Energy Balance 2024 – World and Kazakhstan

Introduction

As the world's population grows and economies continue to expand, the demand for energy has reached extraordinary heights, placing immense pressure on existing systems and resources. The new edition of the Energy Institute's Statistical Review of World Energy offers a snapshot of the moment, highlighting a paradox at the heart of the energy transition: while renewable energy capacity is growing at record rates, fossil fuel consumption remains stubbornly high, driving emissions to new peaks.

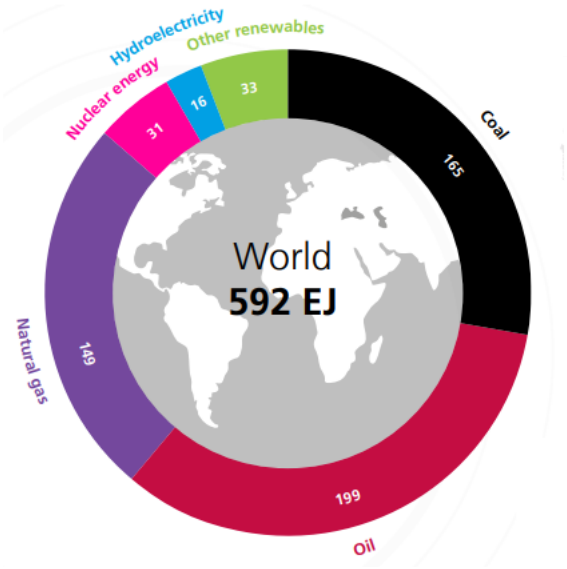
This article explores the complex dynamics shaping the global energy balance in 2024, with a particular focus on the different trajectories of advanced and developing economies, the shifting roles of major energy sources, and the place of Kazakhstan within this evolving situation.

Renewables in Global Energy Balance: Addition, Not Substitution

Fueled by the relentless momentum of economic growth and the pressing needs of an expanding global population, the world's energy system evolves accordingly. The 74th edition of the Energy Institute's Statistical Review of World Energy, a cornerstone document for the global energy community, shows the following paradox. The year 2024 witnessed a record-shattering expansion of renewable energy capacity and generation. Yet, this "green" surge was matched, and in some ways overshadowed, by a simultaneous record-high consumption of fossil fuels.

The global energy balance detailed for the year 2024 serves as powerful evidence to the total scale of the world's energy appetite. In a development not seen since 2006, every single major source of primary energy: oil, natural gas, coal, nuclear, hydroelectricity, and other renewables-registered an increase in demand. This across-the-board growth is a significant indicator of how deeply embedded fossil fuels remain within the very fabric of the global economy, even as clean energy sources are being deployed at an unprecedented rate. The direct and unavoidable consequence of this dynamic is an unabated rise in greenhouse

emissions. Global energy-related emissions climbed to a staggering [40.8 gigatonnes of CO_2 equivalent], marking the fourth consecutive year that this perilous record has been broken. The dream of "peak emissions" remains, for now, stubbornly out of reach.



Source: Energy Institute, "Statistical Review of World Energy 2025" [June 2025]

This growth, however, is not a uniform global story. A stark and deepening divergence has emerged between the energy trajectories of advanced and developing economies. The overwhelming majority of the increase in energy demand was driven by non-OECD countries, which are now firmly established as the center of gravity for both absolute consumption and annual growth rates. Here, industrialization, urbanization, and a rising middle class are fueling an immense need for energy.

Region	2024 energy demand, EJ	2024 energy demand, %	Growth rate in 2024
Asia Pacific	279	47%	2.6%
North America	112	19%	0.4%
Europe	72	12%	0.7%
CIS	41	7%	2.5%
Middle East	41	7%	2.0%
South and Central America	26	4%	1.2%
Africa	21	4%	1.1%
Total world	**592**	**100%**	**1.8%**

Source: Compiled by ENERGY Insights & Analytics based on Energy Institute's "Statistical Review of World Energy 2025" [June 2025]

The Asia Pacific region stands out. Led by the economic powerhouses of China and India, this region has become the undisputed epicenter of global energy demand. This leadership role, however, comes with a heavy environmental price tag. In 2024, these two nations alone were responsible for a staggering 62% of the total increase in global emissions. In contrast, energy demand in the OECD group of developed nations remained relatively flat.

Global Energy Balance: Fuel types

Total energy supply in 2024 by fuel type demonstrated polydirectional growth. Oil remained the leading energy source, accounting for 34% of the global supply and registering a 1.0% increase in energy output during the year. Coal also grew, nearly matching oil with a 1.2% increase, and confidently maintained its position as the second-largest contributor, representing 28% of the global energy mix. Natural gas outpaced both oil and coal, posting a 2.1% rise in 2024 and remaining the third-largest energy source worldwide. Clean energy sources (nuclear, hydroelectricity, renewables) saw even more robust growth rates in 2024. However, their combined share of the global energy supply mix remains below 15%.

Fuel type	2024 energy supply, EJ	2024 energy supply, %	Growth rate in 2024
Oil	199	34%	1.0%
Coal	165	28%	1.2%
Natural gas	148	25%	2.1%
Nuclear energy	31	5%	3.3%
Hydro electricity	16	3%	6.7%
Renewables	33	6%	10.0%
Total supply	**592**	**100%**	**2.1%**

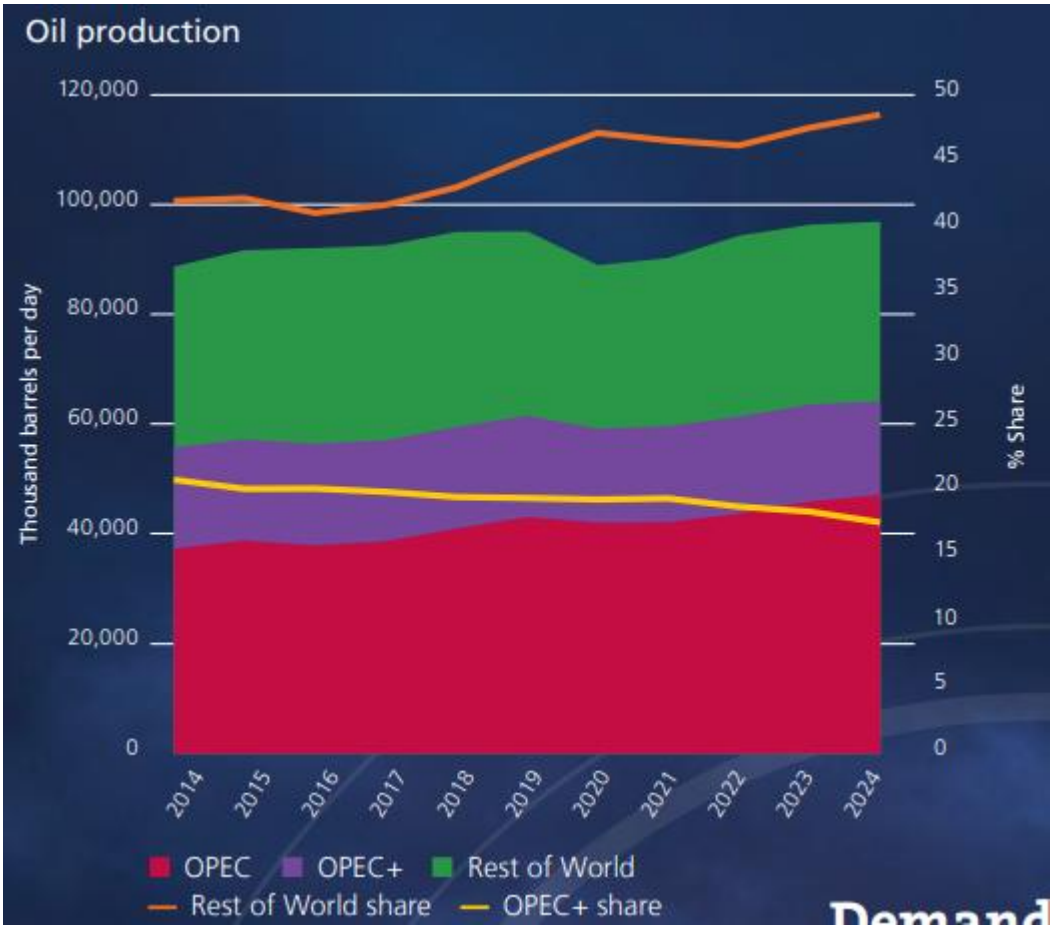
Source: Compiled by ENERGY Insights & Analytics based on Energy Institute's "Statistical Review of World Energy 2025" [June 2025]

Despite decades of efforts to diversify, oil has retained its crown as the world's dominant fuel. Global consumption, while slowing in its growth rate, still climbed by 0.7% to breach the last year record and reaches 101.8 million barrels per day [Mbpd] for the first time. The production landscape, however, has been fundamentally reshaped. The United States, leveraging extraordinary advances in shale extraction technology and operational efficiency, saw its output surge to a record high, breaking the 20 Mbpd level. This has created a new reality in global energy politics, with U.S. production now broadly equivalent to the combined output of historical powerhouses Saudi Arabia and the Russian Federation. The surge from non-OPEC producers has offset production discipline elsewhere and altered the balance of

power in global oil markets[1]. Regionally, while demand plateaued in the OECD, it was driven higher by non-OECD countries, with Africa and the Middle East posting the fastest growth rates.

World Oil Production

- 96.9 Mbpd total global production in 2024
- OPEC share declined from 37.4 Mbpd [2014] to 32.0 Mbpd [2024]
- Non-OPEC rose to 65.0 Mbpd, driven by U.S. growth
- United States reached 20.1 Mbpd in 2024, nearly double 2014 levels

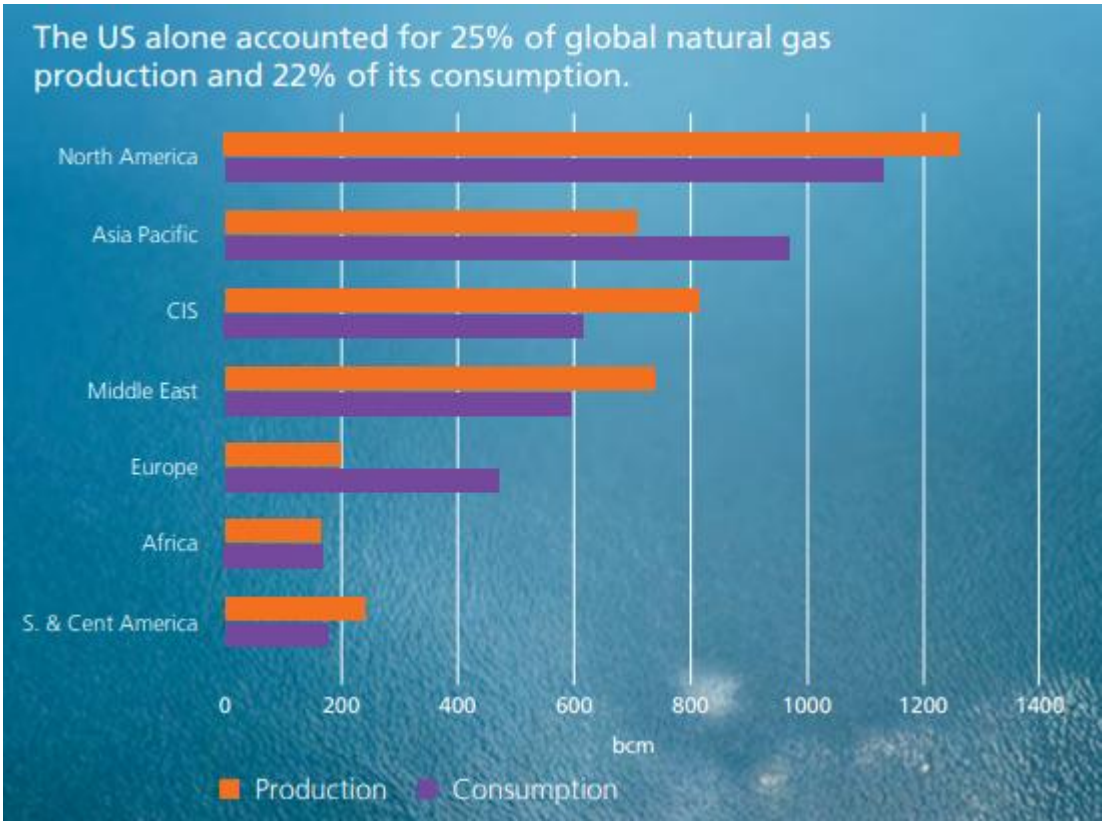


Source: Energy Institute, "Statistical Review of World Energy 2025" [June 2025]

After a period of extreme volatility following the 2022 energy crisis, natural gas experienced a powerful resurgence in 2024. Global demand rose by a robust 2.5%, reasserting its role as a crucial component of the energy mix, meeting a quarter of the world's total energy

[1] ENERGY Insights & Analytics recently covered the topic of emerging oil producers in the article "Emerging Oil Producers – Specifics and Impact"

needs, including rise of AI[2]. Over half of this demand growth was fueled by the Asia Pacific region, where China's industrial and residential needs were a primary driver. Europe also saw a modest rebound in gas demand, its first increase since 2021, though consumption remains well below pre-crisis levels. The global trade in natural gas is also in a state of dynamic flux. The U.S. cemented its position as the world's largest exporter of liquefied natural gas [LNG], with its exports reaching 115 billion cubic meters. In a significant shift, a substantial portion of these LNG cargoes, which had been directed to Europe in 2023, were rerouted to meet the burgeoning demand in Asia, reflecting new price differentials and long-term contract structures. This highlights the flexibility and global nature of the LNG market. Simultaneously, pipeline gas trade also grew, notably with Russia increasing its exports to Europe, neighboring CIS countries, and, most strategically, to China.



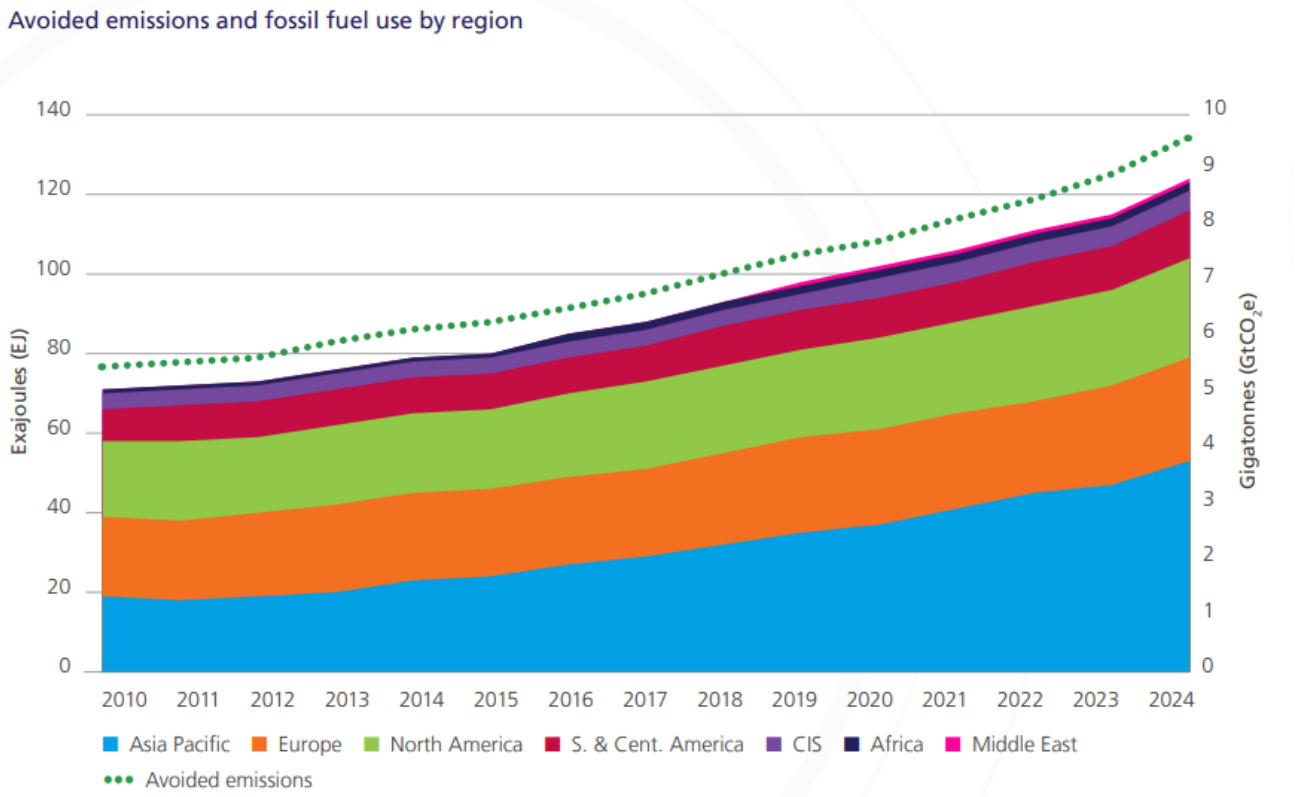
Source: Energy Institute, "Statistical Review of World Energy 2025" [June 2025]

The undisputed achievement is the explosive and accelerating growth of wind and solar power. In 2024, combined electricity generation from these two sources soared by an immense 16%, a growth rate nearly nine times faster than the increase in total global energy demand. Solar energy is unequivocally leading this charge, with new capacity additions

[2] The crucial role of natural gas in powering the ongoing AI revolution covered in ENERGY Insights & Analytics' article "Powering the Digital Age – Energy Perspective"

outpacing those of wind by an impressive four-to-one margin. This rapid deployment has elevated wind and solar to a significant position in the global power matrix, together supplying 17% of the world's total electricity.

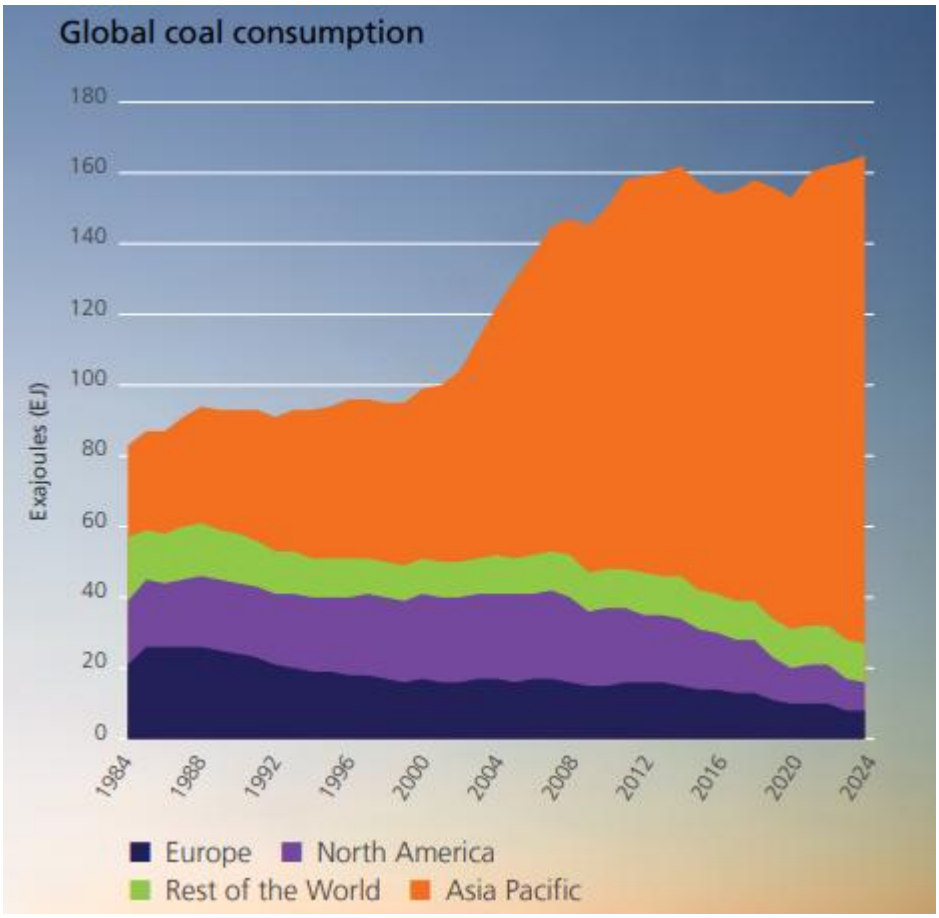
China stands at the absolute center of this evolution. In 2024, the nation was responsible for 57% of all new global renewable power additions and now hosts 47% of the world's entire installed capacity of wind and solar, which is nearly double the combined capacity of the United States and Europe. Elsewhere, significant milestones were also reached. In the European Union, wind and solar combined to supply 28% of the bloc's electricity, and for the first time in history, solar generation surpassed coal. The deployment of renewables and nuclear power since 2010 has collectively avoided the emission of approximately 109 gigatonnes of greenhouse gases. To contextualize this figure, it is nearly 2.5 times the total amount of greenhouse gases emitted by the entire world in 2024 alone.



Source: Energy Institute, "Statistical Review of World Energy 2025" [June 2025]

Despite being the most carbon-intensive of all fossil fuels, global demand for coal continued to climb in 2024, rising by 1.2% to reach a new global record. This growth is driven almost entirely by the insatiable energy demands of the Asia Pacific region. China's consumption alone now accounts for 67% of the global total and exceeds that of the rest of the world combined. This fact is the central irony of China's energy system: it is simultaneously the world's undisputed leader in building new renewable energy and its most profound consumer of coal. Despite its "green" energy boom, coal still generates 58% of the country's electricity.

This contrasts dramatically with trends elsewhere. In Europe, coal demand plummeted by another 7%. In the United States, the decline is even more swift, with American coal production hitting its lowest level in over 44 years.



Source: Energy Institute, "Statistical Review of World Energy 2025" [June 2025]

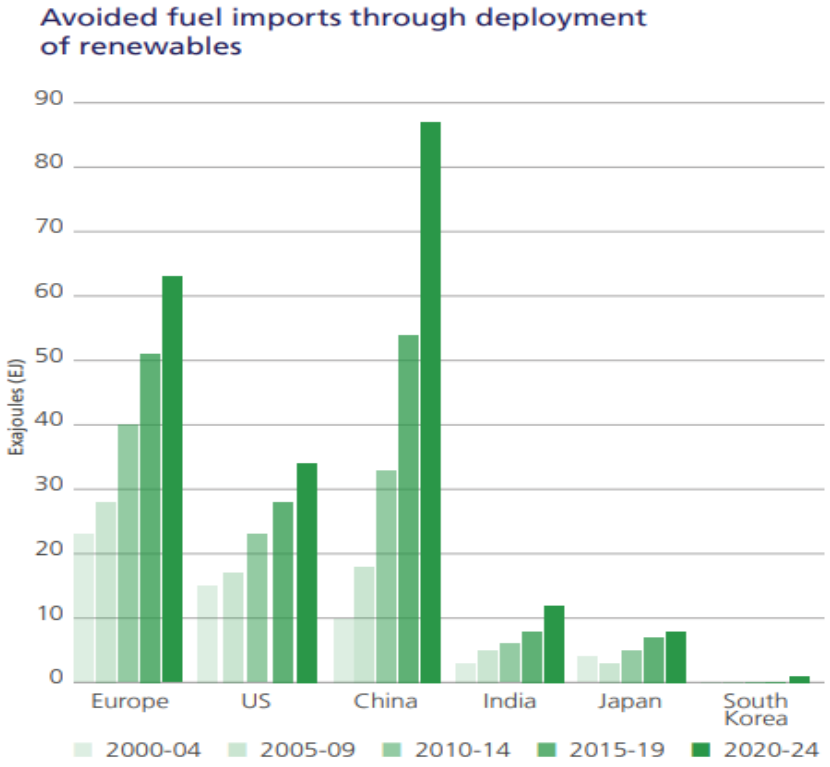
Nuclear energy saw a notable resurgence in 2024, increasing by 3% to supply just over 5% of total global energy demand. This growth was primarily driven by France and Japan, where several nuclear plants returned to service after prolonged outages. Alongside renewables, nuclear power played a crucial role in boosting the efficiency of the global energy system and moderating greenhouse gas emissions. Notably, for the first time, nuclear energy's contribution to Europe's total energy demand surpassed that of coal, marking a significant milestone in the region's energy transition.

Geopolitics' Impact

The global energy landscape of 2024 cannot be understood outside the context of intense geopolitical friction. The seismic shocks of the past five years-from the supply chain

disruptions of the COVID-19 pandemic to the ongoing conflict in Ukraine and the subsequent energy crisis-have fundamentally altered the calculus of the energy transition. As the foreword by Kearney astutely notes, "national priorities – such as energy security and technological sovereignty – are increasingly overshadowing climate objectives." This has fractured any notion of a unified global approach, leading instead to a patchwork of fragmented and divergent strategies, as nations prioritize their own security and economic stability.

In this new paradigm, renewable energy is increasingly framed not just as a tool for climate mitigation, but as a cornerstone of national energy security. By harnessing domestic resources like sun and wind, nations can insulate their economies from the price volatility and geopolitical leverage inherent in global fossil fuel markets. China's massive renewables buildout, for instance, has helped it avoid importing an estimated 87 exajoules [EJ] of energy over the past five years-an amount greater than Europe's entire energy demand in 2024. Europe and the US have likewise avoided significant import volumes. This stands in stark contrast to economies like Japan and South Korea, which remain over 90% reliant on energy imports.



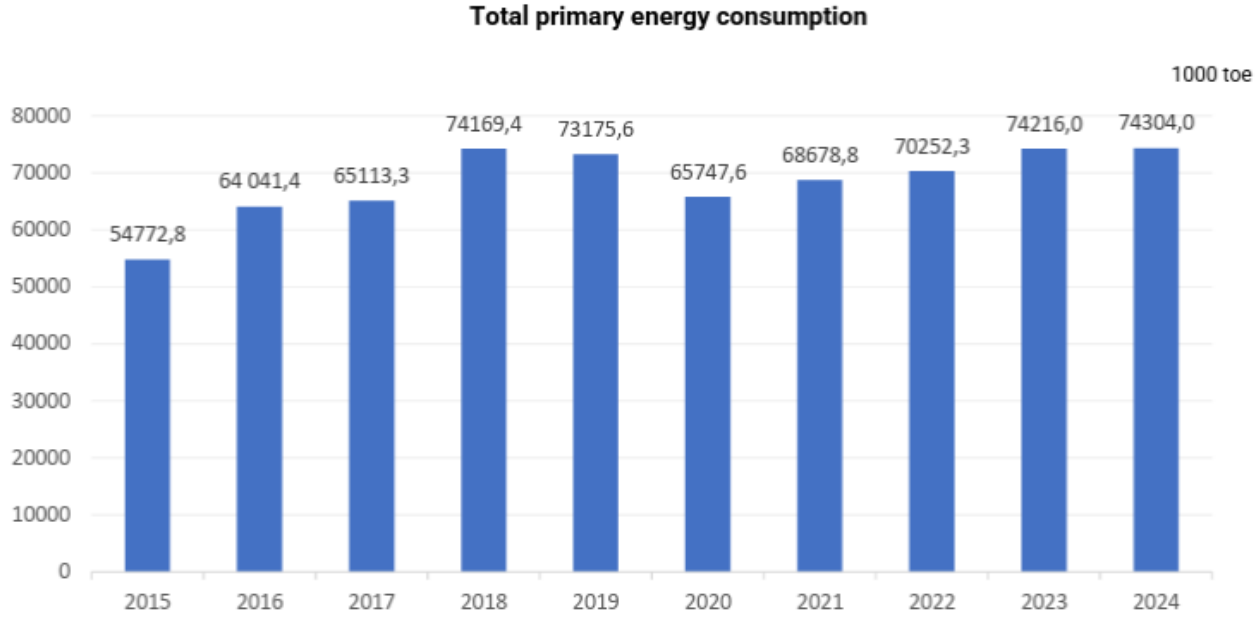
Source: Energy Institute, "Statistical Review of World Energy 2025" [June 2025]

The deep integration of variable renewables like wind and solar demands a fundamental re-engineering of electricity grids. To ensure the 24/7 reliability required by modern economies, this transition necessitates massive parallel investments in enabling technologies like grid-

scale battery storage, advanced smart grids, enhanced cross-border interconnections, and sophisticated demand-response programs.

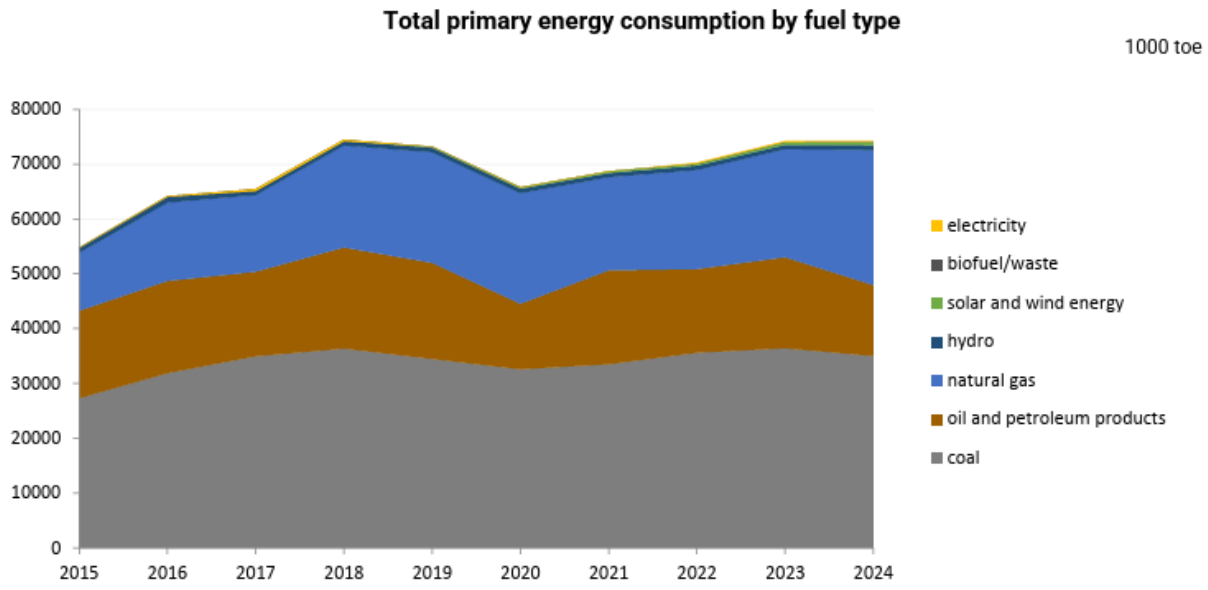
Kazakhstan's Energy Balance 2024

According to the Fuel and Energy Balance 2024 by the Bureau of National Statistics of Kazakhstan, the Kazakhstan's primary energy consumption and sectoral structure reflect both availability of resources and the ongoing challenges of energy transition. Kazakhstan's share in the global energy balance in 2024 represented 0.5% [3 EJ out of total 592].



Source: Bureau of National Statistics of RoK, Fuel and Energy Balance 2024 [August 2025]

Kazakhstan's total primary energy consumption in 2024 reached 74.3 million tonnes of oil equivalent [Mtoe], which is approximately 3.13 EJ [using the conversion 1 Mtoe ≈ 0.042 EJ]. This figure represents a marginal increase of 0.1% compared to 2023, indicating relative stability in overall demand.



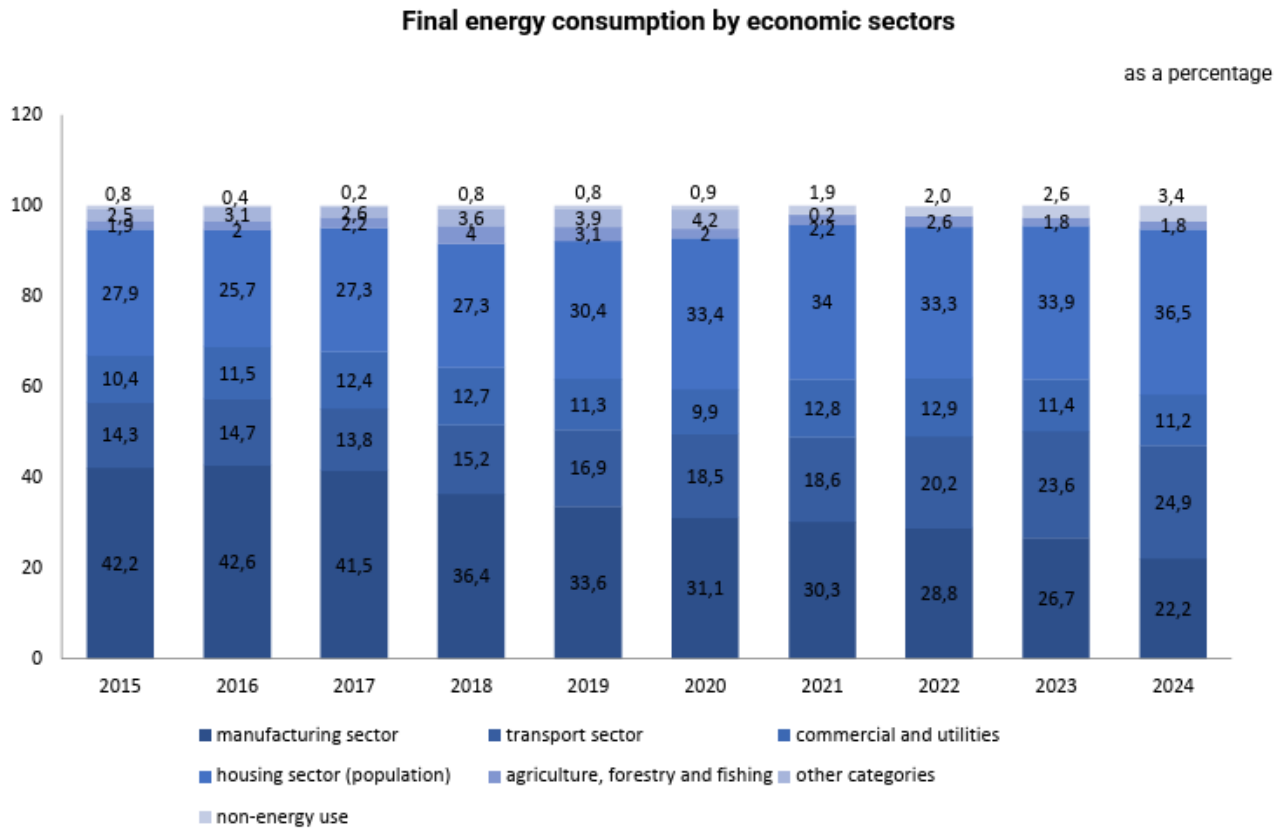
Source: Bureau of National Statistics of RoK, Fuel and Energy Balance 2024 [August 2025]

The structure of Kazakhstan's primary energy consumption remains heavily dominated by fossil fuels. This profile stands in contrast to the global average, where the share of coal is lower and renewables are growing more rapidly. Kazakhstan's reliance on coal is among the highest in the world, reflecting both its abundant domestic reserves and the structure of its power sector.

Fuel type	2024 energy consumption		
	Kazakhstan	CIS (ex-RoK)	World
Coal	47%	11%	28%
Natural gas	33%	56%	25%
Oil	17%	24%	34%
Other types	3%	9%	13%
Total	**100%**	**100%**	**100%**

Source: Compiled by ENERGY Insights & Analytics based on data of Bureau of National Statistics of Kazakhstan and Energy Institute

Final energy consumption in 2024 amounted to 44.6 Mtoe, or about 1.87 EJ. Notably, the share of the residential sector has been increasing, while the industrial and commercial sectors' shares are declining. Within industry, ferrous metallurgy, mining, and non-ferrous metallurgy are the largest energy consumers.



Source: Bureau of National Statistics of RoK, Fuel and Energy Balance 2024 [August 2025]

Kazakhstan's energy intensity [energy use per unit of GDP] in 2024 was 0.3 tonnes of oil equivalent per thousand USD [2015 prices], a 6.3% decrease since 2015. This indicates gradual improvements in energy efficiency, though the country remains more energy-intensive than the global average. The share of electricity generated from renewables [excluding large hydropower] reached 6.2% in 2024, continuing a steady upward trend.

With a population of about 20 million and a relatively small domestic market, Kazakhstan's share of global primary energy consumption is just over 0.5%. However, the country is a major exporter of oil, coal, and uranium, making it a significant player in global energy markets, especially in Eurasia.

While fossil fuels continue to dominate, there is a clear policy focused on increasing energy efficiency and expanding renewables, in line with national interests and (in some degree) international climate commitments. The gradual decline in energy intensity and the growing share of renewables, though modest, signal for some progress. However, the high share of coal and the slow pace of change highlight the long road ahead.

The Bottom Line

The global energy system in 2024 is defined not by substitution, but by addition: renewables are expanding rapidly, yet fossil fuels continue to underpin the world's energy needs. This duality has led to record-high emissions and underscores the immense scale of the challenge facing policymakers, industry, and society at large. The divergence between advanced and developing economies, the shifting geopolitics of energy, and the persistent dominance of coal in key regions all point to a transition that is uneven and fraught with complexity.

Kazakhstan's experience mirrors these global trends, balancing its role as a major energy exporter with the imperative to modernize and decarbonize its domestic energy system. As the world moves forward, achieving a sustainable energy future will require not only technological innovation and investment, but also unprecedented levels of international cooperation and policy alignment to reconcile growth, security, and climate goals.

ENERGY Insights & Analytics

Analytical center "ENERGY" LLP (ENERGY Insight & Analytics) is a joint venture between the KAZENERGY Association and 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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