also provided indirect help by cancelling third-world debt. Thus, from 2005 to 2012 Russia cancelled $11.3 billion worth of debt owed by the poorest African countries, including providing $2.2 billion as part of the initiative for debt relief to poor countries with high levels of debt.

However, as far as scientific and practical efforts to solve the problems of world food security go, Russia can only be called a regional rather than a global player. Besides the school meals project in Armenia and a few smaller projects along similar lines in other countries, Russia has played no significant part in international food and agricultural initiatives.

In the two years of its existence the Eurasian Centre for Food Security at Moscow State University, which was designed to coordinate such work, has not been mentioned in a single international project (not counting negotiations at the end of 2012 between the government of Omsk region and representatives of the World Bank about the possibility of financing Omsk scientists' work on improving the quality of spring wheat).

Russia's internal food security policies are laid out in the 2010 Food Security Doctrine of the Russian Federation (approved by Presidential Decree No. 120 of January 30, 2010) and a number of other documents including the National Security Strategy of the Russian Federation to 2020 (in the section on ensuring food security), the Maritime Doctrine of the Russian Federation to 2020 and others.

The Food Security Doctrine proposes "ensuring the provision of safe agricultural products, fish and other aquatic bio-resources and food, for the population". The foundations for achieving these goals are identified as the "stability of internal production and also the presence of necessary reserves and stocks".

The most significant parts of the Doctrine, which has a bearing on the declaration in general, are the section on quantitative criteria for evaluation of food security and the list of threats. For example, it establishes minimum thresholds for the share of local food production on the domestic market: not less than 95% of grain, 80% of sugar, 80% of vegetable oil, 85% of meat and meat products, 90% of milk and dairy products, 80% of fish products, 95% of potatoes and 85% of edible salt sold in Russia should be from domestic sources, according to the Doctrine.

The main risks threatening Russia's food security, according to the Doctrine, include macro-economic risks associated with reduction of investment attractiveness of the real sector of the national economy and other factors, technological risks associated with the under-development of the country's industrial base, agricultural and environmental risks posed by climate change and natural and man-made disasters and also foreign trade risks caused by fluctuations in the market and the adoption of protective measures by other countries.

Proceeding from the above risks, the Doctrine sets the following priorities for public policy: the fight with poverty, increasing economic accessibility to food, development of the internal food market and trade infrastructure, ensuring the safety of food products (including through harmonization with international safety standards) and accelerated development of agriculture.

There is a special emphasis on food production: the Doctrine talks directly about the need to expand the area of land under cultivation (mostly by exploiting unused arable land), build and re-build drainage systems, accelerate the development of animal husbandry and broaden and intensify the use of potential aquatic biological resources and new technology for their development.

However, the government's efforts to promote agriculture predate the adoption of the Doctrine on Food Security. Rather, this document restated already existing state policies.

The government spent 47 billion roubles under the two-year state priority program "Development of Agriculture" in 2006–2007 and total financing for agriculture under the agricultural development program for 2013 to 2020, which was approved in July 2012, will run to 1.5 trillion roubles.

Since 2013 state support for agricultural producers in Russia has adhered to World Trade Organisation rules and standards (Russia finally joined the WTO in August 2012), based on the "green box" (financial infrastructure, training, research and development, sanitary standards, insurance programs, etc – anything that does not have a distorting effect on the market and competition) and the "amber box" (interest rate subsidies on loans, compensation for the costs of fuel, fertiliser, electricity, debt, etc). Under WTO rules, Russia may allocate up to $9 billion in support for agriculture annually in 2012 and 2013, but must subsequently reduce this to $4.4 billion by 2018.

Thus, in the next few years the Russian government will have to address the difficult task of meeting the minimal thresholds for domestic production on the domestic market and at the same time complying with the WTO's requirement to reduce tariffs on imported food-stuffs, which already account for a rather large share of the domestic market. According to the Federal Customs Service, imported food products and materials for their production reached 13% of the domestic market in 2013. Federal Statistics Service (Rosstat) data indicates that imports now account for 26% of milk on Russian shop shelves and up to 41% of meat.

How the Russian authorities will combine these two opposites is a big question. Some experts believe that the emphasis on "autonomy" in food production in and of itself is a red herring. According to Vladimir Gavrilov, a professor at the Moscow State Academy of Veterinary Medicine and Biotechnology, self sufficiency in food production is not always achieved even in economically developed countries. "Japan imports a significant quantity of foodstuffs and its level of food self sufficiency is only 50%, yet it cannot be said that the country is food dependent on other countries because Japan's export revenues far exceed the cost of food imports", he writes in his study "On the Question of Food Security in Russia".

Alexander Novikov, the president of the Institute for Human and Economic Problems of Food Security, says that existing indicators for food security in Russia show that domestic agricultural production accounts for an important, but not self-sufficient, portion of the food Russians put on their tables.

According to the researcher, the main threats to food security are low incomes (the average Russian, according to Novikov, spends about half his income on food, compared to about 10% for the average American) and the poor quality and meager assortment of food affordable for the average Russian.

Another problem is the gap between reality and the conceptual apparatus used in Russian regulatory documents. "In Russia there is in principle no concept of a sustainable food system", said Novikov. "In regulatory documents it is substituted for things like "agriculture", "the agro-industrial complex" and so on, which are purely sectoral concepts. The explana-tion for this, briefly, is that there is no agency or structure dealing with complex questions of nutrition and the various aspects of food security are addressed by tens of ministries and departments".

Nor is everything going smoothly with agriculture. Yulia Yevtushok, Oxfam's program coordinator in Russia, says that adverse weather events, natural disasters and other ffects of climate change are amongst the main threats to agricultural production, especially small-scale producers.

As an example, Yevtushok points to the catastrophic droughts of 2010 (which caused agricultural losses of 42 billion roubles in 43 regions of the country) and 2012 (when Russian farmers incurred 37 billion roubles of losses), as a result of which many agricultural enterprises found themselves on the brink of bankruptcy. "The Food Security Doctrine talks about risks from adverse climate change, but does not define any measures to reduce these risks. Even though they long ago ceased to be risks and are now realities that cannot be ignored. Unfortunately, there are no government programs in Russia today aimed at adapting agriculture to climate change, or making farms and small holdings more resistant to stressful weather conditions", says Yevtushok.

In 2012, the Russian branch of Oxfam and the Eurasian Centre for Food Safety at Moscow State University collaborated on a study of the impact of climate change on crop production in various regions of Russia, interviewing both large and small farmers, as well as private small holders. It turned out that many farmers have been incurring losses from unusual and adverse weather events for some time and have had to look for ways to adapt on their own, with an almost complete absence of government support.

This year Oxfam carried out a similar study of the economic impact of the 2012 drought on farmers and food prices in the most severely affected regions. Yevtushok says the organisation intends to continue such work in future, since there is a high demand for such research.

Notwithstanding, significant efforts on the part of a few individual organisations, Russian civil society has generally done little to address the problem of food security. The topic is periodically raised during sessions of the federal and regional Public Chambers, mostly in the context of the draft laws "On Food Security" and "On Collective Nutrition in the Russian Federation", which the State Duma and the Public Chamber plan to develop together in 2013.

Without the active involvement of NGOs and independent experts, it is highly likely that the actual draft bills will become divorced from the reality in the country.

6.3. UN Action to Address the World Climate Problem and the Role of Russia

Alexei Kokorin

In this paper we will examine one aspect of global action on anthropogenic climate change – action by international organisations within the UN, their achievements and challenges and the current state of their efforts. The full field of climate change action is much wider than this, encompassing the development of climate science and education; action at the national level by individual countries, both in reducing greenhouse gas emissions and adaptation to adverse climate pressures; financial assistance for the weakest and most vulnerable countries; the development of renewable energy and the "green economy" in general as a strategic direction for global action to avert the most negative consequences of anthropogenic climate change and so on. Concerning Russia's contribution to global efforts in general, special note should be made of the contribution to scientific understanding made by Russian researchers. But Russia has also made a not inconsiderable contribution to institutional efforts at the UN.

The IPCC and UNFCCC

The concept of anthropogenic impact on the global climate is not new and some of its earliest proponents were Soviet scientists, most prominently academician M. I. Budyko[1]. Worldwide increases in temperature were already being recorded between 1980 and 1990, generally in accordance with quantitative assessment. To study the issue two UN departments – the Organisation for the Protection of the Environment (UNEP) and the Worldwide Meteorological Organisation (WMO) – in 1988 established a fundamentally new UN entity: the Intergovernmental Panel on Climate Change (IPCC), where for many years academician Y. A. Izrael served as vice president. There are three working groups in the IPCC. The first deals with analysis of climate change, identifying its causes. The second studies the impact of climate change on natural systems and human life. The third group explores the possibility of reducing human impacts on the climate system (especially the reduction of greenhouse gas emissions).

Amongst other things, the IPCC is charged with producing the most comprehensive scientific review of the problem in the form of assessment reports approved by a consensus of scientists appointed by the governments of all member countries[2]. Such a system makes it impossible to ignore the opinion of even minor research groups working in any country. At the same time, it ensures that officials will adhere to IPCC findings. Thus it is that at meetings the UN Framework Convention on Climate Change (UNFCCC) all countries are united in their opinion that humanity's impact on the climate is powerful, dangerous and should be kept within safe limits. All countries have agreed to set that limit at an anthropogenic increase of average global air temperatures of 2 °C[3] (though more than 100 of the most vulnerable countries would like to see it limited to a rise of 1.5 °C[4]).

The IPCC is a scientific body and draws no conclusions about how countries should act.

This role, as well as other decision making, is left to the UNFCCC and other forums. The IPCC only indicates how likely it is the 1.5 °C or 2 °C targets will be met given various scenarios of greenhouse gas emissions and suggests various options for distributing the desired reduction in emissions between developed and developing countries. It leaves the choice of options to national governments and the UNFCCC.[5]

In 1990 the IPCC released its first assessment report, which helped convince countries of the need for international agreement. Work then began on the UNFCCC, which with Russia's active involvement was completed in 1994.[6] An important feature of the UNFCC is the presence of two lists of countries: Annex 1 is a list of developed countries who play a leading role in reducing greenhouse gas emissions. Annex 2 is a list of the most developed countries that are expected to provide financial support for developing nations (Russia, Belarus and Ukraine all ratified the convention and are listed as Annex 1 nations). At the time, this division seemed sensible. In the early 1990s two thirds of emissions came from developed countries and the growth of emissions in China, India and other developing countries was insignificant.

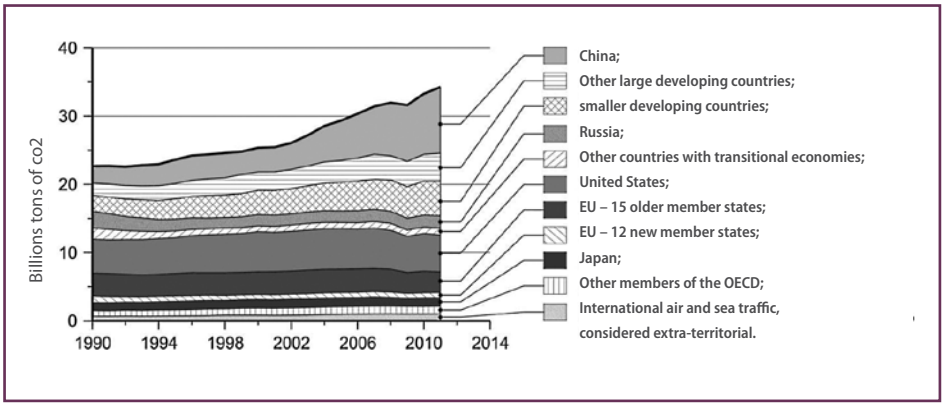

Fig 1. CO_2 emissions from burning of fossil fuels and cement production. This is the largest (70%) but not the only contributor to global anthropogenic greenhouse gas emissions.[7]

This gave rise to the old concept for action within the UNFCCC: developed countries would reduce their own emissions and developing countries could voluntarily implement their own projects with funding from developed countries. This concept was enshrined in the 1997 Kyoto Protocol.

The Kyoto Protocol

Broadly, the goal of the Kyoto Protocol was to expand action on climate issues because it had become apparent that the efforts of the UNFCCC alone were not enough – its information campaigns were not backed by practical examples of action to curb emissions. More specifically, the objective was for 38 developed countries and countries with transitional economies to limit their emissions by 2008 to 2012 to a certain percentage of 1990 levels. Each country set its own target and the overall average goal came to about 5% below 1990s levels.

Another objective of the Kyoto Protocol was to test economic mechanisms for greenhouse gas emissions. Because of the global nature of the greenhouse effect and because

the gases involved generally have no direct impact on human health, it doesn't really matter where emissions are reduced. That makes it reasonable to focus reduction efforts where it is cheaper to do so and then sell the relevant certificates (called reduction units) to those for whom it would be more expensive. Countries and businesses were granted a kind of flexibility: either reduce emissions according to one's obligations, buy reduction units or slash emissions by more than required and sell the excess reduction units. These schemes are called "flexible mechanisms".

Developed countries who committed to reaching emissions targets for 2008–2012 under the Kyoto Protocol were given the right to trade reduction units with one another (inter-state emissions trading). Another mechanism for developed countries was to help reduce emissions in another country and to receive the resulting reduction units in exchange (via joint implementation projects, often abbreviated to JI). Individual businesses are also able to take advantage of this system. Developing countries had no obligations to reduce emissions, but they could join in the general effort via projects paid for by developed countries (at the level of individual businesses who were obliged to reduce emissions at home but preferred to buy reductions abroad). This mechanism was called the Clean Development Mechanism, or CDM.

Within just three years, Kyoto was facing problems, the greatest of which was the United States' refusal to participate. It became clear that the United States had assumed obligations under Kyoto that would require considerably more effort to fulfill than those facing other developed countries, largely because the pattern of emissions in the United States was different to that in Europe or Japan. Canada, facing similar problems, also left Kyoto in 2012. Russia and Ukraine found themselves in quite the opposite situation (Belarus also participated in Kyoto but without assuming any obligations). In the 1990s Russian emissions fell by 40%, providing a huge windfall of "extra" quotas. This led to the illusion that Russia could make a fortune selling certificates, literally earning money for air. In reality, however, inter-state emissions trading under Kyoto was reduced to one-off transactions and very modest deals, in which Russia has taken no part. Nonetheless, the illusion was sufficiently powerful for a number of people not directly involved in the working for UNFCCC to form the opinion that other countries ought to pay Russia for being a "climate donor". Such people often cite Russia's forests as global carbon sinks, forgetting the fact that our forests actually absorb relatively little CO_2 from the atmosphere and that in 20 to 30 years it will not be very much at all.[8]

In 2004, Russia made a decisive contribution to global action on climate change. With the United States refusing to become involved, the fate of global climate action depended on our country. Russia's decision to ratify the protocol allowed the whole world to move forward and the Kyoto Protocol to come into force.

Kyoto has fulfilled its initial goals. The topic of climate has now on the agenda in every country, including the United States and Canada. Secondly, the Annex 1 countries have managed to reduce their emissions by 5%, with their total emissions in 2008–2012 amounting to less than 95% of 1990 levels (even without the participation of the United States and Canada, the 5% reduction will be achieved thanks to huge reductions in Russia and the countries of Eastern Europe). Thirdly, the flexible mechanisms were tested. CDM and JI projects proved successful, though far from flawless: development tended to go toward the cheapest ways of reducing emissions, which often have minimal socio-economic value. For a number of reasons Kyoto forest projects proved unsuccessful. And quota trading has generally proved unworkable.

At the end of 2012, the Kyoto protocol was extended for a second implementation period from 2013 to 2020 (Kyoto-2). This time, Russia changed its position and decided to participate without obligations. But the role of the Kyoto Protocol itself has also changed. It is no longer required for the propagation of climate issues around the world; it cannot ensure the reduction of global emissions because only developed countries are bound by its obligations (even if all of them took part in Kyoto-2, which they don't) and though development of the "flexible mechanisms" continues apace, it is largely at the national and regional level.[9] A new agreement for the period after 2020 (which is meant to be ready by the end of 2015) is expected to include much broader mechanisms than Kyoto. In practice, Kyoto-2 has become a tool for maintaining CDM projects until a new agreement can be drafted, but without any significant development (new projects are expected to be launched only in the least developed countries). For a number of reasons both JI projects and carbon trading will make almost no appearance under Kyoto-2.

Developing a New Concept for Global Action

Back in 2007, when the UNFCCC adopted the Bali plan of action to prepare a new agreement by 2009, Russia stressed that the division of action between developed and developing countries did not correspond to economic reality and as such was doomed to fail. That's just what happened in Copenhagen in late 2009, when an attempt to draft a new agreement based on old principles fell apart. The only document to emerge from Copenhagen was a declaration on joint action by the leaders of leading countries. At the same time, Russia adopted its own Climate Doctrine, which is ideologically very close to the declaration.

In 2010 and 2011 the UNFCCC adopted a string of decisions on wide range of actions outside the Kyoto Protocol (mostly in finance, adaptation and technology transfer) and at a conference in Durban in late 2011 took the decision to draft a new single agreement for all countries for the period after 2020 by the end of 2015. Also in 2011, Russia adopted the Comprehensive Plan to Implement the Climate Doctrine of the Russian Federation. From an institutional point of view, our country has kept pace with the efforts of the United Nations.

The years 2012 and 2013 saw a massive development of national systems for regulating greenhouse gas emissions with the objective of stimulating technological development (including in Australia, Brazil, India, Kazakhstan, China, South Korea, Japan and several states and provinces in the United States and Canada). Russia, however, is still only at the stage of research in this field. Within the UNFCCC, preparations for the new post-2020 agreement have already begun, while parallel discussions continue on pre-2020 action, including the adoption of national goals by individual countries. Such work is also underway in Russia.

In 2014 and 2015, climate action at the United Nations is set to accelerate significantly. Russia does not play the crucial role here that it did in the adoption of the Kyoto Protocol. The new agreement, first of all, will reduce emissions in developing countries and within the UNFCCC Russia is neither a recipient of funds nor a major donor. Nonetheless, Russia's role is far from negligible. Russia and the other BRICS countries must shoulder their share of the common burden in reducing greenhouse gas emissions. They also need to gradually assume the role of financial donors to poorer countries. This will be the main direction of UN climate action in future.

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6.4. International Negotiations on Other Environmental Issues

Olga Ponizova

Contemporary problems of conservation and the transition to sustainable development cannot be addressed without united efforts on the part of world governments. As the largest country on the planet, with an ecosystem largely unaffected by economic activity, vast forests and rich bio diversity, Russia plays a key role in preserving global environmental stability. Thus, Russia's wide-ranging and effective involvement is essential both to international processes directly connected with environmental issues and to other processes affecting conservation and sustainable development. These processes vary from topic to topic – some involve the creation of international environmental laws and regulations, with legal obligations and sanctions for non-compliance, while others involve development of recommendations, policy principles and programmes of cooperation on various issues. But they all make an important contribution to addressing not only environmental problems, but social and economic issues both in Russia and around the world.

Legally Binding International Agreements

The Russian Federation participates in most of the main international environmental conventions, including:

- The Convention on Wetlands of International Importance, especially as Waterfowl Habitat (Ramsar Convention), Ramsar, 1971;
- The Convention for the Protection of the World Cultural and Natural Heritage, Paris, 1972;
- The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES), Washington, 1973;
- The UNECE Convention on Long-range Transboundary Air Pollution, Geneva, 1979;
- The Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel Convention), Basel, 1989;
- The Vienna Convention for the Protection of the Ozone Layer, Vienna, 1985 and the Montreal Protocol on Substances that Deplete the Ozone Layer, Montreal, 1987;
- The Convention on Biological Diversity, Rio de Janeiro, 1992;
- The United Nations Convention to Combat Desertification, Paris, 1994.;
- The Rotterdam Convention on the Prior Informed Consent Procedure for Certain Hazardous Chemicals and Pesticides in International Trade, Rotterdam, 1999;
- The United Nations Framework Convention on Climate Change (UNFCCC), New York, 1992 and the Kyoto Protocol to the UNFCCC, 1997.

Russia has signed, but not ratified, the UNECE Convention on Environmental Impact Assessment in a Transboundary Context (Espoo, 1991). According to the provisions of this important convention, the procedure for evaluating the environmental impact of potentially hazardous projects, including public discussion, should be carried out not only inside the country where it is located, but in neighbouring states that may be affected by the

impacts of these projects. Russia generally follows the provisions of the convention in its activities, including in a number of major international development projects, but the lack of ratification remains a matter of concern for the international community.

Other documents widely discussed in Russia include the Cartagena Protocol on Biosafety to the Convention on Biodiversity (Montreal, January 29, 2000). This protocol aims to ensure the safe handling, transport and use of living modified organisms (LMOs) resulting from modern biotechnology that may have adverse effects on biological diversity, taking also into account risks to human health and the risks of cross-border displacement.

Primarily thanks to the work of scientists and other experts and information campaigns by NGOs, public awareness of the dangers of GMOs to the environment and human health is growing. But while a number of government officials have come out in support of joining the Cartagena Protocol, the issue has yet to be addressed.

The Russian government is currently considering joining the UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, usually known as the Aarhus Convention after its adoption on June 25, 1998, at the Fourth ministerial Convention on Environment for Europe in Aarhus, Denmark. This unique international document represents the first attempt in history to regulate national procedures connected with public participation in decision making at the highest international level. Joining the convention would have profound implications for the legal ability of Russian citizens to defend their environmental rights.

Negotiations on Developing Environmental Policies

Besides participating in conventions, Russia is involved in a number of international processes that do not impose binding obligations, but nonetheless play a role in filling in the details of national policy and practice in environmental protection and sustainable development.

The Russian Federation has been active in the Rio process, from the Conference on the Human Environment in 1972 through to the Rio-92 United Nations Conference on Environment and Development and the Rio+20 UN Conference on Sustainable Development. Russia has also made a significant contribution to the work of the UN Commission on Sustainable Development. The value of this process is that despite the complexity and inconsistency of the questions involved, they provide a powerful stimulus for reflection on the realities of the modern world, threats to its existence, ways to resolve the crisis and practical action at all levels.

Russia is also involved in regional UN commissions, whose activities are to a large degree devoted to conservation and sustainable development: the UN Economic Commission for Europe (UNECE) (which has produced not only landmark environmental conventions, but a host of other documents and processing including the Pan European Strategy for Biological and Landscape Diversity and the UNECE Strategy for Education for Sustainable Development) and the Economic and Social Commission for Asia and the Pacific (UNESCAP) (which has made an especially important contribution to promotion of "green growth"). Russia also takes part in negotiations within the UN system – first and foremost at the United Nations Environment Programme (UNEP), but also in other institutions that work on conservation and sustainable development including the UN Development Programme (UNDP), the United National Industrial Development Organisation (UNIDO) and the UN Food and Agricultural Organisation (UNFAO).

Environmental issues and sustainable development extend into the activities of the World Trade Organisation, which Russian joined in 2012. WTO accession gave impetus to the national debate on the "greening" of trade, including green subsidies, liberalisation of the market for environmentally friendly goods and services, the interplay of WTO rules and international environmental agreements and so on.

Of great significance for sustainable development in Russia is the negotiation process for accession to the Organisation for Economic Cooperation and Development (OECD). A condition of Russia's entry is harmonization of its national policies and practices with more advanced OECD standards, including integrating environmental considerations into economic development and transitioning to "green growth".

Another significant development was the Asia Pacific Cooperation Organisation's decision to liberalise environmentally friendly goods and services during Russia's 2011 presidency of the organisation. Environmental issues, climate change and sustainable energy are all discussed within the G8 and summits of the BRICS countries, in which Russia plays an active role.

Special note should be made of discussions of sustainable development held within the G20. This forum, which was first formed in response to the economic crisis at the end of the 1990s, is now increasingly concerned with the social and environmental aspects of "green growth". In particular, the G20 have taken a decision to gradually abolish inefficient subsidies for fossil fuels – a measure that should give a crucial boost to the development of renewable energy and increase energy efficiency, while also making a big contribution to the fight against climate change. The G20 also plan to widen the sharing of experience in developing national strategies for transition to "green growth". This gives additional incentives to improve Russia's own policies in this area.

The Non-Government Sector

It is widely recognised today that environmental problems cannot be effectively addressed without the involvement of non-governmental sector.

A number of Russian NGOs are actively involved in international cooperation on environmental issues and sustainable development. This offers an opportunity to share experience and information and contribute to solving problems at both on the global stage and at the national and local levels inside Russia.

Many opportunities for NGOs to become involved in international cooperation are associated with the UN system. Russian NGOs are involved in the UN Environment Programme, the Commission on Sustainable Development and the regional UN commission Russia is involved with (UNECE and UNESCAP). Russian NGOs both monitor and try to influence the outcome of negotiations under the UN Convention on Climate Change, the UN Convention on Biological Diversity, the Stockholm Convention on Persistent Organic Pollutants, a new global agreement on mercury and others.

One of the most successful examples of NGOs working within international processes is Environment for Europe, a process coordinated by UNECE. Around 250 environmental organisations from across Europe, including about 60 Russian ones, are involved in this process via the European Eco-Forum, an ad hoc coalition of environmental citizens' organisations (ECOs) and other NGOs acting in the UNECE. NGOs contributing to Environment for Europe have played a key role in developing recommendations for environmental policies in countries with transitional economies, the Aarhus Convention,

the Strategy for Education for Sustainable Development, the Pan European Strategy for Biological and Landscape Diversity and a number of other documents designed to help countries including Russia to transition to sustainable development.

Representatives of Russian NGOs have also been invited to accompany official Russian government delegations to international events, including negotiations on the Convention on Biodiversity, sessions of the UN Commission on Sustainable Development, the UN Conference on Sustainable Development in Johannesburg in 2002, Rio+20 in 2012 and even the UN General Assembly. The participation of NGOs in official delegations allows them to present their views of problems and how to resolve them and encourages constructive dialogue with government agencies.

Russian NGOs also raise environmental issues at other international forums, including the G8, the G20, the WTO, the World Bank and the International Monetary Fund. Russian NGOs initiated the alternative "Civil 8" and "Civil 20", which brought together a wide alliance of NGOs ahead of the G8 summit hosted by Russia in 2006 and was repeated at the G20 conference in St. Petersburg in 2013. It was NGOs that initiated the discussion of environmental and sustainable development issues in the light of Russia's accession to the WTO.

The main limiting factor on Russian NGOs´ involvement in international processes is a lack of funding for secondment of their staff to such events (including as part of government delegations). International foundations and organisations no longer offer Russian NGOs financial support and the Russian government does not offer any help for this particular area of activity either. An even greater challenge is mobilizing the resources of NGOs in implementing the provisions of international conventions and other documents in Russia.

Under Federal Law No. 121 of July 20, 2012, "On the Introduction of Amendments to Certain Legislative Acts of the Russian Federation for the Regulation of Non-Profit Organisations Acting as Foreign Agents", NGOs engaged in political activity and in receipt of foreign funding are defined as "foreign agents" and must give a special account of grants received. And although the law stipulates that activities related to protecting plant and animal life are not "political", a significant number of the country's environmental NGOs nonetheless fall under the law on "foreign agents".

Businesses are also involved in a number of international processes, particularly those that have a bearing on their commercial interests. Russian NGOs believe the government tends to give more heed to the advice of business when taking such decisions than it does to that of the voluntary sector.

The involvement of scientists and the expert community in the negotiation and decision making processes on international environmental issues also remains insufficient. Yet the active participation of such people in discussions at both the national and international level could help Russia give a more detailed and compelling defence of its negotiating positions and improve its contribution to solving global environmental problems.

Problems and recommendations:

Despite its involvement in a large number of international processes and agreements on the environment, Russia still underestimates both the importance of international negotiations in solving domestic environmental, economic and social problems and the need to play a more decisive role in them. As a result, the government has paid

insufficient attention to broadening and making more effective Russia's participation in international cooperation. There is a lack of coordination between various ministries and departments in implementing international conventions. Agencies charged with coordinating the various international processes are often weak and lack the necessary capacity and resources. Public discussion of Russia's position on international agreements and consultation with stakeholders (including government and nongovernmental organisations, scientists and experts, businesses, local authorities) is rare, though it is increasingly initiated by NGOs. Meanwhile, the opportunities for NGOs to participate in international processes have been severely curtailed in recent years.

To make better use of opportunities for involvement in international processes connected to sustainable development, Russia should:

- complete accession and ratification of international agreements including the UNECE Convention on Environmental Impact Assessment in a Transboundary Context (Espoo), the Cartagena Protocol on Biosafety and the UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (Aarhus);
- strengthen information outreach on international environmental agreements amongst the major sectors of society and the general public;
- pay more attention to thorough preparation of Russia's position on international agreements, as well as monitoring of Russia's implementation of its international obligations. Cross-sectoral consultation with non-governmental organisations, businesses, academics and experts and other stakeholders should become regular practice for the Russian government departments.
- support Russian non-governmental organisations to implement specific projects, conduct education and monitor the implementation in international environmental and sustainable development agreements, including via direct grants.

6.5. Social aspects of sustainable development – problems and strategies: reflections on the outcomes of Rio+20

Irina Shmeleva

The UN conference on sustainable development[14, 17] that took place in Rio on June 20–22, 2012, was meant to be a turning point for sustainable development on our planet. Rio+20 was organised in accordance with UN General Assembly resolution 64/236 (A/RES/64/236) on the 20th anniversary of the 1992 UN Conference on Environment and Development in Rio,[12] and the 10th anniversary of the 2002 World Summit on Sustainable Development (WSSD) in Johannesburg.[19]

The principle of sustainable development, proposed 25 years ago in the report of the Brundtland Commission,[10] was endorsed by the Rio summit in 1992 and forms the basis of Agenda 21,[12] the non-binding action plan that emerged from the summit. It was also reflected in the declaration of the "millennium summit" in New York in 2000,[1] and was reaffirmed at the Johannesburg conference in 2002.[19] Agenda 21 recommends that states develop national strategies for sustainable development in three key dimensions – environmental, economic and social – and provides indicators by which countries can assess their progress toward sustainable development.[18] These dimensions of sustainable development reflect a systemic vision of the process of achieveing sustainable development and emphasise the relationship between economic development, social development and protecting the environment.

In the run up to the Rio+20 summit, the Economic Commission for Europe and the United Nations Development Programme (UNEP) produced a joint report titled "from transition to transformation: sustainable and inclusive development in Europe and Central Asia". This report emphasises the importance of the social dimension for sustainable development and it takes the "human dimension" as the basic paradigm of development. Three concerns form the basis of this vision: the depletion of natural resources; degradation of the natural environment; and poverty and inequality. The document emphasises the relationship and interaction that exists between the objectives of poverty elimination and sustainable development and that achieving sustainable development will reduce the impact of environmental degradation on the world's poorest people. The report notes that inequality is growing in some parts of the European region, leading to a deterioration of quality of life according to unemployment, poor health and education, bad housing, insufficient social services and environmental degradation. The report also argues that the current model of development, in which rapid economic growth depends on the exploitation of natural resources to generate rapid but unevenly distributed material wealth, has led to unsustainable patterns of consumption and production. The time has come to rethink the current economic approach to development for the sake of the planet and the people who live on it, especially the poorest and most vulnerable groups. Thus we once again must emphasise the interdependence between economic and social development and environmental protection and note that none of them can be effective if they are considered as competitors. "Within the paradigm of sustainable

development, approaches to investment and public policy are changing: for example, energy policy is important not only for industry and the environment, but also for public health and equality in terms of access to sources of energy and employment".[2] The authors of the report call for us to move beyond the notion that sustainable development will require additional investment and have a negative impact on living standards. In the medium to long term, the transition to sustainable development will mean radical changes to methods of production of goods, services, growth strategies and the transition to a "green economy" that will eventually change our way of life. The behaviour of producers and consumers will inevitably change, both as a consequence of depleted natural resources and more frequent global natural disasters and also as a result of policies aimed at stimulating transition to new sustainable models of production and consumption.

In the run-up to Rio+20 the UNDP also published a report on human development called "Sustainability and Equity: a Better Future for All".[4] The main message of the report was that sustainability is inextricably linked to ensuing equal opportunities for all and especially to questions of moral and legal justice and improved access to a better quality of life.

The report shows that sustainability is not exclusively and primarily an environmental issue and that it depends most of all upon what kind of life the human community chooses for itself, since everyone is aware that their actions have consequences both for the seven billion people living on the planet today and for future generations. The main thesis of the report is that to achieve sustainable development, it is necessary to take decisive global action to reduce environmental risks and inequality; that is, in a positive context to take "further actions by people, local communities, countries and the international community to achieve environmental sustainability and equality of opportunity so they can reinforce one another".[4] Experts believe that the reduction of environmental risks and the elimination of social inequality would alone be enough to ensure several decades of sustainable progress for the poorest layers of the global population and would also guarantee a gradual convergence of levels of human development.

According to the report, reducing environmental risks and eliminating social inequality is impossible because of significant imbalances of power. Furthermore, gender inequalities exacerbate inequalities linked to income. As a result, agreements reached at the global level do not always take into account the interests of developing countries and marginalized groups. Solutions suggested by the authors of the report include increasing investment in innovation, for example in renewable energy, strengthening democratic processes, actively supporting civil society and the media and supporting local government and integrated approaches.

Since the millennium development goals were set to last only up to 2015, maintaining the momentum in this direction will require a framework structure reflecting both the goals of development and sustainability, the report writers argue.

More than a decade ago, researchers and experts proposed studying problems of sustainable development and inequality as mutually reinforcing. This approach allows observation of inequality both within and between generations. This aspect was mentioned repeatedly in the Brundtland report and at the 1972 Stockholm conference, the 1992 Earth Summit in Rio and the 2002 Johannesburg conference. Nonetheless, many experts feel that discussions of sustainability continue to overlook questions of equality, failing to connect them to their environmental context.

The Rio+20 outcome document, "The Future We Want",[9] emphasises that sustainable development is human oriented process and identifies the main ways to achieve to sustainable development as transition to a "green economy", the elimination of poverty

and the creation of an institutional framework for sustainable development. The document reaffirms the commitment of states and governments to the path of sustainable development, aimed at building an economically, environmentally and socially sustainable future for present and future generations. The document emphasises that while the social aspects of sustainable development, such as the eradication of poverty, unemployment, gender equality, public health and promoting a sustainable model of consumption, are very important, building a world based on justice was and remains the key objective of promoting sustainable development at the regional and international levels. The outcome document was based on more than 6000 text of material submitted by national governments, international organisations and UN experts.

Unfortunately, the 283 paragraph document[9] has a very general and declarative character. The general discourse of the document is simply a series of reaffirmations of participating countries' commitment to previously adopted agreements. The text is littered with terms like "sharing the position" or "expressing concern", and so on. Britain's Guardian newspaper[15] said the results of Rio in 1992 were much more impressive, in so far as that conference at least led to the adoption of two conventions (on global warming and on biodiversity) and the creation of corresponding organisations to implement them. At the same time, the Commission on Sustainable Development, which reports directly to the UN General Assembly, was charged with monitoring Agenda 21. The Guardian newspaper reported in 1992 that not everything had gone smoothly, however and as one journalist noted, the group photo at the end of the summit reflected the problems that had afflicted it – in particular the United States' refusal to sign the convention on biodiversity and the politically coloured positions of several leaders from the global north and south.[15] Today, as Guardian columnist George Monbiot wrote on his blog,[16] "190 governments have spent 20 years bracing themselves to "acknowledge", "recognise" and express "deep concern" about the world's environmental crises, but not to do anything about them". Meanwhile, he notes, the concept enshrined in the agreement has mutated from "sustainability" to "sustainable development", to "sustainable growth" and finally "sustained growth", which seems to be nothing more than a a substitute term for economic growth. At the same time and here we are in complete agreement with him, he points out that the concluding document contains no figures, dates, or quantitative targets. It should also be noted that the debate that flared up over the social aspects of sustainable development led to all mention of "rights" "equity" or "common but differentiated responsibilities" being sharply opposed and ultimately deleted from the text by the United States, along with concepts such as "unsustainable consumption and production patterns".

Russia presented its own report on sustainable development at Rio+20. "Report on Implementation of Principles of Sustainable Development in the Russian Federation. The Russian View of a New Paradigm of Sustainable Development", was prepared by an expert working group that included representatives from ministries, government departments, academic institutions and the Civic Chamber of the Russian Federation. Compilation of the report was supervised by A. Bedritsky, the Russian president's advisor on climate issues. The question of who would represent Russia in Rio and present the report to the conference was discussed at length and it was finally decided that Prime Minister Dmitry Medvedev should go. It should be noted that the full text became available to experts outside the working group only after the end of the conference and was thus not widely known to the interested public, although some issues were discussed twice at public forums organised by Institute of Sustainable Development of the Civic Chamber and

which the author of this article attended. As a result, special sections dealing with some of the aspects discussed at the Public Chamber were included in the report.

The report states that the current model of production and consumption significantly increases the burden on the environment and that economic progress does not always lead to social progress. Analysis of the report suggests a wide gap between Russia and developed European and other countries in promoting strategies for sustainable development, largely because the national strategy for sustainable development of the Russian Federation, a draft of which was discussed in a meeting of the Russian government as early as December 1997, has not been adopted. The report notes that the strategy was prepared over five years, beginning with Russian government resolution No. 1522-r of August 19, 1992, following the Rio summit earlier that year. This resolution concerned the creation of an inter-departmental commission to develop proposals for implementing conference's decisions. The strategy was finally completed with the medium-term government programme on sustainable development for 1997–2000, "Structural reform and economic growth".[6] Later, these ideas were developed into the Environmental Doctrine of the Russian Federation, approved by the Russian government in resolution No. 1225-r of August 31, 2002. However as V. M. Zakharov, the head of the Institute of Sustainable Development of Civic Chamber of the Russian Federation, has pointed out on more than one occasion, it has never been implemented.

As a result – and this was also mentioned in the Russian report presented to the summit – Russia has still not created a government agency to coordinate the activities of various stakeholders and departments addressing economic, social, or environmental tasks in the field of sustainable development. Effective decision making in implementing Russia's sustainable development strategy depends on a deep understanding of the systems, difficulties and interdisciplinary problems involved.

The Russian report was based on comparison of the Millenium Development Goals (MDGs)[1], data from the UNDP 2010 and 2011 reports on Russia's progress toward achieving the MDGs,[3, 5] statistical data from the State Statistics Service (Rosstat) and other available expert opinions. In 2005 the UNDP adapted the concept of the Millennium Development Goals for Russia, but the Russian report to Rio+20 stated that the MDGs are not exhaustive indicators of sustainable development and that there are many other approaches.[6] The report cited measures to "green" the economy (including reducing resource intensity and increasing energy efficiency) and reduce the risks of natural and man-made disasters as examples of policy components that are not covered by MDG assessments. At the same time it should be noted that the UN classifies Russia as a country with a transitional economy, not a developing country and therefore mapping Russia's progress solely according to MDP indicators is inappropriate. Additional data is required. The report includes a link to Rosstat data but a more detailed and reasoned analysis was presented in the UNDP's 2010 report on Russia,[3] which we have relied on to a much greater extent in the course of our current analysis.

Let us now consider the MDG indicators on social aspects of sustainable development covered in the Russian government's report.[6] The first Millennium Development Goal is to eradicate extreme poverty and hunger. The report claims that between 2002 and 2007 the proportion of the Russian population living below the poverty line halved. Besides social poverty, many Russians live in economic poverty, when able-bodied citizens are unable to earn a socially acceptable living (about 60 % of Russians living below the poverty line are employed, indicating this problem is particularly widespread). The reason for this may be

deliberate depression of wages as a response to international competition. Unfortunately, the report also failed to mention the county's ranking in the Gini index, which suggests that income inequality is growing significantly. Some researchers believe this is because the country has not adopted a progressive taxation policy.[13]

The report refers to significant regional differentials in small towns and rural areas, where about 40% of Russia's poor live. According to Rosstat, by the end of the first decade of the 21st century the country had succeeded in eradicating "extreme" poverty as defined by the Millennium Development Goals (income of less than one dollar a day per person). According to the UN, 2.8% of Russians lived in such poverty in 1993, 3.5% in 1995 and 2.3% in 1999. The figure only dropped to zero in 2008. In 1992, 33.5% of Russians were estimated to be living below the poverty line. By 2010, the figure had fallen to 12.6%.

At the same time, the 2010 UNDP report identified a number of social policy priorities necessary for reducing poverty. The most important, in our opinion, is investment in human capital, which can take the form of development of state social services in education, health, housing and physical culture and sport and ensured by a more effective use of taxation (transitioning from a flat tax to a progressive scale of taxation on earnings, increasing property tax and introducing taxes on property purchases and luxury vehicles).[3]

The second MDG is to achieve universal primary education. The wording of this goal is taken from the document "Millennium Development Goals" and exclusively concerns developing countries. Russia's report to Rio+20 stated that the country had already met this goal and the 2010 UNDP report on Russia's progress confirms the country has met the objectives of this goal according to the indicators mentioned in international documents. However, if we look at Russian education from the point of view of how it contributes to human development, the reduction of inequality and the growth of citizens' well being, it is clear that emphasis has shifted from access to education to quality of education and equal access to high-quality learning. Analysis of progress shows that, while Russia has seen some positive developments, the overall quality of education is declining. As the authors of the report note, pressing problems remain in the disparity between the quality of secondary education available in different regions, modernisation of the curriculum and the quality of vocational education for the labour market. Large scale measures planned by the government for the period up to 2020 do not take into account the risks associated with changes to budget law.

Furthermore, the Russian report submitted to Rio+20 said nothing about the country's involvement in UNESCO's "Education for Sustainable Development" programme, which is being carried out between 2005 and 2014. Having formally signed all the associated international agreements, Russia is theoretically a participant, but in practice it has done very little to implement this programme, especially in higher education and continuous education accessible to all.[8]

The third task is to promote gender equality and empowering women. In Russia males and females of all ages already have equal access to education – indeed, there are 10% more women in higher education than men. Rather, the main imbalance is seen in positions of influence in government agencies. Between 2008 and 2011, only three of the 18 federal ministers were women, today, only one is. Five of the 54 Federal Agencies of Executive Power are headed by women. Only two of the country's 83 regions have female governors and only 14% of senators and deputies in Russia's national assembly are women. This distribution of gender roles is a long way from the modern trends in developed European countries.

Gender inequality problems are not just women's issues in Russia, the affect the male population and are particularly acute. The main is gender gap – on average, women live 12.3 years longer than men – that is largely attributable to poor working conditions and a high mortality rate amongst 20 to 50 year old men, caused by alcohol consumption, road accidents and industrial accidents.

The report to Rio+20 also included some indicators related to the fourth and fifth MDGs: To reduce child mortality rates and to improve maternal health, as well as data on life expectancy. This data was based on the 2010 UNEP report. Regarding MDG-4, the report notes, infant, perinatal and neonatal mortality is an important indicator of a nation's health. Perinatal mortality in Russia accounts for a large proportion of child deaths and reducing it would allow Russia to achieve the objectives of MDG-4. Russia could achieve European rates of maternal mortality by 2020. However, we agree with the conclusions of the report that "in the context of overall health policy in Russia MDG-4 and MDG-5 not a priority: maternal mortality is low and the infant mortality rate has steadily declined".[3] Of particular concern are Russia's mortality figures for people of working age, especially men. The report notes that Russia has been unable to tackle the high mortality rate amongst its men since the 1960s and that the problem requires special attention from the state. Life expectancy for men in Russia is 20 years less than in Central Asia. The difference between male and female life expectancy in Russia is one of the largest anywhere in the world. The reasons for this have already been discussed in the paragraph on gender equality. At the same time, it is worth noting that both Russia's report to Rio+20 and the 2010 UNDP report identify the main drivers of Russia's high mortality rates as alcohol, tobacco, physical trauma and road accidents and high suicide and murder rates. If this ignores environmental pollution, poor quality drinking water and high concentrations of air pollution in large cities and industrial centres, it is largely because the relevant data in Russia is often inaccessible. We will not dwell on whether these factors impact MDG-6 (To combat HIV/AIDS, malaria and other diseases) and the level of HIV infections (which is steadily growing in Russia), or rates of cardio-vascular disease and cancer, but it must be said that in analysis there is no connection between these indicators and the condition of the environment in various parts of Russia, that is, with the environmental dimension of sustainable development.

In our opinion, the human development index, which reflects the social dimensions of components of sustainable development, is critical for Russia. The UNDP's human development index in 2011 ranked Russia number 66 in the world on indicators including life expectancy, literacy, education and living conditions, with an average score of 0.755.[4] The Russian government's report hailed that as a very positive development, although in our opinion such a result, which was achieved largely on the back of high scores for primary and secondary education, should be grounds for concern rather than optimism. In terms of average life expectancy, Russia's score of 68.8 years ranks it 112 of 193 countries.

At the same time, as the authors of one Russian report on modernisation note, the nature and direction of national development should be determined by the ultimate goal of improving the lives of everyone in Russia today and preserving favourable conditions for development for future generations.[11] According to UN documents, improving the welfare of humans and the planet depends on MDG–7, ensuring environmental sustainability. But on the other hand, human development is more important for accelerating modernisation.

Thus, life satisfaction and well-being emerge as important indicators in discussions of the social aspects of sustainable development.

In April 2012, the UN organised a high level meeting under the title "Wellbeing and happiness: defining a new economic paradigm",[20] which for the first time placed well-being at the forefront of economic progress. More than 600 participants representing governments, the academic community, businesses, civil society and religious organisations attended the meeting at the UN headquarters in New York. The conference concluded that welfare must form the centre-piece of the new sustainable development goals that will replace the MDGs after 2015.

This meeting followed the July 2011 adoption of the UN resolution on life satisfaction called Happiness: Towards a Holistic Approach to Development, which argues that GDP is an inadequate measure of human prosperity and that a more appropriate and balanced approach is needed to promote the ideas of sustainable development, eradicating poverty and improving wellbeing. The meeting in 2012 was presided over by the Kingdom of Bhutan, which in 1970 introduced the world to the idea of Gross National Happiness (GNH) and in 2008 even founded an index for it. GNH is calculated from indicators such as standards and quality of life, health, education, culture, quality control and psychological well being. According to Bhutanese experts, life satisfaction is not a matter of everyday happiness, but a deeper satisfaction with life, which is manifested as a life in harmony with nature and other people, that is, in a feeling of engagement with the world in which we live. Bhutan is a small, developing country, striving to satisfy the needs of its population and hoping that it will be able to achieve consensus on a new global economic model that should be adopted after 2015.[20] Interest in GNH is growing amongst the international community and in 2011 several European countries including the UK, France and Luxembourg included questions on assessment of life satisfaction in social studies.

It should be noted that several of the resolution's recommendations have been translated into real policies, from investing in renewable energy, public transport and green zones, to adopting new employment practices aimed at increasing rest time and preventing unemployment. Efforts have been made to block advertising aimed at children in a bid to reduce the value children attach to material consumption and measures have also been taken to develop assessments for eco-system services.

The problem of life satisfaction and wellbeing was regarded as a priority at Rio+20. Without a doubt, for Russia increasing wellbeing and life satisfaction should be inextricably linked with implementation of new economic policies, including the energy strategy, transition to an environmental or "green" economic model, the creation of "green" jobs and the growth of corporate responsibility strategies amongst Russian businesses. One positive trend that should be mentioned is the growing number of Russian companies who have signed up to UN's Global Compact in the past two years.[13] There is little doubt that such a comprehensive approach to realising the strategy for sustainable development will have a positive impact on the social elements of sustainable development in Russia and will boost the wellbeing and life satisfaction of its citizens.

One cannot but agree with the authors of the independent report on modernisation that the degradation of human potential in Russia today is no less acute than in the 1990s. As the authors argue, massive income inequalities mean that rising living standards, which became the basic guide for government policy over the past decade, cannot solve this problem. After all, the problem is not one of poverty as such, but one of the erosion of social institutions.[11] The authors of the report understand modernisation in Russia as a social reformation and though they mention some aspects of sustainable development, their goals generally have no connection with sustainable development strategy.

Nonetheless, it is both possible and necessary to establish a system for comparative analysis of Russia's sustainable development strategy, in which social aspects play an important role and modernisation strategies in the context of social reform.

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Conclusion

The concept of sustainable development is a logical next step from the greening of scientific knowledge and socio-economic development that began in the 1970s. The 1972 Stockholm Conference on the Human Environment and the subsequent creation of the United Nations Environment Program (UNEP) marked the international community's first efforts to address environmental problems, which had begun to hinder socio-economic development. Environmental policies and diplomacy began to develop, along with the concept of environmental rights, while at the national level new institutions appeared – ministries and departments for environmental affairs.

In the 1980s, the idea of eco-development began to be discussed: the notion of development without environmental damage and of the necessity of sustainable development for ecosystems. The IUCN's World Conservation Strategy, adopted in 1980, was the first international document to mention "sustainable development". A second IUCN work, "Caring for the Earth – a Strategy for Sustainable Life", was published in October 1991. It stressed that development should be based on conservation of wildlife and protection of the structures, functions and diversity of the Earth's natural systems, upon which all species rely. To do this, it is necessary to maintain life support systems, preserve biodiversity and ensure the sustainable use of renewable resources.

Russian scientists and experts have played an active role in advances concerning human development and discussions at international forums. Theory and practice have shown that the environmental component is a vital element in human development. The activities of the World Commission on Environment and Development (the Brundtland Commission) and its final report, Our Common Future, were based on a new, three-dimensional (environmental, social and economic) concept of sustainable development. The UN World Summit on Sustainable Development in 2002 reaffirmed the world community's commitment to the idea of sustainable development and long-term satisfaction of basic human needs while preserving planet Earth's life support systems.

Sustainable development is a process of change in which the use of natural resources, the flow of investment, the orientation of scientific development and institutional changes all align and strengthen the future potential to satisfy human needs and aspirations (according to Our Common Future). In many ways, it is simply about preventing the long-term deterioration of quality of life and natural capital from generation to generation.

In the Soviet Union and Russia, neither the Brundtland Commission's work nor Our Common Future, which was even published in Russian in 1989, elicited much interest in scientific circles. The only public mention of its provisions was made by Mikhail Gorbachev in his 1987 Murmansk speech. The "legalization" of the concept of sustainable development in state documents had to wait until February 1994, two years after the UN Earth Summit in Rio, when Boris Yeltsin signed a presidential decree "On the State Strategy of the Russian Federation for Conservation and Ensuring Sustainable Development", In April 1996 President Yeltsin signed another decree, "On the Concept for the Russian Federation's Transition to Sustainable Development", which had almost no real influence on the country.

Attempts to create the state strategy for sustainable development, envisaged in the decree, have proved unsuccessful – the draft strategy has not been approved by the government. The undoubted urgency of the political call for sustainable development was recognised at the Rio+20 summit in 2012, 20 years after the Earth Summit on Sustainable Development in Rio de Janeiro.

Experience so far has allowed a number of lessons to be learnt and drawing conclusions from them allowed delegates at the conference to draw up new priorities. The contemporary articulation of the idea of sustainable development that was voiced at Rio+20, defines it as long-term development, aimed at improving quality of life, which will ensure global sustainability by addressing socio-economic challenges on the basis of "green" economic principles, thus simultaneously providing solutions to global environmental problems.

In Russia there are big (and viable) opportunities to address socio-economic issues via "green" economic principles. This would involve a series of measures to make the "green economy" attractive at all levels, from industrial sectors to individual households (modernisation, after all, must be profitable). The country's potential for "gentler" forms of natural resource use should also be harnessed. This could include widespread use of renewable energy, sustainable forestry, environmentally-friendly agriculture and eco-tourism.

Defining development priorities and assessing progress in meeting them requires a system of indicators for sustainable development. Success in implementing the ideas of sustainable development requires adapting them to local conditions in each country. For Russia, this means generalizing from rich regional experience and incorporating suggestions for sustainable development in federal and regional-level social and economic development plans.

A broad movement in support of sustainable development is vital. This could be a priority for the country as a donor in co-operation with the international community. Positioning Russia as an environmental donor involves both awareness of its own environmental responsibilities and the development of international mechanisms to compensate for conservation efforts and the enhancement of natural wealth.

The greening of economic development in Russia is an important tool for modernising the Russian economy, transitioning to innovation-based and socially-oriented forms of development and achieving long term goals. In a country that is a global environmental donor, with a fifth of the world's forests and a significant share of water and other resources, ensuring economic development and raising living standards is in the interests not only of present and future Russians, but of the whole world.

This collection of articles contains the opinions of experts from leading NGOs about the current condition of and prospects for sustainable development in Russia. The articles are presented in both a regional and sectoral context.

Sergei Bobylev and Renat Perelet

About the authors

Sergei Agibalov

Sergei is the head of economy and finance at the economic department of the Institute of Economics and Finance in Moscow, where he had worked since July 2006. His professional interests include macroeconomics (CIS), energy efficiency, energy and climate change, foreign trade.

Sergei graduated from the geology faculty of Moscow State University in 2004 specializing in geophysics. In 2001 he trained with the Schlumberger oil servicing company in Tunisia. In 2003 he trained at the University of Bremen's department of earth sciences. In 2004 he graduated with honours from the Moscow School of Economics, part of MSU, receiving a master's degree in economics.

Prior to joining the Institute of Economics and Finance, he worked at the UNESCO-MSU centre for marine geology and geophysics, where he participated in research on gas hydrates and later at the DECO-Geophysical oil services company.

Marina Asadcheva

Marina is a coordinator of the Musora.Bolshe.Net (No More Waste) movement in Moscow and a member of the PRO Waste coalition. She has more than three years experience in promoting waste management literacy and has written many educational and information works on waste for children and adults. She gives public lectures on waste and green living at the Centre for Resource Economy at Flacon.

She organises and coordinates public environmental initiatives (including on a nationwide scale) on refuse collection and improvement of natural areas directed at promoting separate waste collection, recycling and environmental responsibility.

Sergei Bobylev

Sergei is a professor at Moscow State University's faculty of economics, a doctor of economics and an Honoured Scientist of Russia. He heads MSU's centre for bio-economics and eco-innovation. He has authored more than 230 publications, including 20 monographs.

He has headed and participated in projects for the Ministry of Economic Development, The Ministry of Natural Resources and Environment, the State Duma and the Civic Chamber of the Russian Federation, as well as international organisations including the United Nations Development Program, the World Bank and the Global Environment Facility. Between 2000 and 2013 he supervised preparation of the UNDP's report on human development in Russia.

He has visited and lectured at universities in the United States and was a visiting professor at the University of Dauphine (Paris) and the Vienna University of Economics. His main research interests are sustainable development and its indicators, environmental aspects of macro economic policy and biodiversity.

Angelina Davydova

Born in St. Petersburg in 1978, Angelina was educated as an economist and graduated from the St. Petersburg University of Economics and Finance. She has worked for Russian and international media for more than ten years.

She was a scholarship student at the Reuters Institute for Journalism Studies in Oxford in 2006 and In 2012 took part in the Beahrs Environmental Leadership Program (ELP) at the University of Berkley in California. Since 2006 she has been head of the German-Russian exchange program in St. Petersburg and Berlin and director of the Russian-German Environmental Information Bureau. She is an organiser of workshops and seminars for Russian journalists and participants in international exchange projects.

Since December 2008 Angelina has been a Russian observer at climate negotiations within the United Nations Framework Convention on Climate Change. She teaches at the St. Petersburg State University journalism faculty.

Olga Dobrovydova

Olga is head of environmental and energy news within the RIA Novosti news agency's Science and Environmental News department. In 2011 she completed a master's degree in financial economics at Moscow State University, graduating from the economics faculty.

Olga joined RIA Novosti in 2010 and for the past two years has headed a team of journalists covering environment, climate change, sustainable development, environmental policies and practice, renewable energy and "green" technology.

Since 2012 she has also been a columnist for the British publication Responding to Climate Change, where she writes about Russia's position at international climate change talks and national climate policy.

Yevgeny Gasho

Yevgeny is associate professor at the Moscow Power Engineering Institute and an expert consultant for the Analytical Centre under The Government of the Russian Federation. He holds a Ph. D. in technical science.

He has developed energy efficiency strategies and programs for numerous cities and regions (including the Krasnodar Krai, Murmansk, Arkhangelsk, Moscow and Vorkuta – the "energy efficient city"). He helped develop MOEK's 2007 development strategy and assisted in creation of the federal heat-supply holding company as part of the united energy policy to increase the efficiency of heat supply (2007).

He is an expert in environmental standards, best available technology for energy efficiency, the efficiency of power companies and evaluation of investment programs. He has participated in several international projects, managed a number of research projects, conducts lectures and seminars and has written over 200 papers on energy conservation and energy efficiency, as well as text books and training manuals.

Semyon Gordyshevsky

Semyon is chairman of the Union of Industrialists and Entrepreneurs of the St. Petersburg's committee on environmental industrial and technological security and chairman of Ecological Union certification body. He graduated with honours from the Leningrad Institute of Civil Engineering in 1970. In 1989 he organised the engineering and production cooperative IPK Ecocomplex, becoming its chairman. The company continues to work today.

In 1991 he was elected chairman of the St. Petersburg Ecological Union (now simply Ecological Union). Under his leadership the organisation gained international recognition, with its "Vitality Leaf" ecolabel being adopted by the Global Ecolabelling Network in 2007 and receiving certification from the GENISES' international system of mutual recognition.

In 2008 he was awarded the medal for professionalism and honourable business reputation and presented with the Environmental Shield of Russia.

Yulia Gracheva

Yulia is Director and Head of the Certification Body in the NP "Ecological Union" (Saint-Petersburg) – the owner and operator of the voluntary Type I ecolabelling "Vitality Leaf" based on life cycle. She holds a Ph.D. in biology and has authored several scientific biological papers.

She has more than eight years of experience in ecology and project management. She is a developer and head of the only Russian international voluntary ecological certification program "Vitality Leaf" (ecolabelling Type I).

She directs the development of "green" standards based on life cycle, promotes environmentally safe production and consumption, establishes and extends relationship with Russian and overseas partners. Yulia is an active participant of the educational environmental projects. Since 2013 she is a Board member of the Russian Green Building Council (RuGBC).

Ekaterina Khmeleva

Ekaterina graduated from Moscow State Pedagogical University and did her post-graduate study at the Centre for Environmental Legal Studies at the Institute of State and Law of the Russian Academy of Sciences. She earned her Ph.D in environmental law in 1997. She currently works as a head of environmental law program of WWF Russia providing legal support for other WWF programs. She also conducts legal research and analysis of legislation relating to environmental protection and defence of citizens' environmental rights and contributes to the development of legislation on environmental protection.

She is an expert to the State Duma's committee on natural resources, environment and ecology and a member of Ministry of Natural Resources and Environment's working group.

She has numerous publications in legal and environmental periodicals and is a co-author of the Rodnik legal centre's practical guide to defending environmental rights.

Alexei Knizhnikov

Alexei graduated from Moscow State University in 1982, where he studied at the geography faculty and was active in the student environmental group's department for combating poaching and recreation.
In 1984 he joined the Moscow-based All-Union Scientific Research Institute for the Construction of Pipelines as an environmental engineer where he helped to develop environmental safety measures for the installation and operation of pipelines in difficult geographic conditions.
In 1996 he became coordinator of the Caspian program in Russia, within the framework of the international ISAR organisation. The program's objective was to develop public environmental initiatives and intersector cooperation to protect the environment in the Caspian region.
He currently heads WWF Russia's program on environmental policy in the oil and gas sector and is a public organisation observer at the Western Gray Whale Advisory Panel run by the International Union for Conservation of Nature.

Alexei Kokorin

Alexei graduated from the geophysics department of the Moscow State University´s physics faculty with an honours degree in 1981 and subsequently enrolled in post graduate courses. In 1984 he defended his doctoral thesis to gain a Ph. D. in mathematical and physical sciences. From 1984 to 1999 he worked as a junior, then senior and chief research fellow at the Institute of Global Climate and Environment under Roshydromet and the Russian Academy of Sciences. He has written more than 100 scientific papers.
Since 1994 he has been involved in negotiations within the UN Framework Convention on Climate Change. Between 2001 and 2006 he helped to prepare the IPCC's Fourth Assessment Report and along with several thousand other contributing scientists was awarded the Nobel Peace Prize for disseminating scientific knowledge about climate change.
Since 2000 he has worked for WWF Russia as the head of its climate and energy program. He has authored more than 30 works of popular science, books and brochures on climate change. In 2010 he produced a unique book for a wide readership called "Climate Change: 100 questions and answers". Between 2011 and 3013 he also headed WWF Russia's program on adaptation and low carbon development in priority regions of Russia.

Yevgeniya Kolesova

Born in the 1984 in the Arkhangelsk region, city of Mirny, Yevgeniya is a geographer, ecologist and geomophologist by education. She is a gra-duate of the St. Petersburg State University´s geography and geo-ecology faculty and of the Baltic University Programme (a joint program run by SPBSU and Uppsala University in Sweden). She is a participant in the Young Planning Professionals National Workshop, a joint educational project by the Russian Urban Planners Association and ISOCARP (2013).
For about eight years she has worked in strategic consulting and urban

design. She is currently a project manager at the Institute of spatial planning Urbanica. She teaches a master's program in Design of Urban Ecosystems at the St. Petersburg National Research University of Information Technology, Mechanics and Optics.
Her professional interests include territorial and strategic planning, sustainable development of cities and design of the urban environment, including social aspects, energy efficient technology and energy conservation in cities, development of the agricultural-industrial complex and formation and development of agro-parks.

Sergei Kondratyev

Sergei is deputy head of the economics department and head of industry and infrastructure at the Institute of Economics and Finance (Moscow).
Sergei graduated from the Moscow State university physics faculty with an honours degree in mathematical physics in 2007. Since 2006 he has worked at the foundation of the Institute for Energy and Finance and in 2008 he became a senior expert at the foundation.
His professional interests include macroeconomic development of the Russian economy and the infrastructure sector (electricity and transport).

Michael Kreindlin

Michael has been involved in the environmental movement since he was 15 (he started his environmentalist career in young naturalists' circle at the Moscow palace of pioneers and in the ninth grade he joined the nature protection team, a student's conservation group at the MSU biology faculty).
Between 1991 and 2002 he worked in the state conservation service, first on the Moscow region committee for environmental protection and then at the Ministry of Natural Resources and Environment. He mainly dealt with legal issues of specially protected areas and their protection from abuse.
He currently works for "Greenpeace" Russia, where he specializes in defending protected areas and helping their employees.

Anna Matyagina

Anna heads the Moscow office of Ecological Union. In 2000 she graduated with honours from the Moscow State University of Economy, Statistics and Informatics (MESI). She holds a Ph.D. in engineering science and is an associate professor of flight safety and life support at the Moscow State Technical University of Civil Aviation (MGTU CA).
She has authored more than 60 scientific and educational papers. Her professional interests include environmental responsibility and business, voluntary environmental certification and ecolabelling and environmental advertising.
In 2008 she won the prize for the best text book on the natural sciences at the University Book-2008, a Russia-wide textbook competition, for a co-authored complex of training texts.

Renat Perelet

Renat is a senior fellow at the Institute for Systems Analysis at the Russian Academy of Sciences, a member of the Russian Environmental Academy and a member of the State Duma's supreme council for the environment. Renat was awarded the order "For contributions to science" in 2011.

He helped prepare Russia's Sustainable Development Concept and co-authored the country's Environmental Doctrine (2002), the National Strategy for Preserving Biological Diversity and the Strategy for Preserving Rare and Endangered Species of Animals, Plants and Fungi.

He was a consultant to the Burndtland commission and has served as a key expert on projects for the World Bank, the European Union, the OECD, UNEP, UNDP, UNESCO, UNECE and the WWF. He has authored numerous Russian and international publications, including "The Economy and the Environment" (OECD and Harvard University) and the Dictionary of Environmental Economics (Taylor & Francis, London).

Olga Ponizova

Olga is executive director of the Eco-Accord centre for problems of the environment and sustainable development in Moscow. Coordinator of the project "Globalization, the WTO and Newly Independent States: the development of dialogue for sustainable developent".

Eco-Accord works with a wide range of organisations from Russia and other newly independent states, as well as the rest of the world. The centre plays an active role in international process including Environment for Europe and Environment and Health and in cooperation on environmental issues and sustainable development in the Asia-Pacific region.

Nina Popravko

Nina is a lawyer, a member of the St. Petersburg Bar Association and chief legal advisor to Bellona's environmental rights centre.

Nina has extensive experience in providing legal support to citizens and associations on issues of violation of their rights to a healthy environment and defence of environmental rights, including appeals to the Russian Constitutional Court and the European Court of Human Rights.

She has conducted several socially significant cases, including "Citizens against the construction of the Okhta Centre", appealing regional laws in St. Petersburg, defending environmental activists involved in the Khimki Forest dispute and others.

She has written manuals and brochures on defence of the right to a clean environment, as well as reports on violations of Russia citizens' environmental rights. She has numerous publications in the media.

Ilya Reznikov

Ilya graduated from the department of economic and social geography at St. Petersburg State University's geography and environmental geoscience faculty in 2006.

From 2005 to 2012 he worked as a senior engineer and economist at Federal State Unitary Enterprise RosNIPI Urbanistiki, architectural planning workshop No. 1.

He participated in developing territorial planning schemes for the Omsk, Sakhalin, Kaliningrad, Tomsk, Murmansk and other Russian re-gions. He is the author of an analytical report on urban-planning aspects of the rail system in St. Petersburg and a member of the expert group on preparation of analytical documents for amendments St. Petersburg legislation to allow construction of a transport interchange in Peterhof.

He is currently chief economist at the Labgrad Laboratory of urban planning and chief engineer at the St. Petersburg Research and Design Institute of Urban Planning.

Georgy Safonov

Georgy is director of the Centre for Environmental Economics and Natural Resources at the Higher School of Economics. He holds a Ph.D. in economics and has written more than 50 papers on environmental economics, natural resources and climate change.

Georgy has attended conferences and meetings of the UN Framework Convention on Climate Change and the parties to the Kyoto Protocol both as a member of the official Russian delegation and as a delegate from observer organisations. He is a member of the expert group on problems of climate policy under the Ministry of Economic Development, the Energy Ministry, the Federal Forestry Service, the Russian Chamber of Commerce and the Delovyaya Rossia business association.

Alexander Shabaldin

Alexander graduated from the Moscow State Institute of International Relations with a degree in foreign economic activity.

Between 2009 and 2012 he managed emissions reduction and energy efficiency projects at MezhRegionEnergo.

Since 2012 he has been a research fellow at the Moscow State Institute of International Relations' Research Centre for the Environment and Natural Resources, where he works on research projects on sustainable development in cooperation with international organisations. In 2013 he joined the Moscow office of Saint-Gobain as manger for energy efficiency.

He is currently writing his dissertation on development of the low-carbon energy sector and the prospects for energy efficiency in Russia.

Dmitriy Shevchenko

Dmitriy is a deputy coordinator of Environment Watch North Caucasus, an inter-regional environmental protection and human rights group and a member of the Russian Union of Journalists and the Association of Environmental Journalists. He lives in Krasnodar.

He graduated from the Kuban State University's faculty of management and psychology in 2003.

Between 2004 and 2012 he worked as a correspondent for the regional editions of Rossiskaya Gazeta, Izvestia, Kommersant-Yug, Mir Novosti, White Business magazine and others.

Since 2012 he has been a press secretary for Environment Watch North Caucasus. He works closely with the Russian branch of Oxfam, for which he prepares interviews and analytical reports on food security and the impact of global climate change on agriculture in southern Russia.

Anatoly Shevchuk

Between 1988 and 2008, Anatoly worked as a senior manager in the State Environment Commission of the Soviet Union, the Ministry of Natural Resources and Environment of the Russian Federation and the Federal Water Agency. In 2009 he was appointed deputy chairman of the Council for the Study of Productive Forces under the Ministry of Economic Development and the Russia Academy of Sciences. He heads the council's department of natural resources and environmental problems.

He is a professor of the department of management of social and environmental systems at the Russian Academy of National Economy and Public Administration under the President of the Russian Federation, a member of the Russian Academy of Sciences and the Russian Academy of Ecology and chairman of the environmental economics section at the Free Economic Society.

He is a participant in numerous Russian and international projects, programs, conferences and seminars. He has published about 200 papers on economics and environmental organisations.

In 2011 and 2012 he led a scientific expedition to investigate contaminated areas of the Franz Josef Archipelago, which led to a program to clean up the islands.

Irina Shmeleva

A specialist in the field of sustainable development, the psychology of interaction with the environment and international cooperation, for a long time Irina's main activities have been in teaching, research, administration and organising international conferences and seminars for young scientists. She works as Associate professor at MA programs on Urbanism St. Petersburg National Research University of Information Technology and Moscow Higher School of Economics.

In 2005 she was one of the main organisers of a major international conference under the title "Globalization, the new economy and

the environment. Problems for society and business on the path to sustainable development". In 2006 and 2007 she organised international seminars on "Sustainable Development of Large Cities" for young scientists and professionals. Dr. Shmeleva is collaborating with the Environmental Policy Research Centre at the Free University of Berlin and in 2012 took part in a Russian-German energy efficiency week under the direction of Dr. L. Metz.

She co-edited the textbook Sustainability Analysis: An Interdisciplinary Approach (Palgrave Macmillan, 2012). In recent years, Dr. Shmeleva has worked closely with the Public Chamber's Institute of Sustainable Development and is currently in the process of creating a new Institute for Sustainable Development in St. Petersburg, which she will direct.

Yevgeny Shvarts

Yevgeny is director of conservation policy at WWF Russia, is a doctor of geographic sciences (Dr. Sc., Habilitation (second doctoral) degree) in geography and an honorary conservation worker of the Russian Federation (2006). He co-chairs the Federal Forestry Agency's Public environmental council, is a member of the Ministry of Natural Resources and Environment's public and scientific councils and also member of Supreme Ecological Council and Expert Council of Nature Resources and Environment Committee of State Duma (Lower Chamber of Parliament) of the Agriculture Ministry's forest council.

Between 1982 and 1998 he worked in the department of biogeography at the Academy of Sciences' Institute of Geography. Between 1990 and 1998 he was a member of the academic council and a senior researcher fellow at the Institute of Geography. He was a founder and chairman of the Centre for Biodiversity Conservation Centre (BCC, 1992–1998), an international researcher at the Swedish University of Agricultural Sciences (1993) and between 1996 and 1998 ran the protected natural areas component of the Global Environment Facility's project on biodiversity conservation of the Russian Federation in 1987–1988 and again in 1997–1999, he served as a co-chair of the International Social-Environmental Union. He is a member of International Union for Conservation of Nature's World Commission on Protected Areas (IUCN/WCPA) and a graduate of the Leadership for Environment and Development program (LEAD).

He has written four monographs and more than 140 publications and sits on the editorial boards of several journals including Environmental Planning and Management (Russian Academy of Sciences), Sustainable Forest Management, Animal Welfare and Wildlife Conservation.

Maria Stepanova

Maria is an economist and energy efficiency analyst and has worked in both federal and regional state agencies, including in drawing up regional strategies for developing and monitoring productive forces strength.

Since 2008 she has been involved in two international projects at the Institute for Energy in the Sverdlovsk region: "Green School" and "Scanning the Energy Potential at the Seversky Tube Factory". Maria has delivered lectures and seminars on economic mechanisms to encourage energy efficiency and energy service activities, participated in energy management training at leading corporations in the Urals region (including Evras-NTMK, the Seversky Tube Factory and the RTI Factory) and holds several international certificates.
She has published numerous articles on improving energy efficiency in federal and regional media, scientific journals and anthologies.

Anna Sycheva

Anna has more than two years of experience in promoting waste management literacy. She has held a series of activities to promote recycling in Moscow, in particular mobile outreach centres handling separately collected waste. She has participated in projects to promote waste separation in several regions and has produced a number of brochures and posters on the topic.
She currently delivers public lectures on municipal waste management at Centre for Resource Economy at Flacon. She is a member of the PRO Waste coalition.

Yevgeny Usov

Yevgeny is a graduate of Leningrad State University's faculties of journalism and environmental protection and natural resources, as well as a film school for environmentalists.
A photographer, videographer and journalist, he currently works as a press secretary and head of the photo and video departments at "Greenpeace" Russia.

Ivan Yegorov

Born in Moscow in 1981, Ivan graduated from the world economy department of Moscow State University's geography faculty in 2002. In 2007 he defended his doctoral thesis at the same department.
Between 2002 and 2008 he worked in energy and oil and gas consulting. In 2008 he co-founded and became director of biogas projects of AEnergy, a Russian company that specializes in renewable energy. Since 2010 he has been a partner and commercial director of Landco S.A. (Luxembourg) / Agrobiotech (Russia) – a company building waste-free biogas stations in Russia and the EU. He developed a concept for the development of biogas in Russia and also the methodology to assess and achieve cost-effective investment. He is involved in the development of a system of state support for bioenergy in Russia.

Daniyar Yusupov

Daniyar is an architect, tutor, urbanist and essayist.
Since 2004 he has been a consultant on territorial development and the urban environment and since 2007 he has taught at the St. Petersburg State University of Architecture and Civil Engineering. He is curator of the master's program on urbanism at the St. Petersburg National Research University of Information Technology, Mechanics and Optics, a member of the city planning board, a co-founder of the creative urbanist group u:lab:spb, a member of the independent expert initiative "open lab city" and the author of numerous articles and public lectures on topical issues of post-Soviet urban planning and prospects for the development of planning culture.

Maria Zhevlakova

An expert in the sustainable development, circular economy and accelerated learning, Maria is a trainer and consultant with 15 years of experience of teaching and group facilitation. She has written numerous textbooks on education for sustainable development and effective training and is a developer and leader of educational and organisational projects on various aspects of environmental protection, effective training, sustainable development and the circular economy.
Between 2000 and 2011 she was chairman of the environmental education NGO OSEKO, a leading Russian NGO in education for sustainable development.
Currently Maria is an independent sustainability trainer and consultant, as well as development director of the NGO "Center for Transboundary Cooperation – St. Petersburg".

DRA
DEUTSCH-RUSSISCHER AUSTAUSCH
НЕМЕЦКО-РУССКИЙ ОБМЕН

Russian-German Exchange
Badstraße 44 • D-13357 Berlin
info@austausch.org • www.austausch.org • www.facebook.de/draberlin

русско-немецкое бюро
экологической информации
Russisch-Deutsches Büro
für Umweltinformation

Russian-German Environmental Information Bureau
Ligovskiy pr., 87, room 308 • Saint-Petersburg 191040 • Russian Federation
info@rnei.ru • www.rnei.ru • www.rnei.de

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Angelina Davydova, Silke Junge, Stefan Melle

SCIENTIFIC EDITORS
Sergei Bobylev, Renat Perelet

EDITORIAL ASSISTANTS / COPY-EDITING
Alexandra Kokoreva, Irina Grechukhina, Jana Schreiner

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