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The strategic role and importance of Uzbekistan's oil and gas industry in the global energy market

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Abstract. This article provides an in-depth scientific analysis of Uzbekistan's oil and gas industry and its strategic position in international markets against the backdrop of ongoing geo-economic transformations in the global energy system. The study evaluates Uzbekistan's natural gas reserves, production dynamics, export geography, and transit potential based on international statistical data, and substantiates the country's energy and geostrategic advantages on a solid scientific basis. In particular, the economic efficiency, geopolitical significance, and role in international energy security of key energy corridors passing through Uzbekistan—namely the Eastern corridor (toward China), the Western corridor (via the Caspian region to European markets), and the Southern corridor (through Afghanistan to the Pakistan–India markets)—are comprehensively examined. The research findings indicate that Uzbekistan possesses significant potential to emerge as a regional energy hub in Central Asia. Ongoing modernization of the oil and gas sector, development of transit infrastructure, and diversification of export markets are substantially strengthening the country's position in the global energy market. The article also offers a theoretical and analytical assessment of the prospects for regional energy integration, new directions of international cooperation, and the key factors shaping Uzbekistan's future role within the global energy value chain.

INTRODUCTION

The global energy market has undergone profound structural transformations over recent decades, as geo-economic interests and energy security have become central priorities in the foreign policy strategies of major states. Intensifying competition among leading holders of hydrocarbon resources, diversification of energy transit routes, the expansion of low-carbon and renewable energy technologies, and structural shifts in global energy demand have collectively transformed the international energy system into a complex, multi-dimensional environment. Within this evolving context, the Central Asian region—and Uzbekistan in particular—has acquired growing strategic significance in the global energy balance and has begun to play an increasingly important role in shaping geo-economic stability in international energy markets.

Uzbekistan's oil and gas industry represents a key pillar of the national economy, contributing a substantial share to gross domestic product and export revenues. The country possesses significant proven natural gas reserves, positioning it among the leading energy-resource holders worldwide. Furthermore, the advantageous geographical location of Uzbekistan's pipeline infrastructure provides favorable conditions for the country to develop into not only a regional, but also an international energy transit hub. These structural advantages enhance Uzbekistan's capacity to integrate more deeply into global energy supply chains and to strengthen its role in ensuring regional energy security.

Recent geopolitical shifts in the global energy landscape—including the Russia–Europe energy crisis, the rapid growth of energy demand in China, and the expansion of liquefied natural gas (LNG) markets—have further increased the strategic relevance of alternative energy suppliers and transit states. In this regard, Uzbekistan has gained access to new economic opportunities related to export market diversification, transit services, and participation in emerging energy corridors connecting East, West, and South Asian markets.

Against this background, the relevance of the present study is обусловлена необходимостью a comprehensive analysis of the strategic role of Uzbekistan's oil and gas industry within the global energy system. The study aims to assess the degree of the country's integration into international energy markets and to identify prospective

development trajectories from the perspective of energy geo-economics, taking into account both regional and global transformation processes.

EXPERIMENTAL RESEARCH

Uzbekistan is one of the major producers of oil, natural gas, and petroleum products in Central Asia. Despite the growing need to further develop the mining sector, including quarry extraction and oil and gas production, as well as the government's ambitious targets to increase the share of renewable energy sources in the national energy mix from 8% to 25%, the hydrocarbon sector continues to remain one of the leading branches of the Uzbek economy. However, the current supply system no longer fully meets domestic demand for petroleum products. As Uzbekistan does not import oil and gas resources in pursuit of energy self-sufficiency, domestic consumption levels have declined significantly. Consequently, unless new large oil fields are discovered and oil production increases substantially, domestic consumers will continue to experience shortages of petroleum products in the internal market.

In this context, it is appropriate to analyze the ranking of countries by proven oil reserves (Table 1). The data presented in Table 1 indicate that Uzbekistan ranks third in Central Asia in terms of oil reserves, accounting for approximately 0.036% of global proven oil reserves. The first oil production activities in Uzbekistan began in 1885 in the Fergana Valley. Large-scale oil exploration commenced in 1900, and by 1904 oil was being extracted from drilled wells [2], representing one of the earliest instances of oil production in the region. Throughout the twentieth century, Uzbekistan remained one of the principal oil producers and suppliers of petroleum products in Central Asia. At present, the country's conventional oil reserves are estimated at approximately 600 million barrels [6], with more than 60% of proven oil fields located in the Bukhara–Khiva region, particularly in its southern and southwestern areas. Nevertheless, domestic oil production has declined markedly over the past decade [7].

TABLE 1. Ranking of countries by proven oil reserves

№	Country	Oil Reserves - OPEC Report, billion barrels	Share of Global Total, %
1	Venezuela	303.22	18.17
2	Saudi Arabia	267.19	16.15
3	Iran	208.60	10.35
4	Canada	163.63	9.54
5	Iraq	145.02	8.57
6	United Arab Emirates	113.00	6.15
7	Kuwait	101.50	5.93
8	Russia	80.00	4.85
9	United States	55.25	2.93
10	Libya	48.36	2.25
11	Nigeria	36.97	2.13
12	Kazakhstan	30.00	1.82
13	China	27.00	1.53
14	Qatar	25.24	1.52
15	Brazil	13.24	0.98
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46	Uzbekistan	5.9	0.036

The data presented in Table 1 clearly demonstrate significant disparities among countries in terms of global oil reserves. Venezuela (303.22 billion barrels), Saudi Arabia (267.19 billion barrels), and Iran (208.60 billion barrels) dominate the ranking of countries with the largest proven oil reserves. The combined share of these three countries accounts for nearly 45% of total global oil reserves, indicating their exceptionally strong geo-economic influence on global energy policy and oil price formation processes. In addition, countries such as Canada, Iraq, and the United Arab Emirates, each possessing reserves on the order of approximately 100 billion barrels, have also emerged as strategic players in the global energy market. Alongside the European Union's status as a major energy consumer, the relatively substantial oil reserves of the United States and Russia (55.25 and 80.00 billion barrels, respectively) remain key factors in ensuring their national energy security.

Table 1 further indicates that Uzbekistan ranks 46th globally with proven oil reserves of 5.9 billion barrels, representing only 0.036% of total global reserves. Although this level does not position Uzbekistan among the world's major oil exporters, it nevertheless highlights the presence of strategic opportunities for generating added value through the rational utilization of existing reserves, expansion of deep processing capacities, and development of new oil fields. The modernization of the petrochemical industry, the implementation of gas-to-liquids (GTL) technologies, and the expansion of polymer production can significantly enhance efficiency despite the country's limited oil resource base.

Thus, a relatively low share of global oil reserves should not be regarded as a structural disadvantage for Uzbekistan, but rather as an indication of the necessity to diversify resources and accelerate the development of downstream and processing industries. The key scientific conclusion derived from Table 1 is that although oil reserves constitute a fundamental strategic resource in the global economy, their volume alone is insufficient to ensure long-term financial and economic stability. Instead, political stability, technological advancement, access to capital markets, and the degree of economic diversification play a decisive role.

According to assessments by foreign experts, Uzbekistan's oil refineries are not operating at their full production capacity. Nevertheless, Uzbekistan remains one of the major producers of petroleum products and possesses sufficient refining capacity to process a significant share of domestically produced crude oil. The country has a long-standing historical experience in oil refining, with the first oil refinery constructed in Fergana in 1906. Over time, the plant's annual processing capacity was expanded, reaching 176 thousand tons by 1940 [2]. Uzbekistan has supplied petroleum products not only to meet domestic demand and the needs of Central Asian markets, but has also exported refined products to China and Afghanistan.

Uzbekistan's central geolocation within Central Asia positions the country at the intersection of three major energy corridors—the Eastern, Western, and Southern routes. This geographic configuration provides strategic advantages not only in terms of national energy security, but also with respect to access to international markets, transit revenues, and geo-economic influence. In terms of proven natural gas reserves, Uzbekistan occupies a mid-to-upper position in international rankings. According to various sources, the country's natural gas reserves are estimated at approximately 1.5–1.8 trillion cubic meters, placing Uzbekistan roughly between 17th and 22nd globally.

These reserves, combined with average annual natural gas production volumes of approximately 54–66 billion cubic meters, have positioned Uzbekistan as a significant energy player within the region.

Eastern Corridor: The Main Artery for Exports to China

The Eastern corridor currently represents the most actively functioning energy route for Uzbekistan. The Central Asia–China gas pipeline system (Lines A, B, and C) originates in Turkmenistan and passes through the territories of Uzbekistan and Kazakhstan before connecting to China at the Xinjiang (Khorgos) entry point. The total length of the pipeline system is approximately 1,833 km, of which about 530 km traverse the territory of Uzbekistan.

The three parallel lines (A, B, and C) have a combined annual capacity of 55 billion cubic meters of natural gas, a level that approached near-full utilization during 2014–2015. With the planned commissioning of Line D, total capacity could increase to up to 85 billion cubic meters per year, significantly expanding gas flows from Central Asia to China.

Within this system, Uzbekistan participates both as a gas supplier and as a transit country, thereby strengthening its geo-economic position through transit fees, long-term supply contracts, and broader energy cooperation.

Western Corridor: Potential Access to European Markets via the Caspian Sea.

Although the Western corridor has not yet been fully established, it remains strategically significant from a long-term perspective. Since 2022, the European Union has pursued a policy aimed at substantially reducing dependence on Russian gas, with a formal decision to completely phase out Russian gas imports by 2027.

In this context, the Caspian Sea basin and Central Asian countries—including Uzbekistan—are increasingly viewed as strategically important regions for European energy security. The concept of the Western corridor is primarily associated with the Trans-Caspian route (Turkmenistan/Uzbekistan – Kazakhstan/Azerbaijan – Georgia – Turkey – Europe). At present, there is no dedicated trunk pipeline enabling direct gas exports from Uzbekistan to Europe. However, prospective developments related to the Trans-Caspian Gas Pipeline project, the Southern Gas Corridor infrastructure (TANAP, TAP), and new investments in the Trans-Caspian transport corridor could substantially enhance Uzbekistan's access to European energy markets in the future.

These reserves, combined with annual natural gas production volumes averaging approximately 54–66 billion cubic meters, have positioned Uzbekistan as a significant energy player in the region.

Eastern Corridor: The Main Export Artery to China

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The combined annual capacity of the three parallel lines (A, B, and C) amounts to 55 billion cubic meters of natural gas, a level that approached full utilization during the 2014–2015 period. With the planned commissioning of Line D in the future, total transmission capacity could increase to up to 85 billion cubic meters per year, significantly expanding gas flows from Central Asia to China.

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Western Corridor: Potential Access to European Markets via the Caspian Sea

Although the Western corridor has not yet been fully realized, it remains strategically important from a long-term perspective. Following 2022, the European Union has pursued a policy aimed at sharply reducing dependence on Russian gas and has adopted plans to completely phase out Russian gas imports by 2027.

In this context, the Caspian Sea basin and Central Asian countries, including Uzbekistan, are increasingly viewed as strategically important regions for European energy security. The Western corridor concept is primarily associated with the Trans-Caspian route (Turkmenistan/Uzbekistan–Kazakhstan/Azerbaijan–Georgia–Turkey–Europe). While no dedicated trunk pipeline currently exists to directly supply Uzbek gas to Europe, ongoing discussions surrounding the Trans-Caspian Gas Pipeline project, the Southern Gas Corridor infrastructure (TANAP, TAP), and new investments in the Trans-Caspian transport corridor substantially enhance Uzbekistan's long-term prospects for accessing European energy markets.

Given the high purchasing power of European markets and the planned elimination of Russian gas imports by 2027, the Western corridor represents a strategic long-term objective for Uzbekistan.

Southern Corridor: Access to South Asian Markets via Afghanistan

The Southern corridor envisions access to the Pakistani and Indian markets through Afghan territory. The most significant project associated with this route is the TAPI (Turkmenistan–Afghanistan–Pakistan–India) gas pipeline, with a total length of approximately 1,814 km and a projected annual capacity of 33 billion cubic meters of natural gas.

According to available sources, this volume is planned to be allocated as follows: approximately 5 billion cubic meters to Afghanistan, and 14 billion cubic meters each to Pakistan and India. Construction on the Turkmenistan section of the TAPI pipeline was largely completed by 2024, while works within Afghanistan are being implemented in stages.

Uzbekistan's participation in the TAPI corridor is not envisaged through a direct pipeline route, but rather through the integration of regional gas networks. This may be achieved by strengthening domestic gas infrastructure, concluding swap and back-to-back agreements with Turkmenistan and neighboring countries, and developing mechanisms for connecting to gas volumes destined for South Asian markets.

Conclusion: Formation of an Energy Hub

Taken together, the Eastern (China), Western (Europe via the Caspian Sea), and Southern (South Asia) corridors position Uzbekistan as a central node within the Central Asian energy system. International statistical data indicate that Uzbekistan, with natural gas reserves ranking among the world's top 20, annual production volumes of several tens of billions of cubic meters, and existing or potential export routes in three strategic directions, is steadily strengthening its status as a regional energy hub.

This transit geography enhances not only the economic but also the geopolitical value of the oil and gas sector, contributing to Uzbekistan's emergence as a stable and influential player in the global energy market.

The development of Uzbekistan's oil sector is driven not primarily by profit maximization, but by the objective of ensuring national energy security. Domestic consumers continue to experience notable shortages of petroleum products, indicating that the advancement of the oil sector requires an innovation-driven and reform-oriented energy policy aimed at addressing existing and emerging energy security challenges [5].

If existing sectoral capacities and opportunities are fully utilized, Uzbekistan could save up to 3 billion cubic meters of natural gas annually and reduce harmful atmospheric emissions by 20% by 2026 [4]. The country possesses substantial hydrocarbon resources: according to domestic industry sources, total primary energy reserves amount to approximately 5.5 billion tons of oil equivalent, including 1.5–1.6 trillion cubic meters of natural gas, 245 million tons of oil, and 3.3 billion tons of coal. These sectors account for about 5.9% of gross domestic product, contribute approximately 4% to state budget revenues, generate 6.3% of export earnings, and provide employment for nearly 1% of the labor force. Uzbekistan ranks third in Central Asia in terms of natural gas reserves and second in terms of production volumes (Table 2).

TABLE 2. Leading countries by proven natural gas reserves

№	Country	Gas reserves (bcm)	Share of world total, %
1	Russia	1,688.2	24.39%
2	Iran	1,183.0	17.09%
3	Qatar	858.1	12.40%
4	United States	322.2	4.65%
5	Saudi Arabia	303.3	4.38%
6	Turkmenistan	265.0	3.83%
7	United Arab Emirates	215.1	3.11%
8	Venezuela	201.3	2.91%
9	Nigeria	186.6	2.70%
10	China	184.4	2.66%
11	Algeria	159.1	2.30%
12	Iraq	111.5	1.61%
13	Mozambique	100.0	1.44%
14	Indonesia	98.0	1.42%
15	Kazakhstan	85.0	1.23%
16	Egypt	77.2	1.12%
17	Canada	77.1	1.11%
18	Australia	70.2	1.01%
19	Norway	65.5	0.95%
20	Uzbekistan	65.0	0.94%

In 2022, Uzbekistan produced 51.7 billion cubic meters of natural gas, with plans to increase production to 66.1 billion cubic meters by 2030. In December 2022, Uzbekneftegaz JSC, which accounts for approximately 63% of the country's total natural gas production, announced expectations to expand its production volumes over a ten-year period through intensified exploration activities. During this period, the company plans to discover more than 40 new hydrocarbon fields with estimated reserves of 365 billion cubic meters of natural gas and 16 million tons of liquid hydrocarbons. For the first time, Uzbekistan intends to initiate gas extraction from deep geological formations, with leading foreign investors invited to participate in exploration activities in the Ustyurt region.

Despite its substantial resource base, Uzbekistan faced an energy crisis during the anomalously cold period of December 2022–January 2023, which resulted in disruptions to electricity supply, including in the capital city. On 12 December 2022, Uzbekistan signed a three-month agreement with Turkmenistan to supply 1.5 billion cubic meters of Turkmen natural gas to compensate for domestic shortages. However, technical difficulties caused by extreme cold weather led to a temporary suspension of gas deliveries from Turkmenistan to Uzbekistan between 12 and 20 January 2023. Subsequently, on 16 June 2023, Uzbekistan signed a two-year agreement with Russia's Gazprom to purchase 2.8 billion cubic meters of natural gas annually. Uzbek authorities declined to disclose the agreed purchase price, stating that it was determined based on regional market prices, domestic pricing conditions, and ongoing market-oriented reforms. Gas deliveries under this agreement commenced on 1 October 2023, with transit conducted through Kazakhstan via the Central Asia–Center gas pipeline system. In addition, on 24 August 2023, Uzbekistan signed another agreement with Turkmenistan for the supply of up to 2 billion cubic meters of natural gas.

In 2019, the government restructured the state-owned gas monopoly Uzbekneftegaz JSC into three independent entities responsible for production, transmission, and domestic distribution, with the objective of enhancing transparency and aligning operations with market-based pricing principles. The implementation of an automated system for monitoring and accounting of natural gas consumption began in 2020 and is expected to significantly improve resource accountability. In June 2022, UzGasTrade JSC was established to centralize the procurement and sale of natural gas in Uzbekistan, assuming these functions from UzTransGaz, which now remains responsible solely for the operation and technical maintenance of the national gas transmission system.

In the second half of 2022, Fitch Ratings and S&P Global Ratings reaffirmed Uzbekneftegaz JSC's credit rating at BB–, assigning stable and negative outlooks, respectively. Earlier, in November 2021, Uzbekneftegaz JSC issued its debut Eurobonds amounting to USD 700 million on the London Stock Exchange, with a seven-year maturity and a coupon rate of 4.75%.

CONCLUSIONS

The foregoing analysis demonstrates that Uzbekistan's oil and gas industry occupies a strategically significant position within the global energy system. The country's natural resource potential, transit geography, energy infrastructure, and ongoing industrial modernization are collectively transforming Uzbekistan into one of the key energy centers in the region. Structural changes in international energy markets are generating new economic opportunities for Uzbekistan and contributing to the deepening of the country's integration into the global energy system.

The experience of foreign countries such as Norway, the United States, and Saudi Arabia indicates that achieving long-term energy security and financial stability requires economic diversification and a gradual transition toward renewable energy sources. In this context, it is economically justified for Uzbekistan to increase investments in hydropower, solar, and wind energy as part of a balanced and sustainable energy strategy.

An analysis of trends in Uzbekistan's fuel and energy sector over the past thirteen years provides a basis for formulating strategic conclusions regarding national energy security. The decline in oil and gas production volumes necessitates a stronger focus on technological innovation, resource diversification, and the development of renewable energy sources. At the same time, the growth of electricity and coal production continues to play a significant role in supporting economic growth and ensuring the stability of the national energy system.

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