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Economic Geographical Features Of The Development Of The Oil And Gas Industry Of Kashkadarya Region

Olimova D.A.
Shahrisabz State Pedagogical Institute

Annotation. This article analyzes the role of the oil and gas industry in the economy of the Kashkadarya region and its economic and geographical features. The region is one of the largest fuel and energy bases of Uzbekistan, where the Mubarak gas processing plant, the Shurtan gas and chemical complex and other important industrial enterprises operate. During the study, factors affecting the territorial development of the oil and gas industry, production infrastructure and the contribution of this industry to the socio-economic development of the region were analyzed. The environmental consequences of oil and gas production and processing processes were also considered.
Keywords: Kashkadarya region, oil and gas industry, economic geographical position, fuel and energy, industrial development, environmental consequences.

The oil and gas industry is one of the strategic sectors of the modern economy, which, as the main energy source for industrial production, plays an important role not only in ensuring energy security, but also in the sustainable development of national economies, increasing export potential and forming state budget revenues, since oil and gas resources are one of the main drivers of economic growth on a global scale, and their extraction, processing and transportation require developed infrastructure, which expands the possibilities of attracting high-tech investments, innovative developments and labor resources. This sector also serves as a means of strengthening energy independence for developed countries, and as one of the main factors of economic growth for developing countries, and also has a significant impact on the geopolitical balance of the world economy.

The oil and gas industry is a strategic sector in the economy of Uzbekistan, which plays an important role in ensuring the country's energy security, developing industry and increasing export potential. Hydrocarbon reserves in the republic are mainly located in the Kashkadarya, Bukhara, Surkhandarya and Fergana regions, the largest gas fields include the Shurtan, Mubarak, Zevarda, Dengizkul, Gazli and Boysun fields, and the development of this sector also affects the country's geographically balanced economic development, plays a decisive role in the formation of industrial centers, the development of transport and communication infrastructure and ensuring the stability of domestic energy supply. Currently, the territorial distribution of oil and gas production and processing is concentrated around the Mubarak gas processing plant, the Shurtan gas and chemical complex and other large industrial facilities, which contributes to the formation of industrial clusters in these regions, increasing employment and accelerating regional development. At the same time, the country is seeking to ensure economic stability by paying special attention to diversification in the oil and gas industry, gradually transitioning to renewable energy sources, developing the gas and chemical industry, and increasing the efficiency of the fuel and energy complex.

The commissioning of the second stage of the compression compressor station at the Zevarda field of the Mubarak Oil and Gas Production Department in order to modernize the energy sector of the Republic of Uzbekistan and increase the volume of natural gas production is of significant economic and geostrategic importance. This project reflects the development trends of the country's oil and gas industry, the effective development of hydrocarbon resources and technological innovations in the energy sector. This project was implemented within the framework of the "Program to Increase Hydrocarbon Raw Material Production in 2017-2021" approved by the President of the Republic of Uzbekistan. The total cost of the project is 75.8 million US dollars, which is aimed at increasing the efficiency of gas production, economically viable development of residual reserves, and ensuring the stability of energy supply. Also, within the framework of the project, modern gas turbine equipment and compressors were supplied by such large international companies as Baker Hughes General Electric (USA), Motorsich (Ukraine), Akcelik (Turkey) and Denair Energy (China), which laid the foundation for the modernization of gas production technologies. This compressor station has a capacity to increase the pressure of 3.3 billion cubic meters of natural gas per year,

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which will result in an additional 1.5 million cubic meters of daily and 480 million cubic meters of annual natural gas production, which will increase the stability of the country's domestic energy supply and strengthen its export potential. Kashkadarya region is considered a strategic area for natural gas production, and the industrial expansion of the Zevarda field will contribute to the development of the gas industry in this region and the creation of new jobs. In order to ensure the stable operation of the compression compressor station, it is planned to drill 9 additional wells at the Zevarda field in 2021, build a 5.2 km long gas collector, and produce 2.9 billion cubic meters of natural gas annually, which will be implemented on the basis of technological approaches related to the deepening of geological exploration and full automation of gas production processes. These economic and geographical processes create opportunities for ensuring the diversification of the energy sector of Uzbekistan, more efficient use of natural resources, and optimal exploitation of hydrocarbon reserves.

Table 1

Mining industry and products extracted from open pit mines in Kashkadarya region

Product Name	Unit of measurement	2017	2018	2019	2020	2021
Natural Gas	million m3	36212,3	33691,2	32426,8	2408,0	1445,1
Oil	thousand tons	622,5	565,0	529,8	31,3	26,1
Liquefied Petroleum Gas	thousand tons	561,8	626,5	643,0	141,8	137,2
Condensate	thousand tons	1414,9	1448,4	1403,4	283,0	151,4

The table was compiled based on the statistical bulletin of the Kashkadarya region.

Mining production in the Kashkadarya region has sharply decreased over the years 2017-2021, which can be explained by a number of economic, technological and environmental factors, as such a significant decline in natural gas, oil, liquefied gas and condensate production has had a serious impact not only on the development of regional industry, but also on the overall energy balance of the country. While natural gas production in 2017 was 36.2 billion cubic meters, by 2021 this figure had dropped to 1.4 billion cubic meters, oil production had decreased from 622.5 thousand tons to 26.1 thousand tons, and condensate had decreased from 1.4 million tons to only 151.4 thousand tons, a very significant decrease. However, liquefied gas production has been relatively stable, increasing in 2017–2019, but decreasing sharply in 2020–2021.

Such a decrease in these indicators is associated with several factors, first of all, the depletion of natural reserves and outdated extraction technologies have accelerated this process, since as a result of the exploitation of deposits for many years, the amount of hydrocarbons extracted is significantly reduced, and the reconstruction of deposits or the launch of new deposits requires large financial costs, as a result, economically unproductive deposits are closed or their activities are significantly reduced. At the same time, the dependence of the extraction process on modern technologies and insufficient technological modernization can also lead to a decrease in production volumes, because if the level of use of high-efficiency well drilling and hydraulic fracturing technologies in oil and gas production is low, the possibility of effective use of existing reserves is limited, and production volumes naturally decrease.

In addition, the energy policy pursued by the state, in particular, restrictions on mining activities in order to meet domestic consumption and balance export volumes, may also be one of the factors of this decline, since in order to save natural resources, direct them to deep processing and increase economic efficiency, the government may introduce restrictions on mining volumes, which may lead to a reduction in the production volume of industrial enterprises. In addition, it is likely that increased international and domestic requirements for environmental protection, stricter environmental standards and reduction of production capacities in order to reduce hydrocarbon emissions will also lead to a decrease in mining volumes, since many international organizations and local government agencies may take strict measures to reduce harmful substances emitted

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into the atmosphere by the oil and gas industry, which may force them to limit or stop the exploitation of some fields.

In conclusion, the sharp decrease in the volume of mining products in the Kashkadarya region is associated with factors such as depletion of natural resources, low level of technological modernization, restrictions imposed by the state, and compliance with environmental requirements. This trend can negatively affect the economic development of the region, reduce jobs, and reduce budget revenues. Therefore, it is important to attract new investments in this area, introduce modern mining technologies, and develop a strategy for the efficient use of energy resources.

Table 2.

Structure of industrial production by types of economic activity in Kashkadarya region (as a percentage of the total volume)

Industry structure	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
Mining and quarrying	38,1	40,4	37,6	43,8	11,5	10,8	7,5	5,8	4,7
Recycling Industry	53,8	47,9	50,6	43,1	69,3	64,8	68,2	78,3	81,2
Electricity, Gas, Steam and Air Conditioning	7,7	11,2	10,7	12,4	18,7	23,6	23,8	15,4	13,6
Water Supply, Sewage Treatment, Waste Collection and Recycling	0,4	0,5	1,1	0,7	0,6	0,8	0,5	0,5	0,5
Total	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100**

The table was compiled based on the statistical bulletin of the Kashkadarya region.

The year-on-year decline in the share of mining in the Kashkadarya region is explained by the changing structure of the regional economy and the reshaping of the ratio between industrial sectors. Although in 2016-2019, mining accounted for a significant part of total industrial production, especially in 2019 when its share reached 43.8%, a sharp decline was observed starting in 2020. As a result of this decrease, by 2024 the share of mining was only 4.7%, that is, in just five years this indicator decreased by almost tenfold (Table 2). These changes may be due, first of all, to the diversification of economic activities, the expansion of the processing industry, and the increased need for deep processing of raw materials.

One of the important factors that influenced the decrease in the share of the mining industry may be a decrease in the volume of resource extraction or a change in the strategy for the use of mines. If in 2016-2019 the policy aimed at the extraction of natural resources was a priority in the Kashkadarya region, in recent years this activity has been gradually reduced. In addition, there is a possibility that some mines will not be economically viable or their use will be limited due to the damage caused to the environment during the extraction process. Such changes may have led to the replacement of industries dependent on natural resources by industries related to processing and production. The increasing share of the processing industry reflects the changing direction of the Kashkadarya economy. In 2016, the share of the processing industry was 53.8%, while by 2024 this figure had reached 81.2%, that is, the focus of production processes in the region on the processing of raw materials has significantly increased. This process may be associated with the attraction of local and foreign investments, the establishment of new industrial enterprises, and the reorientation of the industry to the production of products with high added value. At the same time, the share of the electricity and gas production sector was also high in 2020-2022, which is likely to have directly affected the decrease in the share of the mining industry.

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If part of the total volume of the mining industry in Kashkadarya region was not distributed to specific regions in the statistics, this may have affected the decrease in the share of the mining industry. That is, although the share of the mining industry has decreased sharply since 2020, it is likely that this is due not only to a decrease in the volume of mining, but also to changes in the presentation of statistical data.

If around 20% of mining products are not tied to a specific region, this share may have been previously included in the industrial production of the Kashkadarya region, and then recorded separately or excluded from the general statistical report. As a result, while in 2016-2019 the mining industry was seen as one of the largest sectors in the regional economy, after 2020 part of this volume remained outside the statistical calculation or was distributed across other regions. This may indicate an artificial decrease in the share of the mining industry calculated for the region.

At the same time, the increase in the share of the processing industry and the expansion of the energy sector may also be one of the factors that exacerbated this decline. If the part of the mining industry that is not clearly reflected in statistics is taken into account, then the real share of this sector may be higher than the official figures. This indicates that the mining industry is not losing its importance for the Kashkadarya region, but rather its share is decreasing due to a change in the form of reflection in statistical data or the distribution of this volume among other economic units.

Therefore, in order to correctly assess the decline in the share of the mining industry, it is necessary to study the methodology of statistical reports in more detail and take into account the impact of the undistributed volume of about 20% on the total industrial production at the regional level. If this factor is taken into account, it may turn out that the real share of the mining industry is higher than official figures, and its role in the economy is still significant. Although a significant decrease in the share of the mining industry in Kashkadarya region was observed between 2016 and 2024, this decrease may be due not only to a decrease in the volume of extraction, but also to changes in statistical calculations. If about 20% of the volume of output belonging to the mining industry was not distributed to specific regions, this may have led to an artificial decrease in the share of the mining industry at the regional level. Thus, although official statistics show a decrease in the share of the mining industry from 43.8% in 2019 to 4.7% in 2024, this indicator may not fully reflect real economic processes.

In addition, a significant increase in the share of the processing industry and energy sectors also affected the decline in the share of the mining industry. While in 2016 the share of the processing industry was 53.8%, by 2024 it reached 81.2%, which indicates that the regional economy is oriented towards the production of high value-added products. At the same time, the share of the electricity and gas production sector was high in 2020-2022, which may also have directly affected the decrease in the share of the mining industry.

If the undistributed volume of the mining industry is taken into account, the real share of this sector may be higher than official statistics. This means that the mining industry in the region has not lost its importance, but its share may be decreasing due to changes in the calculation method or the distribution of production results to other economic units. Therefore, in order to accurately assess the development of the mining industry in the future, it is necessary to conduct a more in-depth analysis of statistical data and ensure accurate accounting of mining products. Although the share of the mining industry in the Kashkadarya region has significantly decreased, it is necessary to analyze in more depth the aspects of this process related to economic and geographical factors. The region is rich in natural resources, has minerals such as oil, gas, marble, phosphorite, but in recent years the trend in the use of these resources has changed. Considering that about 20% of mining products are not distributed to specific regions, some of the raw materials extracted in the region may statistically belong to other economic units. This is especially true when large mines are managed not by regional, but by republican or foreign investments.

Kashkadarya is geographically divided into mountainous and lowland regions. Mining is mainly concentrated in mountainous and hilly areas, where the mining process is carried out depending on natural conditions. In recent years, increased environmental requirements and modernization of mining technologies may have affected the volume of the mining industry. In addition, the transit geographical location of the region has also led to a change in economic directions. Previously, the export of raw materials was a priority, but now the manufacturing and processing industry has developed, and the trend of supplying finished industrial products to other regions is increasing.

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One of the main factors in the industrial development of the region is its infrastructure capabilities. In recent years, energy supply, road and transport infrastructure have been developed, which contributes to the growth of the processing industry. If the share of electricity and gas production in 2020-2024 is observed to increase, this may indicate that the natural gas and oil extracted in Kashkadarya are being directly processed. The decrease in the share of the mining industry probably indicates that the export of these natural resources as raw materials is decreasing, and they are being directed to the domestic market for processing.

In conclusion, the decline in the share of mining in the industrial structure of Kashkadarya region is associated not only with economic factors, but also with geographical and infrastructural changes. Although the natural conditions and resource base of the region are still of economic importance, it is observed that the direction of economic activity is shifting from raw material extraction to its processing. Therefore, in the future, it will be important to focus on the modernization of the mining industry, ensuring environmental safety, and further improving infrastructure in the regional economic development strategy. In general, the industrial structure of Kashkadarya region is undergoing a fundamental change. The regional economy is transitioning from raw material extraction to processing and production, which can create the basis for sustainable economic growth and high added value in the long term. However, the sharp decline in the share of mining in official statistics may not fully reflect its real economic significance. Therefore, it is important to take into account the interdependence between the mining and processing industries, as well as to balance the growth of industrial sectors, in the regional economic development strategy.

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