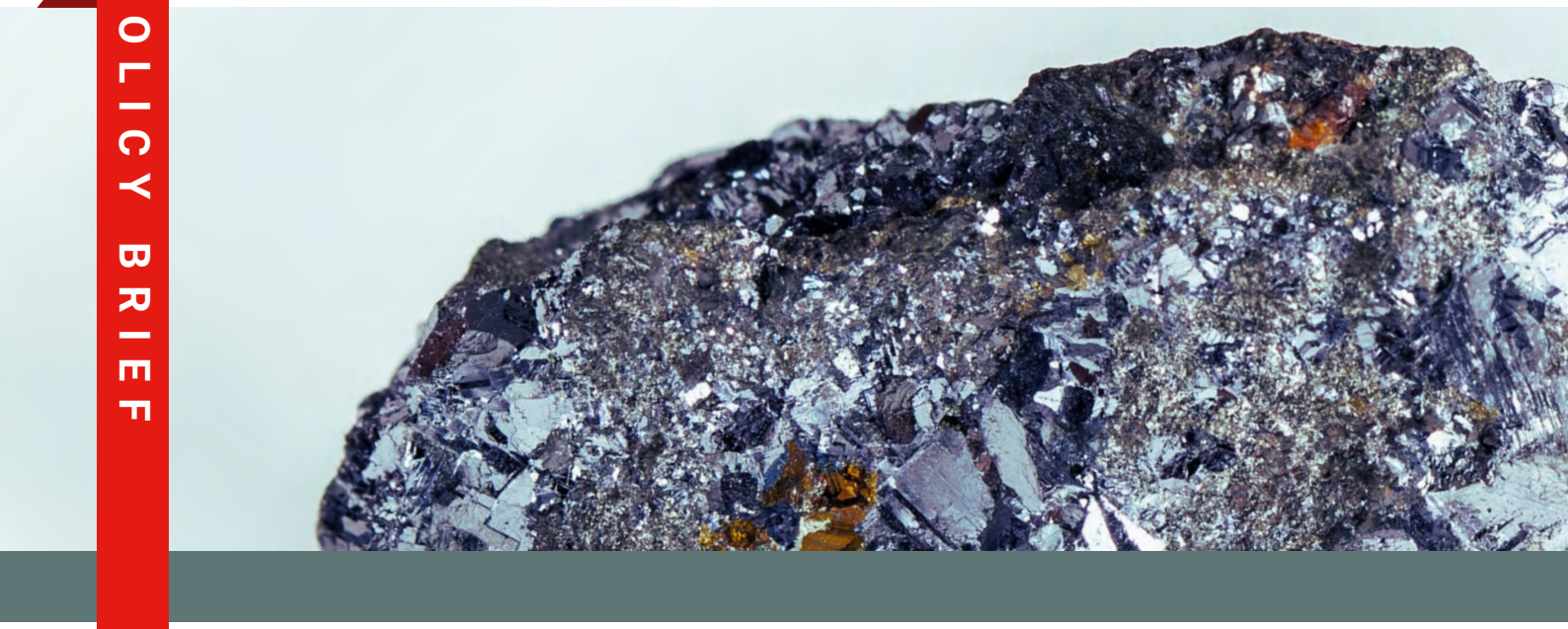
POLICY BRIEF



Critical Minerals and the New Industrial Order

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Understanding the Geopolitics of the
Energy Transition – a new world in the making

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SOPHIA KALANTZAKOS is Global Distinguished Professor in Environmental Studies and Public Policy at New York University Abu Dhabi. Her research centers on the geopolitics of critical minerals, the transition to a net zero future, and the fourth industrial revolution. Her work examines how resource competition in an era of fraught geopolitics has tilted the balance toward securitized assessments of global interdependence. Moreover, she examines China's global aspirations manifested through the Belt and Road Initiative and ecological civilization, Europe's reckoning with a seismic push against both its normative and economic power, and the US's re-evaluation of its leadership role in the global order. Kalantzakos' publications include *Critical Minerals, the Climate Crisis and the Tech-Imperium*, editor (Cham, Switzerland: Springer 2023), *China and the Geopolitics of Rare Earths* (Oxford University Press, 2018; rev.2021) and *The EU, US, and China Tackling Climate Change: Policies and Alliances for the Anthropocene* (Routledge, 2017). Kalantzakos is the Founding Head of eARThumanities and the Geopolitics and Ecology of Himalayan Water research initiatives at NYUAD. She was a Fellow at the Rachel Carson Center at LMU, a Fung Fellow at Princeton, and RIHST fellow at Caltech and the Huntington. Kalantzakos' new project addresses the geopolitics of food security in the Anthropocene.

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On 16 June 2025, European Commission President Ursula von der Leyen (European Commission, 2025a) presented a rare earth permanent magnet made in Estonia at the G7 summit. The move was on point. It spoke to a major geoeconomic challenge troubling governments and industry; how to ensure uninterrupted access to critical minerals to power the global seismic green and digital shifts currently underway. Von der Leyen spotlighted that this magnet was produced by a Canadian company supported by the European Union Just Transition Fund and that the materials it contained were sourced from Australia, not China. Europe was now one step closer to building resilience and derisking the supply chains necessary to electrify transport, deploy renewables, and build its tech capacity for the fourth industrial revolution.

CRITICAL MINERALS DRAW THE WORLD'S ATTENTION

Critical minerals first drew media attention because of a trawler incident between Japan and China in 2010. The rare earth crisis—as it became known—revealed that China had developed a near monopoly position across the supply chain for these indispensable materials and their applications (for defence, tech, and the green sectors) and was willing to leverage (although informally and briefly) its advantage to 'settle' a geopolitical dispute (Kalantzakos, 2021).

While China used a wide range of policy tools like subsidies and financing to strategically leapfrog in the production of quality renewables, EVs, tech and defence systems, building up the relevant supply chains, Beijing's competitors had shunned industrial policy trusting that globalisation would ensure uninterrupted access to inputs. It was a gross miscalculation failing to acknowledge that geopolitics might one day trump economics.

When major OECD industrial nations decided to make the green and digital transitions the crux of global industrial transformation in response to climate change and to reduce emissions, they realized that China had already secured a commanding lead. Through initiatives like the Belt and Road Initiative (BRI), new development banks, and strong ties with the Global South, China controlled supply chains from mine to market and had mastered affordable, large-scale production of green and tech products—pricing out European and American competitors.

THE ERA OF HYPERCOMPETITION

The trade wars began under the first Trump administration in 2018. Hypercompetition and friction continued under Biden, whose goal was to create well-paying 'green' union jobs, build climate resilience, and maintain global tech leadership. Critical minerals lists were updated and expanded to materials beyond rare earths to include lithium and cobalt, as well as other inputs like gallium, germanium, indium, graphite, nickel and copper that are essential for the fourth industrial revolution. Although Biden sought to work with United States Allies, the benefits of US policies like the Inflation Reduction Act (IRA) did not extend to US allies causing friction with the EU and others. China's advantage in these industries eventually produced panic (Schmitz, 2023a). Tariff and non-tariff barriers were introduced. Industrial policy made a come-back and ties of interdependence began to sever (Ilyina, Pazarbasioglu and Ruta, 2024). The race for critical minerals heated up but cooperation with mineral producing nations remained the framework for supply diversification away from China.

Trump's return in 2025, however, marked a major turning point. The US left the Paris agreement, proceeded to defund the US green transition, slapped tariffs not only against China but also its own allies, partners, and competitors alike, and securitised access to critical minerals in the name of defence and Artificial Intelligence. The White House was accused of turning access to critical minerals into a colonialist style discourse, transactional, and often exploitative (Baskaran and Schwartz, 2025). Talk of buying or taking over Greenland and the signing of a Minerals Agreement to stay engaged in seeking peace for Ukraine revealed a new modus operandi that has unsettled global affairs.

FUTURE PROSPECTS

Nonetheless, the green and digital transitions will remain the focal point of the global economic shift. While the US Government deprioritizes the green transition and doubles down on fossil fuels and AI (Volcovici, 2025), China is set to become the first electric and digital superpower (Goldman and Egan, 2025). The EU and major industrial nations in Asia have announced that they will continue to green and digitalise their economies (European Commission, 2025b), indicating that critical minerals and their supply chains will remain a central pre-occupation. Importantly, new actors have entered the race: the Gulf countries are now leveraging their sovereign funds to invest in mining and refining, as well as across their entire supply chains working with both the US and China to attract manufacturing in their jurisdictions (Benny, 2025; Wajid 2025; Kalantzakos, 2025).

Critical minerals will thus remain indispensable for key sectors of global industry fuelling the scramble. The paradox is that the intensity of mineral competition continues to be driven by the US, even while Washington renounces Biden's previous determination to dominate the green and renewable market or power AI through green energy sources (McCadden, 2025). Trump's 'one big beautiful bill', for instance, ends $7,500 tax credits for new electric vehicle purchases on 30 September 2025 and those of $4,000 for used models, seven years earlier than the Biden administration's deadline. The same bill ends electric vehicle battery production tax credits (PTCs) in 2028, four years earlier. In January 2025, Trump revoked the previous administration's mandate for electric vehicles to comprise at least 50% of all new vehicle sales by 2030. Moreover, the federal

government instructed state officials to halt charging infrastructure expenditure via the $5 billion National Electric Vehicle Infrastructure (NEVI) program. Trump also signed an executive order in July 2025 to 'eliminate subsidies for unreliable 'green' energy sources like wind and solar' (The White House, 2025). According to the White House Fact Sheet, solar and wind 'displace affordable, dispatchable energy, compromise America's electric grid, and denigrate the beauty of our Nation's natural landscape'. Moreover: "Reliance on so-called 'green' subsidies threatens national security by making the US dependent on supply chains controlled by foreign adversaries."

Yet, critical minerals are especially crucial in large quantities for these commercial industrial transitions. In what might seem like a paradox, Washington continues to demand control of supply chains from mine to market principally in the name of security (i.e. the defence industry) that in fact has more restricted needs for these inputs. As for powering AI, the US has turned to fossil fuels and (perhaps) nuclear down the line. This contradiction (intentional or unintentional) and its implications for industrial actors, such as the EU, may not have been fully appreciated. Yet, it should raise urgent red flags if it is meant to exclusively serve 'America First' interests. An accurate assessment is therefore crucial for policymaking rationale, design, and implementation. The Union's measures to date are in the right direction but could be further strengthened in recognition that, for the EU (as for China), critical minerals—in addition to defence—are the sine qua non inputs for the massive green and digital transitions that it intends to develop swiftly, though China retains a strong advantage. For Europe, moreover, these industrial priorities have become even more important given the mercurial relations with Washington; the US decision to forego the green transition creates an opportunity for Europe to fill the gap.

Given China's already dominant position across supply chains, the PRC will continue to lead in the affordable, speedy, and scalable production of these technologies. To ensure that both the developing world and China's industrial competitors more fairly partake in this industrial transformation, it is now expected that China increase its FDI in their markets. In addition, the EU and other OECD economies continue to build resilience, derisk, and develop alternate supply chains. The EU, moreover, is advancing its own strategic autonomy through initiatives like the European Raw Materials Alliance (ERMA) in 2020, the European Battery Alliance (EBA) in 2017 and the Critical Minerals Act. These initiatives aim to support new mines, more ESG-compliant supply chains, and promote critical minerals diplomacy—ensuring developing nations are partners, not just extraction zones (Riofrancos, 2021).

As nations compete and collaborate in this new industrial era, the governance of critical minerals will shape not only economic competitiveness but also global stability, environmental justice, and technological ethics (Ali et al., 2022). The challenge ahead lies in ensuring that the green and digital revolutions do not reproduce old patterns of exploitation but instead lay the foundation for a more equitable global order. ■

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