# Combating China's Influence in Mineral Supply Chains

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#### Introduction

Critical Minerals – rare earth elements (REEs), lithium, cobalt, nickel, and graphite – are the backbone of modern technologies and the green energy transition. They are essential for everything from electric vehicle batteries and wind turbines to semiconductors and defence systems. Global demand for these minerals is soaring (projected to quadruple by 2040), underscoring their strategic importance. However, supply chains for critical minerals are highly concentrated and fragile. In the last two decades, China has dominated global supply chains for many of these resources. China is the world's leading processor of strategic minerals, refining major shares of nickel (68%), cobalt (73%), lithium (59%), and copper (40%). It also leads in manufacturing key industrial components (for instance, ~70% of EV battery cathodes are made in China).

This dominance has raised serious concerns in Europe and the West: high dependence on China for inputs critical to clean energy and high-tech industries has become a strategic vulnerability. Policymakers worry that China could exploit its control over these supply chains in times of geopolitical tension, much as it did in 2010 when it abruptly halted rare earth exports to Japan during a diplomatic dispute. <sup>5</sup> Ensuring secure and resilient access to critical minerals has thus become a global strategic issue.

## **Background**

The strategic significance of critical minerals comes from their essential role in modern technologies and green energy, combined with the vulnerabilities inherent in their concentrated extraction and processing. Although not geologically scarce, minerals like lithium, cobalt, nickel, and rare earth elements

<sup>&</sup>lt;sup>1</sup> Rodrigo Castillo, and Caitlin Purdy. "China's Role in Supplying Critical Minerals for the Global Energy Transition: What Could the Future Hold?" *The Brookings Institution*, July 2022, https://www.brookings.edu/wp-content/uploads/2022/08/LTRC\_ChinaSupplyChain.pdf.

<sup>&</sup>lt;sup>2</sup> Sarah Logan, "Can Europe Compete with China in the Race for Africa's Critical Minerals? – Chinaobservers."

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https://chinaobservers.eu/can-europe-compete-with-china-in-the-race-for-africas-critical-minerals/.

<sup>&</sup>lt;sup>3</sup> Rodrigo Castillo, and Caitlin Purdy.. "China's Role in Supplying Critical Minerals for the Global Energy Transition: What Could the Future Hold?," July 2022, https://www.brookings.edu/wp-content/uploads/2022/08/LTRC\_ChinaSupplyChain.pdf.

<sup>&</sup>lt;sup>4</sup> International Energy Agency, "Global Supply Chains of EV Batteries," *IEA Publications*, July 2022, https://iea.blob.core.windows.net/assets/961cfc6c-6a8c-42bb-a3ef-57f3657b7aca/GlobalSupplyChainsofEVBatteries. pdf.

<sup>&</sup>lt;sup>5</sup> Jane Nakano. "The Geopolitics of Critical Minerals Supply Chains AUTHOR a Report of the CSIS Energy Security and Climate Change Program," *Center for Strategic and International Studies*, March 2021, https://csis-website-prod.s3.amazonaws.com/s3fs-public/publication/210311\_Nakano\_Critical\_Minerals.pdf?DR03x 5jIrwLnNjmPDD3SZjEkGEZFEcgt.

face substantial extraction, refinement, and sustainability challenges. In the 1980s, China recognized the importance of its rare metals and significantly expanded its extraction and refining capabilities through state-driven investments and relaxed environmental regulations. By the late 2000s, China produced almost 97% of the world's rare earth oxides, making it the sole extractor and producer of a vital part of the global supply chain. After the dispute in 2010, Japan swiftly reshuffled its supply chain comprehensively, including diversifying sources, searching for partners internationally, and advancing recycling technologies to become less dependent. Since then, Western initiatives have yet to bear fruits despite the initial momentum from the shock of China's export embargo. European policies lack long-term consistency and financial commitment due to the high cost of diversifying or developing extraction and refinement capabilities. Many Western-based projects, such as a comprehensive US-based mine revival project, failed due to aggressive Chinese pricing strategies to keep out competitors. By the late 2010s, China maintained roughly 85% of global rare earth refining with significant shares in lithium, cobalt, and nickel manufacturing. At the same time, the EU's refining industry is still in its early days.

## **Analysis: Current State and Implications**

China's dominant position in critical mineral supply chains remains exceptionally robust. China's influence extends significantly into midstream refining and downstream manufacturing capacities.<sup>12</sup> Even though China does not directly control all global mining outputs—the Democratic Republic of Congo is still a major exporter—it has achieved remarkable control over refining stages, processing roughly 68% of global nickel, 73% of cobalt, and 59% of lithium.<sup>13</sup> Similarly, its dominance surpasses 90% in refining rare

<sup>&</sup>lt;sup>6</sup> Raigirdas Boruta. 2023. "Rare Earths. Seeking West's Strategic Responses to China's Dominance." https://www.gssc.lt/wp-content/uploads/2025/02/v02\_Boruta\_Rare-earths\_A4\_EN.pdf.

<sup>&</sup>lt;sup>7</sup> Diego Laje, "China's Dominance in Strategic Minerals Goes beyond Ore," *AFCEA International*, November 2023, https://www.afcea.org/signal-media/cyber-edge/chinas-dominance-strategic-minerals-goes-beyond-ore.

<sup>&</sup>lt;sup>8</sup> Terazawa, Tatsuya . 2023. "How Japan Solved Its Rare Earth Minerals Dependency Issue." World Economic Forum. October 13, 2023. https://www.weforum.org/stories/2023/10/japan-rare-earth-minerals/.

<sup>&</sup>lt;sup>9</sup> Simon Evenett, and Johannes Fritz, "Revisiting the China–Japan Rare Earths Dispute of 2010." *CEPR*, July 19, 2023. https://cepr.org/voxeu/columns/revisiting-china-japan-rare-earths-dispute-2010.

<sup>&</sup>lt;sup>10</sup> U.S. Geological Survey. 2023. "Mineral Commodity Summaries 2023," January 31, 2023, https://pubs.usgs.gov/periodicals/mcs2023/mcs2023.pdf.

Ajay Kumar, "Breaking the Minerals Monopoly," *Business Standard*, July 3, 2024, https://www.business-standard.com/opinion/columns/breaking-the-minerals-monopoly-124070301160\_1.html.

<sup>&</sup>lt;sup>12</sup> Philip Andrews-Speed, and Anders Hove, "China's Rare Earths Dominance and Policy Responses," June 2023, https://www.oxfordenergy.org/wpcms/wp-content/uploads/2023/06/CE7-Chinas-rare-earths-dominance-and-policy-responses.pdf.

<sup>&</sup>lt;sup>13</sup> U.S. Geological Survey. "Mineral Commodity Summaries 2023."

earth elements and graphite, essential for battery and magnet production. <sup>14</sup> Chinese firms also have extensive stakes in global mining operations, controlling around 80% of the cobalt production capacity in the Congo. <sup>15</sup>

In 2023, China announced export restrictions on graphite, an essential battery component, citing national security, reminiscent of past actions during geopolitical tensions with partners. <sup>16</sup> China regularly uses rare earth export restrictions as leverage in U.S. trade disputes. Sanctions like these can critically disrupt Western industrial sectors, inflate costs, and potentially derail clean energy and technological progress in industries heavily dependent on minerals once China decides to punish an adversary. <sup>17</sup> Dependence on China as the sole refiner opens up vulnerabilities to price manipulation or strategic withholding of supplies for Western economies when push comes to shove. <sup>18</sup> Adding to that, critical mineral extraction often involves significant environmental and ethical challenges in countries with lax restrictions. Cobalt extraction in Congo is regularly scrutinized for labour abuses and environmental damage, while China's lax environmental policies push labour costs down. <sup>19</sup> Evaluating historical policy responses emphasizes the necessity of sustained interventions.

Japan's post-2010 strategies, despite initial success, revealed limitations due to declining political urgency once prices stabilized.<sup>20</sup> Similarly, the United States' efforts to revive domestic mining highlighted the critical need for ongoing financial and political commitment, as aggressive Chinese competition undermined long-term viability.<sup>21</sup> Without sustained policy and monetary support, Western efforts to produce its own refining and extraction industry will fail, as China's dominance in the market can effectively

<sup>&</sup>lt;sup>14</sup> Gracelin Baskaran, and Meredith Schwartz, "China Imposes Its Most Stringent Critical Minerals Export Restrictions yet amidst Escalating U.S.-China Tech War," *Csis.org*, December 4, 2024, https://www.csis.org/analysis/china-imposes-its-most-stringent-critical-minerals-export-restrictions-yet-amidst.

<sup>&</sup>lt;sup>15</sup> Geraud Neema, "China's Role in the DR Congo Cobalt Supply Chain: Who's Who?, Research Brief N°001 the DRC Copper/Cobalt Supply Chain the China-Global South Project," *China Global South Project*, October 2023, https://chinaglobalsouth.com/wp-content/uploads/2015/05/CGSP-Research-Brief-001\_Cobalt.pdf.

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<sup>&</sup>lt;sup>18</sup> Ian Johnston, Alice Hancock, and Harry Dempsey. "Can Europe Go Green without China's Rare Earths?" *Subs.ft.com.* September 21, 2023. https://ig.ft.com/rare-earths/.

<sup>&</sup>lt;sup>19</sup> United States Department of Labor. "Forced Labor in Cobalt Mining in the Democratic Republic of the Congo Final Report." 2023. https://www.dol.gov/sites/dolgov/files/ILAB/DRC-FL-Cobalt-Report-508.pdf.

<sup>&</sup>lt;sup>20</sup> Neema, Geraud. 2023. "China's Role in the DR Congo Cobalt Supply Chain."

<sup>&</sup>lt;sup>21</sup> Chris Moorman"The US Won't Gain a Lead in the Competition for Africa's Critical Minerals without Innovation," *Atlantic Council*, November 26, 2024, https://www.atlanticcouncil.org/blogs/africasource/the-us-wont-gain-a-lead-in-the-competition-for-africas-critical-mi nerals-without-innovation/.

#### **Policy Strategies**

Forming a Strategic International Mineral Alliance could effectively counterbalance China's control by consolidating financial and technical forces from allied nations. A strategic alliance could secure diversified mineral supply channels by investing in resource-rich, politically stable countries.<sup>23</sup> The problem with rare-earth metals is the location and refinement of the extracted resources. Establishing an alliance that pools know-how and is backed up by finance is an obvious first step in diversifying away from China. States would have less pressure to develop their refining industries while shifting their supply chains to a more predictable playing field.<sup>24</sup> Initiatives like the EU-U.S.-Japan-supported Lobito Corridor in Africa represent a successful model, combining infrastructure investment with local development benefits, and could be a basis for further collaboration.<sup>25</sup>

Enhancing Europe's recycling capacities through the European Mineral Recycling and Innovation Initiative is critical.<sup>26</sup> Europe should substantially invest in R&D for advanced recycling methods, particularly lithium-ion batteries and rare-earth elements, following Japan's successful recycling advancements post-2010.<sup>27</sup> Establishing mandatory recycled content regulations would significantly reduce the demand for extraction and actively insulate the supply chains from external shocks.<sup>28</sup> For example, a policy that mandates that a certain amount of rare-earth metals be recycled within the economy is a first step

<sup>&</sup>lt;sup>22</sup> Rebecca Arcesati, François Chimits, and Antonia Hmaidi. "Keeping Value Chains at Home." *Merics* (August 2024). https://doi.org/10.2760/334074.%C2%A022.

Tom Moerenhout, "China's Latest Move in the Critical Mineral and Technology Trade War - Center on Global Energy Policy at Columbia University SIPA | CGEP %." Center on Global Energy Policy at Columbia University SIPA | CGEP,
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https://www.energypolicy.columbia.edu/chinas-latest-move-in-the-critical-mineral-and-technology-trade-war/.

Ahmad Ghaddar, Li Yap, and Shariq Khan, "Global Refiners Face Profit Slump as New Plants Come Online."
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https://www.reuters.com/business/energy/global-refiners-face-profit-slump-new-plants-come-online-2024-09-20/.

<sup>&</sup>lt;sup>25</sup> Zainab Usman, "Priorities for the New U.S. Administration and Congress on Strengthening Economic Relations with Africa." Carnegie Endowment for International Peace. 2024. https://carnegieendowment.org/research/2024/12/priorities-for-the-new-us-administration-and-congress-on-strengthe ning-economic-relations-with-africa?lang=en.

Matt Howard, "Building a Responsible Cobalt Supply Chain," *Faraday Insights*, no. 7 (January 2023), https://www.faraday.ac.uk/wp-content/uploads/2023/01/Faraday\_Insights\_7\_Jan23\_Final.pdf.

<sup>&</sup>lt;sup>27</sup> German Federal Ministry for Economic Affairs and Climate Action, . "Circular Economy Solutions for Critical Raw Materials for the Energy Transition Overview Study," 2024, https://energypartnership-japan.org/fileadmin/japan/media\_elements/2024\_critrawmat\_energy-trans\_ger\_jpn.pdf. 
<sup>28</sup> V&K Insights. "Overview of Policy Barriers to Recycling of Critical Raw Materials | Insights | Vinson & Elkins LLP." *Velaw.com.* 2024. https://www.velaw.com/insights/overview-of-policy-barriers-to-recycling-of-critical-raw-materials/.

toward greater autonomy while combating waste and climate change. Nevertheless, this approach must ensure economic sustainability, avoiding overly subsidized or inefficient operations to avoid being an obstacle and only increasing the cost of production.

Addressing refining bottlenecks through demand-driven public-private partnerships must be another priority. Governments should create incentives—including tax benefits, financing, and guaranteed purchase agreements—to attract private investment in refining infrastructure within Europe or allied nations. Japan's successful approach after the 2010 crisis, which involved targeted state support and clear market signals, provides a valuable template.<sup>29</sup> Policymakers must address the economic viability issues proactively and push for less bureaucracy for the refining industry to attract more investment. Policies must be geared toward signalling enduring support to the refining industry to attract hesitant developers unnerved by a lack of support and policy changes when urgency wanes.

Implementing reasonable stockpiling can soften immediate supply shocks. Policymakers must approach stockpiling strategically, carefully evaluating cost-effectiveness and the risk of material obsolescence when innovation moves on.<sup>30</sup> Coupling moderate stockpiling with gradual policies to diversify the supply chain and encouraging the development of alternative suppliers represents the most balanced and effective policy solution.<sup>31</sup> This approach minimizes economic inefficiencies, allowing adaptation to technological changes and slowly but surely developing capabilities to combat China's dominance.

#### **Key Takeaways**

China's dominance in critical mineral supply chains did not happen overnight – it was the result of strategic foresight and persistent investment. This dominance now poses a serious challenge for Europe and its Western partners as they pursue clean energy transitions and technological innovation. The key takeaway is that critical minerals have moved to the forefront of geopolitical and economic strategy: they are the "material backbone" of the 21st-century economy, and control over their supply can translate into significant power or vulnerability. Western countries have awakened to this reality and are crafting

<sup>&</sup>lt;sup>29</sup> Tatsuya Terazawa, "How Japan Solved Its Rare Earth Minerals Dependency Issue," *World Economic Forum*, October 13, 2023, https://www.weforum.org/stories/2023/10/japan-rare-earth-minerals/.

<sup>&</sup>lt;sup>30</sup> André Wolf, "Strategic Reserves of Critical Metals Building Block of a Resilience-Focused Raw Materials Strategy," *Cntrum für Europäische Politik*, November 14, 2022, https://www.cep.eu/fileadmin/user\_upload/cep.eu/Studien/cepInput\_Strategische\_Reserven\_kritischer\_Metalle/cepInput\_Strategic\_reserves\_critical\_metals.pdf.

<sup>&</sup>lt;sup>31</sup> Raigirdas Boruta, "Rare Earths. Seeking West's Strategic Responses to China's Dominance," *GSSC*, 2025, https://www.gssc.lt/wp-content/uploads/2025/02/v02\_Boruta\_Rare-earths\_A4\_EN.pdf.

multifaceted responses. These include rebuilding domestic mining and refining capabilities, forging new partnerships with resource-rich nations, and promoting innovation in recycling and substitution to reduce overall demand. Notably, Europe is treating this as both an industrial policy issue and a strategic security issue – its Critical Raw Materials Act and related initiatives aim to ensure that the European Green Deal does not trade one dependency for another.<sup>32</sup>

Moving forward, greater investments and coordination among allies to operationalize these policies should be the main objective. In the near term, one measure of progress will be whether concrete projects materialize: if new mines are opened in Europe or North America, new refining plants are built outside China, and more diversified sourcing contracts are signed by industry. It will also be important to monitor China's reactions – if faced with successful diversification, China might adjust by trying to undercut alternative suppliers through pricing (hence the need for Western cooperation to withstand such moves).

Over the medium term, technology could be a game-changer: for example, if battery chemistries evolve beyond lithium-ion or new magnet materials reduce the need for heavy rare earths, the landscape of "critical" minerals may shift. Western policies need to be flexible to such changes, focusing on resilience and adaptability. In essence, the goal is to move from a supply chain that is overly concentrated and brittle to one that is distributed and robust against shocks. Achieving this will require balancing market mechanisms with strategic intervention, and national interests with global cooperation.

Finally, a holistic perspective is crucial. Reducing dependency on China for critical minerals is not about "cutting China out" completely – it is about managing risk and ensuring no single point of failure within the supply market system. In the long run, a more diversified critical minerals ecosystem could be beneficial for both China and Europe by creating more stable markets and encouraging higher environmental and social standards across the board. For Europe and its partners, the journey to critical mineral security is just beginning.<sup>33</sup>

Success will hinge on persistent implementation of the ideas now on paper: investing in domestic capabilities, cultivating trust with new suppliers, and innovating for sustainability. The coming years will determine whether the West can build the supply chain resilience needed to support its green and digital

European Commission. "Critical Raw Materials." *Single-Market-Economy.ec.europa.eu*. 2023. https://single-market-economy.ec.europa.eu/sectors/raw-materials/areas-specific-interest/critical-raw-materials\_en.

<sup>&</sup>lt;sup>33</sup> Arthur Leichthammer, "Mining for Tomorrow: The Strategic Importance of Critical Raw Materials for Europe's Industry," *Jacques Delors Centre*, 2024, https://www.delorscentre.eu/en/publications/detail/publication/mining-for-tomorrow.

ambitions, independent of any one dominant player. The stakes – industrial competitiveness, energy security, and even the pace of climate action – make this a policy challenge of paramount importance for the foreseeable future.

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