

STUDY OF THE RESULTS OF ENERGY SANCTIONS ON RUSSIA

ДОСЛІДЖЕННЯ НАСЛІДКІВ ЕНЕРГЕТИЧНИХ САНКЦІЙ ЩОДО РОСІЇ

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Abstract. *This article analyzes the impact of energy sanctions imposed on Russia after its military aggression against Ukraine, emphasizing their role as an instrument of economic pressure and geopolitical influence. The study examines how restrictions on oil and gas exports, technological cooperation, and access to international financial markets have weakened Russia's economic stability and limited its energy sector's modernization. Despite partial adaptation through the use of a "shadow fleet" of tankers and high global oil prices, the sanctions have significantly reduced export revenues, disrupted logistics chains, and reshaped the geography of energy supplies. The article identifies the loss of the European natural gas market as one of the most significant consequences, highlighting the structural shift in global energy flows and the increased role of Asian countries. The introduction of new sanctions in 2024, including those targeting the "shadow fleet" and the Arctic LNG-2 project, has intensified the economic strain on Russia and threatened key strategic energy initiatives. The results demonstrate that sanctions have become an effective non-military mechanism for influencing state behavior, while Russia's efforts to circumvent them reveal both its resilience and systemic vulnerabilities. The study concludes that continuous adaptation of the sanctions regime and international coordination remain essential to maintaining pressure and supporting global energy security.*

Keywords: *energy sanctions, Russian energy sector, oil exports, financial restrictions, shadow fleet, macroeconomic stability, natural gas, European market, sanctions pressure, technological restrictions.*

Анотація. *У статті проаналізовано вплив енергетичних санкцій, запроваджених проти Росії після її військової агресії проти України, з акцентом на їхню роль як інструменту економічного тиску та геополітичного впливу. Досліджено, як обмеження експорту нафти й газу, співпраці у сфері технологій та доступу до міжнародних фінансових ринків послабили економічну стабільність Росії та обмежили модернізацію її енергетичного сектору. Незважаючи на часткову адаптацію через використання «тіньового флоту» танкерів і*

високі світові ціни на нафту, санкції суттєво скоротили експортні доходи, порушили логістичні ланцюги та змінили географію енергетичних поставок. Одним із найважливіших наслідків визначено втрату Росією європейського ринку природного газу, що засвідчує структурні зміни у світових енергопотоках і зростання ролі азійських країн. Нові санкції 2024 року, зокрема проти «тіньового флоту» та проєкту «Arctic LNG-2», посилюють економічний тиск на Росію та поставили під загрозу реалізацію стратегічно важливих енергетичних ініціатив. Результати показують, що санкції стали ефективним немілітарним механізмом впливу на державну політику, тоді як спроби Росії обійти обмеження виявляють одночасно її стійкість і системні вразливості. Зроблено висновок, що подальше вдосконалення санкційного режиму та міжнародна координація є необхідними для збереження тиску та підтримання глобальної енергетичної безпеки.

Ключові слова: енергетичні санкції, російський енергетичний сектор, експорт нафти, фінансові обмеження, тіньовий флот, макроекономічна стабільність, природний газ, європейський ринок, санкційний тиск, технологічні обмеження.

Introduction. Energy sanctions have become an important element of the global strategy of pressure on Russia in response to its aggressive actions in Ukraine. These sanctions are not only aimed at limiting Russia's financial capabilities, but have also significantly affected its ability to finance military campaigns through the sale of energy resources. Introduced sanctions include numerous measures such as supply restrictions of oil and gas to international markets, export ban of advanced technologies necessary for development of new ones energy projects, as well as limitation of financial operations with Russia.

The strategic goals of these sanctions were not only to reduce Russia's export revenues, but also to hamper its ability to maintain and modernize its energy infrastructure, which is critical for long-term economic stability.

The purpose of the article is to assess the impact and effectiveness of energy sanctions imposed on Russia after its military aggression against Ukraine, focusing on their influence on the country's economic stability, export revenues, and energy sector adaptation, as well as on the broader consequences for global energy security.

Literature review. Literature includes analytical studies, reports and articles. Research KSE Institute and DiXi Group have become important sources of information about economic influence sanctions. They provide financial data losses of Russia, changes in exports of oil and gas, as well as adaptation of Russia to new conditions, including development of shadow fleet of tankers. Others sources are investigating macroeconomic stability in Russia, influence internal sanctions economy, inflationary pressure and infrastructure problems.

In recent years, the field of research on the impact of energy sanctions against Russia has seen increased activity from both Ukrainian and international expert-scientific researchers. Among them, it is worth noting Oleksandr Danyliuk, a Ukrainian economist and former Minister of Finance, who analyzes the economic consequences of sanctions for the Russian economy and their impact on international energy markets. The international level is represented by studies such as those by Anthony Bradshaw from the London School of Economics, who examines how sanctions have affected Russia's energy sector and overall European energy security. Also worth mentioning is Peter Woods from Georgetown University, who investigates the strategic aspects of energy sanctions and their impact on global political relations. These studies provide a deep analysis of the effectiveness of sanctions and their long-term consequences for Russia and the global economy. In this article, we will focus on analyzing the energy sanctions imposed on Russia and their consequences for the country's economy and politics. Although there are numerous studies examining the overall impact of sanctions on Russia, some key aspects remain underexplored.

Main results of research. Sanctions are a non-military measure. They can be applied during an armed conflict between states or as an unfriendly act. In any case, they serve as a form of coercion that does not involve the use of force itself. In some cases, sanctions are a response to the use of force (Koval & Bernatskyi, 2023).

Harry Clyde Hufbauer classifies cases of sanctions imposition according to the foreign policy objectives of the initiating parties:

- a minor change in the policy of the sanctioned state;
- a regime change in the sanctioned state;
- gaining a military advantage;
- constraining the military potential of the sanctioned state;
- a radical change in the policy of the sanctioned state.

Hufbauer emphasizes that in order to assess the effectiveness of sanctions, it is crucial to clearly understand the purpose of their imposition. In some cases, this may be difficult or impossible to determine. Moreover, the goals of sanctions are not static; they may change over time due to political circumstances, economic factors, and other influences.

Energetic sanctions against of Russia became one from key tools of international community for pressure on Russian government to respond to its military aggression against of Ukraine. Introduction of these sanctions was aimed not only at limiting Russia's access to critically important financial resources, but also for deterrence its ability to finance war due to the sale of energy resources. Russia, as one of the largest exporters of oil and natural gas in the world, used revenues from energy sales to fill the budget, stabilization macroeconomic situation and support his own military potential (*Office of the President of Ukraine, 2024*).

Here are the key aspects of energy sanctions against Russia (table 1):

Table 1

Key aspects of energy sanctions against Russia

Aspects of energy sanctions against Russia	Impact
Restriction on oil and gas exports	Reduction in export revenues, change in supply geography
Prohibition on export of advanced technologies	Complication of energy infrastructure modernization
Loss of revenue from oil exports	Economic instability, higher inflationary pressure
Investment in "shadow fleet" tankers	Development of alternative export routes
Adaptation to new sales markets	Exploration of new sales markets, strategy adjustments
Impact on international energy markets	Change in competitive landscape, geopolitical shifts

Source: created by the author

Sanctions have been introduced by the United States, the European Union and others countries, were aimed at several aspects of energy sector of Russia. These included supply restrictions Russian oil to world markets, export ban modern technologies necessary for development new ones energy projects, as well as restricting Russian access companies to international ones financial markets Such the strategy aimed not only reduce Russia's income from export, but also complicate its ability to maintain and modernize its energy infrastructure, which is key for the long-term preservation economic power countries

Thanks to these events are international community hoped that limitation export energy resources will significantly weaken Russian economy, will force the Kremlin to change aggressive policy and will create conditions for a peaceful settlement of conflict

Russia has allies, first of all queue, China, Turkey, UAE and countries in Central Asia and the Caucasus, which help (or play back an important role) in bypassing sanctions. Russia fixed it networks through which it receives by roundabout ways western goods double appointment that are used by it for the needs of the military-industrial complex (*Office of the President of Ukraine, 2024*).

The impact of these sanctions on the Russian economy and global energy markets has been studied by several analytical organizations, including KSE Institute and DiXi Group, who published their research on the impact of energy sanctions in 2022-2024.

According to KSE Institute, sanctions related to the Russian energy sector have significantly affected the Russian economy, especially its oil industry, which is one of the key items of income

for the state budget. The loss of \$78.5 billion in one and a half years is the result not only of EU restrictions, but also of the general international coordination of actions to reduce the demand for Russian oil.

The European embargo and price restrictions, implemented in December 2022, were intended to reduce Russia's revenue from oil sales while allowing global markets to access the energy at stable prices. Aggravation of losses in January 2023, when Russia lost \$8.6 billion, shows that the country was not fully ready for this large-scale changes in export conditions. In particular, they decreased volumes of export to Europe, which was one of the largest buyers of Russian oil, and a reorientation to new markets such as India or China, could not fully compensate losses

By the middle of 2023, Russia began to adapt to the new ones realities Although losses remained significant, they stabilized at the level of \$2.8 billion every month. It maybe testifies that country was able part find new sales markets and ways of circumventing restrictions. However, even under such conditions of sanctions continue to cause a serious blow to the economy, because oil is the main one a source of income for Russia on the international stage Arena (*KSE Institute, 2024*).

Introduced sanctions forced Russia to search alternative ways to work around restrictions that were superimposed on her energy sector. One of these measures was significant investment in the creation of the so-called "shadow fleet" tankers. Russia put in about \$8.5 billion in this fleet, which consisted of 435 vessels at the beginning of 2024. The purpose of this fleet was transportation oil bypass international sanctions, in particular, by masking routes, changes shipowners and registrants documents, as well as using less transparent ports for transshipment of oil.

However, international community quickly reacted to this an attempt to go around sanctions. In response were introduced new ones restrictions which directly concerned operations with the "shadow fleet" as well increased control over insurance and financing of vessels, which they can participate in transportation Russian oil These measures led to growth discounts on the Urals brand oil, which he sells Russia that temporarily increased the discount from \$13.7 to \$18.3 per barrel in the period from September 2023 to January 2024.

Sanctions against Russian of the energy sector led not only to a significant abbreviation of income from oil, but also to changes in geography to supply this strategic resource. The main factor was the limitation of Russia's access to key transport and financial channels. In particular, oil trade with India, one of the largest buyers of Russian oil after the start of the war, suffered essential changes Dixi Group reports that India in the first quarter of 2024 in full stopped purchases Russian oil that was transported by "Sovcomflot" sub-sanctioned tankers. Oil that used to be was delivered to India replaced Iraqi and American oil that indicates effort of India to lower dependence from Russian export because of fears of possible secondary sanctions from the West (*Hufbauer, Schott, & Elliott, 2009*).

Logistical problems became one of the main ones obstacles for Russia in support export oil sanctions made access to infrastructure difficult for tankers transportation that resulted in delays and increases transportation costs. Banks of China, Turkey and the United States Arabic Emirates (UAE) also began to implement tougher financial requirements operations with Russia, because they are afraid to get under American sanctions. It makes it difficult financing export Russian oil, even if it is sold to markets that remain open to Russia.

United Arabic The Emirates have banned Cameroonian - flagged vessels from entering their waters, a move that removes the emirate from risky vessels which were assembled for transportation of oil that got into under sanctions (*Lee & Longley, 2024*).

Except oil, export liquefied petroleum gas (LPG) as well experienced essential impact sanctions. Russian "Sybur" company, one of key exporters of LPG, faced a shortage of tankers for transportation its product to world markets. It caused by both supply sanctions new ones tankers, and physical ones damage infrastructure. In particular, the operation of the terminal in the port of Ust-Luga, which plays back important role in transportation of the Russian ZNG, was complicated by drone attacks that led to additional delays and risks for transportation (*DiXi Group, 2024*).

It is worth noting that supply and logistics issues deepen general trends on the market oil Sanctioned pressure from the West countries, in particular new ones restrictions on the activities of the "shadow fleet" - tankers that help of Russia go around sanctions lead to more and more

complication export processes. It indicates growth efficiency sanctions measures and that Russia forced to find new ones, less and less convenient and profitable ways to sell oil

Although tough sanctions restrictions introduced against energy sector of Russia, its macroeconomic stability demonstrates relative stability. One of key factors that support Russian economy, remains export oil According to KSE Institute, in the first half of 2024 monthly income from export oil averaged \$17.3 billion, which is 22% more compared to similar period of 2023. This allowed not only Russia to save currency income, but also to form a current account surplus balance of payments which reached \$40.6 billion (*KSE Institute, 2024*).

This surplus plays an important role in maintaining economic stability, as it provides sufficient foreign exchange to cover budget deficits and import costs. However, it should be noted that the increase in export earnings was not the result of increased oil sales, but rather the result of higher global oil prices, which helped Russia offset the discount on its oil due to sanctions restrictions.

Despite the increased military spending action and increase burden on the budget, as of June 2024, the federal budget deficit decreased by 60% to 930 billion rubles compared to the first half of 2023. To this contributed not only growth in export income, but also strict austerity measures, as well increase taxes and export duties to energy carriers (*KSE Institute, 2024*).

However, despite these positive macroeconomic indicators, Russian economy faces serious challenges One of the main ones problematic aspects is high level inflation. Central Bank of Russia was forced to use measures for deterrence inflationary of pressure by increasing key rate at 1050 basis points from mid -2023. It was not meant to be to limit domestic demand and stabilize prices, but inflation continues to stay high levels due to growth cost imported goods and depreciation of national currency (*KSE Institute, 2024*).

High level inflation negatively affects the purchasing power ability population, increasing cost life, especially for those who depends on from imported goods In addition, due to limited access to foreign technologies and capital Russian business faces more and more problems in support and updating production capacities that maybe to limit economic growth in the future.

Losses in Russia is one of the most significant in the European natural gas market, consequences in energy sanctions and restructuring energy EU policies. To the beginning full-scale war of Russia against of Ukraine Europe was the biggest consumer of Russian gas, and Russian Gazprom controlled significant share of European market. After aggression of Russia, The European Union, trying to reduce your addiction from Russian of energy resources, started active work on diversification of gas supplies and implementation of sanctions.

One of key elements of this strategy was implementation of sanctions against Gazprom and restrictions export Russian gas. EU significantly shortened purchases of Russian gas, replacing it for supply from others sources such as the USA, Qatar and Norway. A significant role in reducing dependencies of Europe from Russian gas was played back investment in renewables sources energy and development infrastructure for import of liquefied natural gas (LNG), which allowed the EU to significantly lower vulnerability to possible energy blackmail from Russia (*DiXi Group, 2024*).

Because of the loss, the European market for Gazprom for the first time since 1999 damages because he could not quickly reorient its deliveries to other markets. In particular, Russia tried to increase volumes of export to countries of Asia, such as China and India, however, due to logistics limitation and absence of necessary infrastructure, such deliveries could not be made to compensate losses to European market.

Also, try of Russia use gas flows as leverage the EU was put under pressure failures Reduction gas supply or its complete termination due to "Nord Stream-1" and "Nord Stream-2" did not lead to the expected growth energy prices, but instead sped up decision Europe from full rejection from Russian gas. European countries also became more united in their own efforts of software energy security, that yet more reduced odds of Russia for recovering supply in the coming years.

Apart from economic losses, Russia collided with infrastructural ones challenges because some gas pipelines, which earlier supplied gas to Europe, now idle or are used much less Restoration full-fledged cooperation with European partners in the gas industry sphere unlikely due to changes geopolitical situation and implementation long-term sanctions.

In the first Western quarters of 2024 countries much strengthened sanctioned pressure on Russia, focusing on strategic important sectors of the economy and schemes that allowed circumvention of previous ones restrictions. One of the basic directions became implementation of new secondary sanctions against the so-called "shadow fleet" - networks of tankers, which Russia used for transportation of oil to bypass installed price limits and embargoes. Under influence of these measures significant part of the fleet stopped that made it difficult to export oil increased logistic costs and forced Russia to search new ones methods to support their own energy supplies (*Longley, 2024*).

Sanctioned pressure on the "shadow fleet" was accompanied strengthening of control over the maneuvers of vessels, which were often performed atypical operations, trying to avoid detection The USA, EU and Great Britain actively monitored violation that forced Russia change routes and methods transportation oil, causing temporary abbreviation volumes export.

Apart from sanctions against the "shadow fleet", the USA and Great Britain introduced a new set of restrictions aimed at against of the "Arctic LNG-2" project, one of the key ones for Russia economy. The project faced serious problems due to impossibility to get specialized tankers arctic class required for transportation of liquefied natural gas. From the planned 21 tankers are ready for operation were only 3, and construction the rest of the ships were frozen due to rejection Korean and Japanese companies continue cooperation This put under a threat implementation of "Arctic LNG-2" and significantly lowered prospects export of Russian LNG from the Arctic region.

The European Union in its turn strengthened supply sanctions foreign equipment needed for support oil refinery industry of Russia Because of this the company "Lukoil" reduced production of high-octane gasoline at the Nizhnegorod Refinery twice, because she could not replace damaged catalytic converter cracking Lack of access to modern equipment and technologies makes it difficult support technological processes in Russian enterprises that lead to a decrease productivity and efficiency (*Longley, 2024*).

In addition, the EU introduced new compliance control rules price restrictions on Russian oil and oil products. These measures are aimed at to cover opportunities for detour sanctions through third parties countries and virtual schemes that included the sale of Russian oil at an undervalued price.

Countries of the Collective Security Treaty Organization (CSTO) are primarily helping Russia circumvent sanctions. For example, Kazakhstan can resell oil and gas industry equipment to Russia, as it uses similar equipment (*Koval & Bernatskyi, 2023*).

Conclusions. Thus, the sanctions imposed on the Russian energy sector have proven effective as a tool of economic pressure. They not only reduced Russia's oil export revenues but also significantly complicated its ability to modernize its energy infrastructure and limited its access to international financial markets. The loss of \$78.5 billion from oil exports and the need for investments in the "shadow fleet" indicate the serious economic pressure Russia is under.

Russia has managed to partially compensate for its losses due to the rise in global oil prices and the creation of a "shadow fleet." However, these measures have not solved all the problems, and the pressure from sanctions continues to lead to increased transportation costs and complications in export processes. Investments in new tankers and attempts to circumvent sanctions by changing routes have only partially helped Russia, but these measures are not a long-term solution to the problem. Despite the sanctions, the Russian economy continues to show relative resilience thanks to high global oil prices and a surplus in the balance of payments. The reduction in the budget deficit and the preservation of foreign currency inflows indicate Russia's ability to maintain macroeconomic stability, even despite rising inflation and difficulties accessing foreign technologies.

However, the loss of the European natural gas market is a significant blow to Russia. The reduction in supplies and the shrinking of the market share, where Gazprom once dominated, demonstrate serious economic and infrastructural losses. The lack of opportunities to quickly redirect supplies to new markets and the inefficiency of gas leverage on the EU complicate the situation for Russia.

New sanctions, particularly against the "shadow fleet" and the Arctic LNG-2 project, as well as the tightening of control over compliance with oil price caps, have significantly

complicated Russia's economic operations. These sanctions threaten the implementation of strategically important energy projects and limit the ability to bypass previous sanctions.

Thus, sanctions have become a powerful tool for impacting the Russian economy, but Russia continues to adapt to new conditions, using various strategies to maintain its economic and energy interests. Meanwhile, Western countries continue to refine the sanctions regime to increase pressure on Russia and support global stability.

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