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Source: Forbes.

## Securing Critical Mineral Supply Chains: Towards a Transatlantic Council on Critical Minerals (TCCM)

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After decades of relative neglect post-Cold War, critical mineral security has re-emerged as a central object of strategic competition as it was at least since the beginning of the industrialised era. The dismantling of earlier industrial capacity created enduring dependencies exploitable as strategic vulnerabilities. Lithium, cobalt, nickel, and rare earths are no longer seen solely as basic industrial

inputs; they are the foundation of advanced technologies, clean energy systems and, more importantly, defence capabilities. Control over their supply chains can generate dominance without engaging in direct confrontation. In this context, breaking the quasi-monopoly of the supply chain is a strategic imperative for Washington and Brussels, even at a time of troubled transatlantic relations; the same interest is shared by numerous partner countries globally.

[According to the IEA](#), demand for critical minerals is set to grow massively in the coming decades; in particular, demand for rare earths is expected to more than double by 2050 (+116% from 2024), driven by electrification, renewable energy, and, primarily for advanced technologies.

The race for critical minerals is contextual to the return of great power competition after the end of the American unipolar moment. Here, military power is determined by the capacity to secure the resources that underpin technological systems. Building an independent supply chain is therefore not simply an economic objective, but a vital component of long-term security.

Restrictions on the export of critical materials with military applications, such as, for instance, gallium and germanium - [used for LEDs, laser diodes, photodetectors, integrated circuits, solar cells for satellites and fibre optics](#) - illustrate how supply-chain disruptions can impede the use of critical military technologies without escalating into open conflict, weakening deterrence and limiting freedom of diplomatic action. Competition over critical minerals has deep military implications; supply chain control can generate leverage in a manner that is economic in form but strategic in nature, explaining the importance of supply-chain independence for security.

China, the world's main critical minerals supplier, operates in the field through an integrated party-state machine that fuses systemically diplomacy, finance, infrastructure and industry. The case of [China's effort to mine bauxite and iron ore in Guinea](#) clearly exemplifies this pattern. This integrated approach (linking infrastructure investments, long-term offtake agreements, and industrial capacity), has enabled the consolidation of dominant positions across key segments of the supply chain. It also exposes the limitations of Western fragmented responses, where investments, industrial policy, and strategic objectives are often misaligned.

Responding with market mechanisms alone will prove ineffective; it needs a coordinated geo-economic strategy comprising diplomatic, industrial, and financial instruments, linking NATO's strategic agenda with the EU, as well as with other trusted, interest-aligned countries.

### **Critical Minerals concentration and fragmented policy responses**

The surge in demand for critical minerals is occurring alongside a high degree of concentration in extraction and processing, reinforcing the strategic position of the few key suppliers, and weakening

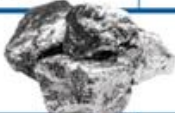
that of all other major economies. A handful of countries dominate extraction, while refining capacity is even more concentrated in a single country, China, whose market share can range between 70% and 99%, depending on the critical mineral. This combination of accelerating demand and structural concentration exacerbates the Alliance's vulnerability.

Nowadays, geopolitical rivalries translate into economic dynamics where the weaponisation of interdependencies has become the new norm. Security and economy are no longer perceived as two separate spheres (they never were), but they increasingly occupy overlapping spaces. Recent examples are the imposition of export controls by [China](#) (December 2024 and February 2025), in response to US tariffs, and by the [DRC](#) (February 2025) to contrast falling prices.

While demand is accelerating, investment momentum is plateauing; in real terms [it grew by only 2% in 2024](#), as a consequence of uncertain economic return amid low prices – owing to (designed) abundant supply from the dominant provider - and long development timeline of new projects – on [average 16 years](#) according to the IEA, slowing down progress on supply diversification when it is most needed, as the investment is often anti-economical for private businesses alone.

Awareness of this flaw is not new; in 2010, after the Chinese embargo on Japan, the US Department of Energy issued its first Critical Materials Strategy. Exposure to this chokepoint has not lessened much since, demonstrating how national efforts are insufficient even when undertaken by the most powerful country in the world.

## Mineral supply chains in scope

| Mining                                                                                                                                                                                                                                             | Refining                                                                                                                                                                                    | Final products                                                                                                                                                            |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Neodymium (Nd)</b><br>#17 on USGS critical minerals list (elevated risk)                                                                                       |                                                                                                                                                                                             |                                                                                                                                                                           |
|  The US' Mountain Pass mine is the largest non-Chinese producer of light REE.                                                                                     |  Currently no large-scale refining; dependent on China, though US-based plants are developing.             | <b>Permanent magnets</b><br>NdFeB magnets are the main end-use, critical for high-performance efficiency in multiple technologies.                                        |
|  Bayan Obo and southern deposits dominate, providing the majority of the world's neodymium-bearing ores.                                                          |  Controls 85%+ of refining capacity, transforming concentrates into separated Nd and Pr oxides at scale.   | <b>Motors</b><br>Neo magnets dominate traction motors, driving range improvements and lower energy use per mile.                                                          |
|  This is the most diversified supply chain node, with a quarter of global mining outside the US and China.                                                        |  Japan, Estonia, and Australia offer niche refining, but volumes remain far below China's.                 | <b>Robotics and advanced manufacturing</b><br>Nd magnets enable compact, precise motion control systems, powering industrial automation.                                  |
| <b>Dysprosium (Dy)</b><br>#5 on USGS critical minerals list (high risk)                                                                                           |                                                                                                                                                                                             |                                                                                                                                                                           |
|  Virtually no Dy mining; most projects focus on light rare earths, not heavy Dy deposits.                                                                         |  Only pilot plants and nascent capacity under development, but progress is being made.                     | <b>Permanent magnets</b><br>NdFeB alloys are doped with Dy alloys to maintain coercivity at high temperatures and resist demagnetization.                                 |
|  Chinese mines in China and Myanmar dominate production, supplying the bulk of global Dy.                                                                         |  Controls 99% of Dy separation, oxide production, and downstream alloying for magnets.                     | <b>Weapons</b><br>Dy-doped magnets power guidance and precision military systems.                                                                                         |
|  Australia and small African deposits produce limited Dy volumes; capacity remains modest.                                                                      |  Australia is rapidly increasing HREE separation capacity, both domestically and in Malaysia and the US. | <b>Motors</b><br>Dy strengthens NdFeB magnets for EV and wind turbine motors.                                                                                             |
| <b>Manganese (Mn)</b><br>High-purity sulfate: #41 on USGS critical minerals list (elevated risk)<br>Dioxide: #67 on USGS critical minerals list (limited risk)  |                                                                                                                                                                                             |                                                                                                                                                                           |
|  The US has not mined Mn since the 1970s due to low-grade, high-cost deposits.                                                                                  |  Negligible refining capacity, but several facilities to produce battery-grade Mn are being built.       | <b>EV batteries</b><br>High-purity Mn stabilizes cathodes in lithium-ion cells, lowering costs and extending vehicle range.                                               |
|  Produces modest share of Mn ore.                                                                                                                               |  China accounts for 95% of high-purity Mn refining.                                                      | <b>Grid-scale storage</b><br>Mn-based battery chemistries enhance storage durability and safety, supporting renewable integration and long-duration energy storage needs. |
|  South Africa, Gabon, and Australia dominate global ore output, supplying most international demand.                                                            |  Ore-exporting countries have little refining capacity.                                                  |                                                                                                                                                                           |

Source: Atlantic Council

In 2023, the European Commission announced the [Critical Raw Materials Act](#), an ambitious set of actions (including simplification of permits, promotion of processing innovation and recycling), to restore refining capacity within the EU borders, reducing the dependence on a single country (maximum 65% for each strategic raw material).

In December 2024, NATO released a list of [twelve defence-critical raw materials](#) essential for the manufacture of advanced weapon systems, whose supply is critical for the readiness of the Alliance. The initiative constituted a first step towards building a more resilient supply-chain for the Alliance.

The UK, Canada, and Australia, as well as Japan and South Korea, have developed [national and multilateral policies](#) to secure their access to raw materials. Yet these efforts remain fragmented, lacking coordination, financial alignment, and critical mass required to reshape global supply chains at scale. The issue is not the absence of initiatives, but the absence of a fully integrated system capable of delivering at scale.

The challenge is no longer analytical, but operational: it is one of urgency, scale, and coordination.

Initiatives, such as the US-led [MSP](#) (Mineral Security Partnership), and its successor [FORGE](#) (Forum on Resource Geostrategic Engagement), represent a key step toward coordination among like-minded, interest-aligned countries. Nonetheless, its scope must be expanded; a simple forum does not match the effort needed to rebalance the access to rare earths, which is unprecedented.

Against this backdrop, purely market-driven or national approaches are unlikely to be sufficient. State acquisition of equity stakes in miners (like the US Government in [USA Rare Earth and MP Materials](#)), can strengthen to some extent the supply chain, but alone they do not address the structural problem. The core challenge is not simply to increase investment, but to build an integrated and independent supply chain from extraction to processing and final use. This requires a level of coordination non-existent today.

This dynamic has profound implications for NATO, because critical minerals security is foundational to advanced technological systems, constituting a key indispensable pillar of collective security.

### **Towards a Transatlantic Council on Critical Minerals (TCCM)**

A credible response may therefore require the establishment of a new multilateral body, here referred to as a **Transatlantic Council on Critical Minerals (TCCM)**, capable of providing a systemic approach, bringing together NATO, the members of the Alliance, the EU, and trusted interest-aligned partners (Japan, South Korea, Australia, GCC, etc.). The **TCCM** would not function as a supranational authority, but as a multilateral body with a clear mandate to align capital, industrial capacity, infrastructure, and diplomatic action across the value chain.



*Source: Euronews.*

The TCCM would perform several key functions:

1. It would map strategic vulnerabilities across extraction, processing, and refining, providing a continuous realistic risk monitoring.
2. It would coordinate long-term demand and offtake agreements, helping to reduce market uncertainty and support the development of new projects.
3. It would support the development of processing and refining capacity, with the creation of [critical minerals processing hubs](#) within member states, bringing together several stages of the value chain, leveraging economies of scale in energy, transport, human capital, and R&D.
4. It would enable the aggregation of public and private capital, supporting the creation of dedicated investment vehicles, including a joint equity fund and syndicated financing structures.
5. It would coordinate the implementation of risk-mitigation instruments such as insurance coverage and guarantees provided by export credit agencies and private insurers.

Within this framework, NATO would provide strategic assessments and security planning, while member states, partner countries, economic and financial actors would provide the instruments necessary to support investment and industrial development. The inclusion of non-formally allied trusted partner countries would augment critical mass and capacity.

This effort must balance scale with agility. The coordination required is far-reaching, involving governments, financial institutions, industrial actors, and logistics networks. However, heavy bureaucratisation would undermine its effectiveness. Designing a structure that is both well-resourced and agile will therefore be paramount.

Securing critical mineral supply chains requires not only investments, but an effort of coordination commensurate with the scale, complexity, and urgency of the challenge. In this context, the establishment of the TCCM may represent a decisive step toward building a more strategically coherent critical minerals supply-chain for the Alliance.

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