Formation of a national environmental strategy for the fuel and energy complex

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Abstract. In recent years, issues related to the protection of the environment and the preservation of the environment for future generations come to the fore. This issue is most relevant for industrial enterprises whose capacities were commissioned 40-50 years ago, while at the same time there was no qualitative and quantitative renewal of equipment for this period. The paper reviewed the indicators of emissions of pollutants by economic activity, as a result, it was concluded that about 26% of all emissions are generated as a result of the functioning of the fuel and energy complex. At the same time, the costs of environmental protection increase by the level of annual inflation and the volume of costs of environmental protection as a percentage of the gross domestic product of the country tends to fall. In the conditions of instability of the national economy and limited financial resources, the authors of the study proposed a mechanism for the formation of an environmental strategy for the fuel and energy complex of the Russian Federation, which is based on a tripartite interaction of state and regional authorities and energy companies.

1. Introduction

The development of branches of the national economy of the Russian Federation dates back to the last century, this period was marked by rapid growth of industrial enterprises, the formation of transport infrastructure, the emergence of new industries and the emergence of a modern economy [1; 2]. Today, production cannot be imagined without the consumption and use of resources that are transformed into finished products as a result of the technological process. All this brings not only benefits for consumers and profits for owners of enterprises, but also negatively affects the environment through emissions of pollutants into the atmosphere, use of water and land resources. In
recent years, issues of interaction between enterprises and the external environment are entering a new stage of development, both in the short and long term [3; 4].

An environmental concept aimed at protecting the environment appeared in the middle of the 20th century and was devoted to issues of sustainable development, that is, the interaction of the economy, society and ecology [5]. Further, it was transformed into programs, concepts and activities aimed at addressing issues of environmental protection, rational use of resources, and preservation of the existing natural potential for future generations.

2. Materials and methods

The relevance of considering an environmental strategy in energy production industries is associated with increasing equipment depreciation rates, the lack of policies to modernize and upgrade basic production assets, the need to restructure and renovate production facilities, and use outdated technologies for the extraction, processing, transmission and consumption of energy resources. In this regard, the aim of the work is the development of the environmental strategy of the fuel and energy complex of the Russian Federation. To achieve this goal, the following tasks:

- to analyze the environmental situation in Russia;
- propose a model of a national environmental strategy for the fuel and energy complex of Russia.

The basis of the study was used the methods of statistical, factor, historical, comparative, logical, economic-mathematical and system analysis, the method of expert estimates, which allowed to propose a model of the national environmental strategy of the fuel and energy complex of Russia.

3. Results

The use of production capacities and the increasing of the processes of extraction and processing of fuel and energy resources negatively affect the environment. Consider the level of emissions of pollutants into the atmosphere (figure 1) [6].

![Figure 1. Air emissions of pollutants from stationary sources, by economic activity, thousand tons.](image-url)

The presented figure describes the variability of pollutant emission indicators in the industries of the Russian Federation. At the same time, it is clear that only enterprises of the processing industry and metallurgical production were able to reduce emissions over the past ten years by 20%, in other sectors of the economy this figure did not exceed 10%.
Next, consider the costs of environmental protection in the Russian Federation (figure 2) [6]. The presented figure should be considered in dynamics with inflation in the Russian economy, as a result, we can conclude that environmental protection costs increase in proportion to annual inflation.

Consider the amount of expenditures on environmental protection to the gross domestic product of the country (figure 3) [6].

![Figure 2. The cost of environmental protection in the Russian Federation, millions of rubles.](chart)

![Figure 3. Expenditures on environmental protection as a percentage of gross domestic product.](chart)

The figure shows that in the period of growth of the national economy and the gross domestic product of Russia, indicators of environmental protection costs are falling, and in the period of instability of the national economy, these indicators have stabilized. Thus, the increase in the cost of environmental protection in real terms does not occur.

The figures show that up to 26% of emissions of pollutants into the atmosphere fall on the fuel and energy complex and throughout the period under review there are no qualitative changes in the level of emissions of pollutants into the atmosphere from objects of the fuel and energy complex, and the
amount of financing for environmental protection increases no more than a fraction of annual inflation.

4. Discussion

In general, the scientific community believes that it is necessary to update and modernize the fuel and energy equipment as soon as possible [7, 8, 9, 10, 11, 12], however, given the instability of the national economy and limited financial resources, it is advisable to develop other approaches to solving these archival problems.

In the context of limited financial resources, in our opinion, it is advisable to develop an environmental strategy that will contain directions not only for state and regional development, but also industry restrictions related to reducing the use of energy waste and inefficient capacities. Imagine a model of the environmental strategy of the fuel and energy complex (figure 4).

It is advisable to develop and implement a national environmental strategy for the fuel and energy complex of the Russian Federation with the trilateral interaction of state and regional authorities and energy companies. Each level performs certain tasks that are aimed at resolving issues to reduce the negative impact of energy facilities on the environment.

At the national level, it is advisable to intensify research and development activities in the field of modernization of existing technical installations that reduce the negative impact on the environment. At this stage, it is necessary to continue improving the legal restrictions on the operation of inefficient equipment, which have the most negative impact on the environmental situation in the region. The material analyzed earlier indicates that companies cannot implement large environmental projects, and in this regard, the state should take on the development of this area and the search for mechanisms to improve energy efficiency. In this case, it is advisable for state authorities to act not only as a supervisory body, but also as a management one. Its functions will be to reduce the use of outdated equipment and technology, with its subsequent elimination.

Today, at the regional level, framework regulatory acts are generally adopted, which generally govern regional environmental policy, and in this regard, it is necessary to develop regional programs to improve the efficiency of energy production. In addition, at the regional level, it is advisable to conduct a comprehensive monitoring of the state and conditions of operation of energy production facilities and to supervise the environmental situation.

In conditions of limited financial and investment resources, it is expedient for companies to carry out work on decommissioning environmentally inefficient production facilities and carrying out maintenance activities of sewage treatment plants, ash collecting devices, replacing filters and cleaning protected water areas.

After the development of state and regional projects and programs in the field of reducing the negative impact on the environment, it is advisable to develop mechanisms for implementing the proposed measures. The implementation of projects must be based on trilateral interaction - the state and regional levels and the level of a company in the fuel and energy complex. At the final stage, if necessary, a search for financial resources takes place, and criteria for evaluating the effectiveness of the implemented measures are developed.

The proposed mechanism for the formation of the environmental strategy of the fuel and energy complex of the Russian Federation will enhance the environmental efficiency of energy production, and branch ministries and agencies, regional authorities, specialized research organizations, educational institutions and companies in the fuel and energy complex will be interested in its implementation.
5. Conclusion
Thus, the paper reviewed the environmental situation of the fuel and energy complex of the Russian Federation. Analyzed showed emissions of pollutants indicate that there is a drop in technical, technological and environmental sustainability of energy enterprises, which is necessary conditions for the formation of mechanisms aimed at reducing the negative impact of energy facilities on the environment. The authors of the study proposed an environmental strategy for the fuel and energy complex based on the division of powers in the field of environmental protection between state and regional authorities and companies in the fuel and energy complex.

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