Features of Production and Consumption Waste Management in Russia

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Abstract. The analysis of legislative issues regulating the sphere of production and consumption waste management is carried out. The problems and shortcomings that reduce the effectiveness of the mechanisms for managing production and consumption waste provided for by current legislation are identified. Features of production and consumption waste management are studied on the basis of analysis of the existing waste management system in the Russian Federation and research of advanced foreign experience. The analysis of the dynamics of the share of waste in the field of mining is carried out. The reasons for the high share of waste generation in the extractive industry are substantiated. It is proved that the steady growth of unauthorized landfills indicates the insufficiency of existing measures and the provisions that need to strengthen existing measures are presented. The main directions that can be considered a priority for the development of the domestic waste management industry are highlighted.

1. Introduction

Waste from production and consumption – these are substances or items that are generated in the course of production, performance of work, provision of services, or in the course of consumption that are disposed of, intended for disposal, or are subject to disposal. The main regulatory document currently regulating waste management in the Russian Federation is the Federal law of 24.06.1998 No. 89-FZ "on production and consumption waste" [1].

Analysis of legislative issues regulating the sphere of production and consumption waste management has shown that certain legislative acts are currently being adopted in Russia aimed at improving the efficiency of waste management, including the elimination of unauthorized landfills, a
drastic reduction in the level of atmospheric pollution in large industrial centers, the formation of regional operators for solid waste management, and others. However, the effectiveness of the mechanisms provided by them is not obvious due to possible tariff increases, the lack of mandatory implementation of the practice of separate garbage collection, and the incomplete readiness of cities and regions to fully implement all legislative amendments. At the same time, the first priority is to implement a system of primary sorting of garbage, which directly affects the volume of secondary waste. In particular, the percentage of recycling can be increased from 15 to 97% of waste [2, 9, 13].

Currently, quite a large number of regulatory documents have been developed that regulate the industry of production and consumption waste management, but a comprehensive systematization of current legislation is required to create unified regulations for the management of production and consumption waste, similar to the practice of EU countries.

2. Study methodology
The purpose of the publication is to study the features of production and consumption waste management based on the analysis of the existing waste management system in the Russian Federation and research of best foreign experience.

The following foreign scientists contributed to the study of this area: A. Scott, D. Heberline, A. Murphy, T. Brannant and others. D. the research used the following methods: system approach, comparative analysis, retrospective analysis, analysis of official statistics, and document analysis method.

Foreign experience shows that smart waste management technologies are being introduced in the EU countries, and the development of environmentally friendly types of energy is being ensured in the waste processing industry, which is a trend in developed European countries [3]. It should be noted that methods are used for planning the collection, processing and further use of garbage, informing objects and subjects involved in the waste management process about the policy of responsible use of products from the moment of its production to disposal [4, 5].

3. Assessment and results
The problem of production and consumption waste management in the Russian Federation is one of the most significant in recent years. Rosprirodnadzor is the main state body that controls activities in the field of waste. The scope of its activities includes mandatory classification of industrial waste, the functions of monitoring compliance with the limits of the impact of waste on the environment and ecology, the organization of their timely destruction in accordance with the requirements of current legislation, the accumulation of data on the formation, use, disposal, transportation and disposal of waste production and consumption in the prescribed form.

A significant part of waste is generated during the activities of various industries. The main type of economic activity in which the share of waste is highest is mining. In 2005, the share of waste from this type of activity was 82.5%, and in 2018 it increased to 94.3%. The main polluter here is the extraction of fuel and energy minerals, the share of waste in which increased by almost 11.9 percentage points between 2005 and 2018 (table 1).

| Table 1. Dynamics of the share of waste in the sphere of mining, % [6]. |
|---------------------------------|---------|---------|
| Type of activity               | 2005    | 2018    |
| Total                          | 100%    | 100%    |
| extraction of minerals         | 82.5%   | 94.3%   |
| from them:                     |         |         |
| extraction of fuel and energy minerals | 59.8%   | 71.7%   |
| mining, other than fuel and energy | 40.2%   | 28.3%   |

The reasons for such a high share of waste generation in the extractive industry are:
1. High degree of outdated equipment. Given the capital intensity of the mining industry, one of the main factors determining the level of waste generation at enterprises is the service life of equipment.

Most of the mining enterprises operating in the Russian Federation were established during the Soviet period, and the renewal of their main production assets is extremely slow, which is why they are characterized by an extremely high level of physical and moral wear and tear. This leads to a decrease in the yield of useful products compared to modern equipment samples, up to the point when the production process ceases to meet the stricter requirements of environmental safety.

2. Dishonesty of manufacturers whose waste is disposed of in the form of creating unauthorized landfills or improper handling of waste that has an increased hazard class. Thus, many producers do not carry out primary sorting of garbage or do not apply the practice of re-using resources, which is due not only to the lack of sanctions from the state or the imperfection of current legislation, but also to the lack of a General vector of economic development aimed at implementing the principles of a closed-cycle economy, in which waste is turned into resources.

3. Imperfect legislation that does not have clear boundaries that define standards in the field of waste, as well as does not indicate the types of legal liability of each participant in the environmental and economic system for violating these boundaries.

4. Problems of production waste logistics. The complexity of transportation of industrial waste is due to the spatial and territorial factor, according to which mining enterprises and their production waste are located throughout the territory of the Russian Federation, the length of which is one of the largest in the world. Thus, the transportation of industrial waste to landfills or waste processing plants can be carried out over considerable distances, which makes the cost of transport a high component.

The profitability of the 3R principle, widely used in foreign countries, is in question in this case. It is obvious that more accurate conclusions require calculations of the profitability of transport logistics for each specific enterprise.

Inefficient management of industrial waste and accumulation of a large amount of household garbage, high cost of transport logistics, low social responsibility of business are the reasons that give rise to the problem of unauthorized landfills [7, 8].

The problem of unauthorized landfills is not only the storage of large amounts of household waste such as paper, plastic, glass and other types of waste, but also the presence of hazardous waste that requires the use of special safe disposal technologies. Such hazardous waste includes batteries, accumulators, lamps containing mercury and other toxic substances. Their presence in unauthorized landfills has an extremely negative impact on the environmental situation, contributes to the contamination of the earth, atmosphere and water resources, and also represents a certain harm to human life and health [10, 11, 12].

In the legislation of the Russian Federation, article 8.2 of the administrative Code of the Russian Federation "non-Compliance with environmental and sanitary-epidemiological requirements when handling production and consumption waste, substances that destroy the ozone layer, or other dangerous substances" regulates the liability of legal entities that are the organizers of unauthorized landfills, while the penalty is a fine of up to 250 thousand rubles or administrative suspension of their activities for up to 90 days. The police and Rosprirodnadzor are the regulatory and Supervisory bodies responsible for solving the problem of unauthorized landfills. If it is necessary to eliminate unauthorized landfills, the local administration is usually involved in such activities [14]. At the same time, the steady growth of unauthorized landfills indicates the insufficiency of existing measures [15], which should be strengthened by the following provisions:

1. Introduction of financial incentives for the population and organizations to search for unauthorized landfills. Material incentives for individual participants in the economic system, such as the population, non-profit or environmental organizations interested in observing the necessary environmental parameters in a certain area will help to more effectively search for unauthorized landfills. The mechanism of interaction of participants involved in the search for unauthorized dumps and payment for their actions can be organized using information technology, for example, for sending a photo of an unauthorized dump with its coordinates through the feedback form, a registered user
receives a certain number of points or bonuses, which can then be exchanged for material incentive prizes or partially pay them for the purchase of other goods [16].

2. Increasing the speed of administrative resources' response to information about unauthorized landfills. The system of interaction between the population, local administration and Rosprirodnadzor should be optimized in such a way that the fastest possible response of regulatory authorities is organized to notification of unauthorized dumps[17, 18, 19-21].

3. Introduction of a progressive scale of penalties for organizing unauthorized landfills. To date, the highest level of the fine is 250 thousand rubles. However, it is quite obvious that depending on the size and scale of the organization that created the unauthorized dump, this amount can be either very large or very small. In large organizations, as shown above, the cost of manufacturing waste logistics can far exceed penalties. The introduction of a progressive penalty scale provides for increasing coefficients that may depend on the organization's profit indicators.

Considering the ways to improve the efficiency of the production and consumption waste management system, we should note the widespread introduction of digital technologies in all areas of activity. Russian waste management practice includes a number of software products that perform the functions of accounting, management, regulation and analysis, which include the software products "Waste-region", "Regional waste inventory", "waste management Accounting", "1C: Enterprise 8. Industrial safety. Environmental protection".

The disadvantages of these software products are their primary focus on accounting, rather than managing production and consumption waste. The lack of comprehensive automation functions, the ability to exchange data with other programs, as well as verification of the provided information about waste does not allow them to be positioned as modern digital solutions that fully use all the available functions of the modern information space. As a solution to these problems, it can be proposed to create a unified information system that provides online interaction with administrative resources, the population and enterprises in the field of waste management of production and consumption.

4. Conclusions
We will highlight the main areas that can be considered a priority for the development of the domestic waste management industry:

1. Improvement of the production and technological base, which should be based on optimal mechanisms for updating the main production assets of extractive industry enterprises, the use of waste-free production technologies, as well as the processing and secondary use of resources.

2. Optimization of administrative resources in terms of organization of monitoring and control over the use of waste by production enterprises, timely response to detected violations in terms of waste disposal, involvement of all interested categories of society in the process of informing about violations of waste management technologies and methods, transfer of functions of control over industrial waste to separate administrative bodies.

3. Separation of penalties in terms of introducing a progressive assessment scale for violations for enterprises with different profit indicators; revision of standards for the permissible quantitative level of waste, depending on the type of production, based on modern technologies for determining recommended indicators.

4. Development of a unified waste management information system that includes the functions of accounting, organization, planning, regulation and analysis, integrated with a single electronic waste management platform, intended for use by both public and private entities involved in the waste management process. The practice of foreign countries shows that such systems become most effective when using artificial intelligence technologies to create them.

Both the state and industrial enterprises should take part in solving the accumulated problems of waste management. Otherwise, the negative impact on the environment will increase, which will lead to consequences that will be much more costly to eliminate than the implementation of the proposed preventive measures.
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