

Processing industries in the implementation of the country's "green" economy

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Abstract. The scientific article is devoted to the issues of a "green" economy, which ensures the creation of rational models of consumption and production, including the adoption of measures to reduce, recycle and reuse waste. The main branches of the processing industry, the system and mechanism of SHW (solid household waste) management in Russia are considered.

1 Introduction

The global environmental crisis, accompanied by problems of economic development, food security and energy, is forcing states to think about creating a national strategy and international cooperation to promote sustainable development. One of these policy measures is the "green" economy, which attracted the attention of the world community 15 years ago. At the UN Conference on Sustainable Development "Rio+20" the multiplicativeness of this instrument was discussed, as well as its effectiveness in solving problems of economic growth, poverty and employment. A "green" economy is an economy aimed at preserving the well-being of a person, society or state through the efficient use of energy and resources, as well as by reducing or completely preventing loss of biodiversity, risks of sustainable development, and negative impacts on the natural environment.

2 Materials and Methods

The "green" economy primarily strives for a more reasonable use of natural resources, which are most often limited and are in a constant cycle of turnover in the economy. The main characteristics of a green economy are: reduction of carbon emissions; preservation and increase of natural capital; efficient use of energy and resources; the use of renewable energy sources in the economic process; reduction of contamination of biophysical components; reducing biodiversity loss; reducing the negative impact of human activity on the environment.

The basic principles of the "green" economy include: the principle of well-being; principle of efficiency and sufficiency; principle of planetary boundaries; principle of justice; principle of good management.

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The lack of proper control over the conservation and protection of natural resources leads to aggravation of the environmental situation. And the “green” economy can serve as a solution to this problem. The first mention of the term dates back to 1989, when a group consisting of eminent ecologists and economists: David Pearce, Edward Barbier and Enil Markandia, first presented the report “The Blueprint for a Green Economy” to the UK government. Later, in 1991 and 1994, with the same composition they proposed projects called “Greening the World Economy” and “Assessing Sustainable Development,” which addressed issues of climate change, ozone layer depletion, and natural resource depletion.

Due to the global weakening of natural capital and ecosystem degradation in the 2000s. Environmental problems were growing rapidly in the world. Global crises led to the creation of UNEP (United Nations Environment Program) in 2008. At the beginning of 2010, the government came to the conclusion that the course of a “green” economy could improve the situation in the world, and in the future, it could help in solving vital problems. Already in March of the same year, the UN included the topic of green economy in the list of topics for the conference on development in 2012 (Rio+20). Thus, the green economy has confidently begun to gain momentum.

3 Results and Discussion

The green economy in Russia began to be mentioned much later compared to European countries. The onset of the global crisis of 2008-2009. led to the fact that the President of the Russian Federation D. A. Medvedev signed decree No. 889 on June 4, 2008 “On some measures to improve the energy and environmental efficiency of the Russian economy.” It was planned to reduce the energy intensity of the Russian Federation's GDP by at least 40% by 2020 compared to 2007, ensuring rational and environmentally responsible use of energy and energy resources. As a result of the introduced initiatives, processing enterprises gradually began to appear in Russia, allowing, when receiving materials from one or several areas of industry, to transform them into new goods, which can be either a semi-finished product or a finished product.

There are also achievements in alternative energy in Russia. Currently, there are about 190 hydroelectric power plants of various capacities operating in the country. Approximately 18% of all Russian electricity is generated by hydroelectric power plants. There are 56 operating solar power plants. The number of wind power plants (WPP) is 1162 units. There are 4 geothermal power plants in operation.

Global Green Economy Index (GGEI) was published by consulting company Dual Citizen LLC in 2010. This is a global green economy index that shows the level of progress, efficiency of economic sectors, quantitative and qualitative climate change, market and investment, and environmental protection. The Russian index was first calculated in 2016.

In 2016, the index was based on data from 80 countries and 50 cities around the world. Russia took 74th place with a total score of 38.08. The overall score is in the bottom quarter of countries with slightly higher perception ratings (Figure 1). Consider the description that Dual Citizen LLC provided from the study: “According to experts, two encouraging indicators for Russia are relatively good estimates of environmental damage and a decrease in emissions over the past decade in the transport sector. While there are no clear signs of renewable energy development, green innovation or investment at the moment, future increases would help Russia improve its overall GGEI score.”

In 2018, Russia ranked 105th out of 130 countries considered. Its index is 0.41, which is almost two times less than the indicators of the leader, Sweden (0.76). This figure, according to experts, is caused by the low share of renewable energy sources and resources in total consumption, high CO₂ emissions and carbon intensity.

Table 1. Dynamics of development of the “green” economy in Russia, 2017-2021.

	2017	2018	2019	2020	2021
Depth petroleum processing (%)	81,0	82,2	82,8	83,8	83,5
Recycling and neutralization of production and consumption waste (thousand tons)	3 264 551,4	3 818 362,8	3 881 871,53	3 429 013,7	3 937 239,42
Emissions of pollutants into the atmosphere (thousand tons)	17 477,5	17 068,09	17 295,1	16 951,5	17 207,7
Clean water and sanitation (%)	12,5	13,43	14,8	18,7	20,36
Reforestation (ha)	961 769.9	940 374.7	1 067 518.1	1 133 693.2	1 058 991
Commissioning of renewable energy facilities (MW)	139	340	594	1 194	1 212

From the data presented, the course of the “green” economy in Russia over the past five years turned out to be relatively small and insignificant. However, in terms of intensity, some subsystems of the green economy have shown progress. The most noticeable improvements have been in reforestation rates from 2015 to 2021. the increase occurred almost 1.32 times, however, deforestation is increasing every year, but active restoration of forest reserves is underway; waste disposal, clean water and sanitation also have a fairly stable movement. According to crude oil refining data, we can say that the indicators increased 1.1 times from 2015 to 2021. Renewable energy facilities are also gaining momentum.

Under the influence of the global coronavirus pandemic and the restrictive measures taken to reduce the spread of COVID-19, in 2020 there was a decrease in global energy demand, which was accompanied by a significant decrease in global carbon dioxide emissions (by 2.1% compared to the previous year, see chart T1). However, following a rapid global economic recovery accompanied by increased consumer demand for hydrocarbon resources, annual greenhouse gas emissions from the energy sector rose in 2021 to levels not seen since 2010 (see Chart T1).

The events that occurred on February 24, 2022 added a new element of instability to energy markets that were already subject to fluctuations. This new factor - the geopolitical situation - arose after the start of Russia's special military operation in Ukraine and subsequent sanctions from the West, including an embargo on Russian oil and restrictions on gas payments. As a result, global hydrocarbon markets have found themselves in a state of fever.

In this environment, the pace of investment in energy transition projects is expected to continue to grow strongly. This highlights the importance of developing technological and industrial competencies in the field of green energy at the national level. In this environment, the pace of investment in energy transition projects is expected to continue to grow strongly. This highlights the importance of developing technological and industrial competencies in the field of green energy at the national level.

In 2022, the current geopolitical situation poses serious risks for most investment projects, and renewable energy is no exception. Due to the dependence of the production of domestic equipment for renewable energy facilities on the supply of components and materials from foreign countries, problems have arisen with foreign suppliers.

Goal 12 “Ensuring the transition to sustainable patterns of consumption and production” implies in solving one of the objectives the reduction of waste volumes by taking measures to prevent its generation, reduce it, recycle and reuse it.

The waste recycling process dates back to ancient times. In agriculture, for example, it has long been a common practice to reprocess organic waste resulting from agricultural and domestic activities. However, with the development of scientific and technological advances,

and in the context of increasing awareness of global environmental issues, waste recycling took on new importance in the second half of the 20th century. This process has come to be seen as one of the effective means of combating environmental pollution and optimizing the use of natural resources and energy.

The regulatory framework in the field of environmental protection is formed on the basis of various legal acts in the Russian Federation. These acts include the Constitution of the Russian Federation, federal laws, regulations, government decrees, presidential decrees and many others. It is important to emphasize that all Russian citizens have a constitutional right to a favorable environment. Norms and regulations relating to environmental protection and environmental safety are regulated by the federal laws of the Russian Federation.

The Constitution of the Russian Federation enshrines the basic rights and responsibilities in the field of environmental protection:

1. "Everyone has the right to a favorable environment, reliable information about its condition and to compensation for damage caused to his health or property by environmental violations" (Article 42).

2. "Everyone is obliged to preserve nature and the environment, to take care of natural resources" (Article 58).

The basis of the regulatory framework for waste management at the federal level in Russia is:

1. Federal Law of the Russian Federation No. 7 FL of January 10, 2003 "On Environmental Protection";

2. Federal Law of July 23, 2013 No. 246-FL "On Amendments to the Federal Law "On the Sanitary and Epidemiological Welfare of the Population";

3. Federal Law of the Russian Federation "On Environmental Expertise" No. 174-FZ (as amended and supplemented, entered into force on March 1, 2022);

4. Federal Law of the Russian Federation dated June 27, 1998 No. 89-FL "On production and consumption waste" (as amended and supplemented, entered into force on March 1, 2022);

5. Order of the Ministry of Natural Resources of Russia dated December 8, 2020 No. 1029 "On approval of the procedure for developing and approving standards for waste generation and limits on their disposal" (Registered with the Ministry of Justice of Russia on December 25, 2020 No. 61834);

6. A block of interstate (CIS) standards, united under the heading "Resource conservation. Waste management";

7. Concept of solid waste management in the Russian Federation. Approved by Resolution of a colleague of the State Construction Committee of the Russian Federation dated December 22, 1999 No. 17.

The processing industry is a large sector of the Russian economy and can be divided into several sectors:

- food;
- mechanical engineering;
- chemical production;
- metallurgical;
- woodworking;
- logging.

The waste management system in Russia includes six main elements:

- - separate waste collection (PCO);
- - waste sorting complexes
- - waste processing complexes;
- - SHW composting plants

- - waste incineration complexes;
- - landfills (dumps)

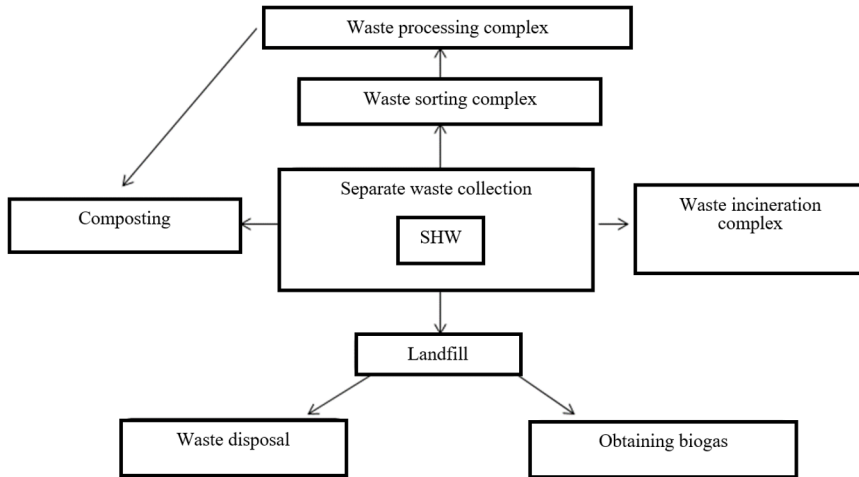


Fig. 1. SHW (Solid household waste) management mechanism

Composting is a biochemical process of decomposition of organic matter by microorganisms. As a result, organic fertilizer - compost, or biofuel - is formed. Through incineration it is possible to reduce the amount of waste and obtain energy from incinerated waste. Currently, modern waste incineration plants must be equipped with emission treatment systems and energy generators.

To form an integrated SHW (solid household waste) management system, it is necessary to implement the following areas:

- prevention and comprehensive reduction of waste from production and use of products;
- creation of a system for separate collection and transportation of waste;
- use of secondary resources in sorting, processing and burning waste;
- disposal of the unused portion of waste taking into account environmental safety conditions;
- creation of a sequential algorithm: formation – collection – transportation – processing – combustion – storage – formation.

At the municipal level, waste management is handled by local authorities. There are specially authorized authorities. Their rights are determined by the Federal Law “On Production and Consumption Waste”. Rights and responsibilities of local governments:

- creation and maintenance of places (sites) for accumulation of MSW;
- maintaining a register of MSW accumulation sites;
- organization of environmental education and formation of environmental culture in the field of MSW management.

The creation and maintenance of a register of MSW accumulation sites should be carried out in conjunction with the local waste management system adopted in a particular region. The procedure for maintaining records of MSW accumulation sites is established by the Government of the Russian Federation.

Municipal waste is part of a waste management system. In reality, waste removal from municipal areas is carried out by special enterprises. Their responsibilities include collecting and transporting waste using specialized transport, according to developed schedules.

In the world, the issue of optimal waste management is considered one of the most significant. Uncontrolled waste management leads to significant negative environmental

consequences. Because of this, all developed countries adopt special legislation regulating waste management that poses a danger to human health and the environment.

In our country, 5 billion tons of waste are created annually, and 48–57% of it is recycled. The volume of MSW is 10% (about 5 million tons) of the total amount of waste, of which 7–9% is recycled, the rest is buried in landfills.

The Russian Ministry of Natural Resources provides the following statistics: each resident of the country produces 400 kg of various waste. This includes both organic and those that can be recycled: plastic, paper, glass, metal.

According to Russian Technologies, more than 40% of landfills are valuable raw materials that can be reused. It is also known that only 8% of all waste is recycled, all the rest goes to landfills. Essentially, valuable resources are wasted.

It is estimated that there are 2,500 processing enterprises in Russia, both small and highly specialized large industries. These include about 240 waste processing plants, 50 waste sorting complexes and 10 waste incineration plants. 648 plastic processing plants, about 270 recycling and waste paper processing plants. Oil refineries - 74 units.

The processing industry is currently faced with declining production levels, lack of technological development and chronic shortages of personnel and investment, restoration of fixed assets, high labor costs, and declining competitiveness of foreign products in the domestic market. The reason is low-quality raw materials, destruction of raw material sites and fuel prices.

Taking into account the above, the strategic development of the processing industry sector should focus on the following priority areas:

1. Increasing production volumes of main types of food products to a level sufficient to meet the needs of the country's population in accordance with scientifically based nutritional standards.

2. Introduction of new types of competitive and high-quality products, expansion of the range of products and redirection of sales markets, in order to maintain the competitiveness of processing enterprises.

3. Strengthening the raw material base and restoring raw material zones around processing enterprises.

4. Introduction of advanced resource-saving technologies and modern equipment, automation of production processes, as well as the use of machines and mechanisms for the comprehensive mechanization of loading and unloading operations.

5. Minimizing losses of raw materials and improving storage conditions for finished products.

6. Creation of marketing services at large enterprises in order to effectively promote products on the market.

7. Ensuring compliance with veterinary and sanitary standards at enterprises involved in the processing of raw materials and livestock products.

3 Conclusion

Today in Russia there are significant problems that stand in the way of the progress of the “green” economy:

1. Consequences of coronavirus infection;
2. Introduction of sanctions against Russia;
3. The influence of the geopolitical market on the renewable energy sector in Russia.

In the near future, the Russian government is introducing various projects to increase the level of efficiency of the ecological economy. It is important to obtain a more complete economic assessment of benefits and effects to reduce environmental risks and uncertainty.

The experience of a number of countries shows that the efficiency of organizing separate waste collection increases when the recycler uses his own transport to transport certain types of recyclable waste to a processing plant. Relieving landfills of excess waste and increasing the desire of society to separate waste can be the practice of introducing containers for the separate collection of some waste at retail outlets for a small monetary reward.

In Russia there is no unified waste processing technology, so it is necessary to study world experience, the hierarchy of the European Union waste management system and, from the data obtained, create your own plan in this area.

In order to increase the volume of recyclable waste, it is necessary to implement certain measures, for example:

- improvement of information support;
- conducting propaganda on the benefits of separate waste collection by the population, starting from an early age;
- creation of a system for training engineers and lower-level specialists for a new sector of the economy, which will be associated with the processing and disposal of production and consumption waste.

The structure of the waste management system must be adaptive to changing conditions in the economic and technological sphere.

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