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Глобальный газовый транзит: новые цепочки поставок

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Аннотация: обострение отношений между Россией и западными странами в начале 2022 года положило начало формированию новых цепочек поставок энергетических ресурсов, в частности, экспорта газа. Глобальный энергетический транзит тесно связан с фундаментальными проблемами в мировой экономике, которые обострились в период пандемии коронавируса. Эмпирические данные показывают, что новые цепочки поставок углеводородных ресурсов кардинально изменили расстановку сил на мировом рынке. Это произошло под влиянием ценовой политики, а также конъюнктуры спроса и предложения на рынке. Рассматривая газовый рынок в качестве системы из взаимосвязанных участников: производителей и потребителей, в исследовании делается вывод, что энергетический транзит определят итоги экономической конкуренции, развернувшейся между Россией и Западом, а также скорость создания инфраструктуры, необходимой для создания и транспортировки сжиженного природного газа. При этом перспективы низкоуглеродной энергетики не так очевидны. Прежде всего, из-за высоких затрат и неготовности многих стран вкладывать значительные средства. В исследовании делается вывод, что реструктуризация глобальных цепочек поставок энергетических ресурсов отвечает интересам отдельных развитых государств. В целом, современные процессы в мировой энергетике представляют собой фундаментальные тренд, который связан с переходным периодом развития мировой экономики. Статья вносит свой вклад в знания, предоставляя всесторонний обзор, посвященный новым процессам в энергетической сфере.

Ключевые слова: энергетический транзит, логистика, сжиженный природный газ, газовый рынок, США, ЕС, Россия, Китай, арабские страны

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The global gas transit: new supply chains

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Abstract: the aggravation of relations between Russia and Western countries in early 2022 has marked the formation of new supply chains for energy resources, particularly gas exports. Global energy transit is closely linked to fundamental problems in the world economy, which were aggravated during the coronavirus pandemic. Empirical evidence illustrates that new hydrocarbon supply chains have dramatically changed the balance of power in the global market. The reasons for this were the pricing policy as well as the supply and demand conditions in the market. Considering the gas market as a system of interrelated participants: producers and consumers, the study concludes that energy transit will be determined by the outcome of the economic competition between Russia and the West, as well as the speed of building the infrastructure necessary for the creation and transportation of liquefied natural gas. At the same time, the prospects for low-carbon energy are not so obvious. First of all, the high costs and the unwillingness of many countries to make significant investments hamper a transition. The study concludes that the restructuring of global energy supply chains is in the interests of some developed countries. In general, the current processes in the global energy sector represent a fundamental trend that is associated with the transition period of the world economy. The paper contributes to the knowledge by providing a comprehensive overview of the new processes in the energy sphere.

Keywords: energy transit, gas market, liquefied natural gas, logistics, USA, EU, Russia, China, arab countries

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INTRODUCTION

Supply chains of hydrocarbon resources through pipelines have evolved over decades and have been characterized by stability. Stable supply chains of suppliers, transit states and consumers have developed within specific regions. The European gas industry has historically relied on long-term contracts to develop gas fields and finance long-distance cross-border pipelines [1]. Major exports to Europe were made in the east-west direction, and north-south deliveries were small. This has changed rapidly in recent years, due to the development of the liquefied natural gas (LNG) industry and the construction of modern gas carriers capable of delivering large volumes of gas over long distances. New LNG supply chains to the European gas market from the United States of America (US), Australia and Qatar have started to emerge. Large volumes of gas were supplied to the Asian

market. Thus, relations between separate regions, which had previously been isolated from each other, began to develop. At the same time, discussions were initiated on new pipeline projects, which had already been considered as additional infrastructure in global LNG supplies.

Fundamental changes in the energy market accelerated during the coronavirus (COVID-19) pandemic that began in March 2020. COVID-19 caused severe shocks and disrupted between 78% and 95% of organizations involved in value chain networks [2]. In March of the same year, oil prices plummeted — Brent crude oil prices have fallen below $46 per barrel [3]. A year later, in February 2021, it rose to $67 per barrel and remained at that level throughout the year [4]. In 2022, the oil price increased to over $100 per barrel [5] and by the end of the first half of the year reached $120 per barrel [6].

Unlike the oil market, which managed to recover by 2022 and began to demonstrate strong production growth and price stability, the global gas market has entered a period of transformation. Until 2019, the main growth in demand for LNG was provided by Asian countries, primarily China, then Europe became the main consumer of LNG. At the same time, the growth rate of LNG imports to China decreased from 40% to 16% [7]. Overall, a 13% (40 million tons) increase in global LNG supply in 2019 (a record for the past decade) [8] set the stage for the subsequent development of interregional gas trade. As a result, a single global gas market with a high correlation between regional spot prices has been formed by that time.

The pandemic intensified negative trends both in the world economy and the world energy sector, although the real challenges started much earlier [9]. Thus, it was not possible to overcome the problem of external debt, which had a depressing effect on the development of the economies of different states. Sovereign debt began to accumulate during the global financial crisis of 2007-2009 and continued to grow in the time of the coronavirus pandemic [10]. However, the global financial crisis did not lead to a revision of economic policies in developed states, where "average growth rates averaged 2 percent per year between 2010 and 2019, compared with 2.4 percent between 2001 and 2007. Growth in developing countries fell from 7.9% in 2010 to 3.5% in 2019, with an average annual rate of just 5.0%, down from 6.9% in 2001-2007" [11].

According to the World Bank, the amount of external debt of low- and middle-income countries in 2020 increased by an average of 5.6% to $8.7 trillion [12]. At the same time, in most countries the increase in external debt occurred against the background of lack of GDP growth [12]. "The key feature of the crisis situation in 2020 is the impact on the economy from both the supply and demand sides at the same time. The self-isolation has led to a significant decline in aggregate supply, since the bulk of goods and services cannot be produced remotely. The economy was even more adversely affected by the decline in aggregate demand, and not only in terms of investment and foreign trade, but also in terms of household spending" [13]. As a consequence of the negative events of 2020, during the coronavirus pandemic, the world economy shrank by 4.3% [14]. The value of merchandise exports decreased by 7.5% and trade in services decreased by 19.9% [15]. Overall, the volume of world trade declined by 9% in 2020 [16]. As a result, "international trade growth rates began to decline well before the pandemic, starting in the first quarter of 2018, and turned negative in the third quarter of 2019, when nothing was yet known about the coronavirus" [17].

The impact of the pandemic on hydrocarbon supplies was minimized by the efforts

of individual states that used fiscal policy to support their economies. This kept demand in the economy intact, reinforcing the need for energy resources.

EUROPE FORMS A NEW ENERGY MAP

The gas supply chains on the European gas market started to change under the EU policy aimed at diversification of gas supplies from Russia and increasing of the use of renewable energy sources. This approach was implemented in the context of the so-called Green Deal. The document was presented by the European Commission in December 2019 [18]. The European Green Deal covers all sectors of the economy that affect CO_2 emissions, including transportation, energy, agriculture, construction, as well as steel, cement, textiles and chemicals [19]. However, this has proved difficult, as both the demand and supply of fossil fuels need to be reduced [20].

EU policies aimed at liberalizing the natural gas market in Europe have played a key role in replacing Russian gas with LNG. As a result, LNG imports to Europe have increased [1]. This allowed total LNG imports to Europe to increase by 47.1 billion m^3 (69.4%) already in 2019. At the same time, the growth was primarily due to increased supplies from Russia (+13.7 billion m^3), as well as additional volumes from the US (+14.6 billion m^3) and Qatar [21].

The situation on the European gas market began to change in 2019, when the extreme heat in Europe resulted in a record high level of gas reserves in underground storage facilities. This was facilitated by market participants' desire to offset the risks of a possible cessation of gas transit through Ukraine. The record high level of reserves put pressure on the prices of European trading hubs [21]. However, Europe already had a cold winter in 2020 and a warm summer in 2021, which led to an increase in energy consumption. Although the LNG price increase started in the spring of 2021, the EU made significant efforts to keep the gas price from rising. This proved difficult to do as there was a fall in gas production in Europe by 11 billion m^3. High prices in Asia made the Asian market attractive for LNG from the US. This decreased exports to Europe by 14 billion m^3 of gas [22]. The reduction of supplies to the European market increased the price of this type of hydrocarbon raw material. As a result, the price of gas on the spot market increased more than tenfold between mid-2020 and mid-2021. In September 2021, a thousand cubic meters of natural gas already cost $1,100, reaching $2,000 per thousand cubic meters in October [22]. In March 2022, the price exceeded $3,600 per 1,000 m^3 of gas [23]. The price increase was due to limited supply from a number of suppliers, low filling levels in European underground storage facilities, a cold winter and a hot summer in 2021. "A fierce competition between Europe and Asia for flexible LNG supplies has raised spot prices to record levels" [23].

Until 2021-2022, 40% of gas supplies to the European market were distributed between the UK, the Netherlands and Norway, and 40% came from Russia. Another 20% of natural gas is supplied from North Africa — Algeria and the Middle East [24]. Russia was one of the main suppliers of hydrocarbon resources to the European market. Gazprom is the largest supplier of natural gas to Europe. The capacity of the EU natural gas market was estimated at about 400 billion m^3 per year. Russia's share of the EU market increased from 31.2% in 2012 to 44.7% in 2019 due to a decrease in imports from Norway (from 29.4% in 2012 to 21.3% in 2019) and production from the Netherlands. Meanwhile, gas imports from the US to Europe have also steadily increased, reaching 4.1% in 2019 and 6.7% in the first half of 2020 [25]. Nevertheless, Russia still led the way in 2020, supplying the EU with

around 44% of natural gas, with Germany and Italy being the main consumers [26].

Vice-President of the European Commission, Maroš Šefković, believed that the EU would need 50-60 billion m3 of gas from other sources to replace supplies from Russia [27]. Sindre Knutsson, Vice-President of Rystad Energy, said: "Assuming that Europe attracts all new volumes from the Atlantic basin in 2022 and additional supplies that previously went to Asia, I think the increase will be 32.5–45.5 billion m3. That is what will work" [28]. While there were no additional free LNG volumes. Former Italian Prime Minister Romano Prodi noted that in the short term, Europe would not be able to find a replacement for Russia as a natural gas supplier [29], and LNG supplies to Europe would not be able to fully replace gas transit through the Nord Stream pipeline (the Nord Stream-1 and Nord Stream-2 pipelines were blown up in September 2022) [30]. Accordingly, it was believed that the EU should either reconsider its politically motivated position on Russian gas or follow the previous course by creating conditions for maintaining high prices on the European gas market.

However, the results of 2022 showed that gas exports to European countries decreased by 80 billion m^3 to 62 billion m^3. At the same time, the reduction in supplies from Russia was not compensated by a similar volume from other sources. LNG supplies to Europe amounted to only 55 billion m^3. So, the gas shortfall was offset by a reduction in consumption. This had a negative impact on the industry of European countries [31]. The countries that suffered the most were those that had production facilities that use gas in significant quantities.

INFRASTRUCTURE BARRIERS

Over the last decade, the EU has been pursuing a course to reduce the share of Russian gas in the European market, betting on increasing LNG supplies. It has come to be seen as an alternative to Russian natural gas. Despite the EU's efforts, the European market has accounted for only 30% of LNG exports in recent years [24]. It was impossible to fundamentally change the supply system for a number of reasons, including the existence of long-term Russian supplies with European companies and the lack of necessary infrastructure for receiving LNG. The EU's approach to cooperation with LNG suppliers, which did not imply signing long-term contracts, had an impact [32]. The connection between the EU countries located on the coast and those in the center of the mainland remained weak.

LNG producers and consumers are concerned about the infrastructure needed for supply. Without this, it is difficult to expect an increase in LNG trade. The main problem for the European Union was the delivery of hydrocarbon resources not only to Europe's shoreline but also to distribute them within the continent. Accordingly, the geographical location of LNG supplies gave significant advantages to countries that were located on the coast and had facilities for receiving hydrocarbon resources [33].

A key problem was the lack of the necessary number of terminals. Some European countries have LNG terminals. For example, they were built in France, the Netherlands and Belgium and were already operating at 80–90% of their capacity. Germany, which consumed the most gas of all European countries, had no terminals. A total of 22 terminals were operating in Europe, including facilities in the UK. In 2021, European countries imported about 79 million tons of LNG. At the same time, there was only 65 million tons of available regasification capacity in the EU, which is almost half of the LNG volume that should replace Russia's pipeline gas [34].

European countries (Italy, France and Germany) have considered options for floating LNG terminals. For example, in northern

France, authorities and companies wanted to install a tanker — a regasification terminal [35]. Similar efforts were made by Italy, expecting to purchase one floating terminal and lease a second one. They are to be located in the ports of the Tyrrhenian and Adriatic seas, where the gas infrastructure has already been created [35]. The capacity of the terminals should be 10 billion m^3. Germany wanted to locate three regasification terminals with a capacity of 27 billion m^3 per year in the Baltic and North Seas [36].

Building floating LNG storage and regasification terminals, as well as creating facilities for further gas distribution among European countries, takes time. However, the problem was that even if LNG was delivered to Europe, there would not be enough capacity to cover the needs of the countries in the region. Finally, natural gas production and liquefaction contributed significantly to CO_2 emissions [37].

Price shocks in the European gas market in 2021–2022 initiated new trends in the previously formed hydrocarbon supply chains. They changed the policy of LNG suppliers and led to a revision of the EU's approach to supplying the European gas market. Diversification of sources and search for new routes of hydrocarbon resources supply became the key task. The EU sought to reduce the share of Russian gas in the European market and reorient towards new suppliers.

THE EU TRANSFORMS THE GLOBAL GAS MARKET

The EU policy aimed at replacing Russian gas has influenced the development of the global gas market. First of all, it affected the growth of prices for LNG coming from the US, Australia and Qatar. These suppliers increased spot prices in response to a sharp increase in demand for their products. At the same time, new price trends in the gas market provoked an increase in the cost of electricity, which has a "gas" component. Prices for coal supply, which has retained its position in the global energy sector, have also increased. Due to its low price compared to gas, coal is still used by many countries. As a result, the transformation of the gas market, the pace of which has accelerated under the influence of the EU policy, can be characterized by a number of features. On the one hand, it is the influence of objective market factors that determine the price dynamics and affect not only the energy sector of European countries, but also the whole European industry. On the other hand, non-market instruments applied by the EU in the implementation of its energy policy should be emphasized. Moreover, as far as Russia is concerned, which until recently was the main gas supplier, political logic dominates. This situation forces the Russian side to minimize the consequences of the EU's energy policy. Russia has responded by taking extraordinary decisions aimed at reorienting gas supply routes.

Despite the challenges in realizing the ambitious project, the EU promoted the idea of reducing dependence on Russian supplies. Thus, on May 18, 2022, the European Commission presented the REPowerEU plan, a response to the disruptions in the global energy market caused by the events in Ukraine [38]. It stated the need to transform Europe's energy system based on two objectives: fighting climate change and reducing the dependence of EU countries on Russian hydrocarbon fuels by 2027, while ensuring the sustainability of the energy system of European countries [39]. In line with these objectives, the EU intended to reduce demand, diversify fuel sources while building appropriate infrastructure, and accelerate the transition to renewable energy sources [39].

According to the European institutions, "REPowerEU is about rapidly reducing our dependence on Russian fossil fuels by accelerating

the clean energy transition and joining forces to achieve a more sustainable energy system for the EU" [38]. President of the European Commission, Ursula von der Leyen, has proposed that the EU would end its dependence on Russian hydrocarbons, including gas, by 2027 [40]. It emphasizes the importance of coordinated action to reduce dependence on Russian nuclear materials and fuel cycle services [41].

The shift away from Russia required targeted EU-wide investment in gas infrastructure. In line with reducing the share of Russian energy resources, the European Union is seeking to increase LNG supplies from the United States and Canada; strengthen cooperation with Azerbaijan, especially in the Southern Gas Corridor; conclude agreements to increase LNG supplies with states such as Qatar, Egypt, Israel and Australia; and explore the export potential of sub-Saharan Africa [42].

GAS SUPPLIES FROM QATAR

Qatar, as the third country in the world in terms of proven natural gas reserves with 24.7 trillion m^3 (12.4%) [43], and it is considered as one of the promising gas suppliers to the European market [44]. In 2021, Qatar exported 77 million tons of LNG [45], which was mainly exported to the Asian market. The share of Qatari gas in the European market is 5% [46].

The EU's relations with the country in the gas sector have been complicated. Qatar focused on signing long-term contracts with the main consumers of its gas in Asia. This allowed this country to become the second largest LNG exporter in the world in 2020 [47]. However, each side promoted its own vision of cooperation in the gas sector. In March 2022, German Minister for Economic Affairs and Climate Protection Robert Habeck held talks with Qatar on Qatari LNG supplies [48]. At the same time, as Federal Minister Habeck emphasized, "the German authorities did not plan to completely replace raw materials from Russia with supplies from Qatar" [48]. As the Qatari energy minister noted "neither Qatar nor any other single country is able to replace Russian gas supplies to Europe with liquefied natural gas in case of disruptions due to the conflict between Russia and Ukraine" [49].

Qatar considered the possibility of increasing gas supplies to Europe, but only in the long term. This was due to the fact that Qatar did not have free gas volumes that could radically change the situation in the European market. In addition, there is competition for Qatari gas from Asian countries. For example, by 2020, 75% of the exported Qatari gas was purchased by the countries of Northeast Asia [50], which, in turn, are focused on long-term contracts. In particular, in 2021, South Korea signed another long-term contract that provided for LNG supplies to South Korea for twenty years from 2025 [51]. A similar agreement was signed with the People's Republic of China, which has consistently pursued a policy of developing a network of LNG terminals under common technical standards [52]. From 2022, a new contract with China has been in force for 15 years [53]. Thus, long-term contracts in Asia reduced Qatar's ability to redirect its supplies to Europe and compensate for gas supplies from Russia. It was only a matter of reducing gas shortages, not replacing them. Qatar was ready to increase gas supplies to Europe by only 10-15%, which would amount to 8-9 billion m3 by the end of 2022 [28].

Qatar expected to reach the production level of 110 million tons of LNG by 2026–2027. At the same time, the question of the geography of its supplies remains open [28]. In recent years, gas supplies from Qatar have been mainly linked to buyers in Asia and other countries under long-term contracts. The Golden Pass LNG Terminal, jointly owned by Qatar Energy and ExxonMobil, is due to come on stream

in 2024. This could partially replace Russian gas, which at the same time will cost more. Finally, the EU gas market is not a priority for Qatar's energy strategy. So far, the EU market plays a supporting role for Qatar, allowing it to channel surplus gas to it. Qatar still relies on the Asian gas market, which remains its priority. In the short term, supplies to Europe may be made in small volumes.

Qatar is not going to fundamentally change its policy. All the more so because it has yet to reach an agreement with Europe, which opposes long-term contracts. Qatar insists on concluding long-term contracts [54] and pursues a policy aimed at maximizing the sale of LNG produced and is interested in increasing the share of gas to be supplied under long-term contracts. Qatar also proposed to introduce a ban on the resale of supplied gas outside the EU; to stop antitrust investigations. These Qatari demands contradict the EU's policy, which over the last decade has promoted an approach of rejecting long-term contracts.

In addition to Qatar, one of the new suppliers of gas supplies to the European gas market could be the US. In 2021, they supplied 22 billion m3 of LNG to Europe [55] and declared their readiness to increase the volume of gas supplies to the European market. According to US President Biden, "The US and the EU will take concrete steps to end dependence on natural gas from Russia. The U.S. will work with its international partners to deliver an additional 15 billion m3 of LNG to Europe this year" [56].

The limited opportunities within the EU to replace Russian hydrocarbon resources increase attention to new supply routes. The Southern Gas Corridor is considered as a promising route for gas exports to the European market. The project was implemented in 2018 to transport Azerbaijani gas to Italy and Greece. This has put Azerbaijan among the countries that have also become a minor influence on the European gas market. The EU's support for this energy project was dictated by the desire to create an alternative corridor for the supply of hydrocarbon resources. Accordingly, this project was viewed through the prism of increasing energy security in Europe [57].

In 2021 Azerbaijan supplied about 10 billion m3 to Europe, and in 2022 — 11.4 billion m3. In the long term, Azerbaijan can enter the European gas market with at best 30 billion m3 of gas [58]. Gas supplies from Azerbaijan to southern Europe can only supplement, but not replace Russian hydrocarbons. It is obvious that Azerbaijan cannot compete with Russian supplies either now or in the future [59].

The situation on the gas market has prompted the EU in 2022 to revise the requirements aimed at transition to "green energy". The attitude towards gas and nuclear power became more loyal [60]. The requirements for the use of coal, which is considered as a substitute for gas, have been also revised. Thus, in 2022, EU countries, including Germany and Italy, revived previously decommissioned coal-fired thermal power plants [61].

The leading EU countries, such as Germany, have already been hit hardest by the restructuring of hydrocarbon supplies. Germany's refusal to import energy from Russia has brought significant costs. Without negative implications for its own economy, it will be difficult for the country to finally give up Russian gas supplies in a short period of time. First of all, because of the lack of the necessary free volumes of natural gas. In addition, Germany does not have the capacity to import liquefied natural gas. According to Robert Habeck "Germany has not guaranteed itself sufficient gas supplies to meet its domestic demand next winter (2022-2023 — author's note)" [62]. As a result, energy-consuming sectors such as fertilizer production, petrochemicals and the steel industry have been hit first and foremost [63].

The reorientation of gas supplies to Germany from Russia to the United States and other countries will create additional opportunities for the country in the long term, but will also bring new risks. Instead of supplying gas through pipelines, which were governed by long-term contracts, Germany is pursuing a shift to offshore gas trade. This forces Germany to pay attention to port development and port infrastructure. Such a change increases the dependence on maritime supplies and the volatility of the global gas market. Pipeline gas supplies to Europe will be minimized [64].

RUSSIA'S ROLE IN THE FORMATION OF NEW LNG SUPPLY CHAINS

The decrease in natural gas supplies in 2021–2022 via pipelines from Russia was partially offset by an increase in LNG production and exports. Of the 79 million tons of LNG delivered to Europe in 2021, 14 million tons came from Russian producers — Yamal LNG (13.3 million tons) and Cryogas — Vysotsk (0.7 million tons) [65].

According to a long-term programme for the development of liquefied natural gas production, which was adopted in Russia in March 2021 [66], LNG production should increase to 120–140 million tons per year by 2035 [66]. For this purpose, state support should be provided to LNG projects and incentives should be offered for exploration in the Arctic. In particular, new LNG production facilities built in the Arctic should come into operation from 2023. Their capacity is almost 20 million tons [68]. If these plans are realized, it will allow Russia to become one of the leading exporters along with the United States, Qatar and Australia [69].

In June 2022, the Russian government approved a programme to subsidize the development of its own liquefied natural gas technologies. According to Deputy Prime Minister Alexander Novak, "if today (2022 — author's note) Russia produces only 30 million tons of LNG, in the long term we can reach 100 million tons per year" [70].

CONCLUSION

The global demand for LNG is growing every year. This fact increases the level of competition among consumers. The demand for LNG is expected to double to 700 million tons by 2040, compared to 360 million tons in 2020 [71]. Based on these projections, hydrocarbon suppliers try to capitalize on the highly volatile LNG supply situation. This makes the need to develop sustainable LNG supply chains all the more imperative [72].

The policy of avoiding long-term contracts has had negative implications both on the European gas market. Replacing cheap Russian pipeline gas with expensive LNG from the US makes the energy component of European costs more expensive and has directly worsened the competitiveness of European products on the world market [73]. This could complicate the transition to "green energy", which aims to replace high-carbon fossil fuels with low-carbon clean energy [74].

The role of export pipelines has changed, but there is no complete abandonment of their use. LNG has displaced pipeline transportation, rapidly changing the balance of power in regional markets. However, despite the seeming decline in the role of pipeline transportation, we should expect to see an increase in the construction of a network of new pipelines in Europe to supply the continent. These should be integrated into global LNG supplies. Such restructuring of the Eurasian energy space will lead to the emergence of new LNG supply centers [43].

The rejection of Russian gas will expand the opportunities for LNG-producing countries, which are interested in strengthening their influence in the European gas market. The US intends to strengthen its position.

In this case, European countries will become dependent on more expensive gas. In particular, gas from Qatar in the future will be more expensive than the resources used by European companies until recently. At the same time, Qatar itself is not ready to reorient all its LNG exclusively to the European market.

So far, the EU continues to adhere to the implementation of the course on the creation of a "green economy". Although "the limitations of green energy development are becoming increasingly clear: the need to make huge investments in the development of economically viable technologies; the expected acute shortage of metals needed for energy transit, including lithium, nickel and cobalt; and the low efficiency of low-carbon solutions. Future policies should combine decarbonization goals with energy security constraints to ensure a smooth and secure transition to a more sustainable energy system [75].

Over the last decade, LNG production has increased from 223.8 million tons to 356.1 million tons per year [43]. Two importing regions, Europe and Asia, are mainly competing for these volumes. The global gas market will develop depending on which region turns out to be more attractive for LNG suppliers [76].

The formation of new hydrocarbon supply chains involves significant costs for the building of new facilities and modernization of existing ones. Moreover, the restructuring of supply chains is a lengthy process. As a result, energy diversification does not improve economic performance in the short term, especially in OECD and G20 countries [77].

The establishing of new global gas supply chains strengthens the position of LNG producers, who utilize technical and technological advances, and creates new conditions for a fundamental transformation of the world economy. This increases instability in international relations, and aggravate geopolitical competition. In this case, the transformation of the gas and oil markets may not be a temporary phenomenon. Accordingly, profound changes may cause new energy crises [78].

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