

CENTRAL ASIA IN THE GLOBAL ENERGY SYSTEM: DEVELOPMENT PROSPECTS, CARBON NEUTRALITY AND GEOPOLITICAL INTERESTS**Mamajonova Sabrina Sattorjonovna**

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Annotation. *The article explores the strategic role of Central Asia within the global energy system amid the global shift toward a low-carbon economy. It examines the region's natural resource potential, energy structure, and the geopolitical interests of major powers - Russia, China, the US, and the EU.*

Particular attention is given to decarbonization processes and the goal of achieving carbon neutrality by 2060, as well as to the influence of the climate agenda on the transformation of energy strategies in the region.

The study outlines key challenges and prospects for sustainable development of Central Asian states in the context of the global transition.

Key words: *Central Asia, energy security, carbon neutrality, renewable energy, geopolitics, sustainable development, decarbonisation.*

Аннотация. *В статье рассматривается стратегическое значение Центральной Азии в глобальной энергетической системе в контексте перехода к низкоуглеродной экономике.*

Анализируется природно-ресурсный потенциал региона, особенности энергетической структуры, а также интересы ведущих мировых держав - России, Китая, США и ЕС. Особое внимание уделено процессам декарбонизации и достижению углеродной нейтральности к 2060 году, а также влиянию климатической повестки на трансформацию энергетических стратегий стран региона.

Сформулированы вызовы и перспективы устойчивого развития Центральной Азии в условиях мирового энергетического перехода.

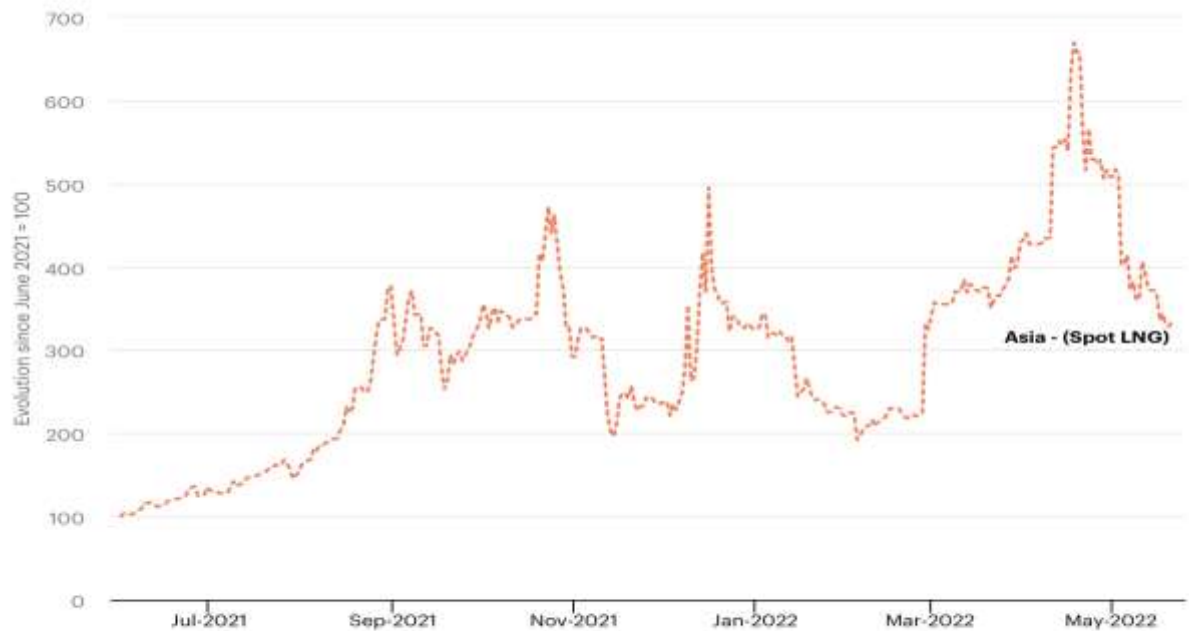
Ключевые слова: *Центральная Азия, энергетическая безопасность, углеродная нейтральность, возобновляемая энергетика, геополитика, устойчивое развитие, декарбонизация.*

Introduction

Central Asia has emerged as one of the most strategically significant regions in the evolving global energy landscape. Its geographic position between Europe, Russia, the Middle East, and East Asia transforms it into a vital energy bridge between major economic centers.

Following the geopolitical upheavals of 2022 and the ensuing energy crisis, the demand for diversified energy sources and secure supply routes has made Central Asia a focal point of attention for both global and regional powers¹.

¹ The crisis and global responses (2022) Energy Crisis



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The purpose of this research is to analyze the region's resource potential and its role in the formation of a new global energy order, while assessing the impact of decarbonization and carbon-neutrality strategies on the economies of Central Asian states. The relevance of the topic lies in the intersection of geopolitical competition, environmental policy, and economic modernization.

Despite abundant energy reserves, the region faces considerable challenges, obsolete infrastructure, limited energy efficiency, and uneven access to modern technologies, which hinder sustainable growth and integration into global markets.

According to the International Energy Agency, Central Asia possesses approximately 8% of the world's proven natural gas reserves and 4% of oil deposits². Kazakhstan and Turkmenistan remain the leading hydrocarbon producers the latter holds an estimated 13,6 trillion cubic meters of natural gas, ranking among the largest reserves globally.

Uzbekistan combines a diversified mineral base with rapidly expanding capacity for solar and wind power generation, while Kyrgyzstan and Tadjikistan rely on vast hydropower resources exceeding 300 billion kWh per year³.

² IEA Energy security (15 April 2020)

³ Geopolitics and development in Central Asia: Exploring opportunities for middle powers

The regional energy structure is highly heterogeneous.



Fossil fuels dominate the balance, while renewable energy accounts for less than 10% of generation. However, an active shift is underway: Kazakhstan and Uzbekistan have adopted national strategies for achieving climate neutrality by 2050 and 2060 respectively, supported by multilateral institutions such as the ADB (Asian Development Bank) and UNDP⁴.

Geopolitically, Central Asia represents a zone of intersecting global interests. For Russia, it remains a traditional sphere of influence, a key component of the Eurasian energy space through the «Central Asia-Center» pipeline system⁵. Moscow seeks to maintain logistics control and political leverage, using energy infrastructure as a stabilizing instrument within the Eurasian Economic Union.

China, by contrast, views the region as an integral part of its BRI (Belt and Road Initiative) and as a secure source of long-term energy imports. More than 55 billion cubic meters of natural gas are annually delivered to China via the Central Asia-China pipeline, covering roughly 15% of its consumption⁶. Beijing's policy combines infrastructure investment, technological cooperation, and renewable-energy expansion, particularly in Kazakhstan and Uzbekistan, where solar and wind installations have become the fastest-growing in the post-Soviet area⁷.

The United States and the European Union encourage diversification of export routes and promote renewable-energy development as part of the climate-neutral portfolios of Central Asian states.

⁴ 2024The Landscape of Development, UNDPS pp.21

⁵ Global Energy Security and Lessons for Uzbekistan

⁶ China's Belt and Road Initiative in Central Asia: Energy, Connectivity, and Influence. CACI, 2023.

⁷ Green Finance and Development Center. Energy and Infrastructure in Eurasia. Beijing, 2024.

Projects such as the Trans-Caspian Gas Pipeline and TAPI (Turkmenistan- Afghanistan- Pakistan - India) form part of a wider geopolitical effort to reduce dependence on Russian transport networks.

The World Bank scenario «CARBON NEUTRALITY-2060» outlines a cost-efficient pathway for the Europe and Central Asia region: a gradual elimination of coal, acceleration of renewable-energy deployment, expansion of electric-vehicle markets, and introduction of carbon-capture technologies. Under this scenario, electricity's share in the total energy balance of the region may rise from 16% in 2019 to 47% by 2060, while the role of fossil fuels would diminish correspondingly⁸.

In particular, Kazakhstan plans to construct the largest «green hydrogen» facility in Asia with an annual capacity of 2 million tons, signaling the region's potential to join the emerging hydrogen economy⁹. Meanwhile, hydropower cooperation between Kyrgyzstan, Tadjikistan, and downstream states is becoming crucial for regional integration. UNECE reports emphasize that effective «water diplomacy» could mitigate conflicts and unlock energy inter-dependence within the Amu-Darya and Syr-Darya river basins.

Looking ahead to 2060, it is likely that Central Asia's energy map will change fundamentally. Oil and gas will persist as export commodities for the foreseeable future, but renewable and hydrogen based energy will increasingly define the structure of national economies. Kazakhstan and Uzbekistan are set to become regional hubs for green investments, Turkmenistan - a major gas supplier to South and East Asia, and Kyrgyzstan and Tadjikistan are leaders in sustainable hydropower. Russia will retain a role as infrastructure partner, but China will firmly establish its dominance through long-term investment and technological influence.

Ultimately, the low-carbon transition presents Central Asia not only with challenges but also with opportunities to achieve sustainable modernization. By integrating national energy strategies, investing in renewable technologies, and implementing coherent climate policies, the region can secure its position as a primary driver of Eurasia's clean-energy transformation and a significant contributor to global carbon-neutral growth.

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