

# Natural Gas Sector - Energy Sovereignty of Kazakhstan

## Introduction

Kazakhstan, as a nation endowed with substantial hydrocarbon reserves, ranking among [the world's top 15 countries in natural gas reserves](#), faces a paradox that defines its contemporary energy challenge: abundant underground wealth coexisting with growing supply constraints and increasing import dependency. The natural gas sector occupies a unique position within Kazakhstan's broader energy landscape, involving the extraction, transportation, and sale of natural gas to both export and domestic markets. Historically, however, the sector is playing a subordinate role to crude oil, with gas extracted primarily as an associated product and often reinjected to enhance petroleum recovery rather than commercialized as a standalone commodity. This production model, centered on megaprojects (Tengiz, Kashagan, and Karachaganak) that together account for 77% of the nation's gas reserves, has created structural dependencies that limit flexibility and constrain the sector's ability to respond to evolving domestic needs and international market opportunities.

The year 2025 marks a pivotal moment in this evolution. While gross gas production reached 68.2 billion cubic meters [bcm], net production available for commercial use declined to 21.4 bcm, as reinjection volumes surged to 33.5 bcm, representing nearly half of total production. Simultaneously, domestic consumption continued its upward trajectory, driven by a gasification program extending network access to 61.8% of the population and a planned shift toward coal-to-gas switching in power generation. This collision between constrained supply and rising demand has altered Kazakhstan's position in regional gas markets, transforming the country from a modest net exporter into an increasingly import-dependent consumer – a shift that reached a noteworthy inflection in 2025, when, for the first time, import volumes marginally but unmistakably exceeded exports. This article examines Kazakhstan's natural gas sector through the lens of [energy sovereignty](#), a concept that extends beyond essential energy supply adequacy (energy security) to cover strategic diversification, infrastructure integrity and capacity management, geopolitical and physical security, and demand-side policy.

## Kazakhstan's Natural Gas Sector in 2024-2025

Kazakhstan ranks among [the top 15 countries globally in terms of gas reserves](#), with 3.8 trillion cubic meters [tcm] of recoverable reserves, primarily located in the Pre-Caspian Basin. Gross gas production reached 68.2 bcm in 2025, an increase from 58.9 bcm in 2024. Marketable gas output after reinjection stood at 34.7 bcm, while net production available for distribution was 21.4 bcm, down from 22.8 bcm in 2024. Gas reinjection reached 33.5 bcm in 2025, up from 23.3 bcm in 2024 and accounting for approximately 49% of gross production. On average across the period examined, reinjection accounts for 39% of the total gas production. Gas reinjection helps maintain reservoir pressure and maximize oil recovery in megaprojects, reflecting Kazakhstan's production model, in which gas extraction remains closely tied to crude oil operations at Tengiz, Kashagan, and Karachaganak. Gas directed for internal use and production of natural gas products (including LPG) accounted for 13.3 bcm in 2025, representing 20% of the natural gas production.

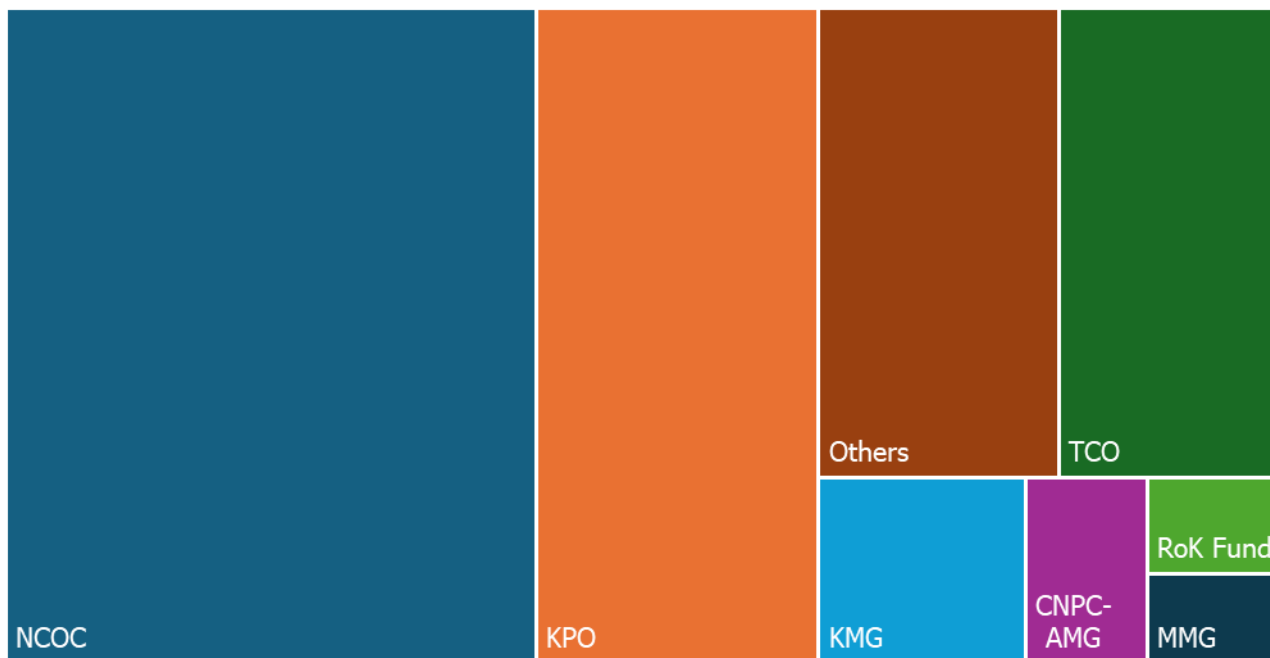
### Natural gas balance, bcm

Indicators	2021	2022	2023	2024	2025	Weight 2025	Average weight 2021-2025
<b>(+) Import</b>	2.3	1.3	0.9	4.4	5.2		
<b>(+) Net production for commercial use, including:</b>	25.0	23.0	25.0	22.8	21.4		
(+) <i> Production</i>	53.8	53.2	60.0	58.9	68.2		
(-) <i> Reinjection</i>	17.3	18.7	22.2	23.3	33.5	49%	39%
(-) <i> Processing and internal use</i>	11.5	11.5	12.8	12.8	13.3	20%	20%
<b>(-) Total sales, including:</b>	27.3	24.4	25.0	27.2	26.6		
(-) <i> Domestic market sales</i>	18.6	19.4	19.4	21.2	21.6	81%	76%
(-) <i> Export sales</i>	8.7	5.0	5.6	6.0	5.0	19%	23%

Source: ENERGY Insight & Analytics, Ministry of Energy of RK / SAC FEC RK

The distribution of natural gas reserves reveals significant concentration within three major fields. The [North Caspian Operating Company's](#) [NCOC] Kashagan oilfield holds 1.57 tcm, representing 42% of total Kazakhstan's recoverable reserves. [Karachaganak Petroleum Operating's](#) [KPO] field contains 0.83 tcm or 22% of reserves, while [Tengizchevroil's](#) [TCO] operations account for 0.47 tcm or 13%. These major oilfields are characterized by complex geology, deep reservoirs, and high hydrogen sulfide content that require specialized gas processing facilities. Together, these three megaprojects hold 77% of Kazakhstan's gas reserves, with the remaining 23% distributed among smaller fields operated by companies including CNPC-Aktobemunaigas [CNPC-AMG], KazMunayGas [KMG], and others.

**Recoverable reserves of natural gas on the end of 2022, tcm**



*Source: ENERGY Insight & Analytics, National Geology Service*

Kazakhstan's gas production is predominantly associated with oil extraction operations in the major oilfields of Tengiz, Kashagan, and Karachaganak, and follows the distribution pattern of reserves. Net gas production is calculated as gross extraction minus reinjection volumes (gas reinjected back into reservoirs to maintain pressure and enhance oil recovery). In 2025, the three megaprojects collectively accounted for 76% of total net gas production, with TCO at 33%, KPO at 25%, and NCOC at 18%. Marketable gas availability is primarily influenced by the technical and economic considerations of upstream operators, who are focused on optimizing overall hydrocarbon recovery.

The trade dynamics of 2025 show notable shifts in Kazakhstan's position in regional gas markets. For the first time, imports exceeded exports with import volumes reaching 5.2 bcm against exports of 5.0 bcm, a milestone that underscores the country's growing supply-demand imbalance. This crossover was driven by two simultaneous trends: imports surged by 18% from 4.4 bcm in 2024 to 5.2 bcm in 2025, while exports declined by 16% from 6.0 bcm in 2024 to 5.0 bcm in 2025. Export sales constitute 19% of the gas pool available for distribution (Import + Net production for commercial use), while domestic market sales reached 21.6 bcm in 2025, up 1.9% from 21.2 bcm in 2024 and accounting for 81% of the gas pool. Total sales, combining domestic and export markets, reached 26.6 bcm in 2025, down from 27.2 bcm in 2024. The growth in domestic consumption stems primarily from the national gasification program, which has extended gas access to previously unserved populations. The planned shift toward (selected) coal-to-gas switching in the power generation sector has driven sustained demand growth, supplemented by industrial demand and population growth.

The institutional framework supporting Kazakhstan's gas sector centers on several key players. The state-owned QazaqGaz company manages transportation, processing, and marketing functions, serving as the national operator for the sector. KMG plays a significant role in exploration and production activities. [Intergas Central Asia](#) [ICA] operates the trunk pipeline network, facilitating domestic gas transit and export operations. Gas processing operates through five major facilities within Kazakhstan, supplemented by Russia's Orenburg Gas Processing Plant [GPP], which processes a significant portion of KPO's output. The infrastructure includes [pipeline networks](#) largely inherited from the Soviet era, with average depreciation exceeding 70% across much of the core network.

The regulatory environment is expected to be significantly changed with the government's approval of [the Comprehensive Development Plan for the Gas Industry of the Republic of Kazakhstan for 2025-2029 \[the Comprehensive Development Plan\] on June 21, 2025](#). This plan assigns QazaqGaz a central role as the national operator and includes multiple strategic initiatives. The resource base expansion component aims to increase the natural gas resource base by 17% to 34.4 bcm by 2029, compared to 2024, through mechanisms to attract private investment and deploy modern exploration and development technologies. The pricing reform component and capacity expansion plans are discussed in detail in [Kazakhstan Energy Outlook 2025](#) by ENERGY Insights & Analytics.

## Sovereignty of the Natural Gas Sector

The looming gas deficit (and increasing reliance on imports) confronting Kazakhstan cannot be understood merely as a technical or commercial challenge requiring incremental adjustments to production targets or import contracts. Rather, it represents a multidimensional threat to energy security that operates across several interconnected domains, each with distinct characteristics, risk profiles, and policy implications. Assessment of energy sovereignty in the natural gas sector based on four foundational pillars established by methodological framework in previous article on [energy sovereignty](#): the diversification of supply sources and routes, which determines resilience against concentrated dependencies; the integrity of infrastructure systems and capacity management, which ensures gas availability and its reliable physical delivery to end users; geopolitical and physical security, which protects against external pressures and deliberate disruptions; and demand-side policy, which shapes consumption patterns and manages the balance between supply availability and customers' needs.

## Diversification

Diversification in the context of [energy sovereignty](#) refers to the strategic distribution of production sources, import and export routes, market destinations, and energy resource types to minimize dependence on single points of failure and enhance resilience against external shocks. For Kazakhstan's natural gas sector, diversification includes both the upstream dimension of production sources and the downstream dimension of market access and [transportation infrastructure](#). True diversification creates redundancy and optionality, enabling the system to absorb shocks in any single supply chain without cascading failures across the entire network.

*Constraints.* Megaprojects (Kashagan, Karachaganak, and Tengiz) account for 77% of Kazakhstan's recoverable gas reserves, with NCOC's Kashagan field alone accounting for 42% of those reserves. This concentration creates inherent vulnerability to operational disruptions, technical challenges, and commercial decisions that affect these megaprojects. Moreover, the dominance of associated gas production tied to oil extraction operations means that gas availability is subordinate to oil production priorities rather than responding to gas market dynamics. The 33.5 bcm of gas reinjected in 2025, representing 49% of gross production, reflects this structural constraint, in which gas serves primarily as a tool for enhanced oil recovery rather than as an independent revenue stream.

*Risks.* Production volatility stemming from the concentration in three oilfields operated by international consortia exposes Kazakhstan to decisions made by foreign partners whose strategic priorities may not align with national energy security objectives. The technical complexity of these fields, characterized by deep reservoirs and high hydrogen sulfide content that require specialized processing, creates additional vulnerability to technological failures or delays in capacity-expansion projects. Furthermore, the growing import dependency (surging from just 0.9 bcm in 2023 to 5.2 bcm in 2025) signals that Kazakhstan is increasingly reliant on external suppliers to meet domestic demand.

*Strategic options.* [The Comprehensive Development Plan](#) targets a 17% increase in the natural gas resource base to 34.4 bcm by 2029, through mechanisms to attract private investment and deploy modern exploration technologies. The Improved Model Contract mechanism, with its 70/30 pricing formula that links producer prices to export parity while maintaining a domestic component, represents an attempt to incentivize the development of new gas fields. Export route diversification remains equally critical, with Kazakhstan's participation in initiatives like the [Caspian Green Energy Corridor](#) and potential Middle Corridor projects offering additional pathways to access European markets.

## Infrastructure integrity and capacity management

Infrastructure integrity and capacity management involve the physical condition, operational reliability, and technical adequacy of [transportation](#), processing, and storage systems enabling gas to flow from production sites to end users, as well as the development of new capacities, including new production facilities, pipelines, and gas processing plants, required to meet growing domestic and export demand. For Kazakhstan’s gas sector, infrastructure integrity is defined by the ability to reliably extract, process, transport, and deliver gas while expanding capacity to keep pace with growing demand. Infrastructure integrity determines whether capacity exists only «on paper» or can be reliably deployed when needed, particularly during stress scenarios when obvious options may be unavailable.

*Constraints.* [The transportation infrastructure](#) faces significant challenges due to age and deterioration. Average depreciation exceeds 70% across the core pipeline network, inherited from the Soviet era and designed for different production and consumption patterns. Kazakhstan's domestic pipeline system remains underdeveloped, creating a paradox in which northern and central residents lack access to gas despite abundant gas in Western Kazakhstan. This geographic mismatch necessitates either extensive pipeline construction or continued reliance on Russian imports (or both).

Processing infrastructure presents equally significant constraints. Kazakhstan operates five major GPPs domestically, supplemented by Russia's Orenburg GPP, which processes a significant portion of KPO's output. High sulfur content in major gas reserves necessitates specialized, capital-intensive separation facilities. The government plans to add 5.9 bcm per year of new processing capacity by 2029 through facilities at Kashagan (1 bcm and 2.5 bcm), plus [KazGPP expansion](#) (0.9 bcm), though delayed implementation history and capital intensity create uncertainty about on-schedule delivery.

*Risks.* Infrastructure deterioration risks extend beyond operational reliability to safety, environmental, and economic dimensions. Pipeline failures or plant outages can disrupt supply to domestic consumers, particularly during peak winter demand periods. Aging pipeline throughput constraints perpetuate import dependency. Beyond physical deterioration, the absence of new production, processing, and transportation capacities poses an equally significant risk: without timely investment, no additional volumes can offset declining output, structurally deepen import dependency, and erode long-term gas self-sufficiency.

*Strategic options.* Reserve extraction capacity should be maintained above baseline demand through accelerated development of mid-sized fields (Rozhkovskoye, Urikhtau, and Kenkiyak), enabling rapid output ramp-up without sole reliance on TCO, KPO, or NCOC. Pipeline infrastructure should operate at ~80% capacity under normal conditions - a threshold already breached in several cases (e.g., Beineu-Bozoy-Shymkent pipeline in winter). Key expansion projects include [the Aktobe-Kostanay pipeline](#) connecting western

production to northern consumers, and [the Ishim-Astana gas pipeline](#), to be implemented jointly with Russia between 2027 and 2030, supplying Petropavlovsk, Kokshetau, and Astana, with potential extension to Oskemen thereafter. Even more resilience will be added by expanding gas storage in salt deposits.

## Geopolitical and physical security

Geopolitical and physical security, within [the energy sovereignty framework](#), addresses the vulnerability of energy systems to external political pressures, territorial disputes, sabotage, accidents, and natural disasters. For the natural gas sector, this dimension examines how geographic pipeline routing, political relationships with transit states, and vulnerability to military attacks shape energy sovereignty. True security requires not only physical protection of assets but also diplomatic and commercial arrangements that preserve operational autonomy even amid a shifting geopolitical landscape.

*Constraints.* Kazakhstan's geopolitical exposure centers on Russia, which functions simultaneously as a processing partner, transit route, import source, and potential competitor. The gas-related arrangements under which Karachaganak gas has historically supplied Orenburg GPP for processing and for growing volumes of Russian gas transit, along with imports to Kazakhstan, create operational interdependence. At the [PMGF-2025, Kazakhstan and Gazprom signed a memorandum](#) to construct a new pipeline connecting Astana and the northeastern regions, potentially deepening this interdependence and presenting strategic dilemmas as Kazakhstan seeks to balance relations with major powers. Russia's ongoing war conflict with Ukraine has introduced an acute physical security dimension. In October 2025, [a Ukrainian drone strike on the Orenburg GPP](#) forced the suspension of Karachaganak gas intake, resulting in a 25–30% reduction in output. In December 2025, a drone strike hit [Lukoil's Filanovsky platform in the Caspian Sea](#), raising concerns about Kashagan's offshore vulnerability.

The physical security dimension covers protection of facilities and pipelines from sabotage, terrorism, or accidental damage. The concentration of 77% of reserves and 76% of net gas production in three megaprojects creates high-value targets whose disruption would have catastrophic consequences. The technical complexity of megaprojects (high-pressure, high-H<sub>2</sub>S environments) means even minor incidents can trigger extended shutdowns.

*Risks.* Disruption of Russian transit routes or processing facilities could leave Kazakhstan unable to access imports and/or process its gas production. A particularly acute risk is sabotage of transit pipelines carrying Russian gas to Uzbekistan - an infrastructure that may attract third-party actors seeking to undermine Russia's export revenues, leaving Kazakhstan to bear the consequences of a conflict not of its making.

*Strategic options.* Mitigating risks requires infrastructure diversification, diplomatic engagement, and enhanced protective measures. Kazakhstan should prioritize physical and cyber security through security exercises, emergency response plans, and coordination with security services. At the highest political level, Kazakhstan should formally declare that threats to its gas-related interests abroad will result in diplomatic consequences.

## Demand-side policy

Demand-side policy (including strategic regulation of exports) within the energy sovereignty framework incorporates regulatory, fiscal, and institutional mechanisms that shape consumption patterns, manage demand during supply constraints, and align market behavior with energy security objectives. Effective demand-side policy creates system flexibility, enabling authorities to manage consumption during shocks without resorting to gas rationing or market disruptions.

*Constraints.* Kazakhstan's historically low gas prices have created distortions undermining energy security. Associated gas procured for the domestic market at below-cost prices, cross-subsidized through oil export revenues, discouraged investment in gas development. End-user prices remain insufficient to cover the full value chain costs, creating financial stress for upstream operators and limiting infrastructure investment. The gasification program, while achieving important social objectives, has created demand pressures straining supply capacity. By end-2024, gasification reached 61.8%, serving 12.32 million people, with plans to reach 62% (12.36 million people) by 2025. This expansion supports coal-to-gas switching in power generation and residential heating, reducing carbon emissions and improving air quality, but it occurs amid stagnant or declining net gas production. Domestic sales reached 21.6 bcm in 2025, up 1.8% from 2024, with projections pointing toward 26 bcm by 2040. Without corresponding production increases, this trajectory will eliminate export capacity and require increased imports.

*Risks.* Continued underpricing encourages wasteful consumption; energy efficiency gains could significantly reduce demand. Expanding the consumer base through gasification without production growth accelerates the shift from net exporter to net importer. Weak efficiency standards allow consumption to grow faster than economic and social objectives require. The absence of demand response mechanisms means peak periods strain system capacity and risk disruptions.

*Strategic options.* Kazakhstan requires a commercially viable gas chemical industry as a strategic alternative to raw gas exports - one that adds domestic value, enables higher procurement prices, and creates economic incentives to attract new upstream investment. Price reform should be accompanied by targeted support for economically vulnerable residents. Building energy codes and appliance efficiency standards can reduce consumption

growth without compromising economic activity. A significant recent step is [Kazakhstan's move toward differentiated gas tariffs](#), introducing tiered pricing to discourage overconsumption and free up volumes for export and gas chemical production. By aligning domestic prices with economic cost, this measure is expected to optimize demand, stimulate upstream investment, and redirect freed-up volumes toward higher-value uses. [The Comprehensive Development Plan](#) paves the way to address price distortions by gradually phasing out cross-subsidization, establishing wholesale prices for LNG producers, and reviewing the 10% cap on price increases for raw and marketable gas purchased by QazaqGaz under the state's preemptive right.

## The Bottom Line

The analysis across the four pillars of energy sovereignty reveals a sector characterized by profound contradictions: vast reserves concentrated in three megaprojects operated by international consortia, aging Soviet-era infrastructure struggling to connect western production with population centers, growing domestic demand outpacing stagnant net production, and pricing distortions that discourage investment while encouraging inefficient consumption. The transformation from modest net exporter to import-dependent consumer signals not merely cyclical adjustment but a structural shift threatening energy security and sovereignty. The 49% reinjection rate, 70% infrastructure depreciation, and widening gap between gross production and marketable gas illustrate a sector where technical realities, commercial priorities, and national interests remain misaligned.

The pathway toward energy sovereignty requires simultaneous action across multiple dimensions. Production diversification beyond megaprojects through the Comprehensive Development Plan's 17% expansion of the resource base by 2029 should be accompanied by pricing reforms to incentivize investment, infrastructure modernization connecting western reserves with northern and central regions, and efficiency programs to moderate demand growth. Geopolitically, Kazakhstan should balance deepening energy interdependence with Russia by pursuing alternative routes. The Improved Model Contract, with its 70/30 pricing formula, represents progress toward aligning producer incentives with national objectives, while the planned addition of 5.9 bcm per year of processing capacity addresses critical bottlenecks. For Kazakhstan, however, the pace of implementation matters as much as the plan itself, making accelerated execution a strategic imperative.

Kazakhstan's ability to achieve energy sovereignty depends not on any single intervention but on the coherence and persistence of a comprehensive strategy that recognizes the interdependencies among production development, infrastructure investment, pricing reform, and demand management. Decisions made in the coming years will determine whether Kazakhstan's 3.8 trillion cubic meters of reserves serve as a foundation for

sustainable prosperity or remain underutilized as the country grows increasingly import-dependent. The technical and commercial challenges are substantial but not insurmountable. What is required is political will to implement difficult reforms, strategic vision balancing short-term pressures with long-term objectives, and diplomatic skill to navigate complex geopolitics while moving toward energy sovereignty.

This strategy should be built on a foundation of resilience - a tangible “margin of safety” that allows Kazakhstan to withstand external shocks, supply disruptions, and geopolitical pressures without retreating into isolation. The path forward lies not in self-sufficiency at any cost, but in finding a sustainable balance of interests across the broader Central Asian region, where energy interdependencies make unilateral solutions both impractical and counterproductive.

The stakes extend beyond the natural gas sector itself, encompassing Kazakhstan's broader development trajectory, its position in regional and global energy markets, and its ability to chart a sovereign course in an era of intensifying great-power competition. Energy sovereignty is not an end in itself; it is the prerequisite for the kind of partnership President Tokayev has articulated. As he wrote in [The National Interest](#), “Kazakhstan remains firmly committed to being a reliable and honest partner that prioritizes stability, respects international obligations, and delivers tangible results”. In this sense, achieving natural gas sector self-sufficiency is inseparable from Kazakhstan's broader strategic identity. As President Tokayev's own framing suggests, [“Reliability Is the New Power”](#), and for Kazakhstan, energy sovereignty is the foundation upon which that reliability must be built.

## ENERGY Insights & Analytics

Analytical center "ENERGY" LLP (ENERGY Insight & Analytics) is a joint venture between [the KAZENERGY Association](#) and the IT company [AppStream](#). The company aims to become a priority source of data, analytical information, and recommendations for Kazakhstan's oil, gas, and electric power industries, allowing decision-makers to analyze and predict the most significant industry indicators with details on leading market players. Activities of ENERGY Insight & Analytics incorporate the whole analytics cycle with consequent stages: Descriptive, Diagnostic, Predictive, and Prescriptive analytics.

The key tool and product of ENERGY Insight & Analytics is internally developed software - [the Analytical Platform EXia](#), aimed to identify, localize, format, and present data most efficiently for the specified use cases.

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