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THE DYNAMICS OF AZERBAIJAN'S OIL PRODUCTION

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Abstract. *This study examines the historical evolution and contemporary dynamics of oil production in Azerbaijan, highlighting its decisive role in the country's economic and industrial development. Since the mid-nineteenth century, Azerbaijan—particularly the Baku region—has been a major center of global oil production, beginning with the world's first mechanically drilled industrial oil well in 1846. The research aims to analyze the major stages of oil production, evaluate statistical trends, and assess future prospects within the context of technical, economic, and political factors. Using comparative historical analysis and statistical evaluation of production data, the study identifies periods of rapid growth, stabilization, and decline. Production increased sharply between 2003 and 2010, reaching a peak of over 50 million tons in 2010, largely due to large-scale offshore projects and foreign investment following the 1994 "Contract of the Century." However, from 2010 onward, output entered a gradual decline phase, falling to approximately 29 million tons by 2024, primarily due to the maturation of oil fields and natural depletion processes. Forecasts for 2025–2028 suggest a continued but moderate decrease in production levels. The findings indicate that fluctuations in oil output are influenced not only by geological and technical factors but also by international market conditions and strategic policy decisions. The study concludes that the current decline phase necessitates economic diversification and increased attention to environmental rehabilitation to ensure sustainable long-term development of Azerbaijan's energy sector.*

Keywords. *Azerbaijan; oil production; Baku oil industry; production dynamics; Contract of the Century*

INTRODUCTION

The dynamics of oil production in Azerbaijan represent one of the most significant components of the country's economic and industrial development, characterized by a long and evolving historical trajectory. Since the mid-nineteenth century, the oil sector has played a decisive role in shaping Azerbaijan's position within the global energy market. The emergence of industrial oil production, particularly in the Baku region, established Azerbaijan as a leading oil-producing area of global importance.

During the Soviet period, oil production expanded rapidly under a centralized economic system and acquired strategic significance, especially during the Second World War. In the post-independence era, the sector has been increasingly influenced by technological modernization, environmental considerations, and fluctuations in international energy markets. The implementation of large-scale oil development projects in the early 2000s resulted in a substantial increase in production levels, culminating in a peak in national oil output around 2010.

This study provides a comprehensive analysis of the historical evolution of oil production in Azerbaijan, identifies the major stages of its development, and evaluates current conditions and prospective trends [1]. Particular attention is given to the transition from onshore to offshore production, the role of foreign investment, and the implications of resource management for sustainable economic development.

Table 1. *Key Historical Phases of Azerbaijan's Oil Industry [2]*

Period	Key Events	Characteristics
Ancient period – 18th century	Natural oil seepages were known	Use of oil for household purposes, medicine, and lighting
1846	First mechanically drilled oil well in Bibiheybat	The world's first industrial oil well
1872–1900	Development of private entrepreneurship	Involvement of the Nobel Brothers, Rothschild family, and Haji Zeynalabdin Tagiyev
1901	Approximately 50% of global oil production accounted for by Baku	Baku became the world's leading oil center
1920–1940	Nationalization and centrally planned production	Increasing environmental impacts
1949	Discovery of "Neft Dashlari"	World's first offshore oil production
1970–1980	Peak oil production during the Soviet period	Severe environmental pollution in the Absheron Peninsula
1994	Signing of the "Contract of the Century"	Large-scale foreign investment in the oil sector
2006	BTJ pipeline	Direct access to global energy markets
2010–present	Relatively stable production levels	Focus on environmental rehabilitation and economic diversification

Following independence, structural transformations occurred within the oil industry, while the signing of international agreements and the development of new export routes created favorable conditions for the recovery of oil production.

In the early 2000s, oil production in Azerbaijan remained at a relatively low level. In 2003, the country's annual oil output amounted to approximately 15 million tons. In subsequent years, the commissioning of large-scale oil development projects led to a rapid increase in production volumes.

By 2010, oil production reached its maximum level, exceeding 50 million tons. This period is widely regarded as the peak phase of oil production. In the years that followed, a gradual decline in output was observed; in the early 2020s, annual production fluctuated within the range of 30–33 million tons [4].

This trend is primarily explained by the prolonged exploitation of oil fields and the transition of production into its natural decline phase.

Table 2. *Characteristics of Oil Production*

Period	Characteristics of Oil Production
1846–1900	Initial industrial production
1900–1940	Rapid growth
1940–1970	Stable and high production
1970–1990	*Declining trend*
2000–2010	Sharp increase
2010–present	Gradual decline and stabilization

A comparative analysis of statistical indicators demonstrates that increases and decreases in oil production are influenced not only by technical factors but also by political, economic, and international market conditions [3]. In particular, the decline observed after 2010 may be regarded as a natural phase in the production life cycle.

Calculations: The given formula is used to conduct a comparative analysis between any two selected years.

The average annual rate of increase or decrease can be determined using the following formula:

Here $Q_{t1,}Q_{t2}$ — denote the oil production volumes in two different years, while r —

$$r = \left(\frac{Q_{t2}}{Q_{t1}}\right)^{\frac{1}{t2-t1}} - 1$$

represents the average annual rate of change.

2018-2022

$$Q(2018) = 38.8, \quad Q(2022) = 32.7$$

$$r = \left(\frac{32.7}{38.8}\right)^{1/4} - 1 = (0.8423)^{0.25} - 1 \approx 0.96 - 1 = -0.04$$

Average annual decline rate ≈ **−4 %.**

2022–2024

$$Q(2022) = 32.7, \quad Q(2024) = 29.1$$

$$r = \left(\frac{29.1}{32.7}\right)^{1/2} - 1 = (0.8896)^{0.5} - 1 \approx 0.94 - 1 = -0.06$$

Average annual decline rate ≈ −6 %.

Table 3. *Average annual growth and decline rate*

Year	Production (mln tons)	Average annual growth/decline rate (%)
2003	15.4	+18 % (2003–2010)
2010	50.8	−5 % (2010–2013)
2013	43.5	−2 % (2013–2018)
2018	38.8	−4 % (2018–2022)
2022	32.7	−6 % (2022–2024)
2024	29.1	–

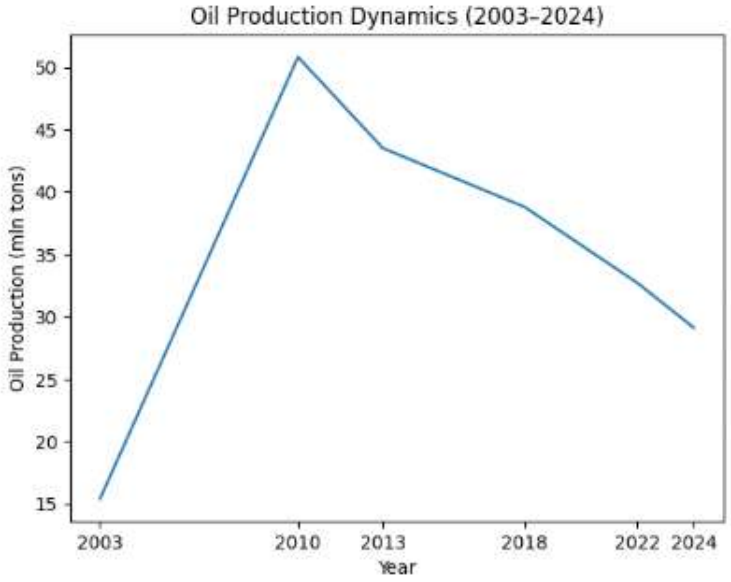

Fig 1. Oil Production Dynamics for 2003–2024 (mln tons)

Based on the current declining trend and projections provided by SOCAR, the state budget, and international analytical reports, the forecasts are as follows:

Table 4. *Oil Production Forecast for 2025–2028 [5]*

Year	Forecasted production volume (mln tons)	Approximate average annual change (%)
2025	28.7	−1.4 % (2024–2025)
2026	27.6	−3.8 % (2025–2026)
2027	27.2	−1.4 % (2026–2027)
2028	26.6	−2.2 % (2027–2028)

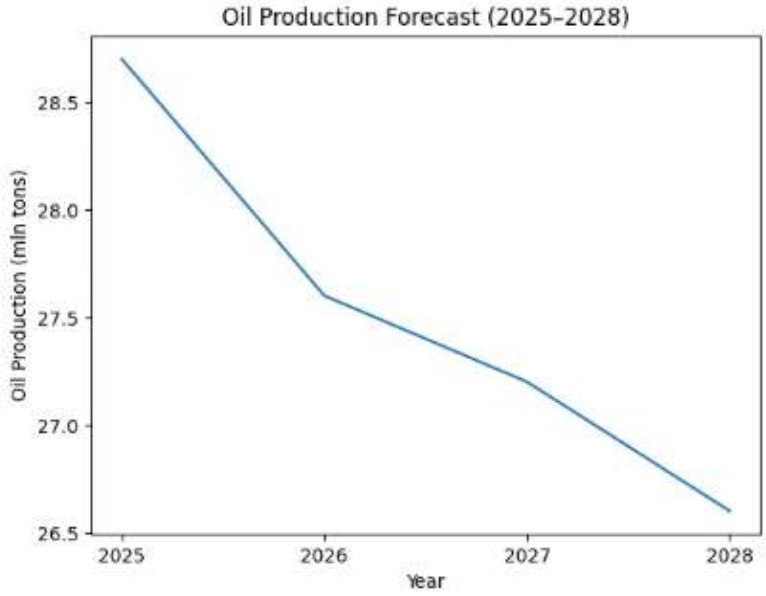

Fig 2. Oil Production Forecast for 2025–2028 (mln tons)

Between 2003 and 2010, oil production in Azerbaijan increased on average by approximately 18% per year as a result of the implementation of industrial-scale projects. During the period 2010–2013, following the peak in production, output began to decline, with an average annual decrease of around 5%.

From 2013 to 2018, the rate of decline slowed, reaching an average annual decrease of approximately 2%, indicating a gradual stabilization of production. Between 2018 and 2024, the decline rate slightly accelerated, fluctuating within an annual range of 4–6%. Forecasts for 2025–2028 suggest that production will continue to decrease gradually, but the decline is expected to be milder, ranging from 1% to 4% per year.

Thus, these indicators, encompassing both historical and projected data, provide a comprehensive overview of the past and future dynamics of Azerbaijan’s oil production.

CONCLUSION

The dynamics of oil production in Azerbaijan reflect the cumulative effects of technical, economic, and political changes over time. Industrial-scale production, which began in the mid-19th century, enhanced the global significance of the Baku region, while during the Soviet period, production was further intensified under centralized planning and strategic objectives. Large-scale oil projects initiated in the 2000s led to a rapid increase in output; however, after 2010, this growth gradually gave way to a declining trend.

The recent decline in production is primarily attributed to the maturation of oil fields and the onset of the natural production decline phase. By the early 2020s, annual output had fallen to the range of 30–33 million tons, indicating that this process is ongoing. Forecasts suggest that after 2025, production is expected to continue decreasing, but at a slower, more moderate pace [6].

These changes highlight the need for Azerbaijan's oil industry to increasingly focus on diversification and ecological rehabilitation. The decline phase of oil production underscores the importance of developing new strategic approaches to strengthen the national economy not solely through oil but also through other sectors. The data presented in this study provide a comprehensive overview of the past and anticipated future of oil production in Azerbaijan, shedding light on the current status and prospective developments within the country's energy sector.

REFERENCES

1. Aliyev F, G., Aliyev F, F. (2019). Microclimate of construction complex. LAP LAMBERT Academic Publishing.
2. Biletskyi, V., Haiko, H. (2019). The history of industrial oil extraction in Azerbaijan (the 19th – beginning of the 20th centuries). Skhid Scientific Journal. An extensive historical study of oil industry development in Azerbaijan and the international involvement of industrialists such as the Nobels and Rothschilds.
3. Karimi, S. (2021). The industrialization of oil and the secured place of Baku in the global economic order. A historical analysis covering Baku's rise as a global oil hub and the role of foreign capital and technology in the late 19th and early 20th centuries.
4. Ministry of Energy of Azerbaijan. Contract of the Century. Official historical overview of the 1994 production sharing agreement (Contract of the Century) that transformed Azerbaijan's post-independence oil strategy.
5. Ministry of Energy of Azerbaijan. Oil and gas figures for 2024–2025. Operational data on national oil production, export volumes, and field-level breakdowns.
6. Mir-Babayev, M. Y. (2002). Azerbaijan's Oil History: A Chronology Leading up to the Soviet Era. Azerbaijan International. A detailed chronology of key developments in Azerbaijan's oil sector from initial wells to pre-Soviet peak production.