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Green logistics in the Russian oil and gas industry: opportunities and limitations.

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Abstract This article presents the main ways associated with the greening of oil and gas enterprises through the introduction of various principles and methods of "green" logistics. Various reasons that hinder the development of environmental science in oil and gas companies are also considered.

Keywords: fuel and energy complex logistics.

The fuel and energy complex (FEC), one of the main elements in the formation of the revenue part of the budget of the Russian Federation, which provides 50% of tax revenues to the country's budget. If we consider the share of the fuel and energy complex in the volume of exports, then it is 70%, mainly crude oil and natural gas. The raw material specialization of Russia's exports makes the country's economy dependent on price changes in the hydrocarbon market. In this regard, the energy strategy of the Russian Federation dictates the need to redirect part of the export flows of energy resources for processing at local processing plants in order to increase the added value of oil and gas products that are shipped abroad. This makes it possible to reduce the dependence of the Russian economy on situations in the oil and gas market.[1]

The fuel and energy complex is one of the most important sectors of the economy, but it is also a source of hazardous emissions into our environment. More than 50% of emissions into the atmosphere, 70% of greenhouse gases, about 20% of the discharge of polluted wastewater, this is exactly the impact that the fuel and energy complex has on the natural environment of Russia. The oil and gas industry is characterized by a fairly high degree of capital intensity, and the planned transition to manufacturing specialization will only increase the volume of investment. [2] This process entails the complication of technological processes, which further necessitates the construction of new oil refineries and distillation stations, an increase in the length of supply chains and an increase in logistics costs, the complexity of the structures of the organization of the oil and gas industry and the system of economic relations. The burden on the environment also increases, since; firstly, oil refining requires a large number of various chemical catalysts, which create a large amount of harmful and toxic fumes during their transportation and storage at refineries. Secondly, there is always a problem concerning the organization of disposal and

[1] The main directions of development of logistics of the XXI century: resource saving, energy and ecology. URL: http://hmbul.bmstu.ru/catalog/econom/log/118.html.

[2] The main directions of development of logistics of the XXI century: resource saving, energy and ecology / I.N. Omelchenko, A.A. Aleksandrov, A.E. Brom, O.V. Belova // Humanitarian Bulletin of the Moscow State Technical University. N.E. Bauman: electron. magazine 2013. No. 10 (12). URL: http://hmbul.bmstu.ru/catalog/econom/log/118.html.

processing of production waste. And thirdly, the increase in harmful emissions into our environment is directly proportional to the increase in the length of gas and oil transportation routes to the places where they will be further processed.[3]

This situation necessitates the improvement of the logistics systems of gas and oil refineries and further optimization of supply chain management, as one of the important conditions for the development and increase in production efficiency. As a solution to the problems mentioned above, it is possible to propose the introduction of "green" logistics technologies in all supply chains that are formed at the enterprises of the gas and oil and gas industries. Today, the concept of "green" logistics is becoming more and more popular, against the backdrop of climate change and increasing emissions into the atmosphere. The definition of "green" economy was given by M.Yu. Grigorak and Yu.V. Varenko: "A system of measures that provides for the use of energy and resource-saving logistics technologies and modern equipment in all parts of the supply chain of goods in order to minimize the negative impact on the environment and increase the total consumer value of products for consumers."[4] Research in the field of application of the concept of "green" logistics was carried out by many scientists and specialists, the works of such authors as A.A. Aleksandrov, A.E. Brom, O.V. Belova, I.N. Omelchenko and others. The work of these scientists and specialists is the development of a system of logistics indicators of environmental friendliness in the production process, as well as the characteristics of technologies and tools for "green" logistics.[5] Green logistics is the science of efficient management of accompanying and material flows while minimizing the negative impact on the environment, through the use of various technologies, such as resource-saving, environmentally friendly transportation, warehousing and storage of goods.[6]

Opportunities and limitations of the use of "green" technologies in the logistics of oil and gas processing organizations.

Technology	Opportunities	Restrictions

[3] Dli M.I., Fomchenkova L.V., Stepanova R.R. Economic and mathematical model of planning and organization of work of the maintenance and repair service of a competitive petrochemical enterprise // Electronic scientific journal Oil and Gas Business. No. 1. 2004. P. 29. URL: http://www.ogbus.ru.

[4] Grigorak M.Yu., Varenko Yu.V. The principles of "green" logistics in the activities of logistics providers. URL: http://www.aticmd.md/wp-content/uploads/2014/04/.

[5] Belova E.A., Zhevtun I.F., Karbyshev A.V. "Green" technologies in logistics and supply chain management (http://dx.doi.org/10.24412/2304-6139-2021-11037) // Bulletin of the Academy of Knowledge. – 2021. – No. 43(23. – pp. 51-57. – doi: 10.24412/2304-6139-2021-11037.

[6] Maksimtsev I.A., Kostin K.B., Gorodilov K.A., Onufrieva O.A. Development of the energy sector of the Russian Federation based on the innovative principles of the green economy (http://dx.doi.org/10.18334/vinec.12.2.114809) // Problems of innovative economics. - 2022. - No. 2. - p. 1165-1184. – doi: 10.18334/vinec.12.2.114809.

Switching to environmentally friendly modes of transport	Emissions of fuel combustion products are minimized	No networks of rail and water transport routes
Shortening of transportation routes	Emissions of fuel combustion products are minimized Reduction of transport costs	Extensive geography of oil and gas industry in Russia
Use of energy-saving and environmentally friendly materials in the construction of warehouses	Reducing the cost of energy supply to warehouses Reducing fumes that contain toxicity during the operation of warehouse knowledge	High cost of materials for the construction of specialized warehouses for oil and gas processing enterprises
Use of reusable containers	Reduction of costs for disposal and purchase of containers	Rapid wear of containers due to exposure to strong chemicals
Ensuring recycling processes	Obtaining additional income by selling waste for recycling Exclusion of emissions of oil and gas processing into the atmosphere	A small number of enterprises that process toxic waste from oil and gas processing plants
Increasing the load capacity of vehicles	Reducing the number of vehicles and their emissions into the environment	Load capacity is determined by safety standards

An integrated approach to the introduction of "green" technologies in the logistics of oil and gas enterprises involves the implementation of these technologies at all stages of the technological cycle of the product, and in all parts of the supply chain. Reducing the distance for transporting goods in the supply chain is one of the rather difficult problems for many Russian enterprises. The geography of oil and gas production in Russia greatly complicates the organization of transportation of production products to the places of their processing and does not allow to reduce the distance between the enterprise where this raw material will be processed and the field where it is produced. Under these conditions, the concept of "green" logistics involves the transition to more forgiving and environmentally friendly modes of transport (sea, rail, water) and the maximum reduction in road transport. In Russia,

there is such an opportunity to switch to more friendly modes of transport that cannot bear such harm to the environment, but due to the fact that the road network in Russia is the most extensive and developed, which covers most of the country, this opportunity is not yet available.

There are not so many problems in the field of ensuring the disposal of production waste, since gas and oil products are actively used as raw materials in other industries (rubber products, rubber, etc.) or fuel (associated gas for oil transportation). The main task is to organize the outflow of production waste in order to avoid the need for overexposure. Or, if we consider resource-saving technologies, although they help to reduce stocks of materials (40-60%), speed up the turnover of working capital (20-40%), and reduce the cost of loading and warehouse operations (15-30%). On the other hand, they lead to an increase in transport costs by 1.5-2 times.[7]

To date, an international and national institutional environment is being formed for the introduction of green technologies in production and logistics activities, the system for accounting for the harmful effects on natural areas and evaluating the effectiveness of measures to protect the environment from pollution is being improved. More and more companies not only in Russia but all over the world are realizing the value of non-renewable resources and are looking for a balance between society, nature and organization. A striking example of the implementation of the concept of "green" logistics in the fuel and energy complex is the construction of the Nord Stream 2 gas pipeline by the German company Nord Stream AG2. This project involves minimizing carbon dioxide emissions into the atmosphere during gas transportation, as the pipes are laid underwater across the Baltic Sea. [8]

The use of "green" logistics technologies for the fuel and energy complex has a rather positive effect not only on the environment, but also on the country's economy and the economic condition of oil and gas companies. In the context of a shortage of investments and limited ways of attracting them, the use of the technologies described above makes it possible to reduce logistics costs. The desire to master and implement "green" technologies forms a positive image of the organization, which in turn has a significant impact on the interest of potential investors and the attractiveness of the industry.

But if companies continue to ignore what is happening around them and how the fuel and energy complex affects the environment, then, according to experts, the deterioration of the environmental situation in the country will lead to annual economic losses that amount to 4-6% of Russia's GDP. But with the introduction of environmental and resource-saving technologies and methods in the Russian Federation, it will make it possible to obtain a minimum economic effect of $500

[7] Makarov I.N., Mikhailov A.M., Korenyako E.A. New Public Management Strategies in the Context of the Green Agenda and Post-Covid Economic Restructuring: Issues of Sustainable Development (http://dx.doi.org/10.18334/epp.12.6.114940) // Economics, Entrepreneurship and Law. - 2022. - No. 6. - p. 1673-1680. – doi: 10.18334/epp.12.6.114940.

[8] https://www.gazprom.ru/projects/nord-stream2/

million per year, in the transport complex - up to $400 million, in the agro-industrial complex - more than $500 million.[9]

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