

Energy Sovereignty of Kazakhstan - Constraints, Risks, and Options

Introduction

This article serves as a sequel to the ENERGY Insights & Analytics article "[Energy Security for Kazakhstan – Strategy and Energy Trilemma](#)". In the earlier analysis, we asserted that for resource-rich nations like Kazakhstan, the global challenge of balancing the Energy Trilemma (security, equity, and sustainability of energy) is not merely a policy exercise but a fundamental requirement for national stability and development of the state. This time, we move from the broad theoretical framework to a conceptual roadmap for ensuring Kazakhstan's energy resilience in an increasingly volatile global landscape.

Recent geopolitical shocks have exposed the fragility of energy systems that rely on (almost) single export corridors and/or cross-border processing capacities, while challenges to meet domestic demand for energy threaten to undermine the very foundation of Kazakhstan's economic growth. Inaction is not an option: a business-as-usual trajectory would lock Kazakhstan into deepening import dependence, infrastructure decay, and vulnerability to external shocks. Kazakhstan should define its very own meaning of energy sovereignty based on informed and strategic decisions on energy's security, equity, and sustainability.

Defining Energy Security and Energy Sovereignty

Let's define this article's key definitions. The International Energy Agency [defines](#) energy security as the uninterrupted availability of energy sources at an affordable price. It focuses on the resilience of infrastructure, the reliability of supply chains, and the ability of the system to recover swiftly from technical or geopolitical shocks. Energy sovereignty, however, goes a step further and represents the nation's ability to make independent strategic decisions regarding its energy future without being compromised by external pressures and/or critical dependencies.

Kazakhstan's pursuit of energy sovereignty remains a complex challenge as the nation continues to navigate a landscape defined by deep-seated dependencies on both regional neighbors and global powers. Despite being a major energy producer, the country's ability to exercise full control over its resources is constrained by a combination of geographical limitations, legacy infrastructure, and a heavy reliance on foreign capital and expertise. This

lack of (sufficient) autonomy and self-sustainability is most visible in the strategic bottlenecks of its export routes and the structural composition of its key oil and gas projects.

The most significant constraint on Kazakhstan's energy sovereignty is its geographical landlocked status that creates dependence on a limited number of export corridors. The Caspian Pipeline Consortium [CPC] has for many years provided a stable, economically most efficient, and technologically proven route for exporting Kazakhstan-borne crude oil and was not considered a keen risk factor until 2022, despite passing through the territory of the Russian Federation. At the same time, the sharp change in the geopolitical environment in recent years has brought to the fore the question of the sustainability of this configuration. It is important to emphasize that a complete replacement of the CPC route in the short and medium term is practically impossible: it transports 82% of oil sent for export (almost 65 million tons of oil in 2025), and in terms of costs, scale, and reliability, this route remains without alternative. Under these conditions, the task of energy sovereignty lies not in abandoning the CPC, but in reducing the criticality of a single export configuration through gradual diversification and increasing the redundancy of the transport system (including storage reservoirs/tanks).

While geopolitics affects the transit, the actual production and technological development of Kazakhstan's energy sector are largely dominated by foreign multinational corporations. The country's three "megaprojects" - [Tengizchevroil \[TCO\]](#), [North Caspian Operating Company \[NCOC\]](#), and [Karachaganak Petroleum Operating \[KPO\]](#) - account for the vast majority of the nation's crude production (70% in 2025). These projects are characterized by an overwhelming dependence on Western technology, management systems, and massive foreign direct investment from companies like Chevron, ExxonMobil, Shell, and Eni. This reliance reflects the fact that Kazakhstan has limited domestic experience in managing such complex offshore and high-pressure fields independently, raising questions about the feasibility and risks of assuming full operational control without established expertise. Furthermore, while Production Sharing Agreements (NCOC and KPO) and stabilized contracts (TCO) provide Kazakhstan with essential investment, technology, and risk-sharing mechanisms, their legal and financial frameworks necessarily constrain the state's ability to unilaterally modify terms, reflecting a thoughtful exchange of some policy flexibility for development certainty and foreign capital. Moreover, disputes arising from these agreements are typically resolved through international arbitration mechanisms, a process that is not only protracted and costly but also operates largely outside the direct control of Kazakhstan.

To translate the concept of energy sovereignty into actionable policy, we identify five essential topics that should form the backbone of Kazakhstan's energy sovereignty. Each of these streams faces unique constraints and risks that must be systematically addressed, and ENERGY Insights & Analytics will publish a dedicated series of articles on:

- Oil Refining: ensuring domestic processing capacity meets [domestic fuel demand](#) and reduces dependence on imported refined products.

- Export Routes: diversifying transportation infrastructure to eliminate single points of failure in [crude oil exports](#).
- Gas Industry: developing domestic [gas processing and distribution](#) to secure internal supply and optimize export potential.
- Electric Power: modernizing [generation capacity and grid infrastructure](#) to meet rising electricity demand.
- Human Resources: cultivating the specialized talent required to operate a high-tech, diversified energy system.

In the sections that follow, we will outline the key constraints and risks facing each direction, setting the stage for the detailed strategic analysis to come.

Key Constraints and Risks

The transition from Energy Trilemma’s energy security to real energy sovereignty is hindered by a set of deeply rooted structural constraints and a new generation of external threats. To build up resiliency, Kazakhstan should address these vulnerabilities with urgency, beginning with the foundational challenge of domestic oil refining. This forces a continued reliance on imports of some refined products like diesel and jet fuel (kerosene), even as the country exports vast quantities of crude oil. Despite substantial modernization over the last several years, Kazakhstan’s three major refineries (Atyrau, Pavlodar, and Shymkent) remain mostly legacy Soviet-era assets¹ with highly concentrated capacity, so unplanned outages can quickly translate into domestic fuel shortages and renewed dependence on imports.

Yet even as Kazakhstan grapples with refining its own resources, the challenge of getting crude oil to international markets reveals an even more acute vulnerability. 82% of the nation’s crude oil exports are transported via CPC², which is mostly placed in the Russian Federation. This creates a critical "single point of failure" where any disruption, such as technical, political, or military, directly impacts the national economy. The reality of this risk was starkly illustrated in late 2025, when [the CPC marine terminal was forced to suspend operations following drone attacks on civilian critical infrastructure](#), and in January 2026, when [drones struck two oil tankers chartered by Chevron and KazMunayGas near the Black Sea loading terminal of the CPC](#). While the government is accelerating the development of

¹ For more details, please refer to "Refining and Refined Product Market Dynamics" section of [Kazakhstan Energy Outlook 2025](#) by ENERGY Insights & Analytics

² For more details, please refer to "Crude Oil Transportation and Marketing" section of [Kazakhstan Energy Outlook 2025](#) by ENERGY Insights & Analytics

the Middle Corridor to bypass this dependency, alternative routes like [the Baku-Tbilisi-Ceyhan pipeline chronically lack the capacity to fully replace the CPC volumes](#).

Resilience vulnerability extends beyond oil into the natural gas sector³, where Kazakhstan's ability to utilize its own natural resources is limited by a lack of domestic processing capacity. This has historically forced a reliance on cross-border infrastructure, most notably the Orenburg Gas Processing Plant in Russia, which handles a significant portion of gas from the [Karachaganak field](#). The fragility of this arrangement became clear in October 2025, when [a drone strike on the Orenburg facility caused an emergency shutdown](#), temporarily halting gas intake from Kazakhstan and threatening domestic supply. Such incidents underscore the risk of "imported" instability and highlight the urgent need for Kazakhstan to complete its own processing facilities to ensure true domestic gas security. Kazakhstan also faces a growing dependence on Russia for both [natural gas imports and transit infrastructure](#). The most visible sign of this trend is [the reversal of the Central Asia-Center pipeline system](#), which was originally designed to transport Turkmen and Kazakh gas to Russia but is now being utilized to deliver Russian gas into Kazakhstan and onward to Uzbekistan.

At the same time, the electric power sector is grappling with its own "perfect storm" of rising demand and decaying infrastructure. Kazakhstan's electricity system relies heavily on aging coal-fired plants, leading to recurring generation deficits, particularly in the southern and western regions, where demand consistently outstrips local generation. The fragility of [the national grid](#) compounds this challenge; the lack of a unified, modern, and resilient transmission system means that regional failures cannot always be compensated for by internal redistribution, forcing a reliance on emergency imports from neighboring countries. Achieving true energy sovereignty thus requires not only additional capacity, but also flexible generation, storage solutions, and enhanced regional balancing capabilities.

Finally, these technical challenges are compounded by a human capital constraint. The transition to a more complex energy mix, including nuclear and advanced renewables, requires specialized expertise that is currently in short supply. The domestic education system has not yet fully adapted to produce the engineers, technicians, and managers needed for this developing energy landscape. Without a strategic focus on developing local talent through targeted education programs, international partnerships, and retention incentives, the technical sovereignty of Kazakhstan's future energy systems will remain uncomfortably dependent on foreign consultants and contractors. The "brain drain" risk is compounded by the competitive labor markets of neighboring countries and the global energy sector, which actively recruit skilled Kazakhstani professionals.

³ For more details, please refer to "Kazakhstan's Natural Gas Sector" section of [Kazakhstan Energy Outlook 2025](#) by ENERGY Insights & Analytics

Options to solve the Energy Trilemma

The resolution of Kazakhstan’s energy challenges requires more than technical fixes; it demands a series of fundamental strategic choices that address the inherent tensions within the Energy Trilemma: maintaining energy equity through affordable prices, ensuring security through infrastructure investment, while achieving environmental sustainability. For the Government of Kazakhstan, the most pressing choice lies in the future of the national power mix, where the country must decide how to progress its aging, coal-heavy generation base with new modern-tech power plants on “clean” coal, nuclear, and renewables.

A second, equally complex strategic choice involves the reform of energy pricing and the transition toward a “Tariff for Investment” model. For decades, Kazakhstan has prioritized energy equity by keeping utility tariffs artificially low, a policy that has successfully protected households but has simultaneously starved the energy sector of the capital needed for modernization. This underinvestment has led to the critical wear and tear of power grids and heating systems, directly undermining energy security. The government is now attempting to navigate this trade-off by gradually raising tariffs to fund the “Tariff for Investment” program, which aims to attract billions in private and state capital to overhaul the nation’s crumbling infrastructure. However, as noted in [the National Energy Report KAZENERGY 2023](#) [NER 2023], this path requires extreme political caution to ensure that price hikes do not trigger social instability or disproportionately burden vulnerable populations, illustrating the delicate dance between security and equity.

Furthermore, Kazakhstan faces a strategic choice regarding the allocation of its natural gas resources, which are increasingly caught between the needs of the export market and the demands of domestic consumption. Historically, gas has been a notable source of the country’s export revenue, but rising domestic demand for heating and power generation, driven by the gasification of northern regions, has created a looming deficit. The government must decide whether to prioritize the energy security of its citizens by diverting gas from lucrative export contracts to the domestic market or to maintain the energy equity by subsidizing domestic gas prices at the expense of the national budget. The shift toward a domestic-first gas strategy is already underway, with the Ministry of Energy emphasizing [the expansion of gas processing facilities and the prioritization of internal needs to prevent shortages](#).

To navigate these multifaceted challenges, we will apply a methodological framework designed to evaluate both feasible and optimal strategic choices available to Kazakhstan. The goal is not to prescribe a single “correct” path, but rather to provide the analytical framework and empirical evidence necessary for policymakers to chart Kazakhstan's course toward true energy sovereignty.

Methodological Framework for Energy Sovereignty

To evaluate the strategic choices for Kazakhstan’s energy sector, we adopt a methodological framework drawing on several established approaches, including the three-factor (Diversification, Resilience, and Transparency) model outlined in [the NER 2023](#), prepared by the KAZENERGY Association in cooperation with S&P Global, and [the Building Energy Resilience in an Uncertain World report](#) by Energy Source Forum.

The first methodological pillar focuses on the *diversification of energy sources and flows*, encompassing domestic reserves, production capacities, and the balance of imports and exports. For Kazakhstan, this involves analyzing the transition from a legacy coal-centric model to a more diversified mix that integrates nuclear baseload, renewable energy, and new modern coal-powered plants. This method evaluates the “resilience of the mix” by simulating how various combinations of internal production and external trade can mitigate supply shocks.

Building upon the foundation of resource and flows diversity, the second methodological pillar addresses the technical and structural challenges of the energy system, specifically focusing on *infrastructure integrity and capacity management*. This pillar assesses the ability of the national energy infrastructure to recover swiftly from shocks.

Such technical (local) resilience is, however, increasingly inseparable from the broader security environment, leading to the third methodological pillar: the assessment of *cyber challenges and physical threats* to energy assets. Kazakhstan’s landlocked position and its role as a transit hub expose it to geopolitical shifts and potential criminal interference. Resilience, in this context, is measured by the system’s ability to withstand and recover from “non-technical” disruptions, such as cyberattacks on digitalized grid controls or physical damage to cross-border pipelines.

Complementing these supply and security-side measures, the methodology finally evaluates the efficiency of *demand-side policies and the strategic regulation of exports*. Rather than focusing solely on increasing production, this approach analyzes how policy levers - such as energy efficiency mandates and price deregulation - can rebalance the Energy Trilemma. This includes transparency, as per NER 2023, which extends to the clarity and predictability of regulatory frameworks, and the openness of decision-making processes that govern resource allocation between domestic needs and exports.

Ultimately, this methodology serves as the analytical engine for the upcoming series of articles, providing a consistent basis for evaluating the trade-offs inherent in each of the five directions of Kazakhstan’s energy evolution. Crucially, the application of this framework should enable us to determine Kazakhstan’s “margin of safety” for key energy commodities: crude oil, natural gas, electricity, and refined products. As previously outlined in [Energy Security for Kazakhstan – Strategy & Energy Trilemma](#) article by ENERGY Insights &

Analytics, this means systematically evaluating reserves, production and transport capacity, infrastructure constraints, and demand trends to determine how many days or months the country could continue to function relatively harmlessly if supply chain disruptions or internal failures occurred.

The Bottom Line

True sovereignty requires the institutional capacity to make independent strategic choices, the infrastructure to withstand external shocks, and advanced human capital. Crucially, the pursuit of sovereignty does not signal a turn toward isolationism; rather, it is designed to provide the stability necessary for engaging in long-term, mutually beneficial partnerships. By fostering a model of strategic interdependence, Kazakhstan aims to secure its national interests while remaining a reliable and proactive participant in the global energy system, ensuring that its autonomy is reinforced by, rather than isolated from, international cooperation. The directions identified in this article represent the essential building blocks of that sovereignty, and the strategic choices facing Kazakhstan are not abstract policy debates but urgent decisions with direct consequences for national security, economic stability, and social equity. In the articles to follow, ENERGY Insights & Analytics will move beyond diagnosis to prescription, offering evidence-based recommendations that enable policymakers to chart a course toward a future in which Kazakhstan's energy destiny is determined not by external dependencies, but by its own strategic vision and execution.

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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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