Azerbaijan's role in natural gas supplies to Europe

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On July 18, 2022, a *Memorandum of Understanding on a Strategic Partnership in the Field of Energy* was signed between the EU, represented by the European Commission, and the Republic of Azerbaijan, as part of Commission President Ursula von der Leyen's visit to Baku. Azerbaijan will double its gas supplies to the European Union, according to President von der Leyen. Von der Leyen stated: "Indeed, with this MoU, we commit to the expansion of the Southern Gas Corridor. This is already a very important supply route for the European Union, delivering currently more than 8 billion cubic meters (bcm) of gas per year. And we will expand its capacity to 20 bcm in a few years." Accordingly, this new MoU opens up new prospects for Azerbaijan to continue contributing to Europe's energy supply. Both parties reaffirmed strong expectations regarding Azerbaijan as a gas supplier to Europe. But how realistic is it to expect such supplies from Azerbaijan? What is Azerbaijan's current role in contributing to Europe's energy supply, and even if all plans are fully implemented, what role will Azerbaijan play?

Europe's natural gas supply

Before turning to the questions mentioned above, we need to look at Europe's gas supply system.

The European continent is not endowed with sufficient natural gas resources for self-sufficiency. According to the International Energy Agency (IEA), Europe's (Russia is not grouped with Europe by the IEA) gas demand in 2021 totaled 604 bcm of gas of which the EU's demand made up 412 bcm). Natural gas imports to Europe satisfy the bulk of its total gas consumption. In 2021, Europe produced 223 bcm of natural gas of which 50,5 bcm alone were produced by the EU. Among the

main natural gas producers in Europe—this includes Norway, Great Britain and the Netherlands—only the latter is an EU-member state. In other words, to ensure its domestic consumption—including, in 2021—the EU had to import 361 bcm of natural gas.

In 2021, 42,4% of the EU's imports of natural gas came from Russia (see Table 1). However, it should be noted that if Russia piped 153 bcm of natural gas to the EU, the existing infrastructure allowed for an increase of this figure to 276 bcm, with an average pipeline utilization rate of 55% over the same year. Norway supplied 24,4% of the EU's natural gas needs, and its pipeline capacity utilization was 81%.

Pipeline gas flows also arrive to Europe from Northern Africa and Azerbaijan. While the full capacity of gas pipelines in Northern Africa is 79 bcm, only 40 bcm of gas were imported in 2021. The same year, a total of 8 bcm of natural gas were imported from Azerbaijan. Azerbaijan supplies the EU via the Trans-Adriatic Pipeline, or TAP, which has a maximum capacity of 13 bcm/y (more on that later).

Table 1: Geographical distribution of natural gas exports to the EU

Exporting source/Supplier	Volumes, bcm	Maximum capacity, bcm	Utilization rate	Share in imports
Russia	153	276	55%	42,39%
Norway	88	109	81%	24,38%
LNG	72	187	39%	19,94%
Northern Africa	40	79	51%	11,08%
Azerbaijan	8	13	62%	2,21%
Total gas imports	**361**	**663**	**54%**	**100,00%**

The table is based on data available in the article: Bella G.D., Flanagan M., Foda K., Maslova S., Pienkowski A., Stuermer M., Toscani F. "Natural Gas in Europe: The Potential Impact of Disruptions to Supply." Working Paper. International Monetary Fund. July, 2022.

The reasons for the EU's high dependency on imports of Russian natural gas are related to the structure of the energy market. First of all, Russia is home to the world's largest natural gas reserves. According to the US Energy Information Administration (EIA), Russia has proven natural gas reserves of about 47,8 trillion cubic meters, while Iran follows with 34 trillion cubic meters, Qatar with 23,9 trillion cubic meters in reserves, Saudi Arabia with 15,9 trillion cubic meters, the US with 13,2 trillion cubic meters, and Turkmenistan with 11,3 trillion cubic meters in reserves. Other countries on the list hold less than 10 trillion cubic meters of natural gas reserves. For example, Azerbaijan's total natural gas reserves are estimated at 1,7 trillion cubic meters, according to the EIA, or 2,5 trillion cubic meters, according to BP. Azerbaijan ranks 15th-20th in the world in gas reserves.

Volume of reserves does not imply large-scale production. Thus, the US, which ranks 5th, is the world's largest producer of natural gas. US natural gas production in 2021 totaled 965 billion cubic meters, which represents a commanding 23,1% share of global natural gas production, ahead of Russia (762,3 billion cubic meters of natural gas or 17%) and Iran (256,3 billion cubic meters). That is, despite the fact that there is no significant difference between Russia and Iran in terms of natural gas reserves, Russia produces a three-times greater amount of gas per year. The two countries accounted for 40% of the world's natural gas production in 2021.

The US, which has a large-scale extraction industry, is also the world's top consumer of natural gas, consuming 88% of the natural gas it produces. The US accounts for 20,5% of the

world's natural gas consumption. Russia is ranked second in terms of consumption, accounting for 11,8% of the world's natural gas consumption and 67,6% of the natural gas it produces. And, as you can see, unlike the United States, 32,4% of the production in Russia remains for export. Because of this surplus, Russia is the world's largest supplier of natural gas. In 2021, Russia exported 251 billion cubic meters of natural gas; that is equal to the total production of Iran, 165 bcm of which was piped to Europe. Russia also owns the world's second-largest gas transmission system with a total length of 172 thousand kilometers. The US has the largest such system. The availability of necessary infrastructure and geographical proximity makes the EU more dependent on Russian natural gas and other energy products, including oil and coal.

Even before Russia's war on Ukraine, which began in February 2022, Europe had taken steps to reduce its dependency on natural gas. For example, according to a proposal for amending the EU's *Renewable Energy Directive*, an agenda adopted by the European Commission in 2021, the Commission sought to increase the directive's original target for renewable energy sources to at least 40% of the EU's overall energy mix by 2030. The 2022 war forced the EU to change this approach. In the short term, the most important issue was not a transition to alternative and renewable energy sources, but the minimization of dependence on Russian natural gas imports. As a result, the EU began to look for opportunities to free themselves from dependence on Russian energy. For example, whereas 34% of Germany's natural gas came from Russia in April 2022, this indicator fell to 9% by August. Other EU countries are also taking steps in this direction.

What are the alternatives to Russian gas?

And what are the sources with which the EU wish to replace Russian energy? Here, each member country has chosen its own option. For example, Germany increased Norway's share of the country's natural gas imports from 27% to 38%, and the

Netherlands increased their import share from Norway from 19% to 24%. Norway is currently mobilizing all its production capacity to boost gas supplies to Europe. Nevertheless, its capabilities allow for only an additional 21 billion cubic meters of natural gas in export, which is equal to only 13% of the EU's previous gas imports from Russia. The *Baltic Pipe*, a gas pipeline between Norway and Poland launched in October, can provide another opportunity for such efforts. Poland imported 10-11 billion cubic meters of gas from Russia per year. Thus, this pipeline can reduce Poland's dependence on Russian gas by transporting 6-10 bcm of natural gas per year (6,5 bcm in 2023 and 7,7 bcm in 2024).

The EU is also leveraging domestic sources. According to the calculations of the European Network of Transmission System Operators for Gas (ENTSOG), the Netherlands is trying to maximize its gas exports. Dutch gas exports to Germany have already risen to their maximum level during the 2nd and 3rd quarters of 2022, up from a normal level of around 11 bcm. The Netherlands has the opportunity to further increase its exports. For this, it must increase production at its large Groningen gas field (this field has the capacity to produce 40 billion cubic meters of gas (bcm) per year, while it currently produces 2,8 bcm). The local population opposes an increase in the volume of gas extracted from the field because of previous earthquakes that have occurred as a result of production. As a result, the government decided to phase out gas extraction in Groningen as quickly as possible to reduce the risk of earthquakes and even shut down production in 2022. However, the Dutch government extended the field's operating license until October 2023 after Russia's invasion of Ukraine. But Dutch Prime Minister Mark Rutte told journalists that he does not want to keep exploiting the Groningen gas field despite the current difficult situation.

As you can see, Europe is not able to replace gas supply lost from Russia with increases in European supplies alone. Therefore, Europe has also focused on liquified natural gas

(LNG) import flows. LNG is delivered to ports by tankers. In January-August 2022 net LNG imports to Europe rose by a stunning 65% (or 43 bcm) year over year, triggering a wholesale realignment of LNG trade flows around the world. The IEA forecasts that Europe's LNG imports will increase by 82,8 billion cubic meters by year-end, up 80% compared to 2021. On the other hand, we noted above (in Table 1) that Europe has room to import an additional 115 billion cubic meters of compressed natural gas compared to 2021. Despite this, the EU cannot fully use these capacities. The main reason for this is that the EU has not previously been recognized as a large consumer in the LNG gas market. Until this year, East Asia accounted for 73% of global LNG imports. Plus, 64% of global LNG supplies are estimated to be sold via long-term contracts, while spot and short-term contracts represent 36% of LNG trade. This also reduces the possibility for a sharp increase in compressed gas imports to the EU. High prices (compared to pipeline gas) also limit these opportunities, as soaring natural gas costs force industrial and energy producers to raise prices sharply, which tightens the market.

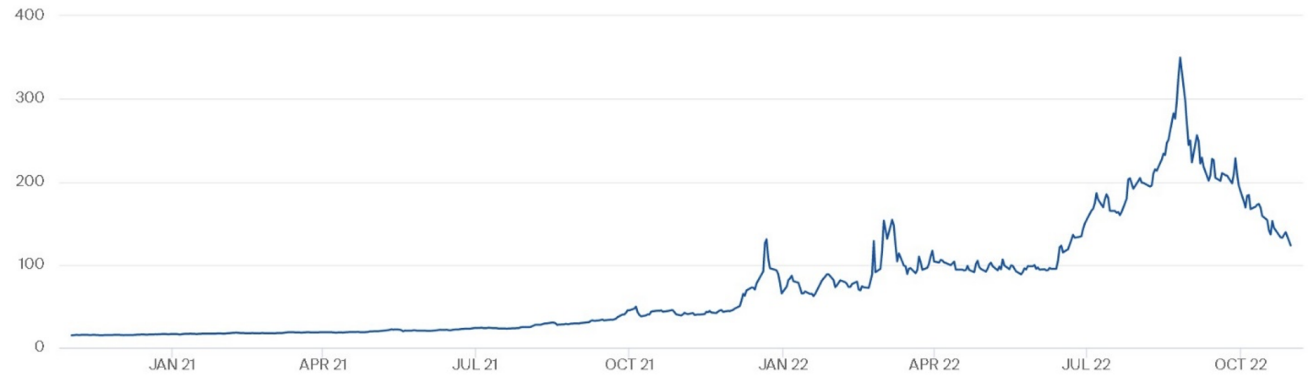
Table 2: EU natural gas consumption, *1.000 cubic metres*

Month	2021	2022	Difference
January	54 016 156	50 314 431	-6,85%
February	44 660 672	40 383 079	-9,58%
March	43 186 988	40 092 891	-7,16%
April	36 253 399	29 321 944	-19,12%
May	26 845 736	21 777 969	-18,88%
June	21 939 172	20 200 404	-7,93%
July	21 612 107	20 471 277	-5,28%
August	20 125 701	18 474 015	-8,21%
TOTAL	**268 639 931**	**241 036 010**	**-10,28%**

The table has been produced on the basis of data provided by Eurostat

A decrease in natural gas imports may also occur due to a decrease in gas consumption. Data from the IEA show that gas consumption in the EU could decrease to 548 billion cubic meters by the end of 2022. As can be seen from Table 2, during the first eight months of 2022, gas consumption in the EU plunged by 10,28%. Consumption cuts had been recorded even before the Russia–Ukraine War. Thus, consumption decreased by 6,85% in January and 9,58% in February. The consumption fell mainly because of soaring prices. As you can see, the price increase started even before the war. The war only exacerbated it.

Figure 1: Dutch TTF[1] gas futures contracts price



The price is calculated for 1 MWh. 10.55 MWh of electricity can be produced from 1.000 cubic meters)

What can Azerbaijan offer the European Union?

In 2021, Azerbaijan exported 20 billion cubic meters of gas, 61% higher compared to the previous year. EU countries accounted for approximately one-third of the total volume of Azerbaijani gas exports (see Table 3). Since the Trans Adriatic Gas Pipeline (TAP) was completed on October 13, 2020, after a construction period of four and half years. Before that, the pipeline had already started to perform the market test, but construction work was completed in October, and

natural gas export to Europe through the pipeline started in early 2021 (see Figure 2).

Table 3: Azerbaijani gas exports between 2020 and 2022 *(1,000 cubic meters)*

Importing source/countries	2020	2021	January-August 2022
Türkiye	9 890 255,95	9 849 813,69	5 657 952,53
Italy		6 111 680,99	6 377 720,10
Georgia	2 174 700,53	2 881 701,51	1 972 808,99
Greece	70 305,50	732 017,40	621 482,84
Iran	289 228,45	239 010,57	169 805,94
Bulgaria		232 426,06	254 217,50
TOTAL	12 424 490,43	20 046 650,22	15 053 987,90

Unless otherwise noted, all figures for Azerbaijan specified in the table here and below have been obtained from the official website of the State Statistics Committee (SSC) of the Republic of Azerbaijan

Data provided by the Azerbaijan's official bodies on the amount of Azerbaijani gas exported to the EU in 2021 are contradictory. Data from the Azerbaijani government, EU representatives and Eurostat show that Azerbaijan exported 8 billion cubic meters of gas to the EU in 2021. But according to the Azerbaijani State Customs Committee, this figure is 7 bcm. So where did the additional 1 billion come from? We find the answer to this question in *the Sector Report of the Natural Gas Market* published monthly by Türkiye's Energy Market Regulatory Authority (EMRA). So, according to the SSC,

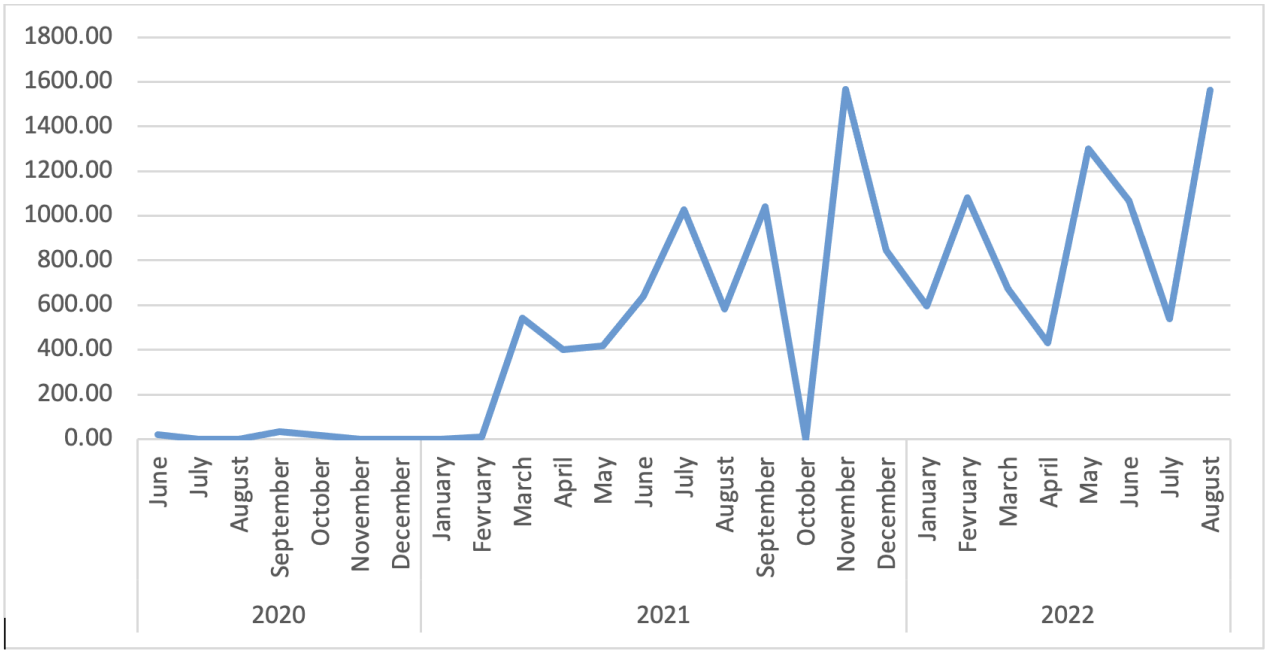
Azerbaijan exported 9,8 billion cubic meters of gas to Turkey last year (see Table 3). But according to EMRA, Türkiye in 2021 imported 8,8 billion cubic meters of natural gas from Azerbaijan. That is, the natural gas originally intended for Türkiye was later exported to Europe. The Ministry of Energy of Azerbaijan confirms this redirection, saying that a total of 8,5 billion cubic meters of gas was exported to Türkiye; that is, even less than the amount that Türkiye claimed to import. Thus, if we add the difference between these two indicators (1 billion) and 7 billion announced by the SSC, we get 8,1 billion cubic meters.

2022 saw a significant increase in the export of natural gas. Thus, in January-August 2022 alone, Azerbaijan piped 6,1 billion cubic meters of natural gas to Italy, 0,7 billion cubic meters to Greece, and 0,2 billion cubic meters to Bulgaria, up 109,3%, 46,5% and 68,8%, respectively, over the first 8 months of 2021. Despite this, the total natural gas export flows increased by only 13,7% compared to the same period of 2021. The main reason for this is the reduction of natural gas exports to Türkiye and Georgia, which are Azerbaijan's main export destinations. Exports to Turkey fell by 22,6% and to Georgia by 8,6%. That is, Azerbaijan reduced gas exports in two directions and redirected this volume to Europe. The main reason for this is a decrease in imports by Türkiye.

This year already Azerbaijan has exported 7,2 billion cubic meters of gas. The plan is to achieve 11,5 billion cubic meters through the end of this year. It should be noted that such plans are constantly subject to change. For example, Energy Minister Parviz Shahbazov, in his remarks at the Antalya Diplomatic Forum in March, said Azerbaijan in 2022 plans to export 9,1 billion cubic meters of natural gas to Europe. At the same time, it was noted in October 2021 that Azerbaijan plans to export 5-5,5 billion cubic meters of natural gas to Italy, Greece and Bulgaria during the year. What we can see from the statistical data is that at the time

when this statement was made, our export index was close to this figure. But November saw a record indicator—1.566 million cubic meters—in the volume of natural gas exports to Europe. The next record indicator was observed in August 2022. Most likely, the main reason for this was the price increase observed at that time (see Table 1).

Table 2: Azerbaijani gas exports by month (2020-2022) *(million cubic metres)*



Azerbaijan currently exports natural gas mainly through the Southern Gas Corridor (SGC). This corridor consists of several pipelines. The TANAP pipeline was commissioned in 2018 and has an initial gas release capacity of 16 billion cubic meters. The TAP pipeline was launched in 2020, and its capacity is estimated at 10 billion cubic meters. In 2022, the Interconnector Greece-Bulgaria (IGB) was also designated as the key route to carry gas from the Trans-Adriatic Pipeline. Once the IGB is launched, this connection will initially supply Bulgaria with an additional 1 billion cubic meters (bcm) of gas per year, and in the next stage, this volume will increase to 3 bcm.

Under the memorandum signed with the European Union,

Azerbaijan plans to expand the Southern Gas Corridor's capacity by at least two times, 20 billion cubic meters, by 2027, according to President Ilham Aliyev. Does Azerbaijan have the capacity and infrastructure for that increase? To determine this, we will examine the current situation from three perspectives (available resources, commitments and infrastructure).

Azerbaijan's proven reserves of natural gas and gas production

On March 4, 2003, the late President Heydar Aliyev said "proven oil and gas reserves in the Azerbaijan sector of the Caspian Sea are estimated at 4 billion tons of oil and 5 billion cubic meters of gas, and it is a field which can be used for 50-100 years." In 2015, President Ilham Aliyev maintained that "proven gas reserves amount to 2.6 trillion cubic meters. This means that Azerbaijan will be able to provide both itself and neighboring countries, as well as Europe, with large volumes of natural gas for at least 100 years."

Early on in this article I made mention of various figures on Azerbaijan's gas reserves. Thus, according to 2021 calculations from OPEC, Azerbaijan's gas reserves are estimated at 1,917 trillion cubic meters. The US Energy Information Administration estimates that Azerbaijan's gas reserves are equal to 1.7 trillion cubic meters. According to the 2018 data posted on the IEA's website, Azerbaijan's reserves are estimated at roughly 1,3 trillion cubic meters. According to BP's 2021 Report (it did not update it in 2022), Azerbaijan's total proven reserves are estimated at 2,5 trillion cubic meters of gas. As you can see, the figures differ from each other, which may be due to different accounting methods.

As for production, Azerbaijan in 2021 produced 43,9 billion cubic meters of natural gas, which is 6,6 billion cubic meters more than in 2020. Since 2016, total gas production has grown

1,5 times. And, according to *the Medium-Term Forecast for Oil and Gas Production until 2026* approved by the government, Azerbaijan is expected to see an annual increase in gas production until 2026, when gas production in the country will reach the strategic goal of 50 billion cubic meters per year.

Of course, part of the produced gas is used for domestic consumption. Azerbaijan's domestic consumption is equal to approximately 12-13 billion cubic meters per year, and the government should take this into account when making export plans. Considering general growth trends, domestic consumption is estimated at roughly 14 billion cubic meters in 2023, and 15 billion cubic meters in 2026. According to my calculations, only 22 billion cubic meters of natural gas will remain for export this year. This figure was also confirmed by representatives of the Azerbaijani government. Also, the government forecasts natural gas production should increase by 3 billion cubic meters between 2023 and 2026. That is, even if there is a slight increase in domestic consumption, this means that there will only be an additional 2,5 billion cubic meters for export. Thus, Azerbaijan will be able to increase this year's export index of 11,5 billion to the EU by only 2,5 billion. So, Azerbaijan's exports to the EU may total 14 bcm.

Energy Minister Parviz Shahbazov said the Southern Gas Corridor is working at maximum capacity to meet the forecast target of 11,5 bcm of gas. The Trans-Adriatic Pipeline (TAP) has reached maximum capacity of 33 million cubic meters of natural gas transferred per day, which means an average of about 12 billion cubic meters per year, according to CEO of TAP AG consortium Luca Schieppati. Taking this into account, the Trans Adriatic Pipeline AG consortium is considering 3 scenarios for expanding TAP capacity: limited – up to 14,4 billion cubic meters; partial – up to 17,1 billion cubic meters; and full – up to 20 billion cubic meters per year. In addition, TANAP should be expanded from 16 to 31 bcm per year. No concrete agreement has been reached on these plans. In an interview in September, Ilham Aliyev said "we only need to

upgrade the compressor stations, but still it is investment." As you can see, capital is also required from Europe. Plans have not been fully agreed—the memorandum is not yet binding—but completion is expected by the end of 2026.

What are the options?

There are neither resources nor infrastructure to realize Azerbaijan's gas export plans to the EU. On the other hand, even if the infrastructure existed now, Azerbaijan would not have the possibility to suddenly increase the gas supply to the EU to 20 bcm per year. Even with the scenario created by the government under the current conditions, Azerbaijan's annual gas production of 50 billion cubic meters will be achieved in 2026, and of this, the maximum export will be 14 billion cubic meters. If Azerbaijan is going to fulfill the goals set out in the Memorandum, the following 2 events must happen.

First, natural gas production should be increased. Azerbaijan's proven gas reserves are estimated at 2,5 trillion cubic meters, with the *Shah Deniz* gas field containing the bulk: 1,2 trillion cubic meters. At present, Shah Deniz almost achieved the maximum production. Only the third stage of the Shah Deniz project can provide an additional 15 billion cubic meters by 2030. But even according to the plans set out in 2014, production will start only in 2025 and beyond. Currently, the potential of the project is being calculated. At the same time, there are expectations from the Azeri and Chirag fields and the deep-water portion of the Guneshli field. According to forecasts, the field's first stage can produce 1,5 billion cubic meters of gas. Work on these fields has either not yet started or is going on passively. The development of these fields depends on BP and *TotalEnergies*. To develop these fields, the country needs sufficient investment. In return for this investment, the companies must have any sales guarantee for at least the next 25 years. This is not compatible with EU policy now. The EU's current move in

the natural gas market only covers the period up to 2030. This is not a sufficient period to invest in the development of these fields.

The more realistic route to achieving export goals is the second way, which involves the expansion of transit opportunities. During the first 8 months of 2022, Azerbaijan imported 495,8 million cubic meters of gas from Turkmenistan. Of course, this volume is not very large, but an agreement was signed between the two countries in late 2021. According to the agreement, the annual purchase will be around 1,5-2 billion cubic meters. Although this is not substantial, it can lead to a certain increase in exports. If Azerbaijan can pipe this gas to European markets (or its own natural gas while using Turkmen gas to meet domestic needs), the share of our country in the supply to the EU can reach a maximum of 16 billion cubic meters.

But will our role change in general? The point is that the EU needs to replace the 155 billion cubic meters of natural gas it receives from Russia. In 2022, natural gas consumption across the EU will decrease by 40,5 billion. If the price of natural gas in the world market remains at the same level, demand in 2023 will likely be the same as in 2022 or slightly more. As mentioned, Norway can supply an additional 27,5 billion cubic meters of gas, while 82,8 billion of the remaining demand will be provided by tankers. Actually, 4,2 billion cubic meters remain from the need of 155 billion cubic meters. Of course, it is cheaper to buy pipeline gas, and if prices stabilize, natural gas imports will increase. But even in such a situation, Azerbaijani gas will make up 5% of EU imports at best. At the same time, Algeria, which this year will supply 4 billion cubic meters more natural gas to Italy, and Libya should also be taken into account. In other words, Russia’s withdrawal from the market will not reduce competition for Azerbaijan. Against this background, it is profitable for Azerbaijan to increase exports only in periods of high prices, that is, in the short term. After that, it

will bring more losses. In other words, the existing gas and infrastructure potential of Azerbaijan is sufficient to ensure a maximum consumption of around 5-6% of EU demand, and to be honest, increasing it would not at all be in Azerbaijan's interest.

References

[1] The Title Transfer Facility, more commonly known as TTF, is a virtual trading point for natural gas in the Netherlands.