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ЭКОНОМИЧЕСКИЕ ВОПРОСЫ В ОБЛАСТИ ЭКОЛОГИИ: ВЗАИМОСВЯЗЬ БЕРЕЖЛИВОГО ПРОИЗВОДСТВА И «ЗЕЛЕНОЙ» ЭКОНОМИКИ В РОССИИ

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ECONOMIC ISSUES IN THE FIELD OF ECOLOGY: THE INTERCONNECTION BETWEEN LEAN PRODUCTION AND THE GREEN ECONOMY IN RUSSIA

Ecological issues in Russia's economy are becoming increasingly relevant due to the vast territory, which possesses significant reserves of natural resources. This necessitates a transition to sustainable models of economic development that can combine economic efficiency with ecological responsibility.

There are two models that have gained particular significance: lean production and the green economy. These two models have developed separately from each other, but their interconnection is becoming increasingly apparent and relevant in the face of modern challenges.

The goals of lean production include: ensuring product quality; guaranteeing delivery times to the customer; reducing the time for new product development; decreasing labor costs; and realizing the creative potential of employees. The green economy, in turn, is aimed at achieving sustainable development without harming the environment or depleting natural resources.

Table 1

Comparison of Lean Production and the Green Economy

Aspect	Lean Production	Green Economy
Goal	Maximizing customer value while minimizing waste	Sustainable development without harming the environment
Main Focus	Process efficiency and cost reduction	Environmental sustainability and rational resource use
Approach	Elimination of all types of waste (time, resources, energy)	Reducing environmental impact and preserving natural capital

Tools	Kanban, Kaizen, 5S, Just-in-time	Renewable energy sources, environmental standards, recycling
Key Principles	Continuous improvement, employee involvement, flow optimization	Rational resource use, biodiversity conservation
Economic Effects	Increased productivity and competitiveness	Job creation, development of green technologies
Environmental Effects	Reduction of waste and energy consumption	Emission reduction, ecosystem protection
Social Effects	Improved working conditions, employee engagement in improvements	Improved quality of life, social justice
Innovations	Process and product improvements	Development of environmentally friendly technologies and solutions
Application Examples	Automotive industry, electronics, mechanical engineering	Energy, agriculture, construction

This table highlights that despite differences in their main goals and methods, lean production and the green economy share many commonalities, and their integration could lead to significant changes for businesses, society, and the environmental situation as a whole.

Some countries have already combined these two methods and successfully apply them in practice.

Sweden began heating its country by burning waste as early as 2002, and by 2017, the country met the heating needs of 1,250,000 apartments and the electricity needs of 680,000 apartments through household waste incineration. Additionally, Swedish plants "recycled" 3.7 million tons of other waste, primarily industrial, along with household waste.

Russia is also paying attention to the issue of the green economy: in January 2019, the national project "Ecology" was approved. Following this, regions began to launch "green" projects as a foundation for lean production. Additionally, within the framework of the federal project "Circular Economy," our country is implementing a program for the use of secondary raw materials in road construction, which is expected to increase the use of these resources to 40% by 2030, thereby reducing construction costs.

There are several examples in Russia where the principles of lean production and the green economy are successfully integrated, demonstrating the potential for creating sustainable and efficient business models.

The metallurgical company “Severstal” has implemented lean production principles to enhance operational efficiency and reduce costs at the enterprise. Sim-

ultaneously, it invests in environmental projects aimed at reducing emissions and improving air quality, such as upgrading treatment facilities and introducing cleaner steel production technologies.

“RusHydro”, a leading renewable energy producer in Russia, applies lean production methods to optimize management and operational processes, which helps reduce operating costs and increase the share of environmentally friendly energy in the country's overall energy balance.

Some agricultural enterprises in Russia are implementing lean production methods to increase crop yields and reduce resource costs. At the same time, they employ environmentally friendly practices such as organic farming and drip irrigation, which help preserve soil fertility and reduce the use of chemical fertilizers. Zero-waste processing of sewage sludge is used in Kazan, Volgograd, Taganrog, Troitsk, St. Petersburg, and other cities, as well as in Crimea. This practice enhances soil fertility and the survival rate of plants in forestry.

Industrial enterprises that implement lean production and the principles of the green economy report reduced energy costs and greenhouse gas emissions through process optimization and the use of cleaner technologies. They also achieve significant productivity gains and cost reductions by optimizing work processes and eliminating unnecessary operations.

An increasing number of Russian companies are starting to implement environmental programs and initiatives aimed at reducing environmental impact, including waste recycling and the use of eco-friendly materials, which positively affect the country's economic aspect.

In the face of growing environmental challenges and the need to transition to sustainable development, Russia encounters several economic issues in the field of ecology that require comprehensive solutions. Key tools capable of making a significant contribution to addressing these issues are the concepts of lean production and the green economy. These approaches, initially developed independently, find points of convergence in the Russian context, offering integrative solutions to enhance economic efficiency and ecological responsibility. The interconnection between lean production and the green economy in Russia is evident in joint efforts to create more sustainable production systems. These efforts can be supported by government policies aimed at promoting environmentally friendly technologies and initiatives to reduce the carbon footprint. As a result, the integration of these approaches could lead to the creation of a new economic model capable of ensuring long-term growth and prosperity without harming the environment.

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