RISK MANAGEMENT IN THE PRODUCTION AND TRANSPORTATION OF NATURAL GAS UNDER THE CONDITIONS OF THE ECONOMIC CRISIS IN THE ENERGY MARKET

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Abstract

The article considers possible specific risks in the production and transportation of natural gas from Azerbaijan to the European continent in the context of the economic crisis in the world energy market. It is stated that the effective management of strategic, as well as specific risks, should be based on a comprehensive identification and description of the risks that determine the key indicators of the gas industry. The necessity of ways to minimize political and economic risks to ensure uninterrupted and reliable export of natural gas from the AR to the countries of the continent, including alternative routes for the transportation of natural gas, taking into account the risk of the transit country, is substantiated.

Keywords: natural gas, risks, exporter, gas pipeline, market, energy carriers.

I. Introduction

In the context of the growing demand for energy resources in the world, the Republic of Azerbaijan (AR) expressed its readiness to expand the volume of natural gas exports to the countries of the European continent. The geopolitical realities in the world and the rising cost of natural gas open up new export opportunities for the gas producing countries of the Caspian region. However, the risks associated with the extraction and transportation of natural gas are also increasing in the context of the economic crisis on energy carriers and the instability of the geopolitical situation in the world. Here, the specific features of the gas business, which differs from other types of energy carriers, are of great importance.

And also, the economic foundations for the development of the gas business also take into account the risks, taking into account the peculiarities of the current stage: the coronovirus pandemic in the world, the risk of a global recession, the energy transition ("green energy", the development of energy from renewable energy sources (RES), low-carbon energy, hydrogen production), the introduction of elements of the fourth industrial revolution (a predicted event, the mass introduction of cyber-physical systems into production), the digitalization of gas technologies, the quality of the mineral gas resource base (SMB), etc. and a systematic approach is used in a timely manner in managing the risks of companies in the gas industry, how quickly they can provide appropriate answers to the full list of risks that have a negative impact on the production, environmental and financial and economic results of their activities, contribute to the quality preparation of

measures and monitoring to prevent and prevent negative consequences that will affect not only the effective performance of their activities, but also the prospects for the gas business as a whole [1]. The gas industry has specific features, as it depends on many internal and external factors related to geopolitical, socio-economic, technical and technological, mining and geological, environmental and technological, natural and other components. In this regard, when managing risks in the gas business, one should take into account the whole range of technological risks, which allows making informed decisions on the balanced development of the production and technological process in conditions of high uncertainty, a long duration of the innovation cycle and active global competition [2]. It is necessary to consider this in the context of the entire "life cycle", from the natural gas production process to the delivery to the consumer (preparation, storage, transportation, processing) of the final product.

II. Material and research methods

The study used the analytical method, the method of comparison. Methods for collecting, processing and analyzing information were determined by the specific objectives of the study based on a systematic approach.

III. Results of the study and their discussions

Problems that reflect the specifics of the gas industry affect the implementation of the strategic goals of oil and gas companies, and this type of risk remains significant for the fuel and energy complex (FEC) of the country [2]. Azerbaijan has significant reserves of natural gas. Over the past 10 years, there has been an increase in gas production in the country by more than 2 times. Only, in 2021, 43.9 billion cubic meters of natural gas were produced in Azerbaijan, which increased by 19.5% compared to 2020. 35.1 billion cubic meters of gas were transported through the main gas pipelines, which is 18.6% more than a year earlier, and the volume of exports amounted to 65.9 million tons of liquefied hydrocarbon gas, which is 2.1 times more than 2020 [1, 3].

Azerbaijan is gradually increasing gas exports to Europe and continues to grow every year, since it has not yet brought exports to Europe to design capacity - within the second stage of the development of the gas condensate field (GCF) "Şahdəniz" (Shahdeniz), this is slightly more than 10.0 billion cubic meters per year. Accordingly, gas supplies to European markets will increase within three years, which will generally serve to saturate the markets of the continent, demonstrating, in addition, the republic's active participation in solving the problems of ensuring the energy security of Europe. The volume of Azerbaijani natural gas supplies to Europe in 2021 amounted to 8 billion cubic meters, and in subsequent years - 9.0 billion cubic meters in 2022 and more than 11.0 billion cubic meters in 2023. A gradual increase in exports is provided for by the adopted schedule in 2013, when the "Şahdəniz" consortium officially announced the construction project of the Trans-Adriatic Gas Pipeline (TAP) for the export of Azerbaijani natural gas from the second stage of the development of the "Şahdəniz" gas condensate field to Europe [1, 3, 4].

Azerbaijan reliably fulfills the concluded gas contracts, there were no interruptions in supplies, the terms of the contract were not violated, there was no political agenda behind the energy policy. Azerbaijan's energy policy is very open, transparent, business and results oriented and has led to cooperation and mutual support. The shares of Azerbaijani gas in the markets of European countries and Turkey are dynamically growing, which is why there is a need to increase production through the development of new oil and gas deposits, primarily in the waters of the Caspian shelf, including jointly with other countries in the region. And for this, there are sufficient reserves of natural gas in the fields of the countries of the Caspian region. Only proven gas reserves in Azerbaijan amount to more than 2.6 trillion cubic meters. cubic meters. The largest of them is the

"Şahdəniz" gas condensate field with reserves of more than 1.2 trillion. cubic meters, where it is planned to expand the third stage of work on the development of a field in the Caspian Sea [1, 3, 4].

This is the minimum expected reserves, since the experience of the AR associated with the development of oil and gas fields shows that the always discovered resources in volume exceed the predicted ones. This became possible due to the introduction of new technologies in the exploration of new deposits. For example, the state company SOCAR, together with the Japanese oil and gas and metallurgical corporation JOGMEC, will conduct 2D seismic surveys on the promising block Utalgi (Utalgi) in the Shamakhi-Gobustan oil and gas region on the shelf of the Caspian Sea. Such a study will make it possible to assess hydrocarbon reserves and minimize economic risks (due to the non-discovery of a productive deposit) and optimize investment investments (to ensure industrial gas production) [5].

Soon, production will begin at one of the largest GCF "Abşeron" (Absheron), where it is planned to produce 1.5 billion cubic meters of gas at the first stage. The estimated reserves of the Babek field are 400.0 billion cubic meters, the Umid field is at least 200.0 billion cubic meters. There are large reserves of natural gas in the deep-water part, where the Azəri-Çıraq-Günəşli oil and gas complex (Azeri-Chirag-Guneshli) has been operating for a long time. The commissioning of the main export route, the Southern Gas Corridor (SGC), with a diversified gas transmission network connecting Azerbaijan with Turkey and Europe, opens up new export opportunities for the gas business [4].

According to the International Energy Agency, Europe's natural gas import requirements will increase by almost 2% compared to 2021, despite a more than 4% year-on-year decline in gas demand. The AR is expanding the geography of its natural gas exports to European countries, as gas plays a key role in moving away from coal and moving towards a carbon-free economy, as well as in the current geopolitical situation in the world. The SGC gas export route is of great importance for Europe's energy security, including its potential to enter new markets such as the Western Balkans [6, 7].

Currently, SGC is considered as one of the promising priorities in the energy supply of an increasing number of countries and there is great interest in its development. European consumers are supplied with about 27.0 million cubic meters of Azerbaijani gas per day. Since the commissioning of SGC, 14.8 billion cubic meters of gas has been exported to Turkey via the Trans-Anatolian Natural Gas Pipeline (TANAP) and 9.4 billion cubic meters to Europe via TAP. Azerbaijani natural gas exports are directly connected to the Turkish gas transmission system. Considering that two gas hubs are already being formed in Europe - German and Turkish-Azerbaijani, and taking into account the length of the transport arm, logistics costs and other things, it is expedient for Turkey to create its own underground gas storages (UGS). This will further strengthen the key functions of the gas hub - this is the possibility of geo-referencing storage facilities, diversifying gas portfolios and playing a role in the market pricing of natural gas. In the near future we should expect the creation of gas hubs in Turkey and Azerbaijan. To do this, it is necessary to have not only the possibility of transit, but also the storage of natural “blue fuel”, since without this it is impossible to fully perform the functions of a gas hub [4, 8, 9].

Azerbaijan has sufficient reserves to increase the supply of natural gas to the European continent, however, unlike the oil market, the export of this energy carrier increases in the presence of specific requests from buyers and in the presence of signed export contracts. This is due to the specifics of the gas business, and primarily from the technical and technological (geological) features of the development of gas condensate fields and the production of “blue fuel”. Without a strategic vision and risk management, it is very difficult to balance the supply and demand for natural gas, since it takes more than 5 years to start gas production at a new field. Therefore, it is important to forecast options for the development of the gas business and manage risks in the production and transportation of natural gas in the context of the economic crisis in the energy

market. And also, it is necessary to take into account other aspects taking place in the world energy market. Despite the fact that natural gas is considered the most environmentally friendly fossil, against the backdrop of global climate change, even on this issue there are discrepancies. All this is reflected in the decision of banking structures to provide loans, as well as the provision of prerogatives in strategic projects, which ultimately affects the cost of production [9, 10].

The export-raw material development model of the Azerbaijan Republic is characterized by its stability, however, the current economic crisis in the global energy market, as well as for managing risks in the production and export of natural gas, requires reformatting this development model, significantly strengthening the role of the state in the development of the national economy.

The geopolitical and energy crisis has become a catalyst for the transformation of international cooperation, disrupting the global technological chains of natural gas exports. Determination of the correct strategic policy of the gas industry, maintaining a stable, sustainable financial condition, in order to invest in further improving the material and resource base for the long term - this is the algorithm for the success of oil and gas companies in the fuel and energy complex (FEC). In this regard, the implementation of promising projects and mechanisms to ensure proper quality and optimal choice of company strategies should be focused on the risks associated with key trends and problems in the development of the gas industry [2].

Azerbaijan is studying the possibility of expanding gas supplies to Europe. In accordance with EU legislation, Trans Adriatic Pipeline AG (TAP AG) regularly conducts market testing to determine the commercial feasibility of increasing the capacity of the main gas pipeline. The next market test is currently underway, and based on its results during this year, TAP AG will determine whether the capacity of the pipeline will be expanded and, if so, by how much. The test results will help improve the quality of making feasibility-based managerial and strategic decisions with minimal risks [6, 9, 10].

The EU favors secure natural gas supply routes and reliable energy exporters. On this issue, the positions of the Azerbaijan Republic and the EU fully coincide, since the energy policy of the Republic of Azerbaijan is very open, transparent, designed for business and results, and has led to cooperation and mutual support. Azerbaijan has been proving in practice and real deeds for more than ten years that it is a reliable partner and a conscientious exporter of the fulfillment of agreements on the supply of oil and gas. Despite the fact that the Azerbaijani energy carrier remains inexpensive for European consumers, it is necessary to improve and strengthen risk management in the gas business.

An important stage in the process of risk management is the systematization of specific risks, which makes it possible to improve the mechanisms of economic management of the gas industry, taking into account risk minimization. Specific risks of the gas industry at different stages of the production cycle [2]:

- at the exploration stage (GEW): exploration errors and undiscovered deposits; discovery of an unprofitable deposit; irrational development of the deposit and its earlier development; losses due to inaccurate determination of the volume of reserves and the hydrocarbon recovery factor (HC);

- in the development of hydrocarbon fields: the wrong choice of drilling technology, hydrocarbon production and reserves assessment; technical failures of equipment and force majeure situations; pollution during the discharge of formation waters, liquid and solid wastes; impact on the ecosystem during geological exploration and geophysical research; delays, failures, stoppages of hydrocarbon production; lack of qualified personnel in the context of the digitalization of the industry;

- in the development of hydrocarbon fields: the wrong choice of drilling technology, hydrocarbon production and reserves assessment; technical failures of equipment and force majeure situations; pollution during the discharge of formation waters, liquid and solid wastes; impact on

the ecosystem during geological exploration and geophysical research; delays, failures, stoppages of hydrocarbon production; lack of qualified personnel in the context of industry digitalization;

- when storing natural gas: an unsuccessful choice of an underground reservoir (geological section) for creating an underground gas storage; wrong choice of drilling technology; non-compliance with the technological regime of gas extraction and injection into the reservoir; incorrect assessment of the thickness of the deposit; incorrect choice of the grid (location) for the placement of observation and production wells; the presence of interlayer flows and the formation of technogenic deposits;

- in the processing of gas and condensate: installation of equipment for the processing of raw materials with poor quality characteristics; logistics of the production cycle of gas and condensate processing; delays, failures, stops in the processing of raw materials; ineffective recruitment;

- when transporting gas: related to the conditions of the gas and condensate sales market, the return of products; transport risk; transit country risk;

- when selling gas and gas condensate in the domestic and foreign markets: the imposition of sanctions by foreign countries; changes in the course of the government and legislation on the use of raw materials, environmental protection, tax and customs regimes; in case of non-receipt, suspension of licenses and permits; investment opportunities for field development, development participants [2, 11, 12].

The most important thing in the system of specific risks is to distribute them according to the stages of production. The most difficult to quantify and qualitatively assess the specific risks arising at the exploration stage, resulting from geological exploration and geophysical developments. In addition, with the help of the proposed system of specific risks, a more complete range of accounting for geological risks is achieved, which in the future will provide information on possible deviations in production and financial indicators, thereby minimizing the losses of oil and gas enterprises associated with investing in field development. oil and gas [2, 12, 13].

Transport risk and the risk of a transit country is the most important factor in foreign economic activity and the implementation of export deliveries. Since the transport system for the export of hydrocarbons has a number of problems, characterized by economic feasibility, political influence and the presence of a certain kind of risk (including the geopolitical influence of different countries). In addition, in the political aspect, oil and gas companies seek to reduce the risk of an environmental catastrophe by implementing a kind of policy (the implementation of which is controlled by the relevant authorities and international organizations) aimed at enhancing the safety of energy facilities, including pipelines [12-15].

Azerbaijani natural gas supplies for export to Europe (including Turkey) are directly dependent on transit countries. Natural gas is supplied from the AR to Europe (including Turkey) through the main gas pipeline (MGP): the South Caucasus pipeline (South Caucasus pipeline - "SCPx") with a capacity of 7.5 billion cubic meters and "TANAP" with a capacity of 16.0 billion cubic meters, a section of which which passes through the territory of Georgia [7, 10, 11].

The geopolitical and geological position of the Republic of Azerbaijan allows us to assert a high transit potential of the country for the transportation of energy carriers, including natural gas from the Caspian region and East Asia, and large volumes of hydrocarbon reserves in the countries of these regions form the prerequisites for the export of natural gas to the markets of the European continent [9, 16].

The issue of natural gas transit through the territory of another country is always associated with a number of political and economic risks. Therefore, ensuring uninterrupted and reliable export of "blue fuel" by the EU consumer requires a review of the policy of gas transit through transit countries and the creation of alternative routes to manage possible risks. Azerbaijan and the gas-producing countries of the Caspian region can expand cooperation in the development of joint oil and gas fields, transportation of hydrocarbons and swap gas supplies, there are new proposals to increase the volume of supplies. New initiatives are being implemented to strengthen bilateral and

multilateral cooperation in the field of gas supplies and transport logistics. As President of the Republic of Azerbaijan Ilham Aliyev noted, "We must expand our activities related to export, enter new markets. ...We have established energy ties with all four neighboring countries. We are currently working on a new project. At present, our plans already include laying a new line along the Zangezur corridor from Azerbaijan to the Nakhchivan Autonomous Republic, and from there to Turkey and Iran. I said that the Zangezur corridor was redesignated not only for railways, roads, and air transport. The Zangezur corridor will simultaneously play its role in the export of energy types" [17].

In this regard, there are good prospects for laying a new line from Absheron to Nakhchivan, entering the gas transmission network of Turkey and Iran, including an alternative route for the gas pipeline through the Zangezur corridor.

According to international experts, natural gas from Turkmenistan coming to Nakhchivan, through Iran, then in Turkey, in the future, can expand the capacity of SGC [11, 18]. And also the implementation of the Trans-Caspian Gas Pipeline (TCGP) project will allow the countries of Central Asia to supply gas to the countries of the continent in the amount of an additional 10-12 billion cubic meters per year through the territory of the Republic of Azerbaijan and Turkey. According to many experts, Caspian gas supplies can pass through the TANAP and TAP gas pipelines, and the countries of the region can increase their importance in the global economy and receive additional profit [6, 10, 18, 19]. The production and supply of liquefied natural gas (LNG) also has good prospects and is a politically and economically beneficial direction.

IV. Conclusion

Under the conditions of the economic crisis in the world's energy market, the management of the specific risks of the gas industry should be carried out at different stages of the production cycle from exploration to the delivery of "blue fuel" to the consumer.

Effective management of strategic as well as specific risks should be based on a comprehensive identification and description of risks, as well as the determination of key indicators of the gas industry, which will allow in practice to comprehensively take into account both the negative consequences of the event and the positive ones.

To minimize political and economic risks, to ensure uninterrupted and reliable export of natural gas from the AR to the countries of the continent, it is advisable to have alternative routes for the transportation of natural gas, taking into account the risk of the transit country. It is necessary to improve the production and export of LNG, as well as to develop transport logistics for the supply of LNG from the countries of the Caspian region to European markets.

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