HSR London International Conference on Multidisciplinary Academic Research
(HSR-ICMAR) 2026
https://houghtonstreetreview.com/index.php/conference

CRITICAL RAW MATERIALS AND GREEN ENERGY: THE FOUNDATION OF THE TECHNOLOGICAL ALLIANCE BETWEEN SOUTH KOREA AND CENTRAL ASIA

Jasurbek Pulatov
Lecturer of International Relations Department
The University of World Economy and Diplomacy
https://doi.org/10.5281/zenodo.21233499

Introduction

The global shift toward combating climate change and transitioning to a green economy is reshaping the architecture of international relations. Today, rare earth elements and critical raw materials (such as lithium, cobalt, nickel, copper, and uranium)—which are essential for manufacturing electric vehicles (EVs), renewable energy systems, and microchips—have turned into highly strategic resources. Although South Korea is a global leader in high-tech and green industries, it faces a severe domestic resource scarcity. Conversely, the Central Asian region possesses vast untapped reserves of these critical minerals. This mutual dependency necessitates shifting the relationship between South Korea and Central Asian states from traditional trade toward a globally significant technological and raw materials alliance. The purpose of this thesis is to provide a scientific and practical analysis of the future prospects of the green energy and critical minerals sectors within these bilateral relations, as well as their structural impact on the regional economy.

Main body (core analysis)

Critical minerals alliance and the value-added chain: South Korea's high-tech economy is highly vulnerable to supply chain shocks, as it imports over 95% of its critical minerals and relies heavily on concentrated markets. Conversely, Central Asia possesses massive, untapped reserves; for instance, the region holds 38.6% of global manganese ore, 30% of chromium, and over 5% of global copper reserves. Furthermore, Kazakhstan's discovery of a new rare earth element (REE) deposit in Karaganda—estimated at 20 million tons—signals the region's expanding resource potential. In response to this synergy, the primary strategy of the partnership must focus on establishing localized value-added processing chains rather than simple extraction. This is exemplified by Uzbekistan's launch of a $2.6 billion minerals initiative covering 76 projects for 28 rare and critical elements, offering a direct opportunity for South Korean tech giants (such as Samsung and LG) to invest in midstream processing plants for electric vehicle (EV) battery components right at the source.

Green hydrogen and renewable energy: Central Asia's geographic landscape offers immense potential for solar and wind energy generation, which aligns perfectly with South Korea's strict Framework Act on Supply Chain Stabilization and its domestic carbon-neutrality goals. Major economies like Kazakhstan and Uzbekistan are aggressively restructuring their energy grids under long-term development plans through 2035. South Korea's advanced expertise in hydrogen fuel cells, combined with direct investment instruments—such as Seoul's 10 trillion won Supply Chain Stabilization Fund—can act as a financial and technological catalyst. This partnership enables the launch of large-scale green hydrogen projects in Central Asia, allowing regional governments to successfully diversify their energy exports away from traditional fossil fuels.

Environmental challenges and the Korean experience: The ecological crisis of the Aral Sea basin, accelerating desertification, and acute regional water scarcity present significant barriers to sustainable growth in Central Asia. South Korea addresses these challenges by making environmental governance a core pillar of its Official Development Assistance (ODA) and corporate investments. By deploying Korea's cutting-edge Smart Water Management (SWM) systems, digitalized irrigation networks, and proven anti-desertification afforestation models, this alliance moves beyond mere

commercial interests. It creates an eco-technological framework that secures the vital agricultural and water infrastructure necessary to sustain the region's expanding industrial zones.

Conclusion

In conclusion, the alliance between South Korea and Central Asia in the fields of critical raw materials and green energy is not merely an economic project, but a strategic shield securing the long-term economic resilience of both parties. The synergy between Seoul's technological know-how and the region's natural wealth enables the creation of new, globally competitive industrial clusters.

To guarantee the successful development of future relations, the following steps are essential:

Establishing joint research and development (R&D) institutes dedicated to applying digital technologies in geological exploration and mining;

Expanding the involvement of South Korean capital in developing multimodal transport corridors (such as the Trans-Caspian Route) to ensure the safe and rapid transit of critical minerals;

Systematically implementing capacity-building and training programs for local professionals in Central Asia regarding the green economy and renewable energy sources.

The final takeaway is that this eco-technological partnership will allow Central Asian states to avoid the pitfalls of the "resource curse" and successfully transition toward an innovation-driven, sustainable economic model.

References

1. Pulatov, J. (2026). THE KOREAN PENINSULA ISSUE IN THE DOMESTIC AND FOREIGN POLICIES OF EAST ASIAN STATES. Shokh Articles Library, 1(1), 3165-3169.
2. Pulatov, J. (2026). THE EVOLUTION OF INTERNATIONAL POLITICS ON THE KOREAN PENINSULA: HISTORICAL STAGES FROM THE TWENTIETH CENTURY TO THE PRESENT. Shokh Articles Library, 1(1), 1014-1017.
3. Pulatov, J. (2024). JANUBIY KOREYANING TASHQI SIYOSATI: ASOSIY YO'NALISHLAR, MAQSADLAR VA GLOBAL MUHIT. JOURNAL OF INNOVATIONS IN SCIENTIFIC AND EDUCATIONAL RESEARCH, 7(12), 48-50.
4. Pulatov, J. (2024). JANUBIY KOREYANING 2025-YILDAGI TASHQI SIYOSATI: RIVOJLANISH VA GLOBAL STRATEGIYALAR [Data set]. Zenodo.
5. Pulatov, J. (2025). IMPICHMENT PROCESS IN THE REPUBLIC OF KOREA: POLITICAL AND LEGAL ANALYSIS. AMERICAN JOURNAL OF EDUCATION AND LEARNING, 3(7), 291-294.
6. Pulatov, J. (2025). KOREYA RESPUBLIKASI VA KOREYA XALQ DEMOKRATIK RESPUBLIKASI: O'TMISH, BUGUN VA KELAJAK. THEORY AND ANALYTICAL ASPECTS OF RECENT RESEARCH, 3(32), 83-85.
7. Pulatov, J. (2025). FOREIGN POLICY INSTRUMENTS OF THE REPUBLIC OF KOREA. SUSTAINABILITY OF EDUCATION, SOCIO-ECONOMIC SCIENCE THEORY, 3(26), 123-125.
8. Pulatov, J. (2023). ILMIY ISH VA TADQIQOT OLIB BORISHDA FOYDALANILADIGAN USLUBLAR. Scientific Impulse, 1(12), 252-255.
9. Pulatov, J. (2026). SOUTH KOREAN FOREIGN POLICY IN 2027: DEVELOPMENT AND GLOBAL STRATEGIES. BG pulse journal, 2(6), 4138-4140.
10. Pulatov, J. (2026). GEOSIYOSIY KUCHLARNING KOREYA YARIM OROLIGA TA'SIRI. ILMIY TADQIQOTLAR VA ULARNING YECHIMLARI JURNALI, 11(02), 820-823.
11. Buzo, A. (2017). The guerrilla dynasty: Politics and leadership in North Korea (2nd ed.). I.B. Tauris.

12. Snyder, S. (2018). South Korea at the crossroads: Autonomy and alliance in an era of rivalry. Columbia University Press.
13. Armstrong, C. K. (2013). Tyranny of the weak: North Korea and the world, 1950–1992. Cornell University Press.