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## PLNENIE ENVIRONMENTÁLNYCH VÝZIEV V RUSKU: VÝSLEDKY A PROBLÉMY

### RUSSIA MEETS ENVIRONMENTAL CHALLENGES: ACHIEVEMENTS AND PROBLEMS

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Článok skúma medzinárodné environmentálne poradie indexu environmentálnej výkonnosti a indexu výkonnosti klimatických zmien. Hodnotí, prečo sa Ruská federácia nachádza na konkrétnom mieste vo svete. Analýzou ukazovateľov použitých pri vyhodnocovaní autori kvalifikujú úspechy budovania zelenej ekonomiky v Ruskej federácii a študujú osvedčené postupy zo zahraničia. Na základe výsledkov štúdie boli vypracované odporúčania, ktoré môžu byť užitočné pri prekonávaní problémov súvisiacich s budovaním zelenej ekonomiky.

Kľúčové slová: zelená ekonomika, zmena klímy, odpadové hospodárstvo, index environmentálnej výkonnosti, index výkonnosti klimatických zmien, sledovanie klimatických opatrení, Rusko

This paper explores international environmental ratings of Environmental Performance Index and Climate Change Performance Index and determines why the Russian Federation occupies a particular place. Analyzing the indicators used in the ratings, the authors assess the achievements of building

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a green economy in the Russian Federation and study the best practice of foreign countries. Based on the results of the study, the authors have developed recommendations, which might be of use in overcoming the problems that hinder the building of a green economy.

Key words: Green economy, climate change, waste management, environmental performance index, climate change performance index, climate action tracker, Russia

JEL: Q53, Q57, Q58

## 1 INTRODUCTION

In order to overcome global challenges, humanity must work together and pay greater attention to ensuring the sustainable development of its environment. Therefore, one of the key directions of the most economically successful countries' development at the beginning of the 21st century is the green economy. The United Nations Environment Programme (UNEP) defines a *green economy* as one that enhances human well-being and builds social equity while reducing environmental risks and scarcities. The key point in this concept is its strategic nature.

Today, there are a lot of forums around the world to discuss this issue. International organizations such as the United Nations, the World Bank and the Organization for Economic Cooperation and Development are developing initiatives to stimulate action in this regard.

At the international level, the green economy trend is supported by such documents as the United Nations Framework Convention on Climate Change (UNFCCC), the biodiversity targets under the Convention on Biological Diversity (CBD) and the Sustainable Development Goals (SDGs). The work at the national level is also important because the specifics of each region must be taken into account when setting targets, identifying and adopting best policy practices and designing specific programmes.

Today, there are many ratings to judge the effectiveness of green economy measures in different countries. In general, the absolute values of the indicators used in the ratings are not as important as the changes in the index over time, as they help to track trends and understand outcomes in the evaluated issues. The Russian Federation is represented in almost all global rating systems, but it occupies a leading position only in some of them. To compare the measures taken to improve the environmental situation in the Russian Federation with the measures of the leading states in the field of building a green economy, we compare indicators from two ratings: Environmental Performance Index (EPI) and Climate Change Performance Index (CCPI).

## 2 LITERATURE REVIEW

The article contains reliable information which comes from sources published in 2018–2021, and only the article written by Moralis, Costa and Pereira is dated 2012. This is justified by the fact that the issue of the heavy metals impact on human health

has not been solved over the years, and the measures proposed by the authors have retained their relevance. Most of the sources focus on analyzing the experience and best practices of foreign countries and adapting green technologies to Russian realities, as well as studying the problems of the energy sector and other industries of the Russian Federation. Particular attention is paid to the introduction of innovative technologies within the framework of the concept of greening the economy and creating a smart urban environment. An enormous amount of up-to-date information was provided by the international environmental ratings, on whose data the authors of this article have built their research and identified the blind spots of Russia's environmental policy.

Beloshitskiy (2021) investigates the experience of different countries in socially oriented investments, the trends of green investment and its challenges. Chernova, Matveeva and Gorelova (2021) carry out research about managerial impacts on the innovative development of industries ecosystems and their approbation. In their work, they use the example of the Russian water industry. Smirnov, Kashtanov, Denk and Halimon (2021) analyse case studies on the management of smart cities and determine the key trends in the development of innovative technologies in this field. Moralis, Costa and Pereira (2012), quoted above, study the problem of heavy metals impact on human health.

Forbes contributor (2021) explores the initiatives which might help the Russian Federation develop its own environmental strategy and also provides statistics about the outcome of the Russian "trash" reform. Glebova and Daneeva (2021) dedicate their work to the decarbonization of the world economy and studies the adaptation of the Russian energy sector to this important and undoubtedly difficult process. They highlight why the situation in the Russian Federation should not be compared with that in other countries in this context. Such comparisons ignore the imposition of numerous sanctions. The economic sanctions imposed for political reasons significantly slow down Russia's economic growth and pose a challenge to the most sensitive sectors of the economy. Krasukov (2021) investigates the potential impact of a carbon tax introduced by the European Union on the exports of the Russian Federation and also studies what technologies modern Russian corporations use in order to reduce their carbon footprint. Alkhasov, Alikirimova, Djavatov and Ninalalov (2021) pay their attention to the problems of implementing renewable energy in Russia and claim that the country's legislation needs to be adjusted. Ljovkina, Brody, Karagulyan, Zakharova and Ljovkin (2021) explore the opportunities of implementing renewable energy in the Russian Federation too, but they focus on the main renewable energy systems' development barriers and the consequences of overcoming some of them.

Climate Action Tracker is a collaborative research effort of the Climate Analytics and New Climate Institute, which monitors and assesses countries' actions to

reduce greenhouse gas emissions in accordance with the objectives of the Paris Agreement of „holding global warming below 2°C, and pursuing efforts to limit warming to 1.5°C.“ This article refers to the 2018 and 2020 reports. In their work, Alekseeva, Arshinova and Bancheva (2018) compile a database including information on Russia's place in global ecological rating systems. It allows them to identify the strengths and weaknesses of environmental development in the Russian Federation.

The two main sources on which the authors of this article relied the most are the EPI and the CCPI rankings and reports. First and foremost, the Environmental Performance Index report (2020) published by Yale Center for Environmental Law and Policy assesses how successfully countries implement their environmental policies and achieve their targets. Dinislamova (2020) analyses the Environmental Performance Index of the Russian Federation too, exploring the country's place in the 2016 and 2018 rankings. She scrutinizes the basis of the EPI. Unlike data and methodology, it does not change from issue to issue. Dinislamova L. stresses that the differences in Environmental Performance Index versions make it inappropriate to create a time series based on several of them.

The Climate Change Performance Index (2021) published by Germanwatch e.V. assesses the measures that the countries take in order to combat climate change. Both these rankings enhance transparency in international climate politics and allow us to draw up conclusions on the achievements and problems of the countries under analysis, including the Russian Federation.

Thus, the research conducted by the authors of this article is relevant in conditions of increased attention to environmental problems from the entire world community.

### **3 DATA AND METHODOLOGY**

Numerous international organizations, universities and commercial companies are involved in the compilation of environmental ratings. The reliability of the displayed information depends directly on the degree of access to it, the accurate systematization of data, and the context. The main objective in ranking is to estimate when there is either too much information available (so it is difficult to generalize) or too little. That is why the indicators used in the international rankings of countries are most often aggregated, which means that each of them includes several indicators.

The analysis commonly uses data from international economic organizations (United Nations, UNEP, World Health Organization, Organisation for Economic Co-operation and Development and other authoritative organizations) and national (and also supranational, such as Eurostat) statistical services, because it has the necessary attributes of objectivity, comprehensibility and comparability. (Alekseeva, Arshinova and Bancheva, 2018)

The overall methodological approach used in this study is quantitative. The authors focus on statistical analysis. The data presentation as a summary table meets the requirement of clarity. Furthermore, the fact that there are the ranks of other countries in the table (both leaders and those lagging behind from the Russian Federation) allowed the authors to designate which countries' experience will be most useful for studying within the framework of a particular indicator.

Most often, Denmark, Sweden, Finland, and the Netherlands take first place. However, the article also refers to the features and results of the environmental policy pursued in the European Union as a whole, as well as those in Ukraine, Indonesia, India, Great Britain, Seychelles, Germany, France, Japan, Canada, Norway, Latvia in particular.

Environmental Performance Index published by Yale University is one of the most interesting rankings. It compares the data for 180 countries and uses 32 indicators that are divided into two groups: ecosystem vitality and environmental health (that is, the impact of the environment on human health).

The Climate Change Performance Index ranks three times fewer countries than the Environmental Performance Index, but these 60 governments account for 90% of the world's energy-related carbon dioxide emissions. The rating classifies 14 indicators into four groups: greenhouse gas emissions (max. 40%), renewable energy (max. 20%), energy use (max. 20%) and climate policy (max. 20%).

The Environmental Performance Index is released biennially in even-numbered years, and the 2020 issue takes into account the impact of the pandemic on the environment. Therefore, a comparison with the 2021 Climate Change Performance Index issue, which was released in December 2020, is adequate. During the research, an analysis of the environmental situation of the Russian Federation was carried out based on data from international environmental ratings.

The study aims to analyse the reasons why the Russian Federation is lagging behind or succeeding in various areas of improving the environmental situation and building a green economy, which are investigated in the ratings, and to draw up a series of recommendations.

The analysis identified areas where Russian indicators could be considered acceptable and areas where work is essential for improving the environmental situation in the country. The experience of foreign countries has been studied as well as their environmental policies' specifics, the differences in which account for differences in the countries' rank in different parameters.

Table 1: Environmental Performance index 2020 and Climate Change Performance index 2021 rankings

<i>Indicator</i>	<i>Indicator content</i>	<i>Russia's rank</i>
<b><i>Environmental Performance Index (EPI), 2020</i></b>	EPI compares 180 countries and uses two groups of indicators: Environmental Health and Ecosystem Vitality. The number in parentheses indicates a change over 10 years.	1. Denmark 2. Luxembourg 3. Switzerland 58. Russia 180. Liberia
<b><i>Environmental Health</i></b>		
Air Quality	The direct impacts of air pollution on human health in each country.	1. Finland (+6.7) 2. Australia (+2.9) 3. Sweden (+3.9) 47. Russia (+14.1) 180. Pakistan (-0.9)
Sanitation & Drinking Water	How well countries protect human health from environmental risks on two indicators: unsafe drinking water and unsafe sanitation.	1. Finland (+0.3), Iceland (+0.9), Netherlands, Norway (+1), Switzerland, United Kingdom (+0.8) 7. Malta (+1.6) 65. Russia (+1) 179. Central African Republic, Chad
Heavy Metals	The direct impacts of heavy metal pollution exposure on human health in each country.	1. Denmark (+6.4), Finland, Japan 4. Sweden (+5.6) 37. Russia (+9.5) 180. Afghanistan
Waste Management	The threats of solid waste to human health.	1. Colombia, Netherlands 3. Denmark 122. Russia 133. Afghanistan, Uzbekistan, Venezuela, Zambia, etc.
<b><i>Ecosystem Vitality</i></b>		
Biodiversity and Habitat	Assesses countries' actions toward retaining natural ecosystems and protecting the full range of biodiversity within their borders.	1. Botswana (+1.4) 2. Zambia (-0.3) 3. Poland (+0.6) 111. Russia (-0.6) 180. Maldives (+1.8)
Ecosystem Services	Recognizes the important services ecosystems provide to human and environmental well-being.	1. Bahrain (+98), Iceland, Malta (+61.5), etc. 7. Niger (+0.8) 113. Russia (-5) 175. Dominica (-48.7) 176. Qatar (-100) 177. Kiribati, Marshall Islands, Samoa, Tonga
Fisheries	The health and sustainability of the	1. Singapore (+19.4)

	world's fisheries.	2. Fiji (-10.4) 3. Kiribati (+4.1) 133. Russia (+0.4) 136. Bahrain 137. Afghanistan, Armenia, etc.
Climate Change	Progress to combat global climate change, which exacerbates all other environmental threats and imperils human health and safety.	1. Denmark (+19.6) 2. United Kingdom (+19.9) 3. Romania (+18.8) 57. Russia (+4.6) 180. Qatar (-2.8)
Pollution Emissions	Progress on managing the emissions of two primary air pollutants: NO <sub>x</sub> and SO <sub>2</sub> .	1. Albania (+93.8), Austria (+22.6), Azerbaijan (+4.9), etc. 23. Norway (+14.9) 50. Russia (-11.6) 179. Afghanistan, Republic of Congo (-25.3)
Agriculture	Efforts to support healthy populations while minimizing the threats of agriculture to the environment.	1. Ukraine (+18.3) 2. Argentina (+1.4) 3. Paraguay (+2.5) 26. Russia (+8.6) 180. Brunei Darussalam
Water Resources	The extent to which humans are mitigating our threats to aquatic ecosystems.	1. Denmark, Finland, Netherlands, etc. 6. Luxembourg, United Kingdom 58. Russia 134. Afghanistan, Angola, etc.
<b><i>Climate Change Performance Index (CCPI), 2021</i></b>	CCPI ranks 60 countries (the first three places are never assigned) and uses four groups of indicators greenhouse gas emissions (max. 40% of overall score), renewable energy (max. 20% of overall score), energy use (max. 20% of overall score) and climate policy (max. 20% of overall score). The number in parentheses indicates a score that a country received in a group.	4. Sweden 5. United Kingdom 6. Denmark 52. Russian Federation 61. United States
Greenhouse gas emissions (max. 40%)	It is the most important measure in the success of climate policies.	4. Sweden (33.15) 5. Egypt (33.00) 6. Chile (32.16) 47. Russian Federation (16.55) 61. Kazakhstan (2.84)
Renewable energy (max. 20%)	Substituting fossil fuels with renewable energies.	4. Latvia (14.17) 5. Norway (13.94) 6. Sweden (13.93) 60. Russian Federation (0.79) 61. Islamic Republic of Iran (0.55)

Energy use (max. 20%)	Performance evaluation in per capita energy use.	4. Ukraine (18.54) 5. Malta (16.82) 6. Mexico (16.34) 45. Russian Federation (10.26) 61. Canada (3.50)
Climate policy (max. 20%)	The most recent developments in national climate policy frameworks. It also includes international climate policy.	4. Finland (19.38) 5. Sweden (17.22) 6. Portugal (16.76) 57. Russian Federation (2.75) 61. United States (0.80)

Source: systematized by authors according to Wendling, et al. (2020) and Germanwatch e.V. (2021).

#### 4 RESULTS

The analysis of the Environmental Performance Index often reveals data gaps. This may be due to several factors. First of all, some data may not be available for every country due to differences in natural resource reserves and other characteristics, and, secondly, the indicators of some countries may be insignificant in the calculation (Dinislamova, 2020). The second is the case for landlocked countries, which a priori do not receive high scores for categories related to the sea or fisheries.

To assess the position of our country in the EPI rating, we can conditionally divide it into three parts. Then, according to the indicators of waste management, our country is in the last third of the countries, ranking 122nd. No more than 5-10% of the waste is currently recycled, and 90% of the waste still goes to landfills (Forbes Contributor, 2021). Poor waste management in the Russian Federation may be due, in particular, to the decentralized system of waste disposal which significantly reduces the efficiency of its operation. Distorted information about the real scale of pollution and unauthorized dumps add up to the effect. Bureaucracy and corruption hinder the development of waste materials processing and utilization, although this area of business is promising (Beloshitskiy, 2021). It highlights the lack of a systematic approach to solving the issues of recycling and disposal in the Russian Federation.

Yet, the implementation of the national project "Ecology" is already underway: within its framework – as was announced in August 2021 – the landfills on the city outskirts will be eliminated in 2023.

In addition to setting up a federal office for waste management and strengthening legislation in this area, the state should subsidize introducing advanced waste recycling and disposal technologies. It should create a comfortable environment for doing business, and encourage adopting European technologies and adapting them to Russian realities. Thus, for example, it would be expedient to create platforms for municipal waste management, adopting Berlin's and Vienna's best practices (Germany ranks 8th in "waste management", and Austria – 12th) (Smirnov, Kashtanov, Denk and Halimon 2021).



The Russian Federation is in the second third of the ranking in "sanitation" and "drinking water". The situation calls for making the current legislation more stringent to regulate the water market, and using the public procurement system to introduce green innovations in this area. Adopting best practices of foreign countries and introducing software to improve water management and, consequently, the water distribution system would be a strategically correct step (the practice is used in a number of cities: Barcelona, Lyon, Milan) (Smirnov, Kashtanov, Denk and Halimon 2021).

The largest increase over the past 10 years has been observed in improving air quality (by 14.1%), however, it is not sufficient to compete with such countries as Latvia (46th place), the USA (16th place), Switzerland (9th place), Norway (5th place), not to mention the lead states. Following the example of prosperous countries, there is a need for ongoing environmental monitoring of urban air quality and control over vehicle emissions, fuel quality and environmental compliance in both the transport and energy sectors.

In the categories of air quality and control over heavy metal pollution, the Russian Federation is in the top third of the ranking. This is largely due to vast forests across the country that produce the largest amount of oxygen, though the woodlands are inferior in size to tropical moist forests. However, the impact of polluted air and heavy metals is quite intense and can have a negative effect on the human body for several generations in a row. Due to their toxicity, heavy metal compounds should be subject to mandatory monitoring. Their safe processing should be ensured. The government and business community should invest in projects to find and implement alternatives to heavy metals. (Moralis, Costa and Pereira 2012)

Raising public awareness, toughening industrial emissions legislation, enforcing health and safety standards at industrial sites that use lead, cadmium, mercury, and others are steps to be taken, following the example of Denmark, Finland and Japan to increase the environmental efficiency of the Russian Federation.

Fairly poor indicators in ecosystems vitality are largely determined by the lagging behind in the condition of fisheries (the Russian Federation occupies 133rd place). Despite the long sea coastline, numerous rivers and lakes on our territory, we are inferior to most of the countries, whose data are presented in the rating, except Australia, Argentina and Bahrain, as well as a number of countries whose data are not available and those that do not have access to large water resources. Countries must prioritize scaling up monitoring efforts and upgrading data collection systems to help conserve the global fish stocks and the communities that depend on them.

At the same time, in wastewater treatment, the Russian Federation ranks 58th, with an indicator of 18.5 out of 100. Although the country is listed in the top third of the rating, the achieved level should be considered unacceptable in view of the low

value of the indicator. According to the research conducted by Chernova, Matveeva and Gorelova (2021), significant operating costs make this industry unattractive for investors. The Russian Federation should increase the industry's investment attractiveness as well as take certain measures to rise in the ranking:

- ensure the efficient operation of wastewater treatment plants;
- guarantee monitoring the wastewater composition and properties.

In this connection, the practice widespread in the European Union is worth mentioning. The European Union has had a directive on urban wastewater treatment since 1991, nevertheless there are still significant indicator differences on the country level. Thus, Denmark ranks first, with 100 points out of 100, whereas Portugal, for example, takes the 33rd place (58.8 points), Iceland – 59th place (15.6 points). The peculiarities of national regulation in the field of wastewater treatment can be accounted for such gap.

The Russian Federation is in the second third of the rating in the category of biodiversity, ranking 111th out of 180. It is common knowledge that the Russian Federation has the largest area among the rest of the countries and the condition of its ecosystem is of particular importance at the planetary level. According to the Environmental Performance Index, over the past 10 years, the Russian Federation has lost 0.6% of its species, which calls for urgent measures to be taken.

The situation is even worse in the category of "ecosystem services", where the Russian Federation has lost 5% over 10 years. Initially, it was presented only as an indicator of tree cover loss – both for anthropogenic and natural causes, including fires. The introduction of a new methodology in 2020 added the indicators of loss of grassland and wetlands.

Fire extinguishing issues are under the jurisdiction of the Russian Federation regions. However, they often do not have the resources to extinguish fires in hard-to-reach areas due to outdated or missing equipment and insufficient financial resources. In addition, the regions are authorized to stop extinguishing fires in some territories due to economic inexpediency. The bill proposing to introduce a ban on stopping extinguishing under this pretext was rejected in the first reading, although its implementation would contribute to a significant reduction in the scale of forest fires due to their timely extinguishing, including forest fire control zones.

One aspect of the national "Ecology" project is realized by a federal project "Conservation of Forests". Within its framework, the volume of reforestation should reach 1.5 million hectares per year by 2024. The first seven months of 2021 saw the restoration of 400 thousand hectares, which is more than 31% of the planned volume of 1.2 million hectares for the current year. The federal project envisages the purchase of equipment and specialized machinery and the cultivation of forest planting material.

Ukraine has become the leader in minimizing agriculture-related threats to the environment, with an increase of 18.3% over the past 10 years. The Russian Federation is 19 points behind in the EPI rating, occupying the 26th place. Tracking the use of nitrogen in agriculture, the ranking compilers note that irrational fertilization poses a threat to human health and sustainability of agricultural systems and the natural environment. Still, the agriculture indicator makes up only 3% of all indicators, constituting the EPI rating.

Developed countries, as a rule, have ample opportunities to ensure yields and efficiency in the use of nitrogen fertilizers, but the leader in this indicator, Ukraine, has a relatively small GDP per capita and a relatively low amount of funds allocated for fertilizing the soil. Consequently, the level of economic development is not the main factor affecting the efficiency in the use of fertilizers. (Wendling, Emerson, de Sherbinin, Esty et al. 2020, pp. 156-157).

The Russian Federation is also in the top third of the ranking in the two remaining categories: pollution emissions and climate change. In pollution emissions (nitrogen oxides and sulfur dioxide), Russia ranks 50th, overtaking such countries as Singapore (56th place), Ukraine (64th place), which lead in other EPI categories. Moreover, over the past 10 years the Russian Federation saw a decrease of 11.6% in this indicator. Sulfur dioxide emissions are subject to stringent restrictions in industrialized countries, whereas developing countries such as Indonesia (139th place) and India (145th place) are experiencing an increase in the consumption of fossil fuels and the use of motor vehicles, which contributes significantly to the NO<sub>x</sub> increase. (Wendling, Emerson, de Sherbinin, Esty et al. 2020, p. 146).

With its eight indicators, the climate change category is largely correlated with the CCPI countries ranking. Climate change is caused by a number of factors, including: greenhouse gas emissions, fuel combustion, emissions of heavy industrial waste, deforestation, poor waste management, etc.

The World Bank and British Petroleum, which monitor harmful emissions, put Russia in the 4th place in the world in terms of CO<sub>2</sub> emissions. In absolute terms, the Russian Federation (more than 146 million people as of January 2021) is ahead of Germany, with a population of over 80 million people, and Japan, a country with a comparable number of inhabitants. In terms of emissions, we are overtaken only by China, the USA and India, which significantly surpass Russia in terms of population (Krasukov, 2021).

The Russian Federation (57th place) needs to boost progress towards a sustainable future, following the example of the leaders – Denmark, Great Britain and the Seychelles. Thus, the Danish Climate Act sets a goal to reduce greenhouse gas emissions in the country by 70% by 2030 compared to 1990 levels. Denmark plans to achieve the status of a climate neutral society no later than in 2050. Germany (14th in

the EPI ranking) plans to reduce emissions by 80-95% from the 1990 levels by 2050, Great Britain (2nd) – by 80%, France (4th), Japan (24th) and Canada (37 place) – by 73-78%. The target, presented by Russian President Putin in November 2020, is to scale down emissions by at least 30% below 1990 levels, based on the maximum absorptive capacity of forests.

The introduction of a carbon tax in the European Union from 2023, which is aimed at achieving carbon neutrality by 2050, could result in Russian raw materials prices becoming non-competitive. Moreover, the initiators of the carbon tax are not so much government agencies or the EU bureaucracy as consumers because it is consumers who shape public opinion and influence investors. The more noticeable the company's carbon footprint, the less attractive it is. Today consumers are paying attention to the energy efficiency of certain household appliances, and tomorrow they will look at the carbon footprint when buying a smartphone or coffee machine. The same applies to investors who already use ESG-rating (Environmental, Social, and Corporate Governance). For those who do not follow it, it is increasingly difficult to attract investments for development.

The total export of carbon-intensive products to Europe is about \$180 billion per year, and the cross-border tax, according to estimates by the Boston Consulting Group, is about \$30 per ton of emissions. For Russian exporters, losses will make up about \$3-5 billion per year. Annual losses of oil exporters can reach \$2.5 billion, and those of metallurgical companies – about \$1 billion. The tax can also hit the cost-effectiveness of fertilizers. Russian companies from many industries will have to pay special attention to their carbon footprint (Krasukov, 2021).

Climate Action Tracker (2018) rates Russia's actions to combat climate change as "Critically insufficient". If all countries set targets similar to those in the Russian Federation, global warming would not only fail to slow down, but it would grow by 3-4 degrees Centigrade. Even the new target within the long-term strategy is estimated as weak, lower than the Russian Federation's own forecast of current emissions (Climate Action Tracker, 2020).

Failure to set a challenging target pushed the Russian Federation to the 52nd position out of 60 in the CCPI rating, which, as was mentioned above, studies the issue of combating climate change in more detail than the Environmental Performance Index. The rating differs from others of its kind: the first three places are never assigned. The CCPI compilers insist that no country's performance is sufficient to achieve the goals of the 2015 Paris Agreement. The Climate Change Performance Index uses five ratings: "very high", "high", "average", "low", "very low". No country has received an overall rating of "very high", not even Sweden, which has been in the lead year after year.

Over the past year, the European Union countries have been rated "average" in terms of their abatement of greenhouse gas emissions, and five of them (including the

UK) have been rated "high". The EU countries intend to achieve carbon neutrality by 2050, which is reflected in the Fit for 55 Bill. Russian Federation is in 47th place in terms of abatement of greenhouse gases with a rating of "very low". The energy sector transformation will require significant financial and political resources, but unlike other countries pursuing a decarbonization policy, the Russian Federation is under sanctions pressure. Therefore, achieving the greenhouse gas emissions reductions needed to meet the commitments under the Paris Agreement hangs in balance (Glebova and Daneeva, 2021).

The rating compilers positively assess Russia's intention to reduce the total energy intensity of GDP by 20% below 2017 levels by 2030, although the rating remains "low". Only two European Union countries were rated "high" in terms of energy consumption (including the UK). It is interesting to note that Norway, Austria and Sweden occupy the low rating positions though they have almost always had the highest scores in both the EPI and CCPI ratings.

Almost 50% of Norway's total energy consumption is based on fossil fuels, and in addition, almost all oil and gas produced in the country is exported. This leads to the country's significant contribution to greenhouse gas emissions and brings about claims of environmental organizations against the government of Norway.

Norway, a leader in the climate policy category, is strongly committed to the use of renewable energy sources and sets a goal to reduce the share of peat heating by 50% by 2030 and substitute it for geothermal and wind power. This country is rated 6th in the EPI climate change index. Finland (9th in the EPI) has a carbon pricing system and a progressive taxation system for transport. Sweden (8th in the EPI) ranks 5th in the CCPI in climate policy performance. It plans to reach zero emissions by 2045.

Denmark, the leader in EPI climate change mitigation, is ranked in the bottom half of the current per capita energy consumption rankings according to Climate Change Performance Index, but remains in the top 10 in climate policy (8th in this indicator).

The Russian Federation ranks 57th in the climate policy category due to the above mentioned reason: lack of ambitious targets. Those currently operating on greenhouse gas emissions do not imply special actions to change the present situation and reflect the raw-material oriented nature of the Russian exports.

The main obstacle to alternative energy development in the Russian Federation is the high level of state control over the energy sector (Ljovkina, Brody, Karagulyan, Zakharova and Ljovkin 2021). Most of the subjects do not have a developed regional regulatory framework to support this area. Additionally, there are no effective incentives to encourage scientific and technical activities in the energy sector. Therefore, delegating authority to the regional level figures might provide a powerful

impetus to improving the situation (Alkhasov, Alikirimova, Djavatov and Ninalalov 2021). There are several more reasons why alternative energy in the Russian Federation is being introduced slowly: the abundant fuel and energy resources, the lack of a guarantee of energy production and the uneven natural conditions of a vast territory.

Latvia is leading in the use of alternative energy sources, followed immediately by the Scandinavian countries: Norway, Sweden, Denmark and Finland. The two most important renewable energy sources in Latvia are biomass and hydropower.

## 5 CONCLUSIONS

A comprehensive study of the current environmental situation in the Russian Federation on the basis of the Environmental Performance Index (EPI) and the Climate Change Performance Index (CCPI) provided recommendations for enhancing the Russian Federation's capacity to meet the environmental challenges, drawing on the best practices in the lead countries highlighted by the rating. Traditionally, the key problems remain strengthening the legislation and bridging relative legislative gaps.

Both the EPI and CCPI evaluate progress in making national economy greener, but the Climate Change Performance Index provides more extensive indicators about the country's effort to combat global warming under the 2015 Paris Agreement.

The Russian Federation ranks 57<sup>th</sup> out of 180 in the Climate Change Performance Index rating of environmental health, which is primarily due to setbacks on the issue categories of sanitation and drinking water and waste management. Over the past ten years, the greatest progress has been made in air quality improvement. Recommendations for the development in this area are as follows:

- monitoring urban air quality;
- setting up a federal office for waste management;
- encouraging the introduction of advanced processing and disposal technologies;
- fostering an enabling environment in the processing industry;
- using public procurement to promote businesses in water management sector;
- toughening legal responsibility for industrial emissions as well as granting subsidies to upgrade industrial facilities.

The Russian Federation's worst values are in ecosystem vitality (72nd place in total). In this connection, it should be noted that poor wildfire management brings about a drop in the "ecosystem services" issue indicator. Russia also falls behind on the issues of "fisheries" and "biodiversity". However, the Russian Federation is among the

top third countries of the EPI rating for the remaining four indicators. The authors pointed out the effectiveness of the following measures:

- updating data collection systems on fisheries;
- ensuring the efficient functioning of wastewater treatment facilities and monitoring the wastewater composition and properties;
- protection of biological diversity (control over compliance with ecological standards);
- strengthening legislation on wildfire management as well as reviewing the progress of the federal project on forest conservation;
- minimizing the threats from nitrogen use in agriculture;
- stringent regulations on pollutants emissions (nitrogen oxides and sulfur dioxide).

The Russian Federation's position in both ratings on combating climate change can be regarded as less than satisfactory. The targets that were set for 2030 and 2050 are nowhere near the EU member countries' indicators, especially those of the forerunners in building a green economy: Denmark, Great Britain, Sweden. Therefore, setting more ambitious new targets might lead to revising and improving Russia's place in the Climate Change Performance Index rating. At the same time, we should keep in mind that the policy of sanctions pursued by the West impedes decarbonization of the Russian Federation's economy. In summary of this part of the analysis, the following recommendations can be given:

- setting more ambitious targets for 2030 and 2050;
- creating a favorable investment climate to increase investment in green innovation in the Russian Federation;
- gradually reducing energy consumption and monitoring compliance with the target;
- increasing public awareness and promoting alternative energy;
- and phasing out the traditional export model based on raw materials.

The authors are aware that building a green economy in the Russian Federation is a complex task that requires significant time and financial investment. On the whole, the implementation of initiatives within the framework of the green economy concept can bring long-term benefits to both the state, organizations and the population.

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