EXPERIENCE OF FOREIGN COUNTRIES AND INTERNATIONAL ORGANIZATIONS IN ENHANCING THE GREEN ECONOMIC EFFICIENCY OF MINING ENTERPRISES

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Abstract: *The mining industry plays a crucial role in the global economy, but it faces significant challenges related to reducing environmental impact, efficient resource use, and ensuring sustainability. This paper explores the experiences of foreign countries and international organizations in enhancing the green economic efficiency of mining enterprises. Examples from the European Union, Australia, and Canada demonstrate how innovative sustainable technologies reduce ecological damage while improving economic outcomes. International organizations such as UNEP, ILO, and the World Bank provide strategic frameworks promoting circular economy, zero waste, and green technologies in mining. The study also highlights the importance of adapting global best practices to local contexts, with a focus on Uzbekistan's 2030 development strategy. Furthermore, the Brazilian Minas Gerais Biotech Cluster is examined as a successful model integrating science, technology, and industry to advance sustainable development through biotechnological solutions.*

Keywords: *Mining industry, green economy, sustainable development, environmental efficiency, circular economy, zero waste, international experience, UNEP, bioclusters, Uzbekistan.*

The mining industry is a vital sector of the global economy, and reducing ecological footprints during resource extraction, efficient use of natural resources, and ensuring environmental sustainability are among today's most pressing challenges. The experience of developed countries and international organizations in implementing green economic principles worldwide serves as an important example for improving the environmental and economic efficiency of mining enterprises. In particular, countries such as the European Union member states, Australia, and Canada have achieved advanced results by applying innovative approaches to introduce sustainable production technologies in the mining sector, thereby reducing environmental damage and ensuring economic efficiency.

International organizations, including the United Nations Environment Programme (UNEP), the International Labour Organization (ILO), and the World Bank, play a significant role in adapting mining enterprises to the principles of a green economy. The principles promoted by these organizations—such as the circular economy, zero waste, and the implementation of green technologies—aim not only to improve the environmental efficiency of mining enterprises but also to ensure their economic sustainability. Therefore, studying the advanced experience of foreign countries and international organizations and

adapting it to local conditions is one of the key directions for enhancing the green economic efficiency of mining enterprises.

The scope of the work carried out by the United Nations Environment Programme (UNEP) to date is highly reputable and admirable; it demonstrates strategic support and international assistance tailored to the infrastructural capacities of each country. In Uzbekistan, environmental protection and ensuring sustainable economic growth are prioritized directions in the country's development strategy aimed at 2030. UNEP's initiatives correspond well with Uzbekistan's strategic goals and can serve as an important foundation for rational resource use, the development of renewable energy sources, and the improvement of waste management systems. These initiatives also support sustainable economic growth and help integrate Uzbekistan into the global green economy system.

It is also worth noting that platforms to activate bioclusters have been established, the first of which belongs to Brazil. The Minas Gerais Biotech Cluster is a strategic platform for developing a global economy based on ecological sustainability. The main principle of this biocluster is the integration of science, technology, and industry into a single system for effective management of biological resources. Biotechnological solutions—including biopharmaceuticals, agricultural biotechnology, and environmental services—align with green economy principles and address critical issues such as waste recycling and carbon footprint reduction. Global experience shows that such clusters are the key to achieving sustainable development.

This biocluster forms an innovative ecosystem that engages government, industry, and research institutions in cooperation. Through sectors such as pharmaceuticals, agricultural biotechnology, and bioinformatics operating within the Minas Gerais cluster, advanced technologies are being implemented to increase resource efficiency and ensure sustainable development.

Conclusion. The global experience of foreign countries and international organizations offers valuable insights into improving the green economic efficiency of mining enterprises. By adopting innovative sustainable technologies and strategies such as the circular economy and zero waste, mining operations can reduce their environmental footprint while enhancing economic viability. International cooperation and adaptation of best practices to local conditions, exemplified by Uzbekistan's alignment with UNEP initiatives and strategic goals, are essential for achieving sustainable growth. The successful model of the Minas Gerais Biotech Cluster further demonstrates the potential of integrating science, technology, and industry to promote ecological sustainability and resource efficiency. Moving forward, these approaches provide a roadmap for mining enterprises worldwide to contribute to a greener, more sustainable future.

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