

The Mineral Advantage

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Introduction

Critical minerals are becoming central to global conflicts and strategic deals, and are bound to reshape geopolitical pressures in the 21st Century. These are defined by their economic and technological importance, scarcity and vulnerability to global shocks.¹ They form the backbone of strategic industries, particularly defence, advanced Artificial Intelligence (AI), machine learning, and the energy transition, with demand for key energy minerals growing by an average of 10 per cent annually.² From chips and turbines to advanced fighter jets, critical minerals drive technological innovation and will increasingly shape global competition. Competition, contestation, and even cooperation will increasingly be directed towards securing access to them. Therefore, it is essential to understand risks to their availability and secure fragile supply chains.

The strategic value of critical minerals, however, does not arise from geological possession alone. National advantage depends upon control across the value chain—from exploration and extraction to refining, processing, component manufacturing and recycling. A state may possess substantial mineral resources yet remain strategically dependent if it lacks processing capacity or technology. Conversely, dominance over refining and downstream supply chains can provide considerable geopolitical leverage even when the raw material is extracted elsewhere. Critical mineral security must, therefore, be understood as a value-chain issue rather than merely a question of resource ownership.

Case Study: Ukraine

Russia's invasion of Ukraine and the occupation of mineral-dense Donetsk, Kherson, Luhansk, and Zaporizhzhia,³ highlight the potential for resources to become central to conflict objectives. Ukraine possesses approximately 20 per cent of the world's graphite reserves, the largest uranium reserves in Europe, and about 7 per cent of Europe's titanium reserves, while accounting for nearly 5 per cent of global mineral reserves.⁴ Ukraine also possesses significant reserves of noble gases, gallium, zirconium, and beryllium, among others, which are of considerable importance to the semiconductor, aerospace, defence, and nuclear industries.⁵ These minerals are concentrated in the 'Ukrainian Shield', extending from Luhansk, Donetsk, Zaporizhzhia, and Dnipropetrovsk to Kirovohrad, Poltava, and Kharkiv,⁶ with major sites, including the Dnieper-Donetsk region and Luhansk, containing identified deposits of lithium, titanium, uranium, zirconium, and several rare-earth elements.⁷ It is no surprise that Russian focus on this region, and occupation of approximately 40 per cent of Ukrainian reserves,⁸ has been a significant factor in the conflict. The Russo-Ukrainian conflict reveals the economic dimension of warfare centred on control over Ukrainian resources.

The Ukraine conflict thus demonstrates how control over mineral-rich territories can influence not only wartime economics but also post-conflict reconstruction, industrial recovery and future strategic partnerships.

The partnerships emerging out of this conflict are not driven solely by humanitarian considerations either. The Ukraine-European Union (EU) Strategic Partnership on Raw Materials,⁹ amidst the war, to advance mineral security, exhibits the strategic importance of critical mineral supplies in global uncertainty. Aimed at securing critical raw materials for EU's Critical Raw Materials Action Plan, the partnership aims to develop supply chains for green and digital transition.¹⁰ The signing of the United States (US)-Ukraine economic partnership by establishing the US-Ukraine Reconstruction Investment Fund in May 2025 is another such deal, marking a clear strategic motivation.¹¹ While envisioning a 50-50 contribution to extract Ukrainian minerals, the US contribution in equivalent military assistance cost is a calculated step in the supply-chain strategy.¹² Geopolitical implications of these deals are hard to miss, as concentration and disruption of supplies become ominous. The invasion and partnerships highlight the pivotal role of critical minerals and delicate supply chains in determining aims and nature of conflicts in the future.

Such arrangements also indicate that access to critical minerals is increasingly becoming intertwined with security assistance, reconstruction finance and long-term strategic partnerships.

Threats to Critical Mineral Supply Chains

Demand for critical minerals is projected to grow beyond 340 per cent by 2040.¹³ The vulnerability, however, extends beyond physical scarcity. Supply disruptions can occur at multiple stages—from extraction and transportation to refining, processing and component manufacturing. The supply chains for critical minerals, from extraction to processing, face extreme volatility. The West Asian conflict has led to production and export disruptions in processing and production supplies like sulphur and helium, leading to increased prices and supply-side risks.¹⁴ Qatar, supplying almost a third of the world's helium, has proposed a 14 per cent cut in annual helium production, pushing up prices and alarming tech giants.¹⁵ Helium is crucial for semiconductor fabrication and, hence, indispensable for high-end technologies such as advanced AI, defence equipment, and space technology.

This demonstrates how conflicts geographically distant from mineral-producing or technology-consuming states can nevertheless disrupt specialised supply chains and affect strategic industries worldwide.

On the other hand, concentration of production and processing is becoming perilous. China has been leading the critical minerals race, and dictating almost 69 per cent of Rare-earth Elements' (REE) extraction¹⁶ and over half of the global processing of

cobalt, lithium, and manganese.¹⁷ China has imposed trade restrictions on key energy minerals and rare earths, utilising them as strategic bargaining tools. Additionally, it has acquired mines and invested in overseas mining sector in Africa and Asia, upwards of USD 24 billion in lithium, cobalt, and nickel mining and processing,¹⁸ while outbidding competitors to build a strategic advantage. The Democratic Republic of Congo (DRC) has captured 74 per cent of global cobalt production.¹⁹ Contentiously, DRC's export bans and quotas created a projected supply gap and led to a sudden doubling of derivative prices.²⁰ Similar resource-nationalist trends have been observed in countries such as Indonesia, Zimbabwe and Mozambique, inducing market shocks and premium inflations on mining and transport.

China's advantage, therefore, lies not merely in access to mineral resources but in its commanding position across processing, refining and downstream manufacturing, giving Beijing considerable leverage over global supply chains.

Lessons for India

India's digital economy, defence production, and green transition depend heavily on critical minerals. India is heavily import-dependent, being entirely so on 10 critical minerals,²¹ and has limited production and processing capability.²² Moreover, India's dependence on a few countries, particularly China, for processed REEs used in radars and semiconductors, as well as critical minerals such as lithium required for deep-tech and clean-tech applications, is a matter of concern. In the current geopolitical environment, these constraints can be catastrophic. Domestically, mining norms and auction processes impede private exploration and mining. India has taken steps to address these vulnerabilities to develop domestic production, amend mining laws, and ensure consistent supply.

Indian efforts in creating a sustainable supply stream have been positive. India launched the National Critical Minerals Mission in 2025, pledging initial investment of INR 16,000 cr, to expand exploration and mining of 30 identified critical minerals, including 24 minerals with exclusive central auctioning authority under the Mines and Minerals Development and Regulation Act 1957.²³ Moreover, Khanij Bidesh India Ltd has spearheaded global partnerships, such as with Argentina, and joint exploration in Chile and Australia, while continuously expanding its reach.²⁴ Indian participation in the Minerals Security Partnership aids diversification and development of upstream and downstream supply chains, and will be significant in the future.

These initiatives mark an important shift from import dependence towards supply-chain diversification; however, securing overseas mineral assets alone will not eliminate India's vulnerability unless accompanied by domestic processing and refining capabilities.

India also needs to identify minerals that are indispensable to defence production and assess the requirement for strategic stockpiles capable of sustaining critical industries during conflict, export restrictions or prolonged supply disruptions.

While these are welcome steps, India also needs to accelerate the investment streams in mapping and downstream processing capabilities. Indian indigenous industries are focused on fabrication and development of end products, making them vulnerable to price and supply instability. Therefore, a comprehensive assessment of mineral demands for production capabilities is imperative to ensure continuous flow of critical minerals, and in turn withstand global disruptions.

A comprehensive Indian critical-minerals strategy must therefore integrate domestic exploration, overseas acquisition, processing and refining, strategic reserves, recycling, substitution technologies and diversified international partnerships.

Conclusion

In the coming years, the geopolitical landscape will be determined by control and concentration of resources, with critical minerals playing an increasingly important role. It becomes pertinent to integrate these resource pressures into strategic calculations. From Ukraine to Hormuz, China to Africa, and India to Argentina, distant incidents will no longer be isolated in determining the technological growth and domestic commitments. For India, mineral security must consequently be treated not merely as an economic or energy-transition requirement, but as an integral component of national security, defence industrial resilience and strategic autonomy. Hence, timely action is therefore essential to India's long-term development and strategic resilience. India needs to actively explore and exploit its domestic reserves and establish international value chains through overseas mining and exploration partnerships.

Endnotes

¹ Jorge Valverde, "What Are Critical Minerals, and Why Are They So Important?", *UNU-MERIT*, 2024, accessed 04 Jul 2026, <https://unu.edu/merit/news/what-are-critical-minerals-and-why-are-they-so-important>

² International Energy Agency (IEA), *Global Critical Minerals Outlook 2026*, accessed 04 Jul 2026, <https://www.iea.org/reports/global-critical-minerals-outlook-2026>

³ Robert Muggah and Vadim Dryganov, "Russia's Resource Grab in Ukraine", *Foreign Policy*, 28 April 2022, accessed 04 Jul 2026, <https://foreignpolicy.com/2022/04/28/ukraine-war-russia-resources-energy-oil-gas-commodities-agriculture/>

⁴ Aigars Liepins, "Ukraine's Resources: Critical Raw Materials", *NATO Energy Security Centre of Excellence*, 2024, accessed 04 Jul 2026, <https://www.enseccoe.org/publications/ukraines-resources/>

⁵ Ibid.

⁶ Robert Muggah and Rafal Rohozinski, “The Mineral Wars: How Ukraine's Critical Minerals Will Fuel Future Geopolitical Rivalries”, *Center for International Relations and Sustainable Development*, accessed 04 Jul 2026, <https://cirsd.org/horizon-article/the-mineral-wars/>

⁷ Ukrainian Geological Survey, Ministry of Environmental Protection and Natural Resources of Ukraine, *Ukraine: Mining Investment Opportunities* (2022), accessed 04 Jul 2026, <https://www.geo.gov.ua/wp-content/uploads/presentations/en/investment-opportunities-in-exploration-production-strategic-and-critical-minerals.pdf>

⁸ Mariia Rachek, “Extracting Mineral Resources in Ukraine during and after the End of the War with EU Support and Investments from Foreign Partners”, *EU NeighboursEast*, 2026, accessed 04 Jul 2026, <https://euneighbourseast.eu/young-european-ambassadors/blog/extracting-mineral-resources-in-ukraine-during-and-after-the-end-of-the-war-with-eu-support-and-investments-from-foreign-partners/>

⁹ CIRCABC, “Memorandum of Understanding between the European Union and Ukraine on a Strategic Partnership on Raw Materials”, 2021, accessed 05 Jul 2026, <https://webgate.ec.europa.eu/circabc-ewpp/ui/group/cf89c883-2efd-452b-a037-de271c1a703c/library/1a8921bf-c943-428a-a13a-64089882c9ed/details>

¹⁰ International Energy Agency (IEA), “Ukraine–EU Strategic Partnership on Raw Materials”, 2025, accessed 05 Jul 2026, <https://www.iea.org/policies/18056-ukraine-eu-strategic-partnership-on-raw-materials>

¹¹ Sam Meredith, “U.S. and Ukraine Sign Landmark Minerals Deal after Months of Fraught Negotiations,” *CNBC*, May 1, 2025, accessed 05 Jul 2026, <https://www.cnn.com/2025/05/01/russia-war-us-and-ukraine-sign-landmark-minerals-deal.html>

¹² Anna Romandash, “Minerals for Weapons: Is Ukraine Making a Deal with the United States on Its Own Terms?”, *Centre for International Governance Innovation*, 05 Jun 2025, accessed 05 Jul 2026, <https://www.cigionline.org/articles/minerals-for-weapons-is-ukraine-making-a-deal-with-the-united-states-on-its-own-terms/>

¹³ United Nations Conference on Trade and Development (UNCTAD), “Critical Minerals Are Reshaping Global Trade as Demand Surges”, 2026, accessed 06 Jul 2026, <https://unctad.org/news/critical-minerals-are-reshaping-global-trade-demand-surges>

¹⁴ International Energy Agency (IEA), *Global Critical Minerals Outlook 2026*, Ibid.

¹⁵ Kelvin Chan, “Iran War Halts Qatar Helium Output, Threatening Global Tech Supply Chains”, *Associated Press*, 21 Mar 2026, accessed 06 Jul 2026, <https://apnews.com/article/iran-chips-semiconductor-helium-exports-war-fe934332f7c83bb722ca87db22cd57d0>

¹⁶ Chaitanya Gupta, “Critical Minerals Explained: Why They Matter for Geopolitics, Clean Energy & Tech”, *Belfer Center for Science and International Affairs, Harvard Kennedy School*, 2025, accessed 06 Jul 2026, <https://www.belfercenter.org/explainer-what-are-critical-minerals>

¹⁷ Zach Whitlock, Sangita Gayatri Kannan, and Michael A. Toman, “Resource Nationalism and the Resilience of Critical Mineral Supply Chains”, *Resources for the Future*, 10 Nov 2025, accessed 06 Jul 2026, <https://www.rff.org/publications/reports/resource-nationalism-and-the-resilience-of-critical-mineral-supply-chains/>

¹⁸ National Security Data and Policy Institute, *Chinese Investment in Mineral Resources* (University of Virginia, 18 Nov 2025), accessed 06 Jul 2026, <https://nationalecurity.virginia.edu/research/chinese-investment-mineral-resources>

¹⁹ United Nations Conference on Trade and Development (UNCTAD), “Critical Minerals Are Reshaping Global Trade as Demand Surges”, Ibid.

²⁰ Matthew Bird, “DRC to Lift Cobalt Export Ban and Impose Quotas through 2027”, *Benchmark Mineral Intelligence*, September 22, 2025, accessed 06 Jul 2026, <https://source.benchmarkminerals.com/article/drc-to-lift-cobalt-export-ban-and-impose-quotas-through-2027>

²¹ Ministry of Mines, Government of India, *Critical Minerals for India: Report of the Committee on Identification of Critical Minerals* (New Delhi: Ministry of Mines, Jun 2023), accessed 06 Jul 2026, <https://www.mines.gov.in/admin/storage/app/uploads/649d4212cceb01688027666.pdf>

²² NITI Aayog, *Scenarios towards Viksit Bharat and Net Zero: Critical Mineral Assessment: Demand and Supply*, vol. 10 (New Delhi: NITI Aayog, 2026), accessed 06 Jul 2026, <https://www.niti.gov.in/sites/default/files/2026-02/Scenarios-Towards-Viksit-Bharat-and-Net-Zero-Critical-Mineral-Assessment-Demand-and-Supply.pdf>

²³ Press Information Bureau, Government of India, “National Critical Mineral Mission: Powering India’s Clean Energy Future,” Ministry of Mines, 09 Apr 2025, accessed 06 Jul 2026, <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2120525®=48&lang=2>

²⁴ Press Information Bureau, Government of India, “KABIL Is Exploring Opportunities for Acquisition of Overseas Critical Minerals Assets in Argentina, Australia and Chile,” Ministry of Coal, 31 Jul 2024, accessed 06 July 2026, <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2039606&lang=2®=48>

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