

"Green" technologies at the heart of sustainable development of the economy of russia and the world

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Abstract. The article examines the essence of the "green" economy, identifies its three components - economic, social, environmental, and justifies the need for the green economy development in Russia. It is argued that the environmental component is a priority for sustainable development. Among the main directions of the "green" economy implementation in Russia, the following is highlighted: rational use of natural resource potential, diversification of energy supply sources, environmental protection, production of organic agricultural products, modernization of housing and communal services, formation of new ecological behavior of the population.

1 Introduction

Modern processes of Russian economy modernization face problems of limited resources and environmental pollution, which further negatively affect the production factors. One of the directions of ensuring the sustainable development of the domestic economy is the introduction of "green" technologies that contribute to reducing the risk to the environment and resource conservation, as well as attracting private, public and international investments. The "green" economy stimulates green growth, which, according to the Organization for Economic Cooperation and Development (OECD), consists in identifying more environmentally friendly sources, developing new environmentally oriented industries, creating jobs and technologies. To do this, growth must boost investment and innovation, which form the basis of sustainable development and lead to the emergence of new economic opportunities.

The intensification of the processes of "green" economy implementation requires a thorough study of its formation features, system-forming factors and the impact on the sustainable development of the state.

Russia is one of the countries of the Eurasian space rich in natural resources, has a favorable geographical and geopolitical position, a highly educated population and is a

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potential transit corridor of the "Silk Road" for energy, commodity and cultural exchanges between East and West.

Currently, Russian enterprises are in search of new ways to achieve ecological purity of production, opening up new ways in the application of the "green" economy, which allows not only to preserve the environment, but also to improve its competitiveness in foreign and domestic markets by modernizing the production process. In addition, "green" technologies are aimed at modernization of housing and communal services, environmental protection, production of organic agricultural products, as well as formation of a new ecological behavior of the population.

In accordance with the decree of the Government of the Russian Federation dated July 14, 2021 No. 1912-r Russia is preparing to launch a system of financing green projects and initiatives in the field of sustainable development. In this case, "... to increase the economy competitiveness, it is necessary to create conditions for a significant reduction in the energy intensity of all its sectors through the introduction of new technologies, progressive standards, modern control, management and accounting systems at all stages of production, transportation and consumption of energy products, the development of a market mechanism to stimulate energy conservation" [11].

One of the important tasks facing Russia is the transition of the domestic economy to a "green" model of development based on the principles of sustainable production and consumption, efficient use of material resources, as well as the promotion of business activities in the field of resource-efficient and environmentally friendly production.

According to the US Social Investment Forum, about 11% of profits of large corporations are spent on sustainable investment, in Europe this figure is about 17%. Currently, most grants from international organizations are allocated specifically for environmental protection, which confirms the interest of businessmen to participate in the development of "green" technologies.

The threats of depletion of limited natural resources and climate change due to the accelerated growth of the world's population and the economies of newly industrialized countries, which is accompanied by a negative impact on the environment, cause widespread recognition of the need to introduce new approaches to ensuring economic growth and development, providing for minimizing the burden on the natural resource base and environmental living conditions of the population through the use of additional sources of growth.

These sources of growth are primarily associated with the spread of the use of productive environmentally friendly technologies, eco-innovations, fair valuation of natural resources and eco-system services in economic activity. In addition, the introduction of sustainable consumption and production models, the transition to more complex business models with high productivity based on the concept of the life cycle, minimization and reuse of waste (recycling), corporate social responsibility also lead to economic growth and the preservation of the purity of nature.

2 Materials and Methods

The purpose of the article is to study the essence of the "green" economy, analyze the factors influencing its development and determine the prospects for the transition to "green" growth in Russia.

In the course of the research, methods of theoretical generalization and comparison, analysis and synthesis were used to define the concept of "green economy", the need for its further development as a new course both in the relationship between the state and business, and the growth of international economic relations.

The theoretical substantiation of the essence, certain features, tools and specific political foundations of the "green" economy development were studied in the works of domestic and foreign scientists, including V.V. Arkhipova, Yu.V. Evdokimova, E.S. Melekhin, K.G. Musailova, S.M. Nikonorov, B.B. Rubtsov, K. Allen, O. Bina, H. Deli, G. Pauli, V. Dietrich, E. Barbier, et al.

Nevertheless, despite the presence of a large number of works revealing the problem of the "green" economy formation and development, although, a unified systematic approach to the formation of its development policy in Russia has not been developed to date, which has led to the relevance of the chosen topic and the need to develop appropriate theoretical and practical recommendations.

3 Results

The term "green" economy was first introduced in 1989 in a report prepared by a group of environmental economists for the Government of the United Kingdom as part of consultations on sustainable development and its measurement. In 1992, the Earth Summit in Rio de Janeiro proclaimed the vital creation of the "green" economy concept to ensure the further development of mankind. The concept of "green economy" suggests governments, businesses and citizens to move to the development of balanced ways of development, including promoting investments in natural capital (increasing the share of protected areas, strengthening forest protection, etc.), solving problems of energy and providing environmentally friendly food, paying attention to land use and land use planning, optimal allocation of limited resources and improving their management. The "green economy" model provides for a harmonious combination of the economic needs of society with the need for permanent restoration and preservation of the environment.

According to the definition of the UNEP (United Nations Environmental Program), a "green" economy is "...an economy that leads to an increase in people's well-being and the strengthening of social justice while significantly reducing risks to the environment and the shortage of environmental resources" [10]. At the same time, UNEP emphasizes the correlation between the concepts of the "green economy" and sustainable development: "...the "green" economy concept does not replace the concept of sustainable development, but now there is an increasingly widespread recognition that achieving sustainability almost entirely depends on creating the right economy" [8].

In turn, for example, Danish scientists define the "green economy" as a transformation process that levels the imbalances and dysfunctions of the modern economy, the result of which is the well-being of mankind and fair access to resources for each member of society in conditions of ecological and economic integrity [11].

At the meeting of Ministers of the Environment of Latin America and the Caribbean, which was held under the UNEP auspices, the participants agreed on the following definition: "green" economy is "...a system of economic activity related to the production, distribution and consumption of goods and services that lead to an increase in human well-being for a long time, while not exposing future generations to significant environmental risks or environmental scarcity" [10].

The International Chamber of Commerce sees the "green" economy as economic growth and environmental responsibility that complement each other, supporting progress in social development.

Studies of opinions and judgments have determined the ambiguity of the authors' approaches to the definition of the "green" economy. For example, according to V.V. Arkhipova, "...green" economy is economic relations between economic entities that are based on the principles of environmental protection and conservation, the introduction of the latest energy and resource-saving technologies and contribute to improving the quality

of life within existing ecosystems" [1]. In a narrower interpretation, scientists A.V. Kuchеров and O.V. Shibyleva understand the "green" economy as "...the development, production and operation of technologies and equipment for the control and reduction of emissions of pollutants and greenhouse gases, monitoring and forecasting of climate change, as well as energy and resource conservation and renewable energy technologies" [8]. L.S. Kabir believes, "...that the "green" economy integrates the ecology of man and space into one system agglomerate with the help of economic, in particular effective market mechanisms, solving the corresponding long-term task of sustainable development" [6].

Thus, the "green" economy in the works of scientists is presented as a kind of system, the elements of which are aimed at sustainable development, providing for the unification of three components: economic, social and environmental, and the latter is a priority direction of stability.

4 Discussion

To determine the specific goals and objectives of promoting the principles of green growth, as well as the benefits for the state and business entities (Table), it is necessary to understand the current state and development trends of the main areas related to green growth.

Table 1. Advantages in the implementation of the "green" economy*

ADVANTAGES OF USING THE "GREEN" ECONOMY	
For state	For business entities
<ul style="list-style-type: none"> - reducing the economy's dependence on external supplies of raw materials and price fluctuations; - introduction of energy- and resource-saving technologies; - entering new markets through clean technologies; - attracting foreign direct investment; - improvement of the ecological situation and conservation of natural resources; - formation of positive "green" image. 	<ul style="list-style-type: none"> - reduction of unit costs for resource consumption; - modernization of production; - obtaining additional income based on the use of available resources (through waste disposal); - improving the quality and competitiveness of products; - ability to use state benefits; - diversification of the asset structure and reduction of strategic risks associated with traditional production.

*Compiled by the authors

One of the key characteristics of green growth is the phenomenon of so-called "decoupling": when the increase in pressure on the environment is less than economic growth over a certain period of time. In this case, the distinction can be relative and absolute. In particular, the distinction of a relative nature is observed when the environmental indicator (pressure on the environment) increases, but at a rate lower than the growth rate of the corresponding indicator of economic development, an absolute distinction, in turn, occurs when the environmental indicator (pressure on the environment) remains stable or decreases, while a certain indicator of economic development increases.

Currently, the governments of many developed countries already have separate strategies for green economic growth, containing the main goals, objectives and specific implementation goals. For example, almost all EU countries have developed new "green" measures in the field of energy, development of public transport and infrastructure, as well as the development of car recycling systems. The environmental sector of the EU economy is about 300 bln. Euro per year (2.5% of GDP). 25% of all EU investments are aimed at the development of "green" technologies. The EU Strategy until 2020 provided for the

integration of elements of the "green" economy into the strategy on economy and employment.

Thus, in the Netherlands, back in 1989, a National Environmental Policy Plan was approved, "...which established guidelines for sustainable development until 2030. In addition to it, the so-called environmental agenda has been adopted, aimed at achieving the benchmarks set by the EU. The ultimate goal of the plan is to create a sustainable environment within 25 years (one generation). The plan is supported by innovative environmental management approaches combined with tax support and strategic management" [3].

In 1990, following a proposal of the Government of the European Union, countries such as Sweden, Finland, Norway, the Netherlands and Denmark introduced carbon taxes. As a result, for example, in Sweden, the level of CO₂ emissions and the level of electricity use by enterprises has been reduced by 7% and 10%, respectively.

The Economic and Social Commission for Asia and the Pacific (ESCAP), which green growth strategy was adopted in 2005, deserves credit for bringing the green economy model to life. The designated strategy initially included priority areas, the main ones among which are: "... rational models of consumption and production; "greening" of enterprises and markets; sustainable infrastructure and "green" tax and budget reforms. Subsequently, two more areas were added - investing in natural capital and environmental performance indicators" [10].

Subsequently, in July 2009, the "...National Strategy for Green Growth in the Republic of Korea (Strategy of the Republic of Korea) was adopted, assuming that by 2020 the Republic will become the seventh "green power" in the world, and by 2050 – the fifth. "...The following strategic goals of integrative growth are defined:

- 1) adaptation to climate change and ensuring energy independence;
- 2) creation of new engines of economic growth;
- 3) improving the quality of life and strengthening the country's role in the international arena" [5].

In the Strategy of the Republic of Korea, green growth is defined as an action-oriented paradigm that simultaneously promotes economic growth and the environment using the concept of sustainable development. The Strategy of the Republic of Korea is also aimed at "...ensuring harmonious relations between economic growth and the environment through the use of new growth engines, including conservation and efficient use of energy and resources, mitigation of climate change and environmental destruction, research and development of clean energy and environmentally friendly technologies, creation of new jobs" [2].

The ideas of the "green economy" resemble methodological approaches to sustainable development, which for a quarter of a century have been a kind of "Bethlehem Star" for society and have become not just an intellectual asset of humanity, but what the French people call "sissis d'estime", that is, they have achieved "critical success" in rethinking all spheres of human activity. The call to limit the economic framework defined within the ecosystem of the Earth and to give priority to social integration and the fight against poverty, which is being heard today from the rostrums of the UN and international forums, is well known to us, since it was voiced in the report of the Brundtlandt Commission (1987).

For example, in European practice, the development of the "green" economy in "...Denmark is declared in the relevant agreement on "green growth", which aims to ensure environmental and climate protection, while simultaneously creating conditions for the development of modern and competitive agriculture and food industry" [11]. This agreement also includes: Denmark's Environmental Plan until 2020; a Strategy for the growth of "green" agriculture and the food industry [16]. In Austria, the "...Resource

Efficiency Action Plan (REAP) was developed, which corresponds to the National Strategy for Sustainable Development. REAP is intended to form the basis and create incentives for resource efficiency activities in relation to the provision of specific types of resources (for example, renewable resources), as well as individual industries (for example, construction). Special emphasis is placed on the efficient use of resources such as metals, minerals and biomass. In addition, the document pays attention to the correlations between the efficient use of energy and other resources, such as water and land resources. It should also be noted that in 2010 the EU adopted the Strategy "Europe 2020", aimed at a developed, sustainable and comprehensive economy, monitoring of macroeconomic factors, reforms that contribute to growth" [4].

The strategy "Europe 2020" identified the factors of strengthening the economy, such as:

- reasonable growth (economic development based on knowledge and innovation);
- sustainable growth (creation of an economy based on the rational use of resources, ecology and competition);
- light growth (assistance in increasing the level of employment of the population, achieving social and territorial harmony).
- expedient use of resources in Europe, assuming "...reasonable use of energy sources, transition to an economy with low consumption of hydrocarbon raw materials, increased use of renewable energy sources, modernization of the transport sector, reducing the dependence of economic growth on the amount of resources consumed" [7].

The concept of the "green" economy does not replace the concept of sustainable development; nevertheless, there is now an increasingly widespread recognition that achieving sustainability almost entirely depends on creating the "right" economy, because for decades, society has not solved problems, including social marginalization and resource depletion.

In this case, the course of the Russian Federation on greening the economy, based on the principles of sustainable development concept, is outlined by the desire to minimize environmental externalities for the full existence of future generations.

In September 2015, the United Nations adopted a new global program to ensure a sustainable future until 2030, which defines 17 Sustainable Development Goals (hereinafter referred to as the SDG) and 169 development objectives. The SDG should become a platform on the basis of which national strategies will be developed over the next 15 years. Goal No. 8 that provides for the promotion of sustained, comprehensive and sustainable economic growth, full and productive employment and decent work for all.

Thus, summarizing the features of the development of the directions and elements of the "green" economy, of existing opinions and judgments, we can agree with the conclusion that its sustainable development "...satisfies the needs of the present, but does not jeopardize the ability of future generations to meet their own needs" [7]. At the same time, considerable emphasis is placed primarily on socio-ecological aspects and the organization of safe production. The overwhelming majority of Russian scientists believe that "...sustainable development is a process of harmonization of productive forces, ensuring that the necessary needs of all members of society are met, provided that the integrity of the natural environment is preserved and constantly restored, creating opportunities for a balance between its potential and the needs of people of all generations" [3].

5 Conclusion

One of the key conditions for the systematic approach and consistency of the country's activities during the implementation of the sustainable development concept is the development of a detailed action plan, a strategy that would ensure full implementation of

economic activities of business entities without discrimination of environmental and social interests; would consider international experience in the implementation of this concept and the realities of the world economy as a whole.

In turn, the versatility of the sustainable development concept and differences in the mentality and culture of the people of the world determine the presence in the scientific literature of a wide range of individual approaches of economists and collective positions formulated within the framework of international organizations regarding the interpretation of the essence of the components of such documents and, above all, the strategy of sustainable development, while the environmental component is a priority.

The process of greening the economy is accompanied by the introduction of resource- and energy-saving technologies, reducing pressure on the environment, increasing demand for organic products, directing investment flows into the "green" economy, changing the employment structure, improving the quality of life and well-being of the population. Among the areas of the green economy implementation in Russia the following is highlighted: rational use of natural resource potential, diversification of energy supply sources, environmental protection, production of organic agricultural products, modernization of housing and communal services, formation of a new ecological behavior of the population. Further development of the "green" economy requires solving the contradictions of production greening, strengthening the role of the state in stimulating "green" investments and innovations, creating conditions for increasing the competitiveness of national producers of "green" products and forming a new attitude of the population to the environment.

References

1. V. V. Arkhipova, "Green finance" as an element of the new economy in the context of the global and Russian financial systems, *In the collection: New Economy: institutions, tools, trends Materials of the All-Russian scientific and practical conference*. In 3 parts. Under the editorship of O V Pilipenko, S Yu Glazyev, A E Aivazov, A G Zaitsev, N V Spasskaya, E V Takmakova, 20-24 (2019)
2. Yu. V. Bulgakova, *Society: politics, economics, law* **12**, 48-50 (2017)
3. A. V. Gatilova, *The "green" economy is the core of the sustainable development strategy implementation Ecology and environmental management on the way to sustainable development: indicators of sustainable development of territories*, 10-12 (Tomsk: Publishing House of the TSU, 2020)
4. M. A. Guryeva, I. S. Simarova, *Global scientific potential* **9(78)**, 48-64 (2017)
5. *"Green" economy*, http://minpriroda.by/ru/actual/new_url_2095511547
6. L S Kabir, *Innovation studies and expertise: scientific works* **1(26)**, 97-108 (2019)
7. G. E. Kudinova, G. S. Rosenberg, V. S. Yurina, *Principles of ecology* **4(4)**, 738 (2011)
8. A. V. Kucherov, O. V. Shibileva, *Young scientist* **4**, 561-563 (2014)
9. S. N. Lapina, *Economics, law and management problems* **7**, 33-37 (2017)
10. K. G. Musailova, *Russian entrepreneurship* **19(6)**, 1765-1776 (2018)
11. B. B. Rubtsov, I. A. Guseva, A. I. Ilyinsky, I. V. Lukashenko, S. A. Panova, A. F. Sadretidinova, S. M. Alykov, *"Green finance" in the world and Russia: monograph*, 15 (M., RUSAINS, 2017)
12. M. T. Butaboev, N. S. Sadriddinov, E. Yu. Rakhmanova, *Economy: analysis and forecasts* **5-6 (8-9)**, 148-153 (2020)

13. I B Dehtyarova, O I Melnyk, Ya V Romanchenko, Mechanism of Economic Regulation, **3** (2014) file:///C:/Temp/Mre_2014_3_4.pdf
14. D. Pearce, A. Markandya, E. Barbier, Blueprint for a green economy, 193 (London: Earthscan Publications ltd, 1989)
15. *Towards a Green Economy: Pathways to Sustainable Development and Poverty Eradication* <http://www.unep.org/greeneconomy>
16. *Website of the Danish Organization for Renewable Energy* <http://www.ove.org>