

Таким чином, тропічна Атлантика є ключовим регіоном кліматичної системи, де взаємодія океану й атмосфери визначає формування теплових, циркуляційних і вуглецевих аномалій. Посилення потепління, зміни апвелінгу та динаміки Атлантичного Ніньйо можуть суттєво впливати на екосистеми, водний баланс і кліматичну стабільність тропічних регіонів у майбутньому.

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Ihor Vitryk

applicant for the third (scientific) level of higher education
National University «Yuri Kondratyuk Poltava Polytechnic»

ECONOMIC SECURITY OF STRATEGIC ENTERPRISES OF THE OIL AND GAS COMPLEX AS A FACTOR OF THE ENERGY STABILITY OF THE STATE

The economic security of strategic enterprises in the oil and gas sector is a key determinant of the country's energy stability and its ability to withstand internal and external threats [1]. In the context of structural transformation of global energy markets, the importance of the effective functioning of the oil and gas sector as a basic element of Ukraine's economic system is growing. Not only macroeconomic stability but also the state's ability to ensure uninterrupted energy supplies and maintain strategic autonomy depend on the level of its financial stability, technological modernization, and institutional capacity.

In the context of war, infrastructure destruction, restricted access to resources, and increased risks of energy isolation, the issue of strengthening the economic security of strategic oil and gas companies is becoming particularly

relevant. This involves not only maintaining their financial stability, but also developing a management system capable of ensuring adaptability, innovation, and resilience to crisis impacts. At the same time, it is important to integrate the principles of energy sovereignty, resource efficiency, and sustainable development into state policy on the strategic energy sector.

The economic security of strategic enterprises in the oil and gas sector is central to ensuring the country's energy stability, as their functional viability directly affects the state's ability to maintain uninterrupted supplies, support macroeconomic balance, and minimize external dependencies [2]. In the context of Ukraine, the importance of microeconomic indicators of natural gas production, storage, and supply as components of economic security is growing. According to data from the relevant association, total natural gas production in Ukraine in 2024 amounted to approximately 19.12 billion cubic meters, which is 2.3% more than in 2023. (18.7 billion cubic meters) – this indicates positive dynamics even under conditions of military pressure on the energy infrastructure [3]. The availability of underground gas storage facilities with an active capacity of about 31 billion cubic meters [4] creates a potential buffer for responding to external shocks. However, the use of this buffer is hampered by infrastructure damage and declining fill levels: for example, analysts' data show that as of June 2025, reserves in underground gas storage facilities exceeded only 7 billion cubic meters, the lowest level in 11 years [5]. These indicators clearly demonstrate that despite increased production and strong positions in storage, companies in the industry are exposed to increased risks, both due to external attacks on infrastructure and due to logistical, personnel, and financial constraints.

For strategic companies in the oil and gas sector, economic security means the ability to withstand shocks: to ensure stable operations despite lower prices, pipeline damage, and difficult logistical conditions, as well as to accumulate financial reserves and maintain investment activity. The risks of infrastructure destruction, logistical bottlenecks, and financial instability are interrelated and have a multiplier effect: for example, a decline in production leads to a decline in revenues, which limits investment opportunities and increases dependence on external financing. At the same time, it is precisely the improvement in production indicators – for example, the increase in production to over 19 billion cubic meters in 2024 – that demonstrates the availability of resources and organizational capacity to improve positions. The economic security of enterprises, therefore, is not only an internal function – it is transformed into a state function of ensuring energy stability.

Thus, oil and gas companies are demonstrating growth in production even in wartime, which indicates the increased resilience of their operations. The large reserve of underground storage facilities creates a strategic buffer, but the low level of filling of these facilities poses a significant risk that could be activated during the cold season or new attacks. The growth in projected consumption exceeds the growth rate of domestic production, which creates an additional

burden on companies and government policy regarding the provision of imported or reserve resources. Therefore, ensuring the economic security of strategic enterprises in the oil and gas sector should be a priority of state energy policy. This requires the implementation of a systematic approach that combines economic, managerial, institutional, and security aspects.

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Alona Buriak

PhD (Economics), Associate Professor
National University “Yuri Kondratyuk Poltava Polytechnic”

DIGITALIZATION IN ENSURING ENVIRONMENTAL SAFETY OF INDUSTRIAL AND NATURAL ECOSYSTEMS

In contemporary conditions, industrial and natural ecosystems face increasing challenges due to the intensification of human activity, technological transformations, and global environmental changes. The integration of digital technologies into environmental management has emerged as a strategic tool for ensuring sustainable and safe ecosystems. Digitalization enables real-time monitoring, predictive analytics, and more efficient decision-making processes that mitigate ecological risks and enhance the resilience of both natural and industrial systems.

Industrial ecosystems are particularly vulnerable to environmental threats arising from pollution, resource overexploitation, and technological accidents. Natural ecosystems, in turn, face risks associated with climate change, biodiversity loss, and human-induced disturbances. In this context, the