European Union Institute for Security Studies

BEIJING'S CRITICAL RAW MATERIAL WEAPON

And how to dismantle it

By
Joris Teer

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Note

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CONTENTS

EXECUTIVE SUMMARY

Beijing's sharp reduction of critical raw material exports to almost all countries in 2025 has drastically weakened the positions of Europe, the United States, and others in their relations with China. These materials are the foundation of their civilian and defence industries: the production of medical equipment, energy grids, weapon systems and other essential items depends on them. China controls 70% or more of global refining or mining for half of the 34 materials that the EU designates as 'critical'. Instead of cutting supplies to zero – and triggering an all-out push towards diversification – Beijing increased exports for most materials again in the latter half of 2025, albeit at lower and strictly controlled levels.

Initially Beijing introduced these measures in response to US tariffs and successive rounds of technology transfer restrictions imposed since the first Trump administration. Throughout 2025, however, China's export controls evolved into a geo-economic weapon targeting a much wider group of countries. Europe is not merely 'collateral damage': Beijing's export controls – like its extensive industrial policies – contribute to China's broader strategic goals. Two stand out: President Xi seeks to build a self-reliant industrial and technological fortress to shield China against geopolitical upheaval (including a potential conflict over Taiwan), while ensuring that foreign markets remain open to absorb its state-supported exports and sustain China's economic development.

Throughout 2025, China used export controls to gather strategic information, coerce its trading partners, erode their (defence-)industrial capabilities, and deter any actions that run counter to Beijing's core interests. For example, it requires detailed information on production sites, products and the identity of industrial end-users, allowing it to map (defence-) industrial networks. China also leverages licensing procedures to extract concessions in unrelated policy areas, including the removal of the EU's tariffs on electric vehicles. Beijing's supply squeeze has disrupted foreign industries' supply chains, raising their production costs. By keeping export volumes low ever since, Beijing has constrained stockpiling and limited the ability of dependent industries to expand production anywhere other than in China.

Beijing's actions also weaken deterrence against Chinese and Russian aggression in East Asia and Eastern Europe respectively. By systematically denying critical material exports for defence end-use, China creates new obstacles to Europe's rearmament and the expansion of the US defence-industrial base. Likewise, the weaponisation of critical raw materials risks aggravating disputes between the EU and its partners. For example, China induced-scarcity will likely disrupt the level playing field between their downstream industries: US and Japanese stockpiling and state-sponsored diversification efforts – so far more successful than Europe's – largely prioritise supply to their own companies.

Perhaps most importantly, Beijing's controls act as a deterrent. For example, by halting exports of specific critical raw materials to Japan entirely in early 2026, Beijing punished Tokyo for Prime Minister Takaichi's statement in late 2025 that Japan's Self-Defence Forces could intervene if China used armed force against Taiwan. Similarly, Beijing's calibrated use of the critical raw material weapon in 2025 raised the costs for Europe, acting in coordination with its partners, of better protecting its industries against

China's state-capitalist policies. After all, Beijing can increase the pain at any time. It can halt exports of controlled materials entirely, resulting in massive economic disruption, extend controls to 11 more materials that it predominantly produces, or weaponise the chemicals, semiconductor wafers and other manufacturing inputs on its list of 800+ dual-use items, as it has already done against Japan. It can also continue to use such tools to further isolate Taiwan from its partners.

American, Japanese and in particular European diversification efforts are not on track to replace either the volume or the range of China-dominated production of critical raw materials and related components over the next decade. In the absence of more decisive and joint de-risking policies, the potency of China's supply chain weapons is only set to grow. Beijing's 9 October rare earth controls (postponed until November 2026 following the Xi-Trump summit in Busan) add an extraterritorial dimension. In a worst-case scenario, Beijing can use these to restrict large swathes of global trade in components and end-products between third countries, even if their China-origin rare earth content is minimal.

This *Chaillot Paper* examines the key factors and policies underpinning China's dominance in critical raw material value chains. It shows how the gradual introduction of controls on a growing number of materials failed to raise alarm in Europe. It sets out to map the full range of adverse effects that China's use of critical raw materials as a weapon has had on European prosperity and security. The paper proposes a detailed emergency policy package to make a fast, comprehensive, and sustained expansion of critical raw material production in Europe and partner countries financially viable. It also sets out proposals for economic deterrence to dissuade China from further curtailing supply.

Among other measures, Europe, the G7 and other key partners like South Korea and Australia should first bring material production online through state financing and other forms of state support, underpinned by a (preferably temporary) joint price floor. To sustain production, they should introduce coalition-wide, demand-side measures like sectoral tariffs, as well as 'Europe and partner' content requirements in public procurement. The coalition should extend an open invitation to non-rival countries to join, provided they adopt the same protections. The focus should be on material producers or deposit holders like Malaysia, the Democratic Republic of Congo, Brazil and Indonesia, and countries with large skilled workforces like India. If successful, the coalition should extend these measures to chemicals, semiconductors, and other core industrial sectors well before China establishes chokepoint control over them too. Whereas these demand-side safeguards can be replicated across industries, using state-support to onshore all of the strategic industrial value chains that China dominates (or is likely to dominate within the next decade) would risk the 'Sovietisation' of European and partner economies.

To strengthen deterrence, Europe should activate the Anti-Coercion Instrument (ACI), leverage export controls – especially on semiconductor technologies – to develop a more forceful and credible counter-threat, and work closely with partners like Japan and the United States to align retaliation in line with an 'escalate-to-deescalate' approach. To reduce China's information dominance in supply chains and be better prepared for future geoeconomic threats, the EU should establish a Geoeconomic Office of Net Assessment (GONA). Finally, Europe should tailor its industrial policies to secure a pivotal role for its industries in strategic value chains – ensuring their 'indispensability' – thereby maintaining leverage with both China and the United States. This will require reversing Europe's deindustrialisation.

INTRODUCTION

PRESIDENT XI'S GEOECONOMIC TRUMP CARD

Beijing has turned control over critical raw material production into a potent geo-economic weapon. President Xi has long argued for the need to develop an 'assassin's mace', a decisive trump card capable of overpowering stronger adversaries at a critical moment in strategic competition[(1)]. China's (quasi-) monopolistic control (accounting for over 70% of global production) over the mining and refining of 17 of the 34 materials that the EU deems critical (and related components like permanent magnets), has effectively provided Beijing with such a tool. This critical raw material weapon strengthens Beijing's ability to gather commercial and military intelligence, and enhances its capacity for economic coercion, including efforts to pry open markets. It also erodes the commercial and defence-industrial bases of other states, and provides a means to deter the European Union, the United States and others from acting against China's 'core interests'. One goal is to make China industrially self-reliant and inoculate it against geopolitical upheaval, including a conflict over Taiwan. Another is to pursue China's economic development by securing continued access to foreign markets for its below-market price exports, most notably in Europe.

Throughout 2025, President Xi demonstrated the damage that this critical raw material weapon can inflict. China responded to President Trump's introduction of 'reciprocal' tariffs in April 2025 and the looming threat of unprecedented US technology transfer restrictions in May and June by radically reducing critical raw materials supply not just to the US, but to almost all countries. China's leaders may have concluded that hitting the US, particularly its defence-industrial base, as hard as possible required sharply reducing supply elsewhere as well. After all, had China curtailed supply to the US alone, third countries could still have transhipped materials, magnets, and other unconnected products to US defence industries.

Whatever its initial intentions, Beijing's actions produced outcomes beneficial to China both within and beyond the US-China relationship. The Chinese leadership accomplished a trade and tech *détente* with the United States, including lower US tariffs, a halt to all new technology transfer restrictions, and even a rollback of some existing measures in the lead-up to and during the October 2025 Xi-Trump summit in Busan, South Korea[(2)]. Beijing's actions led to supply chain

(1) In an April 2020 speech, President Xi called on China to 'forge some "assassin's mace" technologies'. The term refers to a strategy or tool that gives the user a critical advantage in a high-stake conflict. Xi Jinping, 'Certain Major Issues for our National Medium- to Long-Term Economic and Social Development Strategy', *Qiushi*, 1 November 2020, p. 3 (https://cset.georgetown.edu/wp-content/uploads/t0235_Qiushi_Xi_economy_EN.pdf).

(2) President Trump and Xi are set to meet again in Beijing in mid-May 2026.

disruptions in Europe (including in the defence industry), putting security, innovation and prosperity at risk[3]. China readily exploited the leverage created by its export restrictions to extract additional benefits. In exchange for licences, it forced European and other foreign companies to share information on sensitive intellectual property, mapped Europe's (defence-)industrial networks, sought concessions in unrelated policy areas, categorically rejected raw material supplies for Europe's defence manufacturers, and expanded its capacity for economic coercion.

Even though the damage caused by Beijing's move came as a surprise to many governments, the critical raw material weapon has been under development for decades. China's long-standing industrial policies, including extensive state support, made the production of rare earths and a range of other critical materials outside of China financially unviable throughout the post-Cold War era, eventually giving Beijing chokepoint control. Between 2023 and 2025, Beijing finally readied the critical raw material weapon for use: whenever the United States expanded export licence requirements on semiconductor technologies or introduced tariffs, China responded by imposing export controls on a wider range of materials. Beijing's most consequential measure was the introduction of licence requirements on seven (predominantly heavy) rare earths and related components like permanent magnets on 4 April 2025. By just deploying this weapon, China has already increased its leverage, signalling both its capacity and willingness to squeeze supply at any moment of its choosing.

Critical raw materials are the backbone of the global economy.

Far more is at stake than the substantial, but still limited, disruptions seen in 2025 and early 2026. If Beijing cuts supply more radically, and for a longer period, European and partner critical industries will face severe production disruptions, likely even putting critical state functions at risk. European countries rely – often indirectly – on access to these materials to support healthcare, energy and other critical systems, expand defence-industrial production, and sustain other key sectors, like semiconductor manufacturing. These critical raw materials are the backbone of the global economy. Maintaining existing defence, communications, energy, healthcare and other vital systems depends on the production of spare parts, which in turn indirectly depends on access to critical materials. Commercially important industries, like automotive, are similarly dependent. One conceivable trigger for China to cut supply entirely would be (the lead-up to) a military conflict over Taiwan, especially if Europe were to join a sanctions effort against Beijing.

Losing access to critical raw material value chains would be bad enough during peacetime. In the current security environment, however, escalation by China would severely exacerbate the threats that Europe already faces. For Europe to deter Russia, NATO (in a worst-case scenario, just its European members without the Americans) must signal that it can

(3) Emont, J., Somerville, H. and MacDonald, A., 'China is choking supply of critical minerals to Western defense companies', *The Wall Street Journal*, 3 August 2025 (https://www.wsj.com/world/asia/china-western-defense-industry-critical-minerals-3971ec51); Interviews with European industry representatives; EU Chamber of Commerce in China (EUCCC), 'Flash survey on China's export controls', 1 December 2025 (https://www.europeanchamber.com.cn/en/press-releases/3757/european_chamber_survey_finds_one_in_three_looking_to_divert_sourcing_away_from_china_to_mitigate_impact_of_export_controls).

fight a long war. Maintaining a military-technological edge may not be enough. At a time of mass-produced relatively cheap precision weapon systems such as drones, maintaining deterrence also depends on cost-effective large-scale production in short timeframes. Likewise, Europe needs to show to Russia that it can maintain access to the manufacturing capacity (and therefore the materials) needed to sustain its energy grid and other essential state functions both during a hybrid and high-intensity conflict.

Securing peace and security in East Asia, including around Taiwan, also depends on indirect access to critical materials. The region has become the manufacturing hub of the global economy (especially for semiconductors) and is therefore economically vital to Europe. Maintaining deterrence relies among other things on scaling up defence production in the US, Taiwan, South Korea, Europe, and elsewhere. Washington's supply of arms to Europe and East Asia has long faced severe backlogs[4]. The Iran war makes replenishing ammunition stocks – at a time of constrained access to China-monopolised materials – even more difficult[5]. While Beijing curtails critical material supplies to Europe, the US and Japan, it is ramping up its own defence production and continues to backfill dual-use components for Moscow's war against Ukraine.

Considering the incredibly high stakes, Europe's goal should be to dismantle Beijing's critical raw material weapon altogether, while deterring its use in the interim. This would require replacing dependence on China for all critical materials (and related components) with reliance on other third countries or with domestic production within the EU. Europe and its partners will have successfully dismantled the weapon once they have removed Beijing's ability to disrupt European militaries and defence industries, other critical state functions and the wider economy through squeezing critical raw material (and related component) supply. Deterrence, by contrast, means preventing China from using this weapon through the threat of punishment. Commonly proposed measures to restore economic deterrence include halting – or threatening to halt – the supply of EU-produced critical economic inputs (such as semiconductor technologies) or curtailing Chinese companies' access to the European market.

Europe's goal should be to dismantle Beijing's critical raw material weapon altogether.

This *Chaillot Paper* investigates how to make critical material production financially viable outside of China, and what tools could deter Beijing's use of the critical raw material weapon. It proposes an emergency policy package that bridges the gap between Europe's current policies and those required to protect Europe against Beijing's weaponisation of critical raw materials. The paper sets out measures to enable a rapid, large-scale, and sustainable expansion of critical raw materials production in Europe and partner countries, despite China's state-sponsored production. It also outlines actions that could raise the costs for China sufficiently to discourage further restrictions on critical raw material exports.

(4) The arms sale backlog to Taiwan alone is USD 32 billion as of January 2026. 'Taiwan arms sale backlog: January 2026 update', George Mason University, Schar School of Policy and Government, January 2026 (https://tsm.schar.gmu.edu/taiwan-arms-sale-backlog-january-2026-update).

(5) Amoah, M., Bazilian, M. D. and Matisek, J., 'War on Iran costs limited munitions and critical minerals', *Foreign Policy*, 5 March 2026 (https://foreignpolicy.com/2026/03/05/iran-war-munitions-critical-minerals/).

The *Chaillot Paper* grounds these recommendations in a mapping of critical end-user industries that the critical raw material weapon presently puts at risk, while identifying the exact chokepoints (most importantly in refining) that Beijing controls across three particularly high-stakes value chains: rare earths, gallium, and germanium. Even though these materials (and related components) have particularly widespread critical end-uses, diversification efforts – particularly in Europe, but also among partners – have yielded limited results. As a result, the economic, security and societal fall-out is likely to be severe if China cuts supply entirely (see chapter 1). To ensure that the policy recommendations address the root causes of overreliance on China, the paper examines the policies that produced China's current dominance in these three value chains. It describes both the industrial strategies Beijing has pursued and the legal tools it has used to deploy the critical raw material weapon (see chapter 2). The paper outlines the full range of impacts of China firing the weapon throughout 2025 and early 2026, to ensure that the policy recommendations address the breadth of the challenge (chapter 3).

Finally, the policy package is anchored in an analysis of China's broader geo-economic objectives and strategy. This serves two purposes: it highlights the likelihood that Beijing will further escalate its use of the critical raw material weapon, as Sino-European economic interests continue to diverge, and it points to the potential development of a broader range of supply chain weapons beyond critical raw materials (see Conclusion). Accordingly, this paper proposes policy recommendations to de-risk critical raw material dependencies that can also serve as a blueprint to overcome (or prevent) overdependence in semiconductors, chemicals, and other indispensable value chains.

CHAPTER 1

WHAT THE CRITICAL RAW MATERIAL WEAPON PUTS AT RISK

Europe's prosperity and security today hinge on Beijing. From the stability of power grids to the production of advanced weapon systems and medical technologies, European critical state functions rest on – often indirect – access to critical raw materials that are overwhelmingly refined (and to a lesser extent mined) in China. This dependence extends far beyond the well-known case of rare earths and permanent magnets. For 17 out of the 34 materials that the EU classifies as critical, China's share of global mining or refining is 70% or higher (see Figure 1). At present, China-supplied materials form the backbone of Europe's defence, energy and high-tech sectors, as well as its broader economy (see Figure 1 for an overview of their end-uses).

All critical materials have unique properties, and as a result individual functions in critical end-products. The three case studies presented in this chapter show that European industries and likely even critical state functions would face disruption if China were to cut supply entirely of just three raw material groups: rare earths, gallium, and germanium[(1)]. Beijing controls over 74% of global production in at least one value chain segment for each of these materials, and for heavy rare earths and gallium as much as 98%+ (as of 2025).

Manufacturers use rare earths, gallium and germanium to produce a set of components with particularly widespread applications across critical sectors: permanent magnets, wafers for semiconductor production, and fibre optic cables. For each of these components, the case studies show that China exercises the greatest control over the refining stage, but not exclusively[(2)]. They also indicate that two of Europe's partners – Japan and the United States – are likely to make only limited headway in de-risking through state intervention in critical material markets in the coming years, while Europe's own de-risking policies have been comparatively modest. As a result, Beijing cutting supply of just these materials (and their related components) would create large-scale industrial disruption.

(1) Even though these materials are used in (very) low volumes, each is indispensable to maintain critical state functions. The paper refers to 'three critical raw material groups' because rare earths are a group of 17 closely related metals, whereas gallium and germanium are singular materials.

(2) The case studies' findings apply more broadly: China holds similarly large shares of global refining for twelve other materials too (see Figure 1) on page 10.

THE STAKES OF EUROPE'S RARE EARTH, GALLIUM, AND GERMANIUM ADDICTION

Europe's dependence on Chinese critical materials runs through its entire defence and civilian economy. The continent's security increasingly depends on Europe's and its partners' ability to mass-produce weapon systems and ammunition at pace. In turn, this depends on having – often indirect – access to China-supplied materials. The supply of gallium is essential to produce radar systems, communication networks and satellites. Thermal imaging for missile and drone detection systems, and wider battlefield awareness, night vision goggles and satellite imagery sensors relies on germanium. According to Govini, a software company for defence acquisition, over 78% of all DoD weapon systems contain antimony, gallium, germanium, tungsten or tellurium[3]. A variety of rare earths, a group of 17 closely related materials, are used across a wide range of applications, from helicopters, tanks and fighter jets to frigates and drones (see Figure 1). Without Beijing's continued supply, Europe's rearmament would grind to a halt.

Europe's ability to innovate its way out of its security predicament hinges on China-supplied materials too. Sustaining deterrence requires Europe to create advanced technological solutions to counter Russia's (and China's) advantages in manpower and production capacity. Substitution of materials, often touted as a solution to overdependence on China, is frequently not viable. For example, swapping heavy rare earths for light rare earths or completely different materials entails performance trade-offs[4]. Limited access to a range of China-supplied materials constrains opportunities for experimentation in frontier research areas, especially in emerging electronics[5].

Being cut off from Chinese material supplies would pose an equally severe threat to European prosperity. It is difficult to overstate the ubiquity of rare earths in modern economies. A European Central Bank network analysis found that 'over 80% of large European firms are no more than three intermediaries away from

(3) Govini, 'From rock to rocket: critical materials and the trade war for national security', (n.d.) (https://www.govini.com/insights/from-rock-to-rocket-critical-minerals-and-the-trade-war-for-national-security). European-produced weapon systems are likely to exhibit a similar degree of dependence, as they contain the same materials.

(4) SFA Oxford, 'Dysprosium market and dysprosium price drivers', (n.d.) (https://www.sfa-oxford.com/rare-earths-and-minor-metals/rare-earths-elements/dysprosium-market-and-dysprosium-price-drivers/). Similarly, lack of access to gallium imposes exceptional constraints on European weapon systems like radars and emerging disruptive technologies such as quantum computing. See: Augustine Fletcher, A. S. and Nirmal, D., 'A survey of gallium nitride HEMT for RF and high power applications', *Superlattices and Microstructures*, Vol. 109, September 2017, pp. 519–537 (https://www.sciencedirect.com/science/article/abs/pii/S0749603617312120); Mans, U., Rabbie, J. and Hopman, B., 'Critical raw materials for quantum technologies', Quantum Delta NL, 27 November 2023 (https://assets.quantum-delta.prod.verveagency.com/assets/white-paper-crms-for-qt.pdf).

(5) Greenfield, A. and Graedel, T. E., 'The omnivorous diet of modern technology', *Resources, Conservation and Recycling*, Vol. 74, May 2013, pp. 1–7 (https://www.sciencedirect.com/science/article/abs/pii/S0921344913000396). Greenfield, A., Graedel, T. E., Nassar, N. T., Reck, B. K. and Gordon, R. B., 'The criticality of metals and metalloids', *Proceedings of the National Academy of Sciences of the United States of America*, Vol. 112, No 14, 7 April 2015, pp. 4257–4262 (https://www.pnas.org/doi/pdf/10.1073/pnas.1500415112).

FIGURE 1 | **The stakes of Europe's critical raw material addiction**

Critical materials covered under Chinese export controls and their end-uses

Mining Refining

Chinese share of global production

Gallium 100%

2025

Higher-power and higher-frequency electronics, including power semiconductors, for (next-generation) radars, aerospace (incl. satellites), quantum components, LiDAR sensors, 5G networks, electronic warfare systems, data centres, communication systems, medical equipment, power grid management, magnets, and lighting (LED and displays, smartphones, TVs, etc.), and photonics.

Germanium 74%

2024

High-speed transistors, fibre optic cables, computers, communication systems, radars, missile detection systems, night vision systems, helicopters, tanks, electrical motors, batteries, displays, chemotherapy, (satellite) solar cells, semiconductors in automotive applications, firefighting equipment, telecommunications, computer technologies, medical diagnostics, satellite imagery sensors, and aerospace devices.

Graphite 95%

2024

Battery-manufacturing, including for electric vehicles and drones (e.g. UAVs).

Antimony 36%

2025

Bullets, other armour-piercing ammunition, batteries, and flame retardant.

Tungsten 79%

2025

Ultra-hard metal, used to produce artillery shells, armour, grenades, bullet-proof vehicles, armoured tanks and warheads.

Indium 70%

2025

Displays and fibre optic technology, laser rangefinders, and photonics.

Bismuth 86%

2025

Atomic research and medications.

Tellurium 78%

2025

Memory chips and solar panels.

Molybdenum 37%

2025

Hardening steel, airframes, weapons on tanks and principal surface combatants.

Rare earths 69%

2025

Light rare earths 85%

2023

Heavy rare earths 100%

2025

Applications include permanent magnets, lasers and lenses used in the F-35-fighter jet (≈450kg), destroyers, submarines, radar systems, missiles, drones (including Unmanned Aerial Vehicles), smart bombs, offshore wind turbines (≈12000kg), electric vehicles and humanoid robots. REEs are also used in electronic warfare, industrial machinery, nuclear power plants, MRI-systems, data centres, and lithography systems.

NB: The nine non-restricted critical materials of which China either mines or processes over 70% are *Cobalt* (77% in 2024), *Lithium* (70% in 2024), *Magnesium* (86%), *Manganese* (95% in 2024), Phosphorus (79% in 2023), *Silicon metal* (87%), *Titanium and Titanium dioxide* (70%) Vanadium (75%) and the majority of *light and medium rare earths* (likely 85%+). Materials in *italic* refer to Chinese dominance in the refining/processing stage. All others denote China's share of global mining.

Sources for China's share of global production: USGS Raw Material Commodity Summaries 2026 and for all 2025 figures; IEA Global Materials Outlook 2025 Executive Summary for all 2024 figures; European Commission for all 2023 figures

Sources for end-use examples: CSIS, Advanced Electronic Materials, Northrop Grumman, Microwave Journal, USGS, SCRREEN2, All About Circuits, Royal Society of Chemistry, Reuters, IISS, Stanford Advanced Materials, US Department of War, Nieuwsuur, *New York Times* a Chinese rare earth producer'[6]. Electric vehicles (EVs), industrial machinery, humanoid robots, MRI-technologies and lithography systems are just a few end products that contain rare earths. In turn, the world's semiconductor manufacturers depend on lithography systems to produce every single chip within all the end-products Europeans use. Critical materials may be the backbone of the global economy, but semiconductors are its central nervous system. And without critical materials, there are no semiconductors. Gallium, germanium, and the other materials on which China has imposed export controls, also have widespread critical end-uses (see Figure 1).

BEIJING'S RARE EARTH, GALLIUM AND GERMANIUM CHOKEPOINTS

But what exact links in the value chain does China control, and how far have European and partner policies to (re)claim market share progressed? A closer look at the end-uses and value chains of rare earths in permanent magnets, gallium in semiconductor wafers, and germanium in fibre optic cables shows that China leverages most control over refining, albeit not exclusively. For rare earths, however, Beijing controls (almost) the entire chain: Beijing also has (near-) chokepoint control over magnet production, and heavy rare earth mining.

In the absence of additional de-risking policies, Beijing's leverage will likely persist for many years, if not over a decade. Europe's partners, in particular the US and Japan, have largely relied on state grants and equity investments to break China's (quasi-)monopolies. Most promisingly, they have adopted sustained state support in the form of price floors, guaranteeing a minimum price for rare earth mining and refining throughout 2025 and 2026, even if Chinese overproduction sinks prices globally. The Japan Organization for Metals and Energy Security (JOGMEC), a state-owned corporation that supports resource development through state support and expertise established in 2004, spearheads Japanese projects. The US Department of War has led US government state support for critical raw material projects, with the Department of Commerce providing some support too. These combined state support measures will kickstart projects, while the Japanese and US government push the private sector to complete offtake agreements as state-sponsored supply comes online. Most of these projects are likely to successfully reduce (but not eliminate) dependence on Chinese rare earth, gallium and germanium production before 2030. Unsurprisingly, the International Energy Agency (IEA) projects that, based on all current capacity *and* planned expansions outside of China, rare earth diversification will only meet 50% of non-Chinese demand for mining, 25% for refining, and 20% for permanent magnets by 2035[7].

Europe is lagging behind. It may have set ambitious local production targets under the Critical Raw Materials Act (CRMA) in

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[6] In other words, more than four out of five of the surveyed manufacturing, financial and insurance, electricity supply, information and communication, and other companies will face supply chain disruptions if China cuts rare earth supply entirely. See: Banin, M., D'Agostino, M., Gunnella, V. and Lebastard, L., 'How vulnerable is the euro area to restrictions on Chinese rare earth exports?', *ECB Economic Bulletin*, Issue 6/2025, European Central Bank (https://www.ecb.europa.eu/press/economic-bulletin/focus/2025/html/ecb.ebbox202506__01~44d432008e.en.html).

[7] International Energy Agency, *Rare Earth Elements – Executive Summary*, 8 April 2026 (https://www.iea.org/reports/rare-earth-elements/executive-summary).

2023, and designated 60 strategic projects (47 inside and 13 outside of the EU) to deliver on them[8]. However, it has not adopted the policies needed to make these financially viable in the face of China's state-sponsored competition. The European Court of Auditors in February 2026 concluded that the EU's strategy for 'import diversification' has not produced 'tangible results'[9]. Aside from modest support for specific projects, European state support remains largely prospective: the RESourceEU Action Plan announced in December 2025 '*should* mobilise EUR 3 billion [...] within the next 12 months for [...] direct support of the [critical raw material] value chain'[10].

Rare earth permanent magnets: Chinese (near-) chokepoints across the supply chain

Take rare earth permanent magnets. They are used across all critical sectors: from powering motors in electric vehicles, helicopters and jet fighters, to loudspeakers and hard drives, to generating electricity in wind turbines. They maintain their strong magnetic properties, the source of their strength, without an external source like electricity to re-power them.

Magnet producers carefully tailor the material composition of magnets to meet specific customer requirements. For example, militaries use the more powerful neodymium-iron-boron (NdFeb) magnets in lower-temperature applications like drones and radars. To strengthen their heat resistance, producers alloy this NdFeb- magnet with the light rare earth praseodymium and enhance it with two heavy rare earths: dysprosium and terbium[11]. The weaker, but far more heat-resistant, samarium-cobalt (SmCo) magnets are used in missile components, jet engines, aerospace, and in other military and civilian systems that operate at far higher temperatures[12]. Magnets and materials are not interchangeable: using NdFeb-magnets instead of SmCo-magnets in engines can cause them to malfunction mid-flight, as the intense heat causes loss of magnetic properties[13]. Producing these magnets in the required varieties (sizes, heat-resistance levels, and strength) hence requires access to a wide-ranging mix of heavy and light rare earths, as well as other materials.

China's state-owned (or state-sponsored) companies dominate the global 'mine-to-magnet' production pipeline, giving Beijing a stranglehold over multiple segments of the value chain. Together, these manufacturers account for 94% of global magnet output, over

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(8) Most importantly, the CRMA calls on Europe to extract 10%, refine 40%, and recycle at least 25% of total EU demand for strategic materials by 2030, while limiting reliance on any single country to a maximum of 65% for each material. European Commission, 'Critical Raw Materials Act', (n.d.) (https://single-market-economy.ec.europa.eu/sectors/raw-materials/areas-specific-interest/critical-raw-materials/critical-raw-materials-act_en).

(9) European Court of Auditors, *Special Report No 4/2026: Critical raw materials for the energy transition – Not a rock-solid policy*, April 2026 (https://www.eca.europa.eu/en/publications?ref=SR-2026-04).

(10) European Commission, *RESourceEU Action Plan*, 3 December 2025, pp. 2, 5-6 (https://single-market-economy.ec.europa.eu/document/download/01c448d6-dc93-40d7-9afe-4c2af448d00c_en).

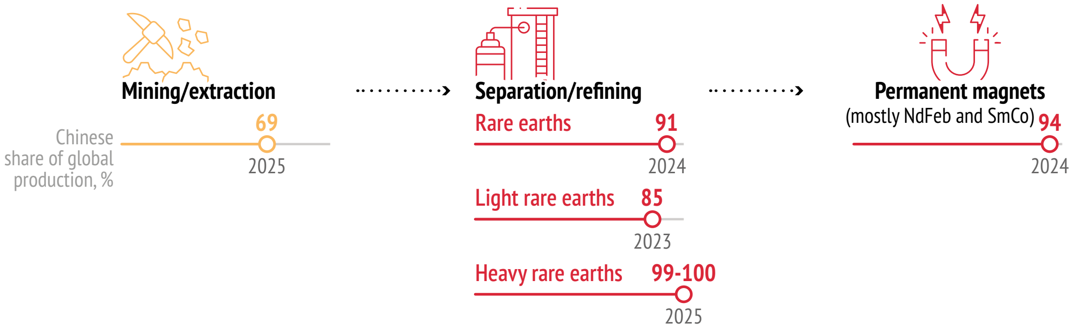
(11) Rare Earth Exchanges, *6 Military Uses of Rare Earth Elements in Defense Technology*, 4 October 2025 (https://rareearthexchanges.com/rare-earth-elements-in-defense-technology/).

(12) These magnets combine the light rare earth samarium with cobalt, a non-rare earth material in which China holds a 77% refining share. International Energy Agency, 'Share of top refining country for 20 energy-related materials', (n.d.) (https://www.iea.org/data-and-statistics/charts/share-of-top-refining-country-for-20-energy-related-minerals).

(13) Europe's relatively large automotive sector produces especially high demand for magnets, especially NdFeb.

FIGURE 2 | **China's share in rare earth production**

'Mine-to-magnet', 2025



NB: This visual is a simplification of a supply chain. 'Metallisation' and 'alloy-making', two more China-dominated indispensable production steps, take place between 'refining' and 'permanent magnet-making'.

Data: US Geological Survey 2026, International Energy Agency, European Commission, expert interviews

90% of rare earth refining, and 68% of mining, with Myanmar covering another 11% of global extraction (see Figure 2 and Figure 3)[(14)]. But for the refining and mining of heavy rare earths, a subset of eight (or nine) rare earths with essential defence applications, Beijing's chokehold is even stronger. China accounts for 84% (and neighbouring Myanmar 9%) of global dysprosium mining[(15)], while close to 100% of refining of all heavy rare earths takes place in China (see Figure 2). If Europe and its partners do not break China's (near)-chokepoints, Beijing's leverage will only grow over time. The demand for rare earths and permanent magnets is skyrocketing, while their use in critical sectors continues to become more widespread. Total mining of rare earths has risen over sevenfold since 1990, while rare earth demand continues to rise structurally, driven in part by the energy transition (see Figure 3).

At various supply chain steps Europe's partners (and to a lesser extent Europe) have started to claim back market share, but volumes remain insufficient to overcome Chinese control. Take mining: the US and Australia (with Japanese support) are in the process of expanding their global share of rare earth mining and the diversity of output, including both light and heavy rare earths. Molycorp tried to make a comeback in the early 2010s, following China's 2010 temporary curtailment of rare earth exports to Japan. But the company went bankrupt in 2015 (partially due to a steep fall in global rare earth prices driven by Chinese overproduction). MP Materials, receiving state support from the US government, bought the mine in 2017 and expanded production[(16)].

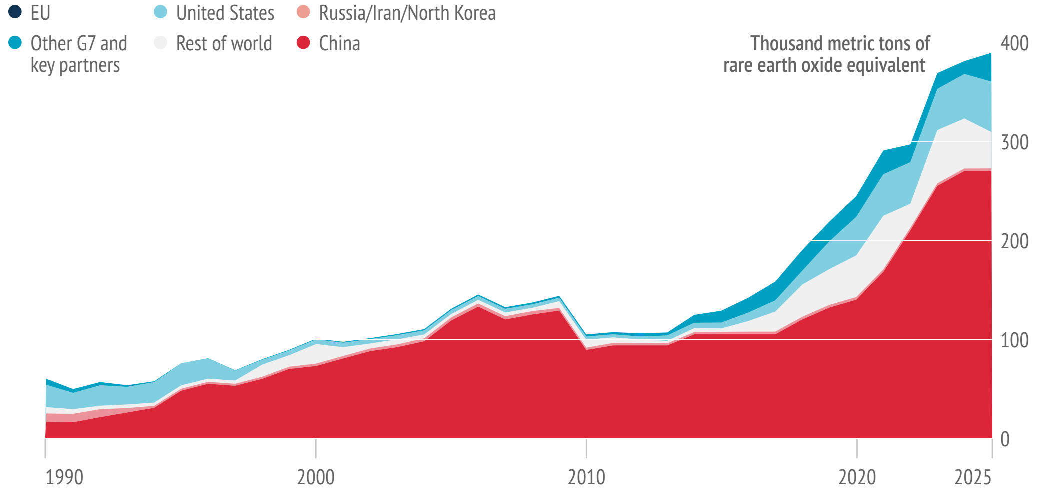
(14) Thiha, A., 'Rare earths and realpolitik: Kachin control, Chinese calculus, and the future of mediation in Myanmar', Stimson Center, 24 June 2025 (https://www.stimson.org/2025/rare-earths-and-realpolitik-future-of-mediation-myanmar/); Kim, T.-Y., Dhir, S., Dasgupta, A. and Scanziani, A., 'With new export controls on critical minerals, supply concentration risks become reality', International Energy Agency, 23 October 2025 (https://www.iea.org/commentaries/with-new-export-controls-on-critical-minerals-supply-concentration-risks-become-reality).

(15) Dysprosium is one of the heavy rare earths that makes the powerful NdFeb-magnets more heat-resistant.

(16) SAFE Center for Critical Minerals Strategy, 'Critical Minerals Pricing Mechanisms Issue Brief', December 2025, p. 8 (https://safe2020.wpenginepowered.com/wp-content/uploads/2025/12/SAFE-Pricing-Support-Issue-Brief.pdf); 'Corrected: Rare earths miner Molycorp files for Chapter 11 bankruptcy', Reuters, 25 June 2015 (https://www.reuters.com/article/business/corrected-rare-earths-miner-molycorp-files-for-chapter-11-bankruptcy-idUSL3N0ZB2OX/).

FIGURE 3 | **Skyrocketing demand, limited non-Chinese supply**

Rare earth mining after the Cold War



Data: US Geological Survey Minerals Yearbook, 1994–2026

As a result, the United States again accounted for almost 13% of global rare earth mining in 2025. Throughout 2025, the mine also made progress in undoing China's quasi-stranglehold over heavy rare earth mining[17].

The Australian company Lynas (which receives Japanese government support) mines just over 7% of global rare earths. The company was the first to revive rare earth mining in the West. In 2011 loan and equity support of around USD 130 million from JOGMEC and Sojitz (and hence indirectly Japanese state support) made it possible for Lynas to kickstart light rare earth mining in Australia in the early part of the decade, despite global rare earth prices collapsing due to Chinese overproduction. In addition, Lynas launched the first integrated mining and refining of heavy rare earths outside of China, namely dysprosium and terbium. The projects seek to add samarium production in April 2026, and four heavy rare earths (including yttrium) by mid-2027. Further state equity investment (approximately €123 million) in March 2023 by JOGMEC and Sojitz aims to make heavy rare earth mining financially viable too[18].

The EU has not brought any rare earth mining online. In the absence of additional support measures, it is very likely to continue to rely on imports for (almost) its entire rare earth feedstock until

(17) Rare Earth Exchanges, 'MP Materials unveils breakthrough in U.S. heavy rare earth supply chain with SEG+ production at Mountain Pass', 16 June 2025 (https://rareearthexchanges.com/news/mp-materials-unveils-breakthrough-in-u-s-heavy-rare-earth-supply-chain-with-seg-production-at-mountain-pass/); Rare Earth Exchanges, 'America's rare earth treasure trove: Can MP Materials make heavy rare earths by next year? Promising signals', 8 November 2025 (https://rareearthexchanges.com/news/americas-rare-earth-treasure-trove-can-mp-materials-make-heavy-rare-earths-by-next-year-promising-signals/).

(18) Sojitz Corporation, 'Sojitz begins import of heavy rare earths from Australia', 30 October 2025 (https://www.sojitz.com/en/news/article/topics-20251030.html); Sato, Y., 'Japan's Sojitz to expand Australian rare earth imports', Nikkei Asia, 16 February 2026 (https://asia.nikkei.com/business/materials/japan-s-sojitz-to-expand-australian-rare-earth-imports).

at least the mid-2030s[19]. Even if Europe succeeds in onshoring refining and permanent magnet production, it will still remain dependent on imports, notably from China and, increasingly, the US and Australia, for the rare earth feedstock.

Breaking China's dominance over refining has proven an even steeper challenge.

Breaking China's dominance over refining has proven an even steeper challenge. When China introduced export controls on seven (predominantly heavy) rare earths on 4 April 2025, and curtailed supply, there was no commercial-scale heavy rare earth refining anywhere outside of China. Since then, American, Japanese (through projects in Malaysia and France), and European companies have kickstarted pilot projects to refine these materials, with many seeking to reach commercial-scale production within the next three years. In addition to expanding mining, MP Materials has set the ambitious goal of bringing online large-scale heavy rare earth refining by mid-2026[20]. The US government has stepped up public-private partnerships to counter China's state-sponsored advantages beyond financial support alone. For example, the Department of Defense (DoD) announced a USD 400 million equity investment in MP Materials, effectively taking a 15% stake in the company in combination with a ten-year guaranteed offtake agreement that includes a price floor of USD 110 per kilogram for the company's neodymium and praseodymium products[21]. The US government has also mobilised private capital, generating offtake and co-investment pledges[22].

American companies (with support from the US government) are also leveraging the expertise of European companies to diversify magnet supply. A November 2025 'strategic agreement' combines the Belgian-French chemical company Solvay's refining of samarium with the metallisation expertise of Less Common Metals (UK), and Permag's (US) samarium-cobalt magnet production. The aim is to create 'sustainable and secure supply chains, both in Europe and abroad' for permanent magnets. The project seeks to 'meet demand' for samarium supply for the most heat-resistant permanent magnets (i.e., SmCo-magnets) 'over the next 3-5 years'[23]. The American state-supported company USA Rare Earth acquired the UK-headquartered Less Common Metals in January 2026, shielding the collaboration from China's below-market price competition. Specifically, USA Rare Earth received USD 277 million in US government funding and a USD 1.3 billion 'Senior Secured Loan' from the US Department

(19) 'Darren Wilson (LKAB Materials) on mining rare earth elements (REEs) in Europe', Studio Energie, 2025 (https://soundcloud.com/studio-energie/darren-wilson-lkab-materials-on-mining-rare-earth-elements-rees-in-europe).

(20) 'MP Materials unveils breakthrough in U.S. heavy rare earth supply chain with SEG+ Production at *Mountain Pass*', op.cit.

(21) MP Materials Corp., 'MP Materials announces transformational public-private partnership with the Department of Defense to accelerate U.S. rare earth magnet independence', 2025 (https://investors.mpmaterials.com/investor-news/news-details/2025/MP-Materials-Announces-Transformational-Public-Private-Partnership-with-the-Department-of-Defense-to-Accelerate-U-S--Rare-Earth-Magnet-Independence/default.aspx).

(22) As part of its pledge under the Trump administration's second term to invest USD 500 billion in the United States, Apple announced a USD 500 million investment in two MP Materials projects. Apple, 'Apple expands U.S. supply chain with $500 million commitment', July 2025 (https://www.apple.com/newsroom/2025/07/apple-expands-us-supply-chain-with-500-million-usd-commitment/).

(23) Solvay, 'Solvay strengthens rare earth supply chain with U.S. PERMAG and LCM agreement', 12 November 2025 (https://www.solvay.com/en/press-release/solvay-strengthens-rare-earth-supply-chain-us-permag-and-lcm-agreement).

of Commerce that same month[24]. In November 2025, Solvay also announced that it would supply the American (Texas-based) state-sponsored magnet manufacturer Noveon Magnetics with various light and heavy rare earths 'starting in 2026'[25]. In short, through state support the US government is also seeking to revive Europe's dormant refining expertise to establish a mine-to-magnet pipeline outside of China.

To support its permanent magnet industry, the Japanese government also provides substantial backing for light and heavy rare earth refining. Joint investment by JOGMEC and Sojitz in Lynas includes ramping up refining capabilities for light rare earths and an increasing variety of heavy rare earths throughout the next two years[26]. Like the US government, JOGMEC and Sojitz protect this state investment through a rare-earth price floor. In March 2026, the involved parties announced that JOGMEC and Sojitz 'commit to buying 5,000 metric tons of neodymium-praseodymium for Japanese industry annually to 2038 with a floor price of $110 a kilogram'. Likewise, they will buy half of Lynas-refined heavy rare earths. In exchange, Lynas reserves 75% of all of its heavy rare earth output specifically for Japanese industry[27]. Beyond financing, JOGMEC contributes highly specialised teams with deep technical refining expertise to support Lynas' refining projects, while limiting the environmental burden for Malaysia[28]. Lynas is expanding refining beyond Asia too, with financial support from the US government for a Lynas refining facility in Corpus Christi, Texas.

Some rare earth refining and permanent magnet manufacturing capacity exists in Europe. Despite capacity across Estonia, Finland, France, Germany, Slovakia, the UK and Northern Sweden, Europe's midstream output represents no more than 1% of the global total[29]. This may change. The Japanese and French governments are providing €216 million in support for Caremag's rare earth refining and recycling project in France, seeking to produce 15% of global terbium and dysprosium, although no timeline has been specified[30]. The EU has the industrial potential to bring online more supply:

(24) USA Rare Earth, 'USA Rare Earth announces Letter of Intent with U.S. Government', 26 January 2026 (https://investors.usare.com/news-releases/news-release-details/usa-rare-earth-announces-letter-intent-us-government-access-16).

(25) Noveon raised $215 million investor funding, after receiving $40 million in federal grants 'from prior administrations'. Somerville, H., 'Rare-earth magnet maker raises $215 million to amp up U.S. supply', *The Wall Street Journal*, 19 January 2026 (https://www.wsj.com/finance/rare-earth-magnet-maker-raises-215-million-to-amp-up-u-s-supply-db5cec42).

(26) More specifically, the project seeks to produce dysprosium and terbium with the intent to add samarium soon, and 'two to three more imported materials by mid-2027', possibly yttrium and gadolinium. 'Japan's Sojitz to expand Australian rare earth imports', op.cit.

(27) Hoyle, R., 'Lynas Rare Earths secures floor price in revised Japan supply deal', *The Wall Street Journal*, 10 March 2026 (https://www.wsj.com/business/lynas-rare-earths-secures-floor-price-in-revised-japan-supply-deal-654184c7); 'Rare-Earth magnet maker raises $215 million to amp Up U.S. supply', op.cit.

(28) In the face of local opposition, the Malaysian government announced that it will not allow for additional 'permanent disposal facilities' for radioactive waste, a by-product of rare earth refining, in Malaysia. Jun, S. W., 'Lynas stays another decade, no new radioactive dump; WLP to cease by 2031', *Malay Mail*, 6 March 2026 (https://www.malaymail.com/news/malaysia/2026/03/06/lynas-stays-another-decade-no-new-radioactive-dump-wlp-to-cease-by-2031/211209).

(29) More specifically, some European industries 'have the ability to separate individual REOs (in Estonia and France), and to manufacture REE-based products for various industries (phosphors, catalysts, polishing powders, etc.). There are also alloys makers and magnet manufacturers (in Germany and Slovenia) operating from imported processed materials. Just outside of the EU there is metal and alloy-making capability in the UK.' SCRREEN2 (Solutions for Critical Raw materials - A European Expert Network 2), 'Rare earth elements (REE)', SCRREEN2 factsheet, n.d., p.4 (https://scrreen.eu/wp-content/uploads/2023/08/SCRREEN2_factsheets_REE-EUROSTAT.pdf).

(30) With the potential of adding samarium and yttrium later. Carester, 'Caremag, a subsidiary of Carester, has secured €216 million in financing to build its rare earth recycling and refining facility in France', 17 March 2025 (https://www.carester.fr/en/caremag-launch/).

the CEO of Solvay stated that his company has the ability to refine all 17 rare earths for European use, and launched a pilot project to demonstrate this, in addition to his company's projects for US offtakers. However, he underlined that producing commercial volumes for European end-users is financially unviable, citing a lack of European state support[31].

But even if Europe and its partners manage to reduce their dependence on Chinese refining, Beijing retains chokepoint control over permanent magnet production, including both NdFeb and SmCo-magnets. Japan accounts for most non-Chinese output – about 4% of the global total according to the IEA, but about 15% according to other sources[32]. Neo Performance Materials has opened rare earth magnet manufacturing facilities in Narva, Estonia, supported with €18.7 million from the EU's Just Transition Fund[33]. Orano and CEA in France are in the early stages of bringing magnet production online[34]. The United States has initiated new permanent magnet-manufacturing facilities too, including by E-Vac, Noveon Magnetics, and MP Materials.

In short, barring additional de-risking policies, efforts by the US, Japan, and especially Europe to diversify supply will fall short of replacing the volume and range of magnets and rare earths imported from China. Diversifying sufficient permanent magnet production, as well as heavy rare earth refining and mining, is likely to be the greatest challenge.

Gallium semiconductor wafers: a Chinese chokepoint over refining

Until Europe and its partners expand non-Chinese gallium refining, Beijing has the tools to disrupt production of essential semiconductor wafers in Japan and Europe. In turn, semiconductor manufacturers use these wafers to produce essential components on which Europe's defence, other critical sectors, and the broader economy depend. Gallium arsenide wafers are essential to produce chips for wireless communication systems, including mobile phones, and Wi-Fi. These semiconductors are in turn ubiquitous throughout Europe's military systems, notably in guided ammunitions, medical systems, the energy grid, and a wide range of commercial applications[35]. Production of gallium nitride-based semiconductors (which so far relies on ten-times lower volumes of gallium) makes all of our battery chargers – for phones, and EVs – far more energy-efficient. More broadly, use of gallium nitride-based chips is increasing rapidly, including to improve the performance of data centres, radar systems, autonomous vehicles, missile defence

(31) van der Velden, L. and van Poll, M., 'Europa's grootste raffinaderij voor zeldzame aardmetalen draait niet op volle kracht: "Waarom zou ik?"', FD, 21 February 2026 (https://fd.nl/bedrijfsleven/1586618/europas-grootste-raffinaderij-voor-zeldzame-aardmetalen-draait-niet-op-volle-kracht-waarom-zou-ik).

(32) 'With new export controls on critical minerals, supply concentration risks become reality', op.cit.; December 2025 interviews during a study trip to Japan.

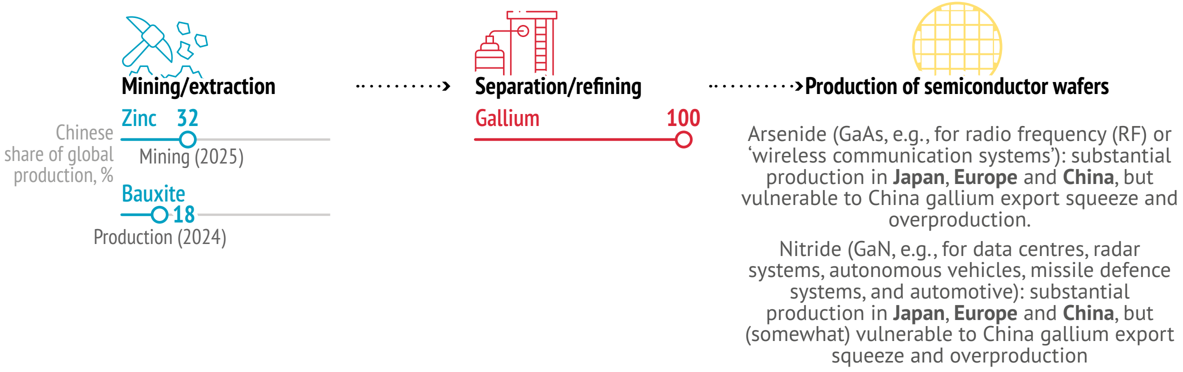
(33) *RESourceEU Action Plan,* op.cit., p.4.

(34) Orano, 'Orano and CEA launch a new pilot line unique in Europe for recycling and manufacturing rare earth-based permanent magnets', September 2025 (https://www.orano.group/en/news/news-group/2025/september/orano-and-cea-launch-a-new-pilot-line-unique-in-europe-for-recycling-and-manufacturing-rare-earth-based-permanent-magnets).

(35) Of total gallium used in wafer production, Japan, Europe and China-based manufacturers use 92% for gallium arsenide and 8% for gallium nitride wafer-technology. As a result, the latter is more resilient to production shortages, partly because it can draw on gallium recycling in North America and elsewhere. 'Gallium', SCRREEN2, (n.d.), p. 15 (https://scrreen.eu/wp-content/uploads/2023/09/SCRREEN2__factsheets_GALLIIUM.pdf).

FIGURE 4 | **China's share of gallium production**

'Mine-to-wafer', 2025



Data: Sources: US Geological Survey, SCRREEN2, 2026; International Lead and Zin Study Group

systems, 5G-networks and the automotive sector[36].

Unlike in the case of (heavy) rare earths, Beijing only holds a monopoly in the refining of gallium[37]. According to the US Geological Survey, China still accounted for 100% of global low-purity gallium refining in 2025 (see Figure 4 and Figure 5). Japan and South Korea have respectively tripled and quintupled their production share, but still accounted for only around 1% each in 2024. Europe, which produced almost 30% of all gallium globally between 2000 and 2009, saw its last production sites in Germany and Hungary close in 2013 and 2015 (see Figure 5).

Given the small volumes of gallium used around the world and the mining of the feedstock for gallium outside China, diversification prospects are better than for rare earths. Projects are more advanced too. In August 2025 JOGMEC announced support (equivalent to 90% of Sojitz's investment) for Alcoa Corporation, a US-headquartered firm, to produce gallium in Western-Australia. The project, expected to start in 2026, aims 'to produce 100 metric tons of gallium annually', amounting to over 10% of global production[38].

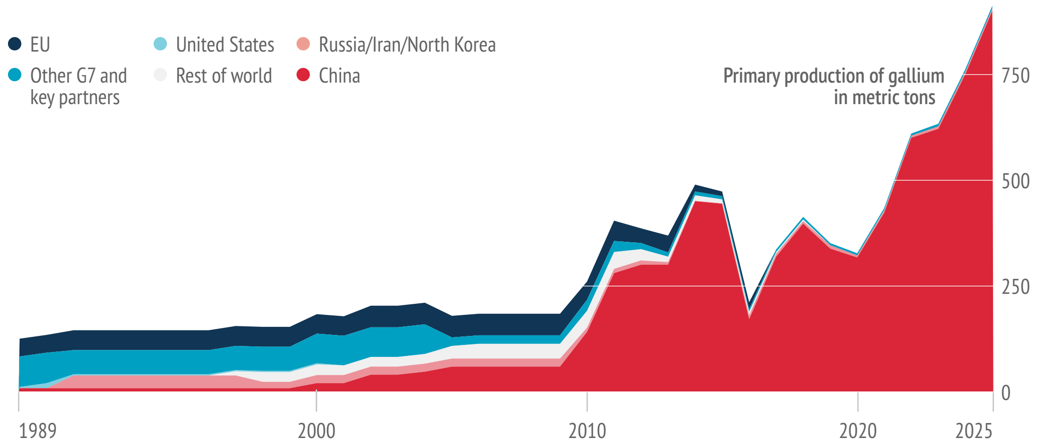
The imposition of reciprocal tariffs gave the Trump administration tools to attract investment via trade deals. In a joint venture with the US government, Korea Zinc will make a USD 7.4 billion investment in a Tennessee zinc smelter, with USD 5.4 billion contributed by 'US government

(36) Shivakumar, S., Yoon, J. and Sirkar, T., 'Gallium nitride: a strategic opportunity in the semiconductor industry', Center for Strategic and International Studies (CSIS), 20 May 2024 (https://www.csis.org/analysis/gallium-nitride-strategic-opportunity-semiconductor-industry). Gallium has a function in other widely used components too, namely the production of solar cells and to strengthen the heat resistance of NdFeb-permanent magnets. 'Gallium', SCRREEN2, op.cit., p.24.

(37) For now, China lacks a dominant share over the upstream (i.e., mining) and the downstream production of the gallium-arsenide and nitride semiconductor wafers. See: 'Gallium', SCRREEN2, op.cit., p.19. However, the Chinese government has called on its industries to expand bauxite production. See: Ministry of Industry and Information Technology, 'Interpretation of the "Implementation Plan for High-Quality Development of the Aluminium Industry (2025-2027)"' [translated from Chinese], State Council, 28 March 2025 (https://www.gov.cn/zhengce/202503/content_7016214.htm).

(38) The United States and Australian governments announced investments in the same project in December 2025. Alcoa Corporation, 'Governments announce support for Alcoa's gallium critical mineral development project in Western Australia', Alcoa, 20 October 2025 (https://news.alcoa.com/press-releases/press-release-details/2025/GOVERNMENTS-ANNOUNCE-SUPPORT-FOR-ALCOAS-GALLIUM-CRITICAL-MINERAL-DEVELOPMENT-PROJECT-IN-WESTERN-AUSTRALIA/default.aspx).

FIGURE 5 | **From diversified production to (near-)exclusive Chinese supply**
Gallium production after the Cold War



Data: USGS Materials Yearbooks 1994 to 2021, USGS Raw Material Commodity Summaries 2020-2025

loans and grants and capital contribution from Korea Zinc'[39]. The project aims to produce antimony, germanium and gallium sometime between 2027 and 2029. Also for this gallium (and germanium) project the US leverages European expertise: Korea Zinc recently acquired the Tennessee operations of Nyrstar, a Dutch-headquartered company[40].

In a European Commission-designated 'strategic project', METLEN Energy & Metals seeks to produce 50 metric tons (about 5.5% of global gallium production) per year in Greece 'gradually from 2027 and [reaching] full-scale operation by 2028'[41]. In short, even though gallium-dependence is concentrated at the refining stage, diversification efforts will result in only modest production volumes outside of China over the next three to four years.

Projects will likely come online first as part of US-Japanese-Australian or American-Korean projects, instead of European ones.

Germanium in fibre optic cables: China's near-chokepoint control over refining

Manufacturers use germanium to produce superior fibre optic cables that enable high-speed telecommunication within and between countries[42]. Fibre optic cables are the arteries of all communication systems, making financial transactions and government and military communications possible. Likewise, they connect server racks in data centres. Germanium also facilitates communications between countries: Around 99% of

[39] In December 2025, Korea Zinc purchased (pending regulatory approval) the 'fully permitted [zinc mining and smelting] sites' in Tennessee of Nyrstar, a Netherlands-headquartered company. Jung-a, S., 'US backs $7.4bn critical minerals smelter to counter China', *Financial Times*, 15 December 2025 (https://www.ft.com/content/d885ab55-b4f8-4c8f-a213-94f2778863ac).

[40] 'Proposed sale of Nyrstar USA to Korea Zinc', Nyrstar, 15 December 2025 (https://www.nyrstar.com/resource-center/press-releases/proposed-sale-of-nyrstar-usa-to-korea-zinc).

[41] Metlen Energy & Metals, 'New large-scale mining, metallurgical, and industrial investment by METLEN amounting to €295.5 million', 16 January 2025 (https://www.metlengroup.com/news/press-releases/new-large-scale-mining-metallurgical-industrial-investment-by-metlen/).

[42] Using germanium as a dopant for silicon prevents signal loss over long distances.

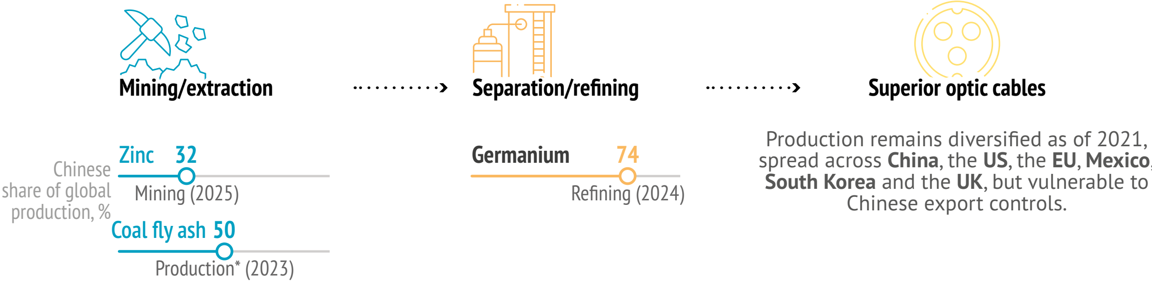
all communications globally are transmitted through subsea cables, rather than satellites[(43)].

China has achieved near-chokepoint control over germanium refining[(44)]. Beijing's total share of global primary production of germanium fell from 83% in 2023 (with Russia accounting for another 5%) in 2023 to 74% in 2024 (see Figure 6). The US produced merely 2%, with Belgium and Japan accounting for another 5 and 2% in 2023 (the last year for which country-level data is available)[(45)]. This marks a major shift over the post-Cold War era: In 1990 the US still produced over 50% of germanium globally. If the issue remains unaddressed Beijing's leverage will only grow over time. Annual germanium production quadrupled between 1990 and 2022 while demand will likely continue to rise in the upcoming years, mostly due to the digital transition (see Figure 7).

European partner countries have provided state financing to kickstart efforts to diversify germanium refining outside of China, while the EU has designated a strategic germanium refining project under the CRMA. The aforementioned Korea Zinc and US government-sponsored (USD 7.4 billion) project in Tennessee aims to start 'full scale construction' in 2027, and 'phased commercial operations from 2029.'[(46)]. The EU has designated two strategic projects on germanium under the CRMA. Umicore's GePETO is a refining project. Umicore has not received state aid for the project yet, but its designation as a strategic project makes it a priority for funding from

FIGURE 6 | **China's share of germanium production**

'Mine-to-fibre-optic-cable', 2024



* Estimate based on China's total production of coal, which exceeds 50% of global output.

Data: European Commission, International Energy Agency, US Geological Survey, World Bank (WITS), People's Daily, 2026

(43) International Telecommunication Union (ITU), 'Submarine cable resilience', ITU, November 2024 (https://www.itu.int/en/mediacentre/backgrounders/Pages/submarine-cable-resilience.aspx).

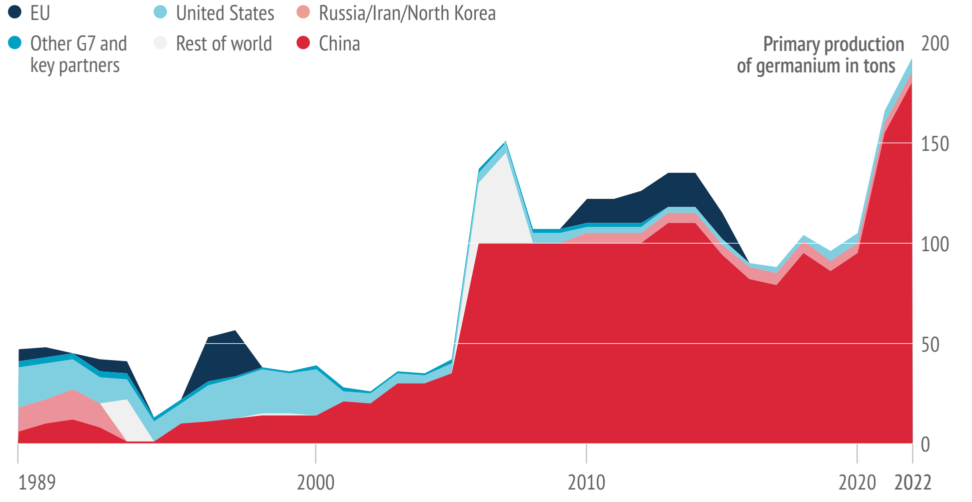
(44) Beijing is likely self-sufficient in the mining of the source material for germanium (i.e., zinc and coal fly ash) and fibre optic cable manufacturing. See: 'Germanium', SCRREEN2, op.cit., p.23; World Bank, 'Optical fibre cables exports by country in 2021', World Integrated Trade Solution (WITS), 2021 (https://wits.worldbank.org/trade/comtrade/en/country/ALL/year/2021/tradeflow/Exports/partner/WLD/product/854470).

(45) More recent data on germanium refining by country is unavailable. The USGS does not publish per country data, because of a lack of company reporting on their production volumes.

(46) Korea Zinc, 'Korea Zinc partners with the U.S. Department of War and U.S. Department of Commerce to build a state-of-the-art critical materials smelter in the United States', 15 December 2025 (https://www.koreazinc.co.kr/en/korea-zinc-partners-with-the-u-s-department-of-war-and-u-s-department-of-commerce-to-build-a-state-of-the-art-critical-materials-smelter-in-the-united-states-with-6-6-billion-of-capital-expenditures/). U.S. Department of War, 'DOD awards $14.4 million to sustain and enhance the space-qualified solar cell supply chain', Press release, 16 April 2024 (https://www.war.gov/News/Releases/Release/Article/3743467/dod-awards-144-million-to-sustain-and-enhance-the-space-qualified-solar-cell-su/).

FIGURE 7 | **From diversified production to China-dominated supply**

Germanium production after the Cold War



Data: British Geological Survey, 1989–2023

organisations such as the European Investment Bank (EIB).

SCENARIO: THE CONSEQUENCES OF BEIJING HALTING SUPPLY ENTIRELY

Imagine Europe's fate without access to China's supply of critical raw materials (assuming Europe and its partners do not accelerate efforts to bring non-Chinese production online). Such a scenario goes beyond Beijing's limited, but already disruptive, temporary sharp curtailment of supply throughout 2025 and early 2026. Beijing could go further and opt for creating maximum disruption by cutting off supplies of critical materials and related components, such as permanent magnets, to Europe, its partners, and most other countries, entirely.

The effects would be felt within weeks or months for most industries. As limited stockpiles run out, key industries like automotive and essential services like healthcare, communications systems, and energy grid production would grind to a halt. The economic fallout would be enormous: the IEA estimates that a complete halt in Chinese exports of 'only' rare earth and permanent magnets would cost just under USD 3.5 trillion annually for the EU and US alone[47]. But even crucial state functions would be threatened. Europe's rearmament, as well as its digital and green transitions, would face major disruption. Such resource scarcity would severely constrain Europe's ability to produce weapons systems and ammunition rapidly and at scale in the lead-up to

[47] Importantly, this would be the impact once China implements its rare earth export controls (so also the 9 October 2025 controls now postponed until November 2026) in full. International Energy Agency (IEA), *Rare Earth Elements; Pathways to secure and diversified supply chains*, IEA, Paris, 8 April 2026, p. 38 (https://iea.blob.core.windows.net/assets/de6a7c0d-f42e-4b0d-b16a-8dd3b9afb9e0/RareearthelementsPathwaystosecureanddiversifiedsupplychains.pdf).

or during a military conflict, for example an armed confrontation with Russia over NATO territory in the Baltics. This would erode deterrence, as it could convince the Kremlin of Europe’s and the United States’ inability to fight a long war. Global competition over the remaining scarce critical raw material resources would drive up prices. Developing economies, lacking purchasing power, would face more extreme shortages and at an earlier stage.

Scarcity would likely disrupt the level playing field between partners too. In the run-up to a crisis, Japan and the US would likely prioritise their own industries with the limited critical raw material production they onshore in the coming years. However, their defence companies would face production stoppages too, once their critical raw material stockpiles are depleted. In the longer term, supply disruptions would even erode the ability of European countries to provide critical state functions beyond military protection. Without maintenance and repairs, medical equipment, energy grids, and communications systems degrade over time. The production of spare parts to maintain these systems is impossible without access to critical raw materials.

CONCLUSION

Passively waiting for this scenario to play out is, however, not Europe’s only option. Beijing’s dominance has emerged only in the post-Cold War era. In 1990 most rare earth mining still took place in the West, as did over 50% of germanium and almost 90% of gallium refining (see Figure 3, Figure 5, and Figure 7). This suggests that if Europe and its partners pursue the right policies, overcoming China’s dominance will be a steep but not insurmountable challenge.

CHAPTER 2

HOW BEIJING DEVELOPED AND DEPLOYED THE CRITICAL RAW MATERIAL WEAPON

To understand why China's supply chain coercion in 2025 was so effective, it is necessary to trace how Beijing developed and finally deployed its critical raw material weapon. China achieved (near-) chokepoint control over critical raw material value chains through supply- and demand-side industrial policies and regulatory support, including large-scale subsidies. These measures were embedded in a context of relatively lax climate, environmental and labour laws, and reinforced by the vertically integrated industrial demand generated by China's unprecedentedly large manufacturing base. Beijing also introduced legal measures to sustain its control, banning and restricting the export of key rare earth production technologies as early as 2008.

The result is that China's (quasi-) monopolies have enabled the government to undercut non-Chinese production by maintaining a constant risk of flooding global markets. The Chinese government has expanded and refined the intelligence apparatus, along with the legal and bureaucratic tools needed to restrict exports. These legal instruments – gradually introduced on more critical materials between 2023 and the end of 2025 – represent the deployment of powerful economic weapons directly aimed at Europe's critical sectors. Yet at the time they did not spur European or partner governments to adopt effective de-risking countermeasures.

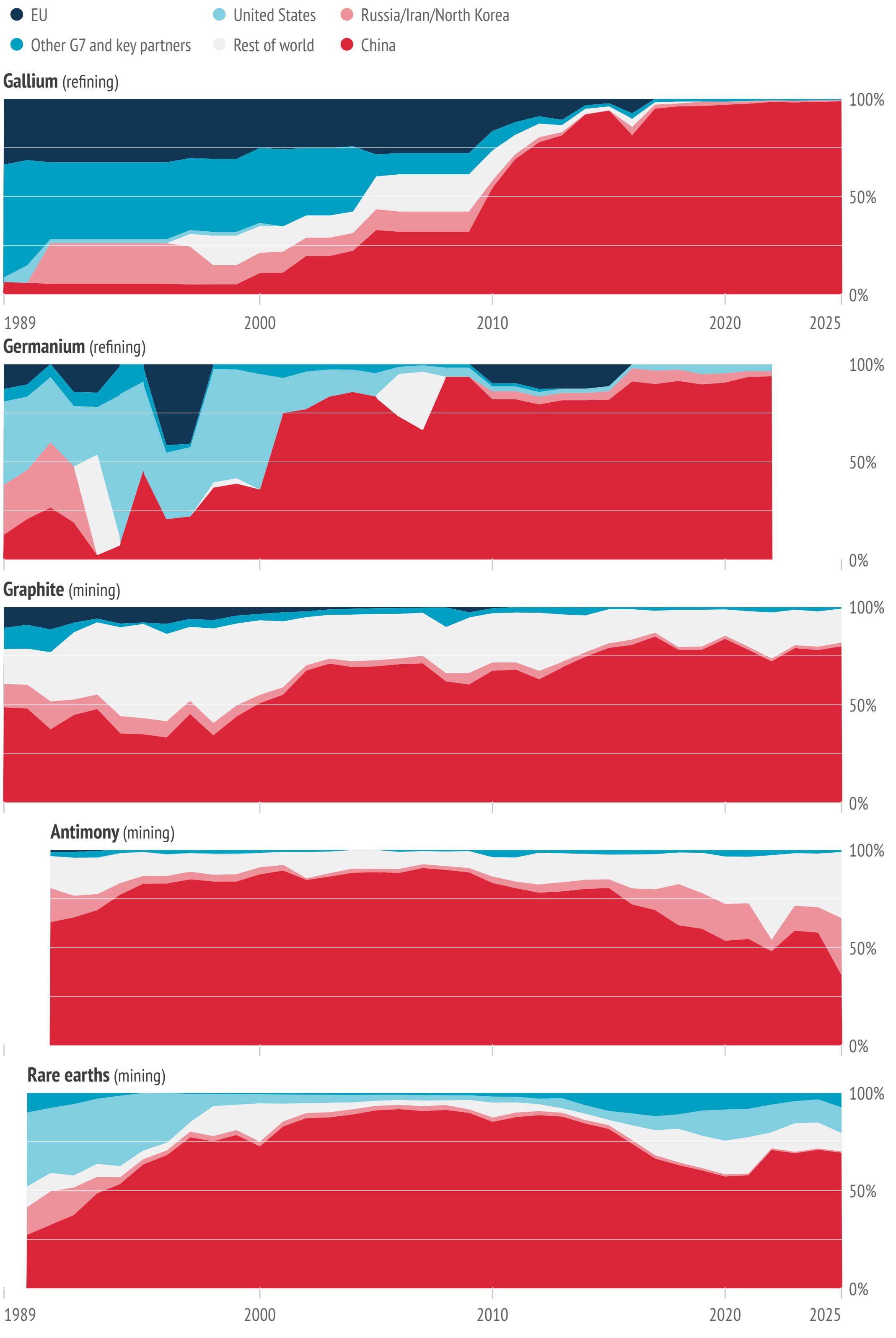
WEAPON DEVELOPMENT: ACHIEVING CHOKEPOINT CONTROL

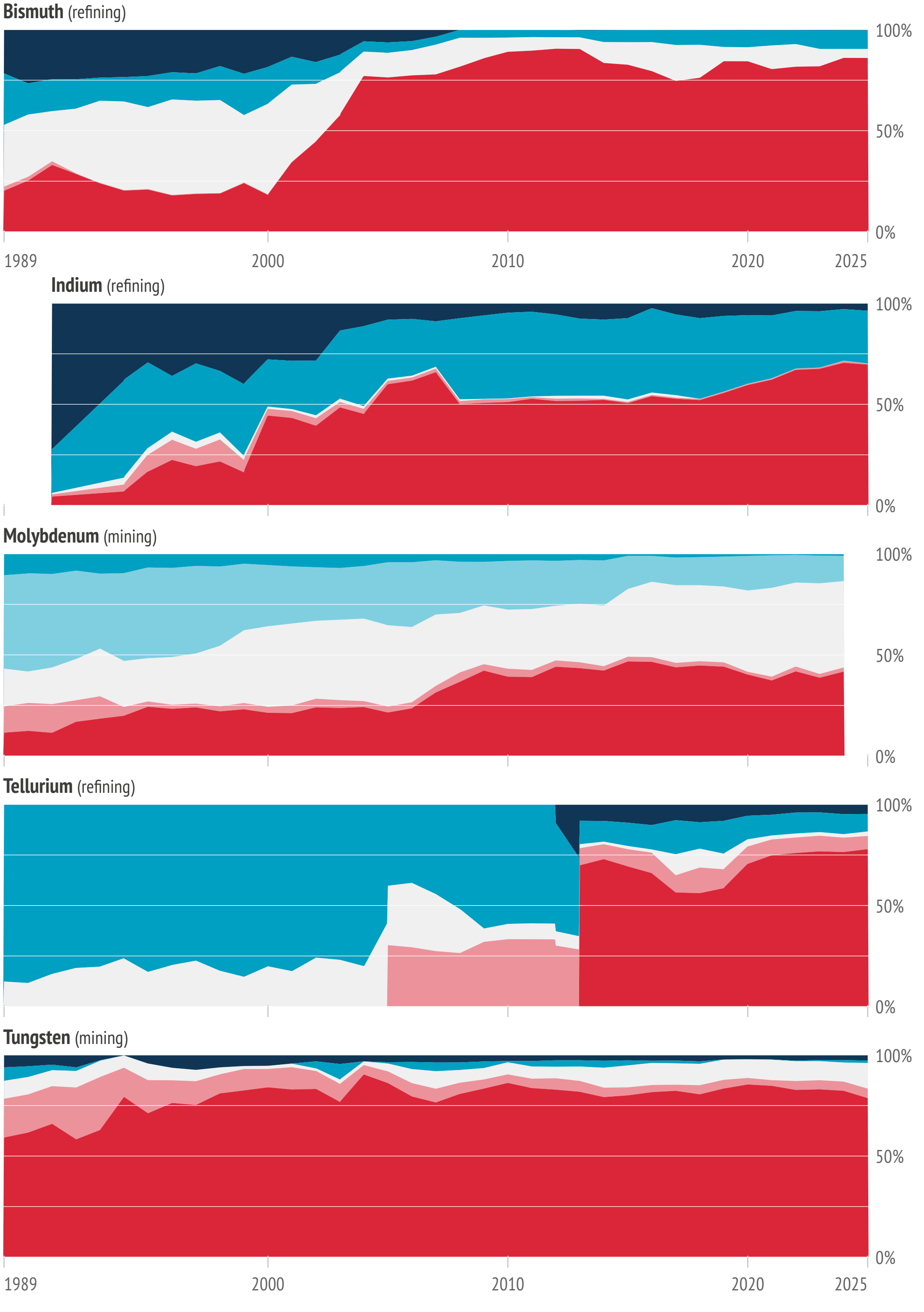
The results of China's policies to monopolise rare earth and other raw material production are striking: In 2025 two Chinese state-owned enterprises – China Rare Earth Group and Northern Rare Earth Group – together accounted for all of China's (and the dominant share of the world's) rare earth mining and refining[1]. Strengthened by their stockpiles, these companies can leverage their enormous production capacity

[1] Hart, C. A., *Mapping China's Strategy for Rare Earths Dominance*, Atlantic Council, Washington, D.C., June 2025, p. 39 (https://www.atlanticcouncil.org/wp-content/uploads/2025/06/Mapping-Chinas-strategy-for-rare-earths-dominance.pdf).

FIGURE 8 | **Beijing's post-Cold War development of the critical mineral weapon**

China's production share of ten materials on which it introduced export controls





Data: US Geological Survey (USGS) Minerals Yearbook and Mineral Commodity Surveys 1990–2026,
British Geological Survey, 1988–2022

to heavily influence (or even set) prices globally[2]. The same is true for gallium. China stockpiled about 948 tons, approximately 31% of all gallium output, in the period 2005-2020, bolstering Beijing's ability to drive down gallium prices around the world by flooding global markets[3]. Price formation itself is highly opaque: like rare earths, gallium and germanium are traded in small-volume, non-transparent markets, typically through business-to-business transactions or via commodity traders, often under longer-term contractual arrangements rather than through transparent stock exchange trading. Beijing's price-setting makes it impossible for private companies outside of China to produce these materials at a profit. As shareholders expect quarterly returns, loss-making projects cannot survive.

But how has Beijing achieved (and maintained) this dominant position (see Figure 8)? With the world's largest rare earth deposits on its soil – one third of the global total – China enjoys clear geological advantages[4]. Yet, the real foundation of Beijing's dominance is a decades-long 'whole-of-government strategy[5].

First, Beijing has put in place unprecedented supply-side support, including subsidies. The Rare Earth Observer estimates that total Chinese government financial support between 2010 and 2019 for rare earth production amounted to between USD 9 and USD 10 billion. This came in the form of subsidies, 'grant cash incentives, reduced, fees, and cheap land or energy to spur investment'[6]. Such support measures have also put China's state-owned enterprises (SOEs) in a better position to invest in developing rare earth deposits abroad. To build scale, Beijing has consolidated dozens of firms over decades, culminating in a final merger in January 2025 that folded the remaining players into the two remaining SOEs.

Second, the Chinese government instructs SOEs to produce at predefined high volumes (or calls on them to expand production more generally). China Rare Earth Group and Northern Rare Earth Group receive production quotas from Beijing, along with the financing needed to meet them[7]. Beijing also instructs gallium producers to pursue self-sufficiency goals, thereby reinforcing foreign countries' dependence on Chinese supply. Despite gallium overcapacities and massive stockpiles, China's 2025–2027 Aluminium Industry Development Plan calls on Chinese industries (including the state-owned Aluminum Corporation of China) to again increase the 'recovery of associated resources such as gallium during the alumina production process'. The Chinese government designates germanium as another

(2) One much-cited study finds that rare earth prices are 'volatile' and 'largely dependent [...] on Chinese actions' and that 'stockpiling [...] has gained momentum since 2012'. Mancheri, N. A., Sprecher, B., Bailey, G., Ge, J. and Tukker, A., 'Effect of Chinese policies on rare earth supply chain resilience', *Resources, Conservation and Recycling*, Vol. 142, March 2019, pp. 108, 111 (https://www.sciencedirect.com/science/article/pii/S092134491830435X).

(3) Jia, H., et al., 'Evolution of the anthropogenic gallium cycle in China from 2005 to 2020', *Frontiers in Energy Research*, Vol. 10, July 2022, p. 6 (https://www.frontiersin.org/journals/energy-research/articles/10.3389/fenrg.2022.944617/full).

(4) *Mapping China's Strategy for Rare Earths Dominance*, op.cit.

(5) Ibid.

(6) Rare Earth Exchanges, 'China's rare earth industry: subsidies and state control over the last decade', 14 August 2025 (https://rareearthexchanges.com/news/chinas-rare-earth-industry-subsidies-and-state-control-over-the-last-decade/).

(7) The Chinese government no longer publishes these quotas (as of mid-2025), ending a 30-year tradition of relative transparency and making it even harder for other economies to de-risk. See: Woods, D., 'The power of withholding: rare earth quotas and informational statecraft in China', *Journal of Chinese Political Science*, October 2025 (https://link.springer.com/article/10.1007/s11366-025-09922-9).

'associated resource' to be produced in larger volumes[8]. Likewise, the 15th Five Year Plan (launched in March 2026) calls for expanding the construction of 'bulk commodity storage'[9]. In short, the ultimate aim of Beijing's supply-side support is self-sufficiency, not profitability.

The ultimate aim of Beijing's supply-side support is self-sufficiency, not profitability.

Third, the Chinese government has built the full range of support mechanisms required by its energy-intensive mining, refining and manufacturing industries. This includes training a vast talent pool of metallurgy and more general manufacturing experts. Central to China's general manufacturing success is sustained investment over multiple decades in 'deep infrastructure', including training of 'its more than 70-million-person industrial workforce' consisting of 'factory managers, engineers, and workers'[10]. Similarly, Beijing ensures abundant and cheap energy (especially electricity) production through an all-of-the-above energy strategy. For now, Beijing is pursuing energy addition, not transition – with ensuring energy security as the ultimate goal. Beijing is overseeing the largest coal buildout around the world, while also investing in an unprecedented expansion of nuclear and renewable power[11]. The 15th Five-Year Plan may highlight the fact that the 'installed capacity of non-fossil energy […] exceeded that of fossil energy' during the previous five years. However, it still calls for increasing 'oil and gas reserves and production' and mentions China's mass coal production capacity as part of the 'national security system'[12]. The result is that China's large industrial producers benefit from more secure and cheaper energy supply than their counterparts in other countries with large critical raw material deposits and in Europe[13].

Fourth, Chinese producers in emissions-intensive industries face less stringent climate emissions reduction targets (and related taxes) than their European competitors. Beijing's pledge to peak emissions by 2030 – and then reduce them by 7-10% from peak levels in 2035 – gives China greater scope to expand energy-intensive sectors. By contrast, the EU promises to achieve a 55% reduction by 2030, an (almost) 90% reduction by 2040, and to reach net-zero by 2050, while imposing an Emissions Trading System (ETS) and energy taxes

(8) People's Republic of China. *Implementation Plan for the High-Quality Development of the Aluminum Industry (2025–2027)*, March 2025, p. 2 (https://www.gov.cn/zhengce/zhengceku/202503/content_7016126.htm).

(9) 'Authorised release from the Two Sessions: Outline of the 15th Five-Year Plan for National Economic and Social Development of the People's Republic of China', [translated from Chinese], Xinhua News Agency, 13 March 2026 (https://www.news.cn/politics/20260313/085af5de5a4b4268aa7d87d90817df2f/c.html).

(10) Wang, D. and Kroeber, A., 'The real China model: Beijing's enduring formula for wealth and power', *Foreign Affairs*, August 2025 (https://www.foreignaffairs.com/china/real-china-model-wang-kroeber).

(11) Patel, A., 'China's construction of new coal-power plants reached 10-year high in 2024', Carbon Brief, 13 February 2025 (https://www.carbonbrief.org/chinas-construction-of-new-coal-power-plants-reached-10-year-high-in-2024/). Myllyvirta, L., Qin, Q. and Qiu, C., 'Analysis: clean energy contributed a record 10% of China's GDP in 2024', Centre for Research on Energy and Clean Air (CREA), 19 February 2025 (https://energyandcleanair.org/analysis-clean-energy-contributed-a-record-10-of-chinas-gdp-in-2024/); World Nuclear Association, 'Nuclear power in China', World Nuclear Association, 7 April 2026 (https://world-nuclear.org/information-library/country-profiles/countries-a-f/china-nuclear-power).

(12) 'Authorised release from the Two Sessions: Outline of the 15th Five-Year Plan for National Economic and Social Development of the People's Republic of China', op.cit.

(13) International Energy Agency, 'Estimated final electricity price for large industrial customers in energy-intensive industries, 2019–2024', 12 February 2025 (https://www.iea.org/data-and-statistics/charts/estimated-final-electricity-price-for-large-industrial-customers-in-energy-intensive-industries-2019-2024).

that artificially make European industries more expensive[14].

Fifth, limited labour rights and looser environmental regulations also facilitate production. This allows China to carry out the more polluting stages of rare earth production at lower cost, especially dealing with the radioactive residue of the refining process. A case in point is the emergence of poisonous artificial 'lakes' in Inner Mongolia, while 'rare earth mines have poisoned dozens of once-green valleys' in southern-central China[15]. Although the Chinese government launched efforts to 'clean up' the rare earth industry in 2010, reporting on rare earth pollution has since faced increasing censorship[16]. The government has also deferred environmental compliance costs for rare earth projects[17]. Beijing's moral flexibility helps too. For the more polluting extraction of two heavy rare earth elements, namely dysprosium and terbium, China has come to increasingly rely on neighbouring Myanmar, engaging with both the government and parties that fight against it[18].

The 15th Five Year Plan again promotes self-sufficiency as China's industrial lodestar.

Sixth, China's critical raw material and related component production also benefits from strong state-sponsored demand from its manufacturing sector, the world's largest. Whereas China already accounted for over 30% of global manufacturing output in 2025, the UN projects that this share could reach 45% by 2030[19]. The International Monetary Fund (IMF) puts China's industrial policy expenditure at about 4.4% of GDP for manufacturing in general, far higher than in the EU, US and other advanced economies[20]. Demand for rare earths and other materials is particularly strong in China-championed green industries, such as wind energy and electric vehicles. The 15th Five Year Plan again promotes self-sufficiency as China's industrial lodestar[21]. Wider manufacturing system support for

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(14) 'Full speech: Xi Jinping tells UN China will cut emissions 7–10% by 2035', Dawn News English, 24 September 2025 (https://www.youtube.com/watch?v=CjR5FavwDzU).

(15) Bradsher, K., 'China has paid a high price for its dominance in rare earths', *The New York Times*, 5 July 2025 (https://www.nytimes.com/2025/07/05/business/china-rare-earth-environment.html).

(16) Ibid.; Bradsher, K., 'China, citing errors, vows to overhaul rare earth industry', *The New York Times*, 20 June 2012 (https://www.nytimes.com/2012/06/21/business/global/china-vows-tighter-controls-over-rare-earth-mining.html).

(17) 'China's rare earth industry: subsidies and state control over the last decade', op.cit.

(18) 'Rare earths and realpolitik: Kachin control, Chinese calculus, and the future of mediation in Myanmar', op.cit.

(19) United Nations Industrial Development Organization (UNIDO), *The Future of Industrialization – Building future-ready industries to turn challenges into sustainable solutions*, UNIDO, Vienna, 2024, p. 17 (https://www.unido.org/sites/default/files/unido-publications/2024-11/The%20Future%20of%20Industrialization%20-%20Building%20Future-ready%20Industries%20to%20Turn%20Challenges%20into%20Sustainable%20Solutions.pdf).

(20) Chinese industrial state support mainly consists of cost subsidies (2.0%) and tax benefits (1.5%), with SOEs benefiting 'from lower interest rates and higher cash subsidy rates'. See: Garcia-Macia, D., Kothari, S. and Tao, Y., 'Industrial policy in China: Quantification and impact on misallocation', IMF Working Paper No WP/25/155, International Monetary Fund, August 2025, p. 3 (https://www.imf.org/-/media/files/publications/wp/2025/english/wpiea2025155-source-pdf.pdf).

(21) See for example chapter four, section two: 'Authorised release from the Two Sessions: Outline of the 15th Five-Year Plan for National Economic and Social Development of the People's Republic of China' [translated from Chinese], op.cit.

China's upstream materials producers is only set to grow[22].

Seventh, Beijing has put measures in place to sustain its rare earth monopolies, or in other words to 'lock in' the supply chain bottlenecks it controls, long before the Netherlands, Japan and the US imposed restrictions on the transfer of leading and trailing-edge semiconductor equipment to China. Measures include informal and formal bans on exports of key production technologies. For example, since 2008, Beijing has prohibited the export of several technologies used for rare earth extraction, refining, and the production of metals, alloys and permanent magnets. In the same year, China also 'restricted' the export of all other rare earth 'mining, processing, and smelting technology', as well as gallium separation technologies[23].

Additional controls introduced on 9 October 2025, (although implementation was postponed until November 2026 following the Xi-Trump Busan summit) further restricted technology transfer. These new measures include a long and detailed list of rare earth mining, refining and permanent magnet-manufacturing technologies. Furthermore, they also cover an unspecified list of technologies, requiring exporters to apply for a licence from China's Ministry of Commerce for 'goods, technologies, and services' that are not explicitly mentioned in China's dual-use list, if they are 'aware that [these] are used for substantially contribut[ing] to overseas rare earth production'[24]. The same day Beijing announced legislation that forbids 'Chinese citizens, legal persons, and unincorporated organisations' from assisting 'overseas rare earth mining, smelting and separation, metal smelting, magnetic material manufacturing, or rare earth secondary resource recycling activities' without explicit agreement from China's Ministry of Commerce[25]. In short, China will impose even more severe technological obstacles on non-Chinese diversification projects if the Xi-Trump Busan *détente* unravels (or when the twelve-month postponement deadline expires).

DEPLOYMENT: IMPOSING THE LEGAL TOOLS TO WEAPONISE SUPPLY

Between 2020 and 2026, Beijing gradually adopted legal tools enabling it to curtail exports of the actual critical raw materials and related components themselves, to all countries, at its discretion. In 2020, it passed the export control law, streamlining the Chinese government's control

(22) Or in President Xi's words, 'the building of production chains and supply chains that are independently controllable, secure, and reliable, and strive for […] supply channels to all have at least one alternative source, forming the industrial back up system.': Xi Jinping, 'Certain Major Issues for Our National Medium-to Long-Term Economic and Social Development Strategy', op.cit., p.3.

(23) Chinese Ministry of Commerce (MOFCOM) and Ministry of Science and Technology (MOST), *Chinese Catalogue of Technologies Prohibited or Restricted From Export [July 2025]*, Center for Security and Emerging Technology (CSET), 18 August 2025, pp. 9–10, 18–19, 28–29 (https://cset.georgetown.edu/publication/china-export-control-catalog-july-2025/).

(24) Ministry of Commerce of the People's Republic of China and General Administration of Customs of the People's Republic of China, 'Announcement No. 56 of 2025', 9 October 2025 (https://www.mofcom.gov.cn/zwgk/zcfb/art/2025/art_1315078cebe04210bc35c72a4e7f7967.html); Ministry of Commerce of the People's Republic of China, 'Announcement No. 62 of 2025', 9 October 2025 (https://www.mofcom.gov.cn/zwgk/zcfb/art/2025/art_6cb42957741440c6984de696b70df9ae.html).

(25) Ibid.

over the export of dual-use items[26]. From mid-2023 to mid-2025, Beijing's deployment of supply chain weapons accelerated: whenever Washington imposed tariffs or export restrictions on semiconductor technologies targeting China, Beijing responded by imposing export controls on additional critical raw materials and related components such as permanent magnets (see Figure 9). Importantly, these licence requirements are not export bans. Depending on Beijing's policy objectives at a given moment, the Ministry of Commerce may grant licences swiftly, leave applications in 'administrative limbo', or in rare cases reject them outright[27]. For the export of items that may affect national security, the Ministry must receive permission from the State Council and Central Military Commission before granting licences, further prolonging the process[28].

Beijing requires export licences for critical raw material and related components not only for shipments to the United States, but to all countries. As argued elsewhere, one initial reason why Beijing likely opted for a global approach is that US companies can easily circumvent targeted restrictions by relying on re-exports via third countries. Likewise, in many cases the US does not depend on materials from China directly, but on components produced with Chinese materials in third countries (often Japan and EU Member States)[29]. Whatever the reason, European importers today are also subject to Beijing's licensing regime, despite only the Dutch government having been involved in just a single phase of the US-China tech-material export control action-reaction cycle (see Figure 9)[30].

Beijing's controls also cover essential components, including permanent magnets and batteries. The 4 April 2025 rare earth controls, introduced in response to Trump's 'reciprocal tariffs', covered a wide range of midstream products, most importantly the (militarily) essential SmCo, and NdFeb magnets that contain terbium or dysprosium[31]. Furthermore, Beijing's 9 October 2025 controls (suspended for twelve months following the Trump-Xi meeting in Busan) expanded restrictions to even more components, including a wide range of battery technologies[32]. With the inclusion of batteries and related items, including 'equipment used for manufacturing rechargeable lithium-ion batteries', China is pointing broader supply chain weapons squarely at Europe's EV and drone-value

(26) People's Republic of China, 'Export Control Law of the People's Republic of China', Order of the President of the People's Republic of China No 58, 17 October 2020 [entry into force 1 December 2020] (http://www.npc.gov.cn/englishnpc/c2759/c23934/202112/t20211209_384804.html).

(27) Wübbeke, J. and Catarata, M., *Chokepoint Politics: China's export controls in the era of Great Power rivalry*, Sinolytics, Berlin, (n.d.), pp. 5–6 (https://sinolytics.de/global-business-news/blog/public/uploads/article/pdf/2/Whitepaper_Export-Controls.pdf).

(28) Ibid.

(29) Teer, J., 'Caught in the US-China crossfire: To protect itself, Europe must call a critical raw material emergency', CSDS Policy Brief, 21 May 2025 (https://csds.vub.be/publication/caught-in-the-us-china-crossfire-to-protect-itself-europe-must-call-a-critical-raw-material-emergency/).

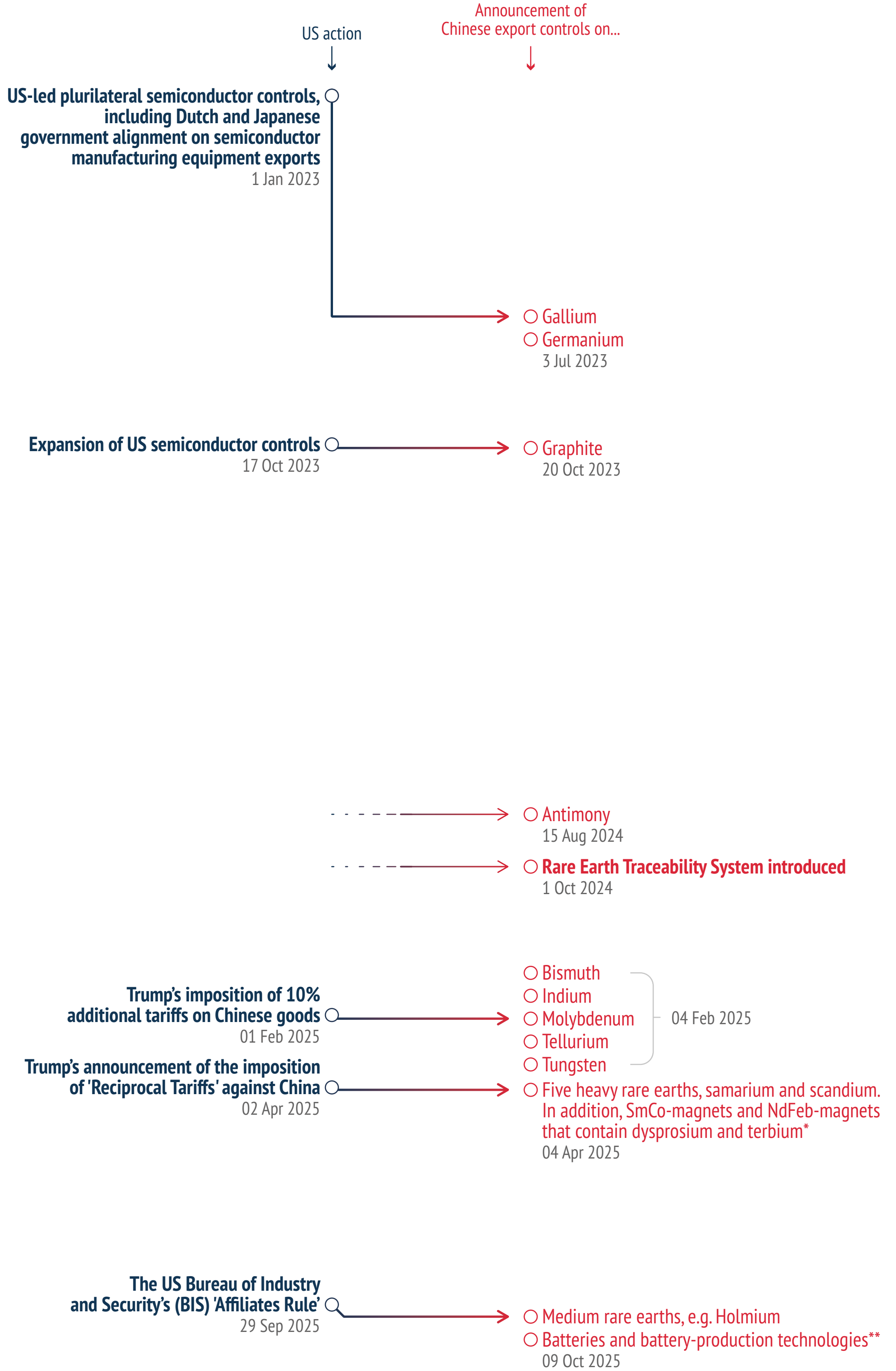
(30) Following the US-Japan-Netherlands announcement on the expansion of controls on lithography system exports to China in June 2023, Beijing imposed export controls on gallium and germanium.

(31) Ministry of Commerce of the PRC, 'Announcement No. 18 of 2025 of the Ministry of Commerce and the General Administration of Customs announcing the decision to implement export control on some medium and heavy rare earth related items' [translated from Chinese], 4 April 2025 (https://english.mofcom.gov.cn/Policies/AnnouncementsOrders/art/2025/art_0dd87cbee7b045bf93fabe6ab2faceee.html).

(32) Ministry of Commerce of the PRC, 'Announcement No. 57 of 2025 by the Ministry of Commerce and the General Administration of Customs', [translated from Chinese], 9 October 2025 (https://www.mofcom.gov.cn/zwgk/zcfb/art/2025/art_59ec4f6bec0b459aa4a30c4bbd0a41c1.html); Ministry of Commerce, 'Announcement No. 61 of 2025', 9 October 2025 (https://www.mofcom.gov.cn/zwgk/zcfb/art/2025/art_7fc9bff0fb4546ecb02f66ee77d0e5f6.html).

FIGURE 9 | **US-China action-reaction cycle**

But why does Beijing squeeze material supply to Europe?



* And other components containing these rare earths. SmCo stands for samarium-cobalt and NdFeb for neodymium-iron-boron. ** Postponed until November 2026 following Trump-Xi meeting in Busan on 30 October 2025.

Data: Ministry of Commerce of the People's Republic of China; The White House, U.S. Department of Commerce chains[33]. Beijing's 2026 Catalogue of Dual-Use Items and Technologies Subject to Import and Export Licensing includes a wide range of semiconductor wafers, chemicals and other industrial enablers[34]. The inclusion of these vital components underlines that 'mere' reshoring or friend-shoring of mining and refining of critical raw materials will not be sufficient to protect European and partner value chains from China's supply chain weaponisation.

In addition, the Ministry of Commerce has expanded its enforcement approach to clamp down on unlicensed exports and deter circumvention by public reporting of violations. The Office of the National Export Control Coordination Mechanism, the Ministries of Commerce, Public Security and State Security, and many other Chinese government bodies, launched a 'special operation' to prevent unlicensed exports of the ten controlled strategic materials. The aim is to counter the constant innovation of 'overseas entities' and 'domestic criminals' [...] smuggling methods', including 'transhipment via third countries'[35]. There is more to come: following the establishment of the 'joint enforcement coordination centre for export control on dual-use items', a MOFCOM spokesperson announced it would publish 'judicial cases' and add 'illegal foreign entities to export control lists'[36].

Beijing has improved the precision and effectiveness with which it can use the critical raw material weapon too, by investing in supply chain intelligence. For example, half a year before it imposed the first round of rare earth export controls, the Chinese government launched the Rare Earth Traceability System on 1 October 2024. This system already obliged rare earth miners, refiners and exporters to carefully map their sales, even before Beijing introduced rare earth export controls.

Finally, Beijing's (currently suspended) 9 October 2025 controls will significantly expand the reach of China's critical raw material weapon. Under these controls, Beijing would require licences for five additional medium rare earths. But, most importantly, they would provide the Chinese government with extraterritorial legal tools to weaponise trade in heavy and medium rare earths, samarium and related components between third countries. These extraterritorial controls apply even if 'items [...] that originated in China' account for '0.1% or more' of the value of the product *or* if the product was produced with the help of just one machine 'originating in China' at any supply chain stage[37].

At a minimum, this rule allows China's Ministry of Commerce to block exports to Europe of a permanent magnet produced in Japan, even if manufactured with exclusively Malaysia-refined and Australia-mined rare earths, provided that just one player in the supply chain used a single China-origin machine. However, in private meetings with European companies and industry representatives in Beijing, MOFCOM's

(33) Ministry of Commerce of the PRC, 'Announcement No. 58 of 2025', 9 October 2025 (https://www.mofcom.gov.cn/zwgk/zcfb/art/2025/art_79646f0161564975a938fe00fee158d5.html).

(34) *Chinese Catalogue of Technologies Prohibited or Restricted from Export [July 2025]*, op.cit.

(35) Ministry of Commerce of the PRC, 'The Office of the National Export Control Coordination Mechanism launches a special campaign to combat the smuggling of strategic minerals', [translated from Chinese], 9 May 2025 (https://www.mofcom.gov.cn/zwgk/jgdt/art/2025/art_2f8636687d014b2c84384628b01ab410.html).

(36) 'Chinese authorities to roll out more measures to combat smuggling, illegal export of strategic minerals as situation remains severe: MOFCOM', *Global Times*, 24 July 2025 (https://www.globaltimes.cn/page/202507/1339176.shtml).

(37) 'Announcement No. 61 of 2025', op.cit.

representatives have not confirmed that the 9 October controls (once active) will only apply to immediate components (e.g., the permanent magnet). Under a more expansive interpretation, the controls would even allow Beijing to block the export of end-products between third countries[38]. For example, shipping a Volkswagen car from the EU to the United States would require an export licence from Beijing, if the vehicle contained a magnet produced using even a trace of Chinese rare earths or a single China-origin machine. More dangerously, if Beijing imposes controls based on this broader interpretation, then they could block shipments of European drones (and other weapon systems) to Ukraine. This would make Beijing the regulator of large swathes of global trade (given that rare earths are ubiquitous in the global economy), strengthening China's ability to massively disrupt foreign industries. The resultant ambiguity – whether MOFCOM will implement the 9 October export control regime, and whether in a narrow or broad form – again provides China with a powerful bargaining chip.

Ambiguity about implementing the 9 October controls provides Beijing with a powerful bargaining chip.

Under the 9 October controls, the IEA projects that USD 6.5 trillion in downstream non-Chinese economic production per year would be at risk, including 1.5 trillion each in both the EU and US[39]. Even though suspended, Beijing has indicated that it will use the one-year postponement of its 9 October controls to 'study and refine specific implementation plans'[40].

CONCLUSION

Taken together, the measures imposed by China between 2023 and late 2025 have squarely targeted a wide range of essential European and partner industries: In a November 2025 EUCCC survey, 68% of European companies active in China 'report their overseas production facilities rely on inputs from China that are or will be subject to China's export controls'[41]. In reality, Europe's exposure is far greater: China's gallium, germanium and rare earths are essential for the production of general-purpose components, namely permanent magnets, semiconductors and fibre optic cables, which are used across all sectors (see chapter 1).

Yet Beijing's deployment of the critical raw material weapon failed to trigger adequate de-risking responses among politicians and policymakers in Europe and partner countries. Beijing incrementally rolled out these export controls and traceability systems, often without reducing supply immediately. Furthermore, the controls cover highly complicated, technical and opaque industrial

(38) Online roundtable on Chinese export controls under the Chatham House Rule in April 2026.

(39) *Rare Earth Elements: Pathways to secure and diversified supply chains,* op.cit.

(40) 'Xinhua: China and the United States reach consensus to suspend implementation of Section 301 measures for one year', Xinde Marine News, 30 October 2025 (https://www.xindemarinenews.com/en/worldreview/2025/1030/61864.html).

(41) On the December EUCCC survey's methodology, it is important to note the following: 'The first question asked, "Which Chinese export controls have you been impacted by or expect to be impacted by?". For members that responded "none" (56 out of 131), the survey immediately ended with no further questions asked. Of the remaining 75 companies, 53 finished the survey and 22 answered some but not all of the following questions. Unless otherwise stated, all percentages […] relate only to those that indicated that they already had been or expected to be impacted by China's export controls, i.e., those that responded "none" to the first question have been excluded from the sample size the percentages pertain to.' EUCCC,'Flash survey on China's export controls', op.cit.

ecosystems, which are difficult for politicians and generalist policymakers to understand. This left the militaries, medical systems, and industries of Europe and partner countries totally exposed when Beijing finally fired its critical raw material weapon.

CHAPTER 3

THE EFFECTS OF BEIJING USING THE CRITICAL RAW MATERIAL WEAPON

Events in 2025 and early 2026 confirmed that the critical raw material weapon has finally provided President Xi with his ‘assassin’s mace’: a multi-purpose geo-economic tool comprising:

1. economic and military intelligence gathering;
2. coercion;
3. the erosion of competitors’ economic and military capabilities; and
4. a shield to deter the US, European countries and others from acting against China’s core interests.

Following the tariffs and technology controls introduced under Trump 2.0, Beijing sharply reduced supply of a wide variety of materials to almost all countries. Later in 2025 and early 2026 China’s exports increased but remained well below pre-control levels for most materials (see Figure 10)[1]. Beijing’s use of the critical raw material weapon produced eight effects, all beneficial to China but detrimental to European interests (see Figure 11)[2]. Below follows a summary of the damage, at least as far as publicly revealed or privately communicated to the EUISS, to Europe and its partner countries.

China’s use of its critical raw material leverage contributes to Beijing’s core objectives: achieving industrial and technological self-sufficiency (while deepening the rest of the world’s dependence on China), and sustaining economic development through below market-price exports. The 15th Five-Year Plan warns that ‘strategic opportunities coexist with risks and challenges, with increasing unpredictability’. It reiterates the imperative to strengthen technological and industrial self-reliance (‘accelerate breakthroughs [and] the construction of a manufacturing powerhouse’) while also emphasising the need to increase supply chain leverage (‘enhance advantages in rare earths’)[3].

(1) However, one expert interviewee raised doubts about the accuracy of China’s export statistics. Their structured comparison of China's export statistics and Eurostat import statistics on gallium and germanium supply from China to Europe in 2025 revealed ‘irreconcilable differences’.

(2) The EUISS published a preliminary version of this typology in October 2025. See: Teer, J., ‘Beyond Trump: Xi’s price wars and weaponisation of critical raw materials threaten European prosperity’, Commentary, European Union Institute for Security Studies (EUISS), 9 October 2025 (https://www.iss.europa.eu/publications/commentary/beyond-trump-xis-price-wars-and-weaponisation-critical-raw-materials).

(3) ‘Authorised release from the Two Sessions: Outline of the 15th Five-Year Plan for National Economic and Social Development of the People’s Republic of China’, [translated from Chinese], op.cit.

Furthermore, the 2025 National Security White Paper reelevates development as a top priority for the Chinese Communist Party (CCP)[(4)]. China's dual circulation strategy dictates that domestic demand should sustain most of China's manufacturing might and economic growth, merely complemented by international consumption[(5)]. However, China grapples with structurally weak domestic consumption. This makes the country's development dependent on expanding exports of below market-price products. The critical raw material weapon provides Beijing with a comprehensive tool to pursue both objectives.

ONE CRITICAL RAW MATERIAL WEAPON: EIGHT OUTCOMES BENEFICIAL TO BEIJING

First, even before reducing supply, export licensing regimes and the 'rare earth traceability system' already serve as **a spy glass** for economic and military intelligence gathering. To greenlight exports, Beijing demands detailed information from material exporters, importers and (on occasion) even downstream (end-) users about their product and production process, and the identities of (in) direct customers.[(6)] In a survey conducted by the EU Chamber of Commerce in China (EUCCC) in November 2025, 11% of European companies express concern 'over having to disclose information about sensitive intellectual property'. 20% found that Beijing's Ministry of Commerce requires an 'excessive amount of information'[(7)]. Already in June 2025, 'dozens of companies in Europe and North America' described the process as '"highly invasive"'. They cited requirements to 'submit detailed production data, end-use applications, facility images, customer names, and transaction histories'[(8)]. In some cases, Beijing demands photographs (and even drawings) of sensitive components, including drone motors[(9)]. For some companies, failure to provide such material resulted in licence denials[(10)].

The opaqueness of MOFCOM's licensing process provides foreign companies with a powerful incentive to oversupply information, however sensitive. In the same EUCCC survey, 39% of European companies report 'a lack of transparency' in MOFCOM's licensing approval process, and 21% said 'application requirements lack clarity'[(11)]. Companies have complained to the EUISS that MOFCOM is a black box that constantly leaves their licence requests in 'pending' status,

(4) The paper states that China's 'primary task' is 'advancing high quality development'. State Council Information Office, 'White Paper on China's National Security in the New Era', Beijing, May 2025 (http://www.mod.gov.cn/gfbw/fgwx/bps/16385614.html).

(5) Xi Jinping, 'Certain Major Issues for Our National Medium- to Long-Term Economic and Social Development Strategy', op.cit., p. 3.

(6) Online roundtable on Chinese export controls under the Chatham House Rule in April 2026.

(7) 'Flash survey on China's export controls', op.cit.

(8) Kurtenbach, E. and Weissert, W., 'Deal with Beijing will speed China's export of minerals to the US, treasury secretary says', Associated Press, 27 June 2025 (https://apnews.com/article/china-trade-earths-tariffs-trump-463ae8d6ccba15b56c7d4d31d3fc42a1).

(9) 'China is choking supply of critical minerals to Western defense companies', op.cit.

(10) 'Deal with Beijing will speed China's export of minerals to the US, treasury secretary says', op.cit.

(11) 'Flash survey on China's export controls', op.cit.

without clear timelines for approval or rejection by the Ministry of Commerce[12]. The stakes of the Chinese government gleaning information through licensing requirements are high. Europe's most strategic tech companies, as well as emerging ones with high potential, depend on Chinese licences: ASML uses China-supplied permanent magnets in its lithography systems; photonics companies rely on the use of indium and gallium for their innovations; and quantum computing, modern radar technology and guided missile systems all depend on Chinese supply of gallium.

China's export controls help Beijing map defence production supply networks in Europe and elsewhere.

China's intrusive information requests complement its broader, longstanding efforts to overcome 'technological bottlenecks' in dual-use technologies: the ongoing expansion of its online and offline economic espionage campaigns, and its widespread use of joint venture and local content requirements. Obtaining product 'recipes' through licence requirements risks helping China close the military-technological gap. Beijing can share the information it gleans with Moscow. After all, Chinese-Russian cooperation on the development of dual-use technologies continues to deepen[13].

China's export controls also help Beijing map defence production supply networks in Europe and other countries. Receiving a licence is often contingent on importers of Chinese materials disclosing their customers, including defence firms[14]. Likewise, exporters need to detail the transport mode (sea, air, land) and route. Providing insufficient 'documentation of their end users' often results in denials[15]. This comes at a time of rapidly expanding Chinese intrusion into critical infrastructure in Europe and elsewhere, giving Beijing the means to commit sabotage at a later point[16]. Beijing's mapping of sensitive defence industry networks provides it with the means to disrupt them with greater precision – whether through cyber or physical sabotage, or additional export restrictions – in the future.

China's current export controls already provide it with clues as to where the weak links are in Europe's defence supply chains. To continue receiving shipments, the EU regularly flags its most urgent deliveries to China through an online 'license monitoring system' that 'allows companies to register licence requests, track customs clearance and report any issues encountered during the process'[17]. This well-intentioned mechanism, designed to safeguard access to Chinese raw materials, risks identifying the companies that the EU deems particularly strategic or vulnerable.

(12) Interviews with European industry throughout 2025.

(13) Cook, C., Clover, C., Langley, W. and Ko, H., 'Chinese parts supplier takes stake in leading Russian drone maker', *Financial Times*, 29 November 2025 (https://www.ft.com/content/e907c2fa-2d3b-4269-bc6c-b2fee4d9f688).

(14) 'China is choking supply of critical minerals to Western defense companies' op.cit.

(15) 'Deal with Beijing will speed China's export of minerals to the US, treasury secretary says', op.cit.

(16) General Intelligence and Security Service (AIVD), *AIVD Annual Report 2023*, Ministry of the Interior and Kingdom Relations, The Hague, 25 June 2024 (https://english.aivd.nl/documents/2024/06/26/aivd-annual-report-2023); 'Chinese hackers are getting bigger, better and stealthier', *The Economist*, 25 March 2025 (https://www.economist.com/china/2025/03/25/chinese-hackers-are-getting-bigger-better-and-stealthier).

(17) 'Flash survey on China's export controls', op.cit.

Second, before, during and after a supply squeeze, China's licensing requirements function as **a crowbar**. China dangles the prospect of 'general licences', and fast-tracking licence approvals to extract concessions in other policy areas. For example, Beijing sought to achieve even more asymmetric access to the European Single Market in the lead-up to the EU-China Summit in July 2025. The EU-side intended the summit to focus on China's state-supported competition and dual-use support for Russia. But with the prospect of far-reaching industrial disruption through rare earth shortages hanging over the meeting, critical raw materials supply became the key topic[18]. Beijing pushed for the reversal of the EU's countervailing duties on EVs, including in meetings beyond the summit, despite these measures only being imposed after extensive investigations into China's state support for EVs. European companies' dependence on licences (even among the very few holding one-year general licences) gives the Chinese side constant opportunities to seek commercial concessions too.

Similarly, the prospect of licence denials looms over both EU-level and bilateral negotiations on other trade and technology issues, including with the Netherlands. China has sought access to the more advanced ASML-semiconductor manufacturing equipment, exports of which the Dutch government restricts[19]. Following a trip to China in December 2025, President Macron referred to the 'mutual dismantling of our aggressive policies', meaning Beijing's critical raw material controls and the Netherlands' ASML-systems[20].

When it comes to maintaining and securing even greater access to advanced technologies, China has used the crowbar even more successfully against the United States. China forced the Trump administration to lower its 'Liberation Day' tariffs. More broadly, partly by playing the rare earth card, Beijing achieved a radical break in US technology transfer restriction policy: the Trump administration moved away from an approximately eight-year national security-focused policy aimed at 'maintain[ing] as large a lead as possible' in foundational technologies *vis-à-vis* Beijing, towards a much more transactional form of G2-bargaining over high-tech access[21].

Third, China's supply squeeze has functioned as **a production disruptor** for European and other industries. Lack of access to these materials forced European and US carmakers and other manufacturers to draw on their inventories and even halt production throughout the summer of 2025. The impact was likely far more widespread: an EUCCC November survey showed that 60% of EUCCC member companies 'expect "moderate" or "significant" disruptions to their supply chains'. Another 13% expected 'production stoppages or slowdowns, [...] once all of China's announced export control measures have been implemented'. Cases of severe disruption have already emerged. One firm expected

(18) Beijing's conclusion that 'what needs "rebalancing" is not China-EU economic ties per se, but the EU's mindset' underlines China's complete dismissal of European priorities. Ministry of Foreign Affairs, 'Foreign Ministry spokesperson Mao Ning's regular press conference on July 9, 2025', 9 July 2025 (https://www.mfa.gov.cn/mfa_eng/xw/fyrbt/lxjzh/202507/t20250709_11668073.html).

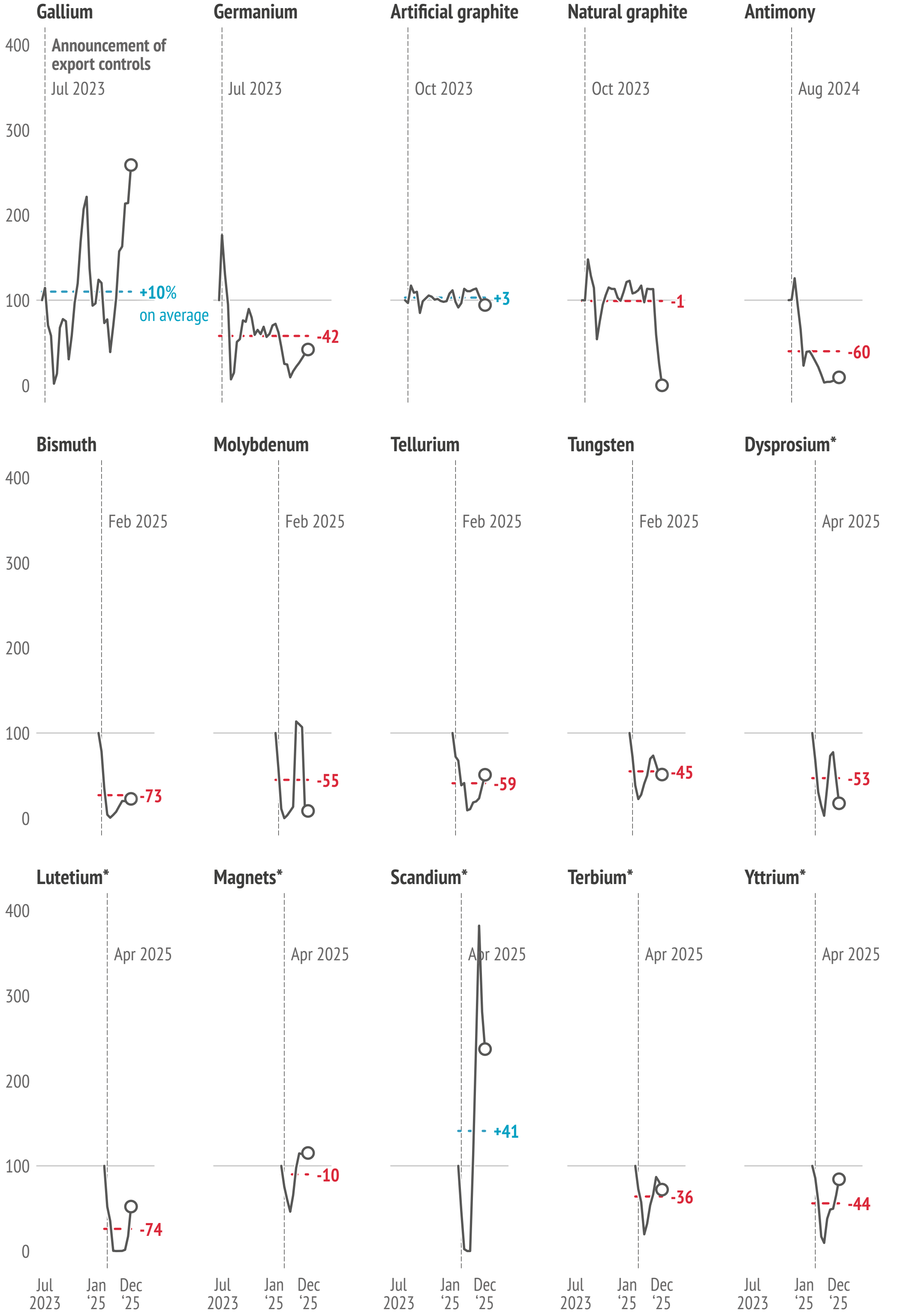
(19) Gusbeth, S., Heide, D. and Hanke Vela, J., 'China nutzt Rohstoffe als Verhandlungswaffe gegen die EU', *Handelsblatt*, 20 June 2025 (https://www.handelsblatt.com/politik/handelskrieg-china-nutzt-rohstoffe-als-verhandlungswaffe-gegen-die-eu/100135834.html).

(20) Nicholson, T., 'European industry faces "life or death," Macron says – and China needs to help', *Politico*, 7 December 2025 (https://www.politico.eu/article/europe-china-emmanuel-macron-foreign-investment-trade/).

(21) Teer, J., 'Tech war 2.0: The dangers of Trump's 'G2' bargaining with an emboldened China,' Brief No. 30, EUISS, 16 December 2025 (https://www.iss.europa.eu/publications/briefs/tech-war-20-dangers-trumps-g2-bargaining-emboldened-china).

FIGURE 10 | **Beijing sharply reduced exports for most materials**

Before again supplying them at lower (and strictly controlled) volumes, Jun 2023-Dec 2025



* Dysprosium, lutetium, terbium, and yttrium are heavy rare earths. Scandium is a rare earth.

Data: Data analysis by Sinolytics, based on General Administration of Customs of the People's Republic of China (GACC) data

China's existing controls to cost it '20% gross global revenue' in 2025, while another projected losses exceeding €250 million[22]. An EUCCC survey conducted in October provides clues about how severe China's rare earth squeeze actually was throughout mid-2025: it caused seven production stoppages in August, with another 46 projected for September of 2025. The survey also showed that, as of early September – five months after controls took effect – Beijing had only approved 19 out of 141 rare earth licence requests.

In all cases, the controls extended delivery times. 6% of EUCCC member companies experienced added delays of less than a month, 34% of one or two months, and 40% of 'more than two months'. Beijing therefore by and large does not adhere to its 45-day licensing processing timeframe: For 40% of surveyed companies, processing took longer, while '42% reported additional delays' for 'customs clearance'[23]. This limited account of disruptions throughout 2025 almost certainly understates the true impact. Information on disruptions often circulates through informal industry channels and reaches the public domain only after several months. Moreover, companies have a strong incentive to underreport disruptions. Many insisted on speaking to the EUISS strictly off-the-record, given their need to maintain relations with the Chinese government, including to obtain future licences. Public disclosure of production disruptions can also affect stock prices and sales.

China's supply squeeze has also driven up material prices abroad, providing Chinese manufacturers with another advantage. For example, dysprosium and terbium prices were four times higher in Europe than in China over 2025, with the gap continuing to widen[24]. By degrading the cost-competitiveness of global rivals, China thus clears the way for its own industries to export even more.

Fourth, by creating raw material scarcity abroad Beijing produces a **fish trap**-effect. Beijing denies licences to traders and importers suspected of building stockpiles. Even the few ('dozens') European companies whose China-based suppliers have received 'general licences' face constraints that inhibit inventory building[25]. MOFCOM strictly limits annual exports to no more than the average volumes shipped over the previous three years, ostensibly to prevent stockpiling and re-exports (including to military end-users). In addition, MOFCOM obliges these foreign companies to limit imports to no more than 25% of the permitted annual volume per quarter. In other words, a European company holding a general licence could import no more than 3000 kg of permanent magnets in 2026 (capped at 750 kg per quarter), if it had imported 9000 kg annually in 2023, 2024 and 2025[26]. But the potential effects are far greater: curtailing supplies to past volumes risks making it impossible for high-growth industries to scale production using China-controlled materials anywhere other than inside China.

(22) 'Flash survey on China's export controls', op.cit.

(23) Unpublished October 2025 EUCCC-survey

(24) Ingall, G. and Mukherjee, N., 'Ex-China rare earths premium to grow, especially for heavies', Benchmark Minerals, [n.d.] (https://source.benchmarkminerals.com/article/ex-china-rare-earths-premium-to-grow-especially-for-heavies).).

(25) According to insider sources, originally the Chinese government indicated that far more European industries (approximately '80%') would be covered by 'general licences'. See: Teer, J., 'False sense of security: European complacency on rare earths is the wrong answer to the US-China trade truce', Commentary, EUISS, 27 November 2025 (https://www.iss.europa.eu/publications/commentary/false-sense-security-european-complacency-rare-earths-wrong-answer-us-china).

(26) Online roundtable taking place under the Chatham House Rule in April 2026.

To avoid production shortfalls, some foreign industries are considering offshoring even more production to China, including of higher value-added components and related end-products. A survey conducted by EUCCC in December found that 11% of its member companies intend to 'produce more in China using existing capacity, […] while 4% plan to invest in new production capacity in the country' because of China's export controls[27]. For example, soon after China introduced the 4 April 2025 rare earth controls, US carmakers warned the Trump administration that Beijing's controls would undermine US reindustrialisation goals pursued through 'Liberation Day' tariffs. The automobile industry informed the White House that China's actions might force them to offshore additional production to China. The reason is that Beijing still allows firms operating in China to export complete engines (or vehicles) without a licence, unlike permanent magnets[28]. European carmakers like BMW, Mercedes, and Volkswagen face similar pressures to expand production in China. In short, raw material scarcity helps Beijing attract higher economic value-added production to China.

Raw material scarcity helps Beijing attract higher economic value-added production to China.

More dangerously, critical raw material scarcity may make European militaries, healthcare systems, energy grids, and other critical state functions more reliant on China-produced connected components. Dependence on China for production of pacemakers, 5G-networks, wind turbines, and other connected end-products carries greater risks. Once a permanent magnet – an unconnected component – arrives in Europe, European producers can use it for the entire multi-decade lifecycle of the product. Connected products like wind turbines, on the other hand, require ongoing servicing, including software updates and spare parts, often over their entire lifespan. The challenge goes beyond whether an individual Chinese supplier can be trusted: Chinese firms have an obligation to support state objectives, as part of the 2017 National Intelligence Law.

Fifth, China's critical raw material weapon will likely degrade the capabilities of Beijing's rivals in the military realm (even more so than in civilian industries). Throughout 2025 and 2026, Beijing effectively tried to pull **a rug** from under Europe's and Japan's rearmament efforts, as well as US efforts to expand the defence industrial base. Crucially, Beijing has categorically refused to grant European and partner importers any licences for military end-use. While Beijing may have postponed its explicit 9 October 2025 ban on rare earth exports for military end-use for twelve months (as part of the Xi-Trump Busan *détente*), it appears to have continued to deny all critical material export licence requests for military end-use in line with MOFCOM's early pronouncements. To combat smuggling, China's Office of the National Export Control Coordination Mechanism proposed issuing guidelines for 'export companies to conduct thorough due diligence to strictly prevent related materials

(27) 'Flash survey on China's export controls', op.cit.

(28) McLain, S. and Felton, R., 'Automakers race to find workaround to China's stranglehold on rare-earth magnets', *The Wall Street Journal*, 4 June 2025 (https://www.wsj.com/business/autos/car-companies-production-rare-earth-shortage-aaf87ad2).

FIGURE 11 | **Being's critical raw material weapon**

A multi-purpose geo-economic trump card

Spy glass

1

Intelligence gathering

Export licence information requirements and other legal measures like 'traceability systems' serve as a tool for economic and military intelligence gathering.

Example

Chinese supplier (and/or foreign importer and downstream users) must provide information

a. that reveals product recipes.
b. on the production site or even the product (e.g., pictures), including of dual-use components (e.g., drone motors).
c. on the transport mode (sea, air, land) and route.
d. and on the identity of product end-users, especially defence-industrial networks.

Contribution to China's long-term goals

Improving competitiveness of Chinese industry; Reducing reliance on EU and other foreign producers; Enhancing intelligence capabilities to disrupt foreign (defence) industries more effectively; Tilting military balance of power in China's favour.

Crowbar

2

Coercion

Beijing links (volumes of) supply to other issues, in order to extract concessions.

Example

In the lead-up to the July 2025 EU-China Summit, Beijing dangled prospect of resuming the supply of materials ('green lists') to obtain the removal of EV-import duties, and the lifting of export restrictions on semiconductor manufacturing equipment (e.g., ASML systems).

Contribution to China's long-term goals

Gaining even more market access and removing tech controls to bolster economic growth and techno-industrial self-reliance in China.

Production disruptor

3

Corrosion

Beijing's supply cuts disrupt foreign firms' operations, increase their production costs, and result in supply delays.

Example

Through supply cuts Beijing has driven up the costs of materials, forced European companies (e.g., in the automotive industry) to eat into inventories and in some cases even to decrease or halt production. EU companies face high material costs, while prices remain low in China.

Contribution to China's long-term goals

Weakening European competitor industries to bolster economic growth, employment, technological progress, and industrial self-reliance in China. Weakening rivals' defence-industrial sub-base.

Fish trap

4

Corrosion

By creating scarcity abroad, Beijing inhibits stockpiling and incentivises foreign companies to offshore even more production to China.

Example

Whereas Beijing curtails licences to export materials or components (e.g., permanent magnets), European industries can still ship more advanced semi-finished products (e.g., engines) or full-end products (e.g., cars) from China without a licence. Producers of more critical, connected goods - such as medical equipment and wind turbines - face similar pressure to expand production in China.

Contribution to China's long-term goals

Deepening European industrial dependence on China; Making European state functions more dependent on China-produced connected products (e.g., transformer blocks and wind turbines) including long-term servicing and spare parts.

5 Rug

Corrosion

By trying to eliminate supply to US, European and other military end-users entirely, Beijing undermines the (re)armament of Europe, Japan, the United States and other partners.

Example

Export licences for materials and component exports to military-end users in Europe, the US and other countries have been categorically denied. Beijing threatens to cut off raw material sales to European and partner industries that produce dual-use components for military end-users too.

Contribution to China's long-term goals

Weakening European and American deterrence against Chinese and Russian aggression in East Asia and Eastern Europe; Aggravating existing (USD30bn+) backlog in US (and allied) arms transfers to Taiwan.

6 Innovation decelerator

Corrosion

By limiting supply of materials and components, Beijing introduces new constraints on the innovation capabilities of research institutes and firms abroad.

Example

Shortages of indium, germanium and gallium and other materials constrain innovation in AI, quantum computing, photonics, semiconductors, and other technologies. China-induced supply uncertainty incentivises European, American and other R&D departments to prioritise material availability in their innovations, instead of (solely) maximising efficiency.

Contribution to China's long-term goals

Maintaining/achieving an economic and military-technological edge; Improving competitiveness; Tilting the balance of industrial and military power in China's favour in East Asia.

7 Wedge

Corrosion

By limiting supply of materials and components, Beijing may aggravate diplomatic, economic, trade and technological disputes between the EU, US, Japan and other parties.

Example

Ahead of the July 2025 EU-China Summit, Beijing forbade European reexports of controlled items to the US. European industries risk being cut off entirely from Chinese supply, if they do tranship. Reportedly, US firms may have secured greater access to Beijing's controlled materials, than Europe's. US and Japanese stockpiles and (a share of) state-sponsored raw material production will supply American and Japanese industries (almost) exclusively at first.

Contribution to China's long-term goals

Disrupting the transatlantic (defence-)industrial base; Weakening G7-alignment on de-risking from China.

8 Shield

Deterrence

By showcasing the effects of curtailing critical raw material (and other) exports, Beijing strengthens its economic deterrence.

Example

Beijing prevented a vast expansion of US-led controls on ASML exports to China; Seeks to deter its trading partners from closing off their markets and de-risking supply chains (e.g., US-EU Trade Deal, US-UK Trade Deal, US-NSS); and imposes economic punishment on Japan for its commitment to Taiwan's defence.

Contribution to China's long-term goals

Overcoming technological bottlenecks by maintaining access to EU technology; Preventing market protections against China's predatory economic policies; Disincentivising military and economic intervention against Chinese aggression in East Asia (e.g., against Taiwan).

from being used by military end-users or for military purposes'[(29)]. European and partner industries producing semiconductor wafers or other components risk being entirely cut off too if Western defence industries use just a fraction of their total production.

Anecdotal evidence of defence production disruptions in Europe exists, but emerges only slowly from a highly secretive industry. Rheinmetall's CEO has indicated that supply chain issues have become the main constraint on his company's ambitions to drive European rearmament. The company holds rare earth stockpiles sufficient for about a year. Yet he insists on receiving weekly updates on rare earth supply[(30)]. The CEO of Leonardo DRS, a US subsidiary of a large Italian defence company, warned during the summer of 2025 that his company had eaten into 'its safety stock' of germanium, and cautioned that production disruptions could occur in the second half of the year if supply did not improve. Drone manufacturers and other newly established companies are likely even more vulnerable. Reportedly, they lack the stockpiles of magnets held by their longer-established competitors[(31)]. Finally, defence industries have strong additional incentives to underreport disruptions. European arms manufacturers are in competition with global rivals to win new projects (especially amidst the surge in Europe's defence spending), while also seeking to maintain their stock price, and avoid undermining European deterrence.

Through these *de facto* export bans for military end-use Beijing tilts the balance of defence production in Europe and the US even further in Russia and China's favour. This is particularly concerning at a time of Russian incursions into NATO airspace and following statements by China's foreign minister, Wang Yi, indicating that China does not want to see Russia lose the war in Ukraine[(32)]. Furthermore, Beijing's export squeeze is also likely to exacerbate weapon system and ammunition supply backlogs to Taiwan[(33)]. By contrast, Beijing's production proceeds largely unimpeded: China is expanding its invasion and blockade simulations around Taiwan and rapidly commissioning the naval platforms and missile systems on which it would rely if it sought to take the island republic by force.

Sixth, China's critical raw material controls act as an **innovation decelerator**, constraining EU and partner innovation in both the economic and military realms. Civil-military innovation is key for the EU to maintain deterrence *vis-à-vis* Russia, as it can help overcome the Kremlin's advantages in manpower. Likewise, leadership in robotics, AI, photonics, and quantum will help the US and its East Asian allies to sustain deterrence against China in East Asia. Europe's commercial success (including that of ASML) in cutting-edge technologies is increasingly predicated on out-innovating Chinese competitors in indispensable, but niche capabilities.

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(29) This office convened national and regional authorities on 19 July 2025. See: 'Chinese authorities to roll out more measures to combat smuggling, illegal export of strategic minerals as situation remains severe: MOFCOM', op.cit.

(30) 'Netflix, Warner Bros. begin deal talks, EU's plan for frozen Russian assets | The Opening Trade 12/5', Bloomberg Television, 5 December 2025 (from 1:31:00) (https://youtu.be/Zy1GQJfSHWk).

(31) 'China is choking supply of critical minerals to Western defense companies', op.cit.

(32) Bermingham, F., 'China tells EU it cannot afford Russian loss in Ukraine war, sources say', *South China Morning Post*, 4 July 2025 (https://www.scmp.com/news/china/diplomacy/article/3316875/china-tells-eu-it-cannot-afford-russian-loss-ukraine-war-sources-say).

(33) 'Taiwan arms sale backlog: January 2026 update', op.cit.

Beijing's export controls threaten the EU's ability to optimise efficiency in disruptive technologies. Reduced access to a wide variety of inputs limits experimental pathways in frontier research, especially in emerging electronics. Access to a lesser variety of materials results in performance compromises in semiconductors, quantum computing, radar systems, and other strategic technologies (see chapter 1). One industry source noted that European and other semiconductor manufacturers increasingly consider material availability when designing new products, rather than focusing solely on maximising efficiency (often measured in computing power)[34]. As a result, Chinese – and by extension Russian – producers do not face these constraints.

Seventh, the critical raw material scarcity that China creates may also become **a wedge** in the transatlantic alliance and within the G7 more broadly. China has forbidden reexports of controlled materials to the US, which risks putting European governments in President Trump's crosshairs. Europe and the US still depend on a highly interconnected defence industrial base (including the manufacturing of key components on both sides of the Atlantic). This provides both parties with a strong incentive to ensure each other's access to sufficient critical materials. Obtaining rare earths and permanent magnets (also from US allies) has long been a priority issue for President Trump personally, but especially in the lead-up to the contentious and high-stakes Hague Summit. At moments of great scarcity (for example because of the Iran War), Washington could demand that European allies tranship magnets, for instance to produce guided ammunitions. Europe might agree out of self-interest: the continent depends on US weapon systems for its security (and continues to order these in great numbers). But European capitals and companies might also reject such requests out of fear that Beijing might cut them off entirely. Refusing reexports would put additional strain on transatlantic relations.

Another risk is that the US, EU and other players could compromise the level playing field between their manufacturers by pushing for preferential access to China-controlled materials individually. The day after the Xi-Trump Busan Summit, Beijing confirmed to the EU that its general licence scheme and other 'relaxations' of supply restrictions would also apply to Europe. However, it remains unclear whether Beijing applies consistent licence approval rates across countries. Early reporting indicates that US firms have faced significantly shorter delays in importing materials, including the heavy rare earth erbium, from China than their European counterparts following the Busan summit[35]. In ongoing licence negotiations, Beijing can reward countries that act in accordance with China's 'core interests' while penalising others. European, American, Japanese and other mid- and downstream industries, for example car producers, are often direct competitors. Disruptions affecting industries in even a single country risk eroding the level playing field between them, and sowing further discord within the G7. An outcome in which the US receives more licences than its partners would be especially awkward, given that Beijing's controls were initially responses to export

[34] Product development and fine-tuning take place roughly five-to-eight years prior to large-scale production. Interview with a semiconductor industry source.

[35] In fact, Noble Elements, a European-based materials trader, warns that selling 'a ton of terbium' to Europe takes about 'three to four weeks' and to the US 'three to four days'. Alviz, L. and Leonard, J., 'US firms are snapping up the rare earths Europe needs to rearm', Bloomberg, 2 December 2025 (https://www.bloomberg.com/news/articles/2025-12-02/us-firms-are-snapping-up-the-rare-earths-europe-needs-to-rearm).

controls and tariffs imposed by successive US administrations.

Finally, the uneven pace at which European and partner countries adopt unilateral, bilateral or trilateral de-risking policies also risks undermining the level playing field among them. Examples include large-scale state-sponsored stockpiling, as well as grants, price floors, exclusive guaranteed offtake agreements and other forms of supply-side state support. For instance, the US government has launched Project Vault, a critical raw material stockpiling initiative 'to shield domestic manufacturers from supply shocks', backed by a direct loan of USD 10 billion from the Export-Import Bank of the United States (EXIM)[36]. During periods of China-induced scarcity, the build-up of large raw material inventories risks exacerbating shortages in the rest of the world. Project Vault comes on top of an expansion of the National Defense Stockpile (NDS) and Japan's government-led critical raw material stockpiling, while European governments do not hold inventories beyond a pilot project.

But even bringing (exclusive) de-risked supply online may distort competition between G7 partners. Lynas has pledged to provide 75% of its heavy rare earth output to Japanese industry[37]. Several US-sponsored projects aim to guarantee offtake for US defence producers first. As these projects are ultimately funded by taxpayers, they will likely not allow for European 'free-riding' (at least until larger-scale production comes online). Even though these stockpiling and state-supported policies have merit, China's raw material squeeze is sowing the seeds for future commercial disputes within the G7.

Eighth, China-controlled dependencies **shield** Beijing from efforts by its rivals to expand tech containment, protect themselves against a flood of Chinese below-market exports, and resist China's military pressure in East Asia. By showcasing the disruption caused by a sharp, albeit largely temporary, curtailment of supply, Beijing signals its capacity to inflict far greater industrial disruption in the future. For example, Beijing deterred a major US-led expansion of semiconductor export controls to China. From May to September 2025, additional restrictions on exports of ASML's semiconductor manufacturing equipment to China, including many older products, appeared 'imminent'[38]. These would also have covered the servicing and supply of spare parts, thereby taking offline semiconductor production already established in China, at least until domestic firms learn how to operate the equipment without ASML's support. After China reduced rare earth export volumes, the US government withdrew its plans.

The critical raw material weapon also facilitates Beijing in deterring its trading partners from protecting themselves against China's below-market price exports. Brussels is devising more policies to reduce its exposure to China's dependency-creating policies, while exploring joint approaches with Washington to achieve this objective. At least some representatives of the second Trump administration sought to build a tariff wall around China together with allies, while lowering tariffs between partner countries[39]. One of the goals set

(36) Office of the Spokesperson, US Department of State, '2026 Critical Minerals Ministerial', 4 February 2026 (https://www.state.gov/releases/office-of-the-spokesperson/2026/02/2026-critical-materials-ministerial).

(37) 'Lynas Rare Earths secures floor price in revised Japan supply deal', op.cit.

(38) Conversations with European industry representatives and policymakers.

(39) EUISS closed-door workshop on how to deal with Beijing's overcapacities, 2 April 2025.

out in the 2025 National Security Strategy is 'encouraging Europe to take action to combat mercantilist overcapacity, technological theft, cyber espionage, and other hostile economic practices'[40]. On 'steel, aluminium, and their derivative products', the EU-US trade deal highlights 'the possibility to cooperate on ring-fencing their respective domestic markets from overcapacity, while ensuring secure supply chains between each other, including through tariff-rate quota solutions'[41]. However, China's control over critical raw materials gives Beijing the means to impose severe costs on Europe and others for each measure taken to protect their prosperity.

China's raw material squeeze is sowing the seeds for future commercial disputes within the G7.

Similarly, Beijing has raised the costs for the US, European and other countries of protecting their security interests, especially in relation to Taiwan. By squeezing supply, Beijing appears to replicate Moscow's tactics. Throughout 2021, the year prior to its full-scale invasion of Ukraine, Russia drove up gas prices, giving a foretaste of the economic pain it could inflict. The aim was to raise the costs of any European economic sanctions, weapons supplies for Kiev, and other countermeasures taken against Russia in response to the invasion. In the lead-up to, or during, a military confrontation over Taiwan or in the East or South China Seas, Beijing would likely adopt a similar strategy, threatening to cut off materials and other critical supplies entirely. Through such threats, Beijing seeks to deter the US and its Asian allies from launching a military response and the EU from imposing economic sanctions against China.

Beijing's use of more extreme supply chain coercion to deter Japan's commitment to Taiwan's defence should serve as a stark warning. On 6 January, China imposed an export ban on all items on its dual-use list for 'Japanese military users, for military purposes, and for any other end-user purposes that could enhance Japan's military capabilities'[42]. Likewise, Beijing cut off supplies of germanium, gallium, terbium, and dysprosium to Japan entirely in January and February 2026. This will likely affect Europe's diversification strategy. For now, Japan is Europe's most promising non-China source of permanent magnet production, accounting for 4% of global production. But Tokyo is still only in the process of reducing its dependence on China for heavy rare earths. Likewise, Beijing's *de facto* gallium export ban against Japan risks halting Japan's essential production of gallium-arsenide wafers entirely once stockpiles run out (see chapter 1). Europe – the only other non-China producer of these essential inputs for the manufacture of many essential semiconductors – faces gallium supply constraints too, likely accelerating the growth of China's gallium-arsenide wafer market share. China's actions came in response to Prime Minister Takaichi's statement in November 2025 that Japan's Self-Defence Forces (SDF) could intervene militarily if China

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(40) The White House, *National Security Strategy*, Washington, DC, November 2025, p. 27 (https://www.whitehouse.gov/wp-content/uploads/2025/12/2025-National-Security-Strategy.pdf).

(41) European Commission, 'Joint statement on a United States–European Union framework on an agreement on reciprocal, fair and balanced trade', Brussels, 21 August 2025 (https://policy.trade.ec.europa.eu/news/joint-statement-united-states-european-union-framework-agreement-reciprocal-fair-and-balanced-trade-2025-08-21_en).

(42) Ministry of Commerce of the PRC, 'Announcement No. 1 of 2026: announcement on strengthening export controls on dual-use items to Japan', [translated from Chinese], 6 January 2026 (https://static.poder360.com.br/2026/01/commerce-dual-item.pdf).

were to invade, blockade, or use other forms of 'armed force' against Taiwan[43].

The potential impact of reducing exports of dual-use items beyond critical materials is equally dangerous: China's dual-use list covers over 800 items ranging from materials, to electronics, to sensors, to chemicals. As Japanese manufacturing is deeply integrated in global value chains, China-induced production disruptions are likely to have global economic repercussions. China continues to concentrate more manufacturing within its borders, further expanding its supply chain arsenal and capacity to disrupt foreign industries. In an extreme scenario, Beijing could even halt the supply of essential precursors or active pharmaceutical ingredients needed to produce vital medicines. The EU and the US have largely remained silent on China's escalation of economic coercion against Japan, underlining the deterrent effect of China's control of critical raw materials.

Europe could be next. After all, Japan was also the first country to face China's rare earth weaponisation in 2010. China's Ministry of Foreign Affairs closely scrutinises all foreign government statements on Taiwan, looking for changes, however innocuous. Beijing will surely have taken note of the EU's pledge, in the European Commission's 2024-2029 Political Guidelines, to strengthen deterrence around Taiwan:

> *'We will work with Japan, Korea, New Zealand and Australia with whom we face common challenges in cyber, space and in the secure supply of critical materials and technologies. This includes our collective efforts to deploy the full range of our combined statecraft to deter China from unilaterally changing the status quo by military means, particularly over Taiwan'*[44].

[43] Kawashima, S., 'Japanese academic: what Sanae Takaichi meant by "a survival-threatening situation"', ThinkChina, 17 November 2025 (https://www.thinkchina.sg/politics/japanese-academic-what-sanae-takaichi-meant-survival-threatening-situation).

[44] von der Leyen, U., *Europe's Choice: Political Guidelines for the next European Commission 2024–2029*, European Commission, Strasbourg, 18 July 2024, p. 28 (https://commission.europa.eu/document/download/e6cd4328-673c-4e7a-8683-f63ffb2cf648_en?filename=Political%20Guidelines%202024-2029_EN.pdf).

CONCLUSION

HOW TO DISMANTLE THE CRITICAL RAW MATERIAL WEAPON AND DETER ITS USE

China's sharp curtailment of critical raw material exports throughout 2025 (extending into early 2026 for some materials) has severely weakened Europe, the United States and other countries in their relations with Beijing. What began as Beijing's countermeasures to US tariffs and technology curbs has evolved into the normalised use of the multi-faceted critical raw material weapon against a wide range of countries. President Xi has found his geoeconomic 'assassin's mace' (or 'trump card'): critical raw material export controls have enhanced Beijing's economic and military espionage capabilities and strengthened its capacity to extract concessions from foreign governments and industries across policy and business areas. They also strengthen Beijing's ability to deter states from acting against its core interests, and will likely accelerate Beijing's continued industrialisation while eroding its competitors' manufacturing industries (especially their defence sectors).

By leveraging its control over critical raw materials, Beijing has dangerously raised the costs for Europe of adopting protections against China's below-market price exports, which already contribute to the deindustrialisation of the continent. Likewise, it constrains the ability of others to impose costs on China for its dual-use support for Russia and the People's Liberation Army's growing military pressure in East Asia. Despite the US-China Busan *détente*, and President Trump's claims that the summit was a success, these negative effects are structural.

Yet, emboldened by its newfound leverage, China can escalate further. At any time of its choosing, Beijing can decide to reduce supply of the eleven (and other) material groups to zero, with disastrous economic, societal and defence-industrial consequences for Europe. Despite the costs already incurred and the prospect of further and far more severe disruptions to production, Beijing's actions have not resulted in an all-out European diversification effort.

Making European and partner economies resilient to Beijing's use of the critical raw material weapon will be costly, while retaliation to raise the price of China's weaponisation carries risks too. Through its system of mass supply and demand-side state support, coupled with loose labour and environmental regulations and technology export bans, Beijing has created entrenched chokepoints. Production of rare earths, gallium, germanium and other Beijing-controlled materials outside of China is financially non-viable without European and partner policy intervention.

Ongoing European, but especially American and Japanese, state-sponsored de-risking initiatives are likely to bring limited commercial volumes of a wide variety of materials and related components, such as permanent magnets, online in the coming years. In particular, the Japanese and American use of price floors and state-sponsored leveraging of European expertise (e.g., of Solvay, Nyrstar, and Less Common Metals) have merit. However, based on existing projects alone, these efforts will fall far short of meeting the industrial needs of the G7 and key partner economies. To make matters worse, some American and Japanese taxpayer-funded critical raw material production projects, as well as stockpile expansions (e.g., Project Vault), understandably tend to prioritise offtake for domestic industries. These stockpiles do, however, risk exacerbating material scarcity. Both the projects and stockpiles could undermine the level playing field among industries outside of China, thereby sowing the seeds of greater discord within potential de-risking coalitions.

A 'Europe-alone' de-risking approach will not deliver results in time.

A 'Europe-alone' approach in response will not deliver results in time. European self-sufficiency in all critical materials is impossible due to a combination of factors: geological constraints; the long timelines required for mining and refining projects; slow decision-making processes; overregulation; high energy prices (including energy taxes); a low pain threshold for environmental pollution; the absence of European stockpiles (beyond a Commission-Member State pilot project); and the realities of a densely-populated continent. The European Commission acknowledges that several of these factors already deter 'downstream industries from committing to long-term purchase agreements with EU suppliers'[1].

Furthermore, focusing de-risking efforts solely on just the eleven materials already weaponised by Beijing still leaves Europe vulnerable to Chinese supply chain coercion. Beijing has not abandoned but merely postponed its extraterritorial rare earth controls (announced on 9 October 2026) until November 2026. At a minimum, these measures would enable Beijing to heavily impede any cooperation between foreign countries on rare earth de-risking. In a worst-case scenario, through these controls Beijing could seek to disrupt trade between third countries of any item containing even trace amounts of Chinese rare earths (see chapter 2). Moreover, Beijing retains the capacity to introduce export controls on additional materials with widespread defence and civilian end-uses: it controls over 70% of the mining or refining of at least nine additional materials, including cobalt (77% of refining), manganese (95% of refining), silicon metal (87% of refining) and the majority of light-and-medium rare earths (likely still 85%+ of refining). This constrains both European and partner efforts to diversify supplies, and undermines their strategies to deter China's use of the critical raw material weapon.

But even a better-funded push by European and partner governments to dismantle China's control over these materials will fail to protect their industries from Beijing's supply chain weaponisation more generally. China retains (near) chokepoints in the production of energy-intensive, often low-value-added, but strategically

[1] *RESourceEU Action Plan*, op.cit., p.2.

indispensable midstream components like permanent magnets, battery cells and other industrial enablers. Beijing's policies continue to tilt the balance of dependencies further in China's favour. Its market share is also expanding in semiconductor wafers, legacy semiconductors (especially in back-end but increasingly also front-end manufacturing), chemicals, and other essential manufacturing inputs. In line with President Xi's 2020 call to 'tighten international production chains' dependence on China', Beijing is carefully mapping industries where it can next establish monopolistic control[2]. Therefore, just diversifying production of upstream production of critical materials would still leave Europe and its partners exposed to China's ability to weaponise supply chains.

In other words, Beijing's self-sufficiency-oriented industrial policies risk producing the same cycle of overdependence already seen in raw material markets following the end of the Cold War. Take gallium. Through *overproduction* in the 1990s, 2000s and early 2010s non-Chinese producers lost market share (eventually going out of business in the mid-2010s). This led to *overconcentration* of production in China (resulting in the loss of expertise in Europe) in the late-2010s, giving Beijing the opportunity to leverage *overdependence* by weaponising supply chains from 2023 onwards (see chapter 1). Barring decisive countermeasures by Europe and its partners, Beijing's state-capitalist system is likely to replicate these dynamics across an increasing number of markets. Given that President Xi sees manufacturing as 'the real economy', European appeals for China to change its economic model will continue to fall on deaf ears.

Beijing is carefully mapping industries where it can next establish monopolistic control.

The first signs of China expanding the weaponisation of supply chains beyond critical raw materials are already visible. Beijing's 9 October 2025 export controls (postponed until November 2026 following the Xi-Trump Busan summit) will enable it to restrict exports of a wide range of batteries too. China's ban on exports of all items to any end-users that 'could enhance Japan's military capabilities' further demonstrates its willingness to leverage the full range of 800+ items on its dual-use list. Similarly, Beijing's curtailment of Nexperia chip exports (including a temporary general export ban in late 2025) shows that foreign companies and governments cannot rely on China-controlled semiconductor back-end manufacturing either.

Meanwhile, China continues to industrialise at the expense of everyone else. As a result, unless an economic crisis intervenes, within five years Beijing will likely wield even greater supply chain leverage. It will also continue to use its control over production technology chokepoints to make diversification away from Chinese supply costly for Europe and its partners. One example is banning exports of rare earth production machinery. Given the scale and diversity of China-controlled production, a mere 'diversification-through-subsidy' or 'Europe-alone' approach will not result in dismantling China's weaponisation of critical materials, let alone other supply

[2] President Xi advocates deepening dependence on China to form 'a powerful countermeasure and deterrent capability against foreigners who would artificially cut off supply [to China]'. Xi Jinping, 'Certain Major Issues for Our National Medium- to Long-Term Economic and Social Development Strategy', op.cit., p.3; 'Will China be the real winner from the Iran war?', *The Economist*, 2 April 2026 (https://www.economist.com/insider/the-insider/will-china-be-the-real-winner-from-the-iran-war).

chain chokepoints. To address overdependence comprehensively and shift the balance of manufacturing power back in their favour, Europe and its partners need a coordinated demand-side policy that helps non-China producers to scale up production of industrial enablers rapidly.

POLICY RECOMMENDATIONS: UNITED WE STAND, DIVIDED WE FALL

The EU should push G7-countries and other key partners like Australia and South Korea to coordinate state support and adopt joint market protection measures that make critical raw material production financially viable outside of China. The coalition should offer an open invitation to non-rival countries (of any country in the core group) to join, provided they adopt the same protective measures. Particularly important are raw material producers, or deposit holders, like Malaysia, the Democratic Republic of Congo, Brazil and Indonesia, as well as countries with vast skilled-workforce potential like India, and to a lesser extent the Philippines and Vietnam. The ongoing US-EU-Japan negotiations, seeking to align demand-side measures, could serve as the nucleus of a coalition to spearhead policy design, while taking into account the preferences of these third countries.

The time is now. The Trump administration has implicitly acknowledged the limits of pursuing fully unilateral de-risking of critical raw material supply chains from China. Beijing's escalating economic coercion against Japan has sparked a greater willingness in Tokyo to take bolder protective measures. If Europe can overcome its policy inertia, conditions are now in place to begin breaking China's dominance through this trilateral collaboration. Any success in critical raw material de-risking can serve as a best practice model for other strategic industries.

First this emergency policy package should include state financing, equity stakes, and other forms of state support for critical raw material mining and refining outside of China, underpinned by a joint price floor. Through the latter mechanism, European and partner governments would compensate producers when material prices fall below a pre-established threshold (for example, when China floods the market). These combined forms of taxpayer-backing ensure that Chinese below-market raw material exports do not kill off nascent European and partner projects in the short-term. Concretely, the IEA estimates the financing gap (covering both public and private sector investment) for projects outside of China to meet non-China demand at USD 60 billion for just the rare earth mine-to-magnet pipeline. By contrast, it expects economic losses in Europe alone to be USD 1.5 trillion per year, if China cuts rare earth and magnet supply entirely. Without this investment, the IEA warns that existing capacities and planned production expansions outside China will fall short by about 15%, 50%, and 70% at the mining, refining, and permanent-magnet production stages by 2035[3].

Instead of using state funds to onshore all materials, the EU should focus on (re-)starting domestic production of key materials in supply chain segments

(3) *Rare Earth Elements: Pathways to secure and diversified supply chains*, op.cit.

where its industries retain traditional strengths. Meanwhile, Europe could leverage offtake agreements and co-investment to help more advanced partner projects scale up as part of a critical materials 'trusted buyers' club'. Europe cannot bring energy-intensive manufacturing back unilaterally across the board. Instead, it should focus on low-hanging fruit options within the EU, for example gallium refining. Germany and Hungary were still producing the material in the mid-2010s; required volumes are low; and modest state funding could bring production back online. Another measure is expanding production of germanium, which still takes place in Belgium (albeit at low volumes). Similarly, Solvay retains capability in the refining of heavy rare earths, which are particularly difficult to process. JOGMEC already supports Caremag in scaling rare earth refining (and metallisation) in France, and could lend this expertise to other projects as well.

The EU cannot afford to wait for domestic rare earth mining projects to come online in the 2030s – if at all.

Considering Europe's need to rearm and de-risk as fast as possible, the EU cannot afford to wait for domestic rare earth mining projects that may only come online sometime in the 2030s, if at all. In the short term, it should not reinvent the wheel: the Japanese-funded Lynas project in Australia and the Mountain Pass Mine in California are already ramping up mining output, including for an increasing variety of heavy rare earths. Both the US and Australia are less densely populated, which tends to make it easier to develop large-scale mining projects. American and Japanese projects are looking for greater offtake commitments (and in specific cases co-investment) to make their projects viable. Europe could maintain influence by securing market share across key segments of the value chain for a variety of materials, and by investing in partner projects allowing Europe to co-determine offtake conditions. The US administration acknowledges its dependence on allied contributions too: the United States only graduates approximately '200 to 250 mining engineers annually'[4]. Minimum prices – or preferably a joint price floor – could help kick-start production of materials currently dominated by China. Initially focused on the rare earth mine-to-magnet-pipeline and exclusively in Europe, Japan and the United States (the three parties currently negotiating these measures), this would provide the financial certainty material producers need to scale up.

The more Europe 'free rides' on these joint supply-side de-risking efforts, however, the less control it has over setting the conditions on who receives critical materials produced outside of China. Becoming a partner requires the EU and European governments to provide upfront investment in specific niches, and a contribution to the allied price floor. Under RESourceEU, the EU seeks to make €3 billion available throughout 2026, while the US claims to have mobilised USD 30 billlion in 'letters of interest, investments, loans, and other support' between July 2025 and February 2026[5]. The Department of War is a substantial contributor. Both Japan and the US are working on concrete support measures for mining or refining in third

(4) Rubio, M., 'Opening remarks at the critical minerals ministerial', U.S. Department of State, Washington, DC, 4 February 2026 (https://www.state.gov/releases/office-of-the-spokesperson/2026/02/opening-remarks-of-the-critical-minerals-ministerial).

(5) U.S. Department of State, '2026 Critical Minerals Ministerial', Washington, DC, 4 February 2026 (https://www.state.gov/releases/office-of-the-spokesperson/2026/02/2026-critical-minerals-ministerial).

countries. For Washington this includes projects in the Democratic Republic of Congo (including with backing from US government development assistance), and Argentina. The aim is to make these projects financially viable through blended finance that mobilises private sector investment at scale.

Considering trust issues in transatlantic relations under the second Trump administration, the EU should, everything else being equal, prioritise joint projects with Japan, South Korea, Canada, the United Kingdom and Australia over those with the US. If Europe fails to 'buy into' these more advanced partner projects altogether, however, it risks losing on two fronts: China's curbs on critical material exports would continue to cause disruption, while Europe becomes unconditionally dependent on the US, Japan and other partners. In turn, these countries are likely (at least in part) to prioritise supply for their own industries, especially at the early stages of projects, and during times of crisis. To minimise resulting distortions to the level playing field, the EU should push for European companies to be eligible for participation in US and Japanese stockpiling schemes, including Project Vault. European governments should study (and where appropriate emulate) Japanese government support-schemes that enable manufacturers to expand their stockpiles of critical components, including permanent magnets and semiconductors.

A failure to diversify material production risks making Europe's rearmament far more expensive.

To expand European leverage, the EU should adopt American best practices by mobilising defence funding to kick-start critical raw material production and strengthen the defence industrial sub-base. RESourceEU rightly calls on Member States to use defence spending as a 'catalyst for offtake or priority CRM projects'[(6)]. Under the 1.5% NATO target, investments are eligible that 'expand the defence industrial base'. Allies may also draw on NATO's 3.5% for dual-use research 'when the military component can be specifically accounted for or estimated',[(7)] to unlock much-needed innovation in heavy rare earth, germanium and gallium refining and permanent magnets. A Manhattan Project-like initiative could bring together researchers, engineers, and business representatives from the US, Japan and other partners. Its goal should be to break China's dominance in the production of machinery for rare earths and other critical minerals, and accelerate innovation in areas 'such as smart mining, novel separation and refining technologies'. Another objective for industries where performance trade-offs are acceptable would be to substitute rare earths (especially heavy rare earths) and other China-dominated materials for non-China controlled ones[(8)].

Leveraging European defence budgets would come at a comparatively modest cost. A failure to diversify material production risks making Europe's rearmament far more expensive: funnelling taxpayers' money into weapons systems and ammunitions manufacturers plagued by supply chain disruptions will inflate prices. Appointing junior Ministers for Innovation and the Industrial

(6) *RESourceEU Action Plan,* p. 13, op.cit.

(7) North Atlantic Treaty Organization (NATO), 'Defence expenditures and NATO's 5% commitment', NATO, 10 April 2026 (https://www.nato.int/en/what-we-do/introduction-to-nato/defence-expenditures-and-natos-5-commitment).

(8) *Rare Earth Elements – Executive Summary*, op.cit.

Base within the ministries of defence of all 27 Member States would help anchor supply chain resilience, innovation imperatives, technical expertise, and best practices more deeply. Similarly, the EU and Member States should work with mineral-rich countries in the Global South to jointly strengthen resource security. Co-developing higher value-added economic activities (including refining) in resilience partnerships should be a central goal of trade and development assistance policies, including in projects supported by the EIB. Support can also come in the form of geological surveying, helping to build infrastructure to resource sites, and strengthening regulatory regimes.

Second, once supply-side measures have brought production outside of China online, the coalition should shift the costs from taxpayers to the buyers of materials, namely European and partner industries. This could be achieved by introducing 'buy European and trusted partner' content requirements in public procurement (especially for raw material-intensive sectors like defence and renewable energy industries like offshore wind), imposing steep (and adjustable) tariffs on Chinese raw material and related component imports, and – once sufficient trusted supply has come online – banning the use of China-produced materials in defence production. The US Department of War has announced a ban on the use of China-produced magnets, battery materials and other components in US weapon systems, starting on 1 January 2027 (but may continue to issue waivers until sizeable non-China supply becomes available). Combined, these demand-side measures seek to make ex-China production (including recycling) financially viable on a sustained basis, thereby enabling Europe and partner countries to phase out taxpayer-funded price floors over time.

Joint G7 and key partner demand-side measures will increase Europe's leverage *vis-à-vis* the United States – including over its state-sponsored critical material production. As the EU still plans to complete the energy transition (including through wind turbines and EVs) and seeks to rearm rapidly, the continent produces ample demand for almost all critical materials[9]. Europe (and its partners) should also move swiftly to ban the exports of scrap – especially permanent magnets from EVs and wind turbines – to countries outside of the coalition, in order to boost production capacity within it.

Measures that create ex-China markets are also preferable to governments 'picking winners' on grounds of economic efficiency. Competition between at least the G7 and other key partners (together accounting for almost 60% of the global economy) would recreate the corrective mechanisms of global markets. This includes harnessing comparative advantages across partner economies, but without the dependency-deepening effects of China's policies. As a result, European and partner industries would continue to receive their manufacturing inputs, but with far greater availability and at lower cost than under a scenario of exclusively EU-based production. Over time the US-initiated and South Korea-chaired 'FORGE' initiative (the successor to the Materials Security Partnership) convening over 50 countries, and accounting for approximately two-thirds of global GDP, could serve as the foundation for an even larger protected market. After an EU-US-Japan (or G7 and key partner) core group establishes best practices,

(9) The IEA projects that EVs and wind turbines will make up 33% of rare earth demand by 2035. *Rare Earth Elements – Executive Summary*, op.cit.

FORGE countries should be invited to adopt similar China-related safeguards and join a coordinated critical raw materials buyers' club[10]. The club should however strictly monitor compliance, expelling countries that fail to remove internal barriers or to enforce agreed measures against China's production.

Third, Europe and its partners should expand these demand-side policies (if successful) to other strategically indispensable products – long before China monopolises production, and expertise and capital disappear from Europe and partner countries. Whatever policies Europe and its partners formulate on critical materials today are likely, if successful, to guide broader de-risking across industries tomorrow. Merely 'plugging holes' in critical raw material value chains will not comprehensively de-risk production of weapon systems, medical equipment, and other critical end-products. After all, to secure production of drones and pacemakers Europe still relies on China-dominated midstream production of battery cells and power electronics. At the same time Beijing continues to expand its global share of semiconductor, wafer, and chemical production through state-capitalist industrial policies.

By de-risking through demand-side measures with partners Europe can avoid economic 'Sovietisation'.

Europe and its partners cannot apply price floors, subsidies, or other forms of state support across all critical down- and midstream industries. A supply-side only approach to reducing dependencies would gradually transform them into state-run economies, killing innovation at a prohibitive cost to taxpayers. Joint demand-side measures with partners – including joint tariffs – can avoid such 'Sovietisation', while preventing the balance of dependencies from tilting further in China's favour. At the same time, Europe should press the US to eliminate its 'reciprocal' tariffs on Europe-produced semiconductors, chemicals and other industrial enablers, in the same way that Washington already exempts European critical materials for reasons of geopolitical resilience.

Fourth, Europe and its partners should complement these measures with broad, reciprocity-based tariffs and other trade safeguards applied to Chinese end-products, especially critical raw material-intensive ones. At a minimum, these should compensate for China's (artificially) weak currency, extensive state support, joint venture requirements and other measures that asymmetrically benefit its industries over Europe's. Despite an increasingly common view on the need to diversify away from China, European and partner end-user industries often object that friendshoring inputs and imposing tariffs on Chinese imports raises their production costs. They are right to worry: European manufacturers in sectors such as automotive, medical equipment, wind energy and chemicals already face significant pressure from Chinese state-sponsored competitors. Meanwhile, Europe desperately needs its heavy end-user industries to sustain demand for scaled-up production of critical materials outside of China too.

Tariffs and 'Europe and trusted partner' requirements in public procurement in end-user industries can level the playing field, with the ultimate aim of achieving strict trade reciprocity with China. Europe's exclusion of Chinese medical

(10) Rubio, M., 'Opening remarks at the critical minerals ministerial', op.cit.

equipment from public procurement should serve as a best practice. China's *Made in China 2025* strategy instructed hospitals that 95% of high-end medical devices they procure should be produced domestically by 2030. An EU Commission investigation likewise found discrimination against 'imported medical devices' in 87% of Chinese public procurement tenders[11]. In response, the EU does exclude 'companies from the People's Republic of China from participating in EU public tenders [...] above €5 million'[12]. The Trump administration's need to reimpose tariffs (replacing the IEEPA tariffs that were struck down by the Supreme Court) on Chinese products provides an opportunity for Europe to synchronise with US actions.

Fifth, as China is likely to use the critical raw material weapon to preserve its leverage, Europe must develop a robust strategy to deter such actions in the interim. The first step to restoring balance would be for Europe to finally activate the Anti-Coercion Instrument (thereby curtailing Chinese access to the European market) if China's extraterritorial export bans targeting a broadly defined range of Japanese industries harm Europe's economic interests, or if China imposes the 9 October 2025 rare earth controls after all. As domestic demand remains lacklustre, access to Europe's market is of substantial importance to China's economy[13]. Europe should be ready to exert this pressure unilaterally, if Chinese coercion persists and the Trump administration seeks a bilateral deal with China during the mid-May Xi-Trump summit. EU institutions and governments should communicate clearly to their citizens that while retaliation is not risk-free, the continued erosion of Europe's manufacturing base – and China's continuous use of the critical raw material weapon – would entail far higher costs.

> **As domestic demand remains lacklustre, access to Europe's market is important to China's economy.**

The EU should also mobilise its Member States to deploy export controls as a tool of deterrence – most critically in the semiconductor value chain, which like the critical material production chain underpins all of global manufacturing. Given China's dependence on ASML (including for servicing, spare parts, and its widespread network of unique suppliers), and the fact that ASML machines are essential to produce approximately 90% of all semiconductors globally, Europe holds powerful leverage. One meticulous case study-based inquiry into Europe's reverse dependencies did not identify clear-cut European chokepoints beyond this[14]. Another study, however, suggests there are more, including in other critical semiconductor

[11] European Commission, 'Factual findings of the IPI investigation on the procurement market for medical devices in the People's Republic of China', Commission Staff Working Document SWD(2025) 2, Brussels, 2025, pp. 3, 19 (https://ec.europa.eu/transparency/documents-register/api/files/SWD(2025)2?ersIds=090166e5172ecdf1).

[12] European Commission, 'International Procurement Instrument (IPI) investigation into Chinese medical devices', Brussels, 2025 (https://policy.trade.ec.europa.eu/help-exporters-and-importers/accessing-markets/public-procurement/international-procurement-instrument/china-medical-devices_en).

[13] Garcia-Herrero, A. and Rühlig, T., 'China – A Fragile Power? How Europe can use its economic leverage over Beijing', *Chaillot Paper* no. 188, EUISS, March 2026 (https://www.iss.europa.eu/publications/chaillot-papers/china-fragile-power-how-europe-can-use-its-economic-leverage-over).

[14] Rühlig, T. et al, *Reverse Dependency: Making Europe's digital technological strengths indispensable to China*, Digital Power China, May 2024 (https://timruhlig.eu/p/dpc-reverse-dependency).

technologies[15]. A quantitative study identified 43 EU-controlled 'critical' supply chain dependencies *vis-à-vis* China, but did not define 'critical' beyond China's high dependence on Europe and the low-substitutability of the products in question[16]. Europe's leverage is likely greater than these findings suggest. Research efforts to map Europe-controlled chokepoints across sectors remain scarce, underfunded, and mostly do not leverage granular supply chain information provided by Europe's industries themselves. Industry representatives, for example, in exchanges with the EUISS, occasionally highlight essential additional Europe-controlled manufacturing inputs (often in the semiconductor domain).

Similarly, in the short term, Europe should carefully monitor opportunities to coordinate joint countermeasures. Japan's appetite for threatening retaliation ('escalate-to-deescalate') appears to be growing as China intensifies its economic coercion against Tokyo. Prime Minister Takaichi's resistance has proved domestically popular. The Trump-Xi détente could unravel following their May meeting due to Washington's need to replace the IEEPA tariffs, its continued arms sales to Taiwan, reports on Chinese military support for Iran, or Congressional initiatives aimed at sharply curtailing US and partner exports of semiconductor manufacturing equipment to China.

China's ability to escalate geoeconomic pressure is partially rooted in its superior command of supply chain information.

Strengthening economic deterrence in collaboration with key partners would enhance Europe's toolkit. Japan dominates the production of photoresist (an essential input for semiconductor production); while the US leads in chip design; and Japan, South Korea and Taiwan combined together account for the bulk of memory chip production. Meanwhile the EU, US and Japan dominate semiconductor manufacturing equipment beyond lithography systems. These economies can together also make access to their markets conditional on China ceasing its supply chain weaponisation.

China's ability to escalate geoeconomic pressure is partially rooted in its superior command of supply chain information. To understand Europe's real strengths, the European Commission needs to establish a Geoeconomic Office of Net Assessment (GONA). Since 1973, the US Department of Defense's Office of Net Assessment (ONA) has systematically mapped how 'specific US military capabilities, say its bombers, aircraft carriers and offensive cyber capabilities, measure up against those of rivals, now and in the next decades'[17]. GONA's multidisciplinary teams, bringing together deep market, technical, geopolitical and China expertise, would instead set out to

(15) Gehrke, T. and Schmelzer, N., 'Beijing hold'em: European cards against Chinese coercion', Policy Brief, European Council on Foreign Relations (ECFR), 31 March 2026 (https://ecfr.eu/publication/beijing-holdem-european-cards-against-chinese-coercion/).

(16) These chokepoints were identified using data from 2021 to 2023. Since then, China's continued industrialisation has progressed rapidly. Barth, J. and Eisl, A., *Relearning the Language of Power: Geopolitical coalitions and pooled geoeconomic deterrence as Europe's plan B for a post-WTO world*, Jacques Delors Institute, 12 February 2026 (https://institutdelors.eu/en/publications/relearning-the-language-of-power-geopolitical-coalitions-and-pooled-geoeconomic-deterrence-as-europes-plan-b-for-a-post-wto-world/).

(17) Teer, J., 'Preventing war in East Asia: A European action plan to strengthen deterrence', EUISS, 9 July 2024, p. 4 (https://www.iss.europa.eu/publications/analysis/preventing-war-east-asia).

comprehensively map both dependencies and reverse dependencies, while drawing on granular industry knowledge by temporarily hosting European company representatives. Likewise, a dedicated foresight unit within the Office could track the evolving global balance of dependencies and manufacturing over time. It should produce scenarios with five, ten and, twenty-year time horizons, including early warning signals for industries where the EU risks losing technological niches (or even chokepoints) or where China may establish new ones. In the same vein, GONA should specialise in economic (but also military) wargaming for joint groups of industry boards and key policymakers; spot regulatory changes in China to anticipate new export control risks; and identify niche research and start-ups in Europe that have the potential to become European chokepoints. Imagine the advantages: had Europe begun de-risking rare earth supply chains when China first weaponised them against Japan in 2010, it would be in a far stronger position today.

Europe should tailor its industrial policies to strengthening its indispensability.

GONA should prioritise assessment of industries needed to maintain critical state functions, including those that support European militaries. In particular, it should focus on the production of indispensable industrial enablers for all sectors, such as critical materials, semiconductors, wafers and chemicals. Likewise, it should carefully track overdependence in vital end-product markets, such as medical and telecommunications equipment, and pharmaceuticals. As a first step, GONA should complete a structured analysis of the balance of manufacturing power for the 800+ items on China's Catalogue of Dual-Use Items and Technologies Subject to Import and Export License Administration and its 'restricted 'list. After all, Beijing's purported export ban against Japan suggests that these are the products that China is likely to weaponise next.

Europe should tailor its industrial policies to strengthening its indispensability. A structured consultation of research and technology organisations and European semiconductor industry representatives suggests that barriers to advanced mass manufacturing are the main impediment to strengthening Europe's control over technological niches. Europe still excels in world-leading basic and applied research (for example at Fraunhofer, IMEC, CEA LETI, and TNO), and start-ups and scale-ups, including in key semiconductor technologies and emerging fields such as batteries, photonics and quantum technologies. Yet, the failure to build these out into world-leading producers, with large-scale manufacturing based in Europe, is no longer just a threat to Europe's competitiveness, the focus of the Draghi report. In an era of weaponised interdependence, creating the conditions for scaled European production of niche technologies in semiconductors and other deep-tech sectors supports building geopolitical influence – *vis-à-vis* both rivals and partners – through Europe-controlled links in key supply chains.

Expanding advanced mass manufacturing requires that the EU halt its deindustrialisation. To resolve labour shortages, European governments should incentivise the training of mechanics and engineers in Europe, aggressively attract global STEM talent, especially from India (including through visa liberalisation), and reduce regulatory barriers to accelerate housing and factory construction. Ensuring ample energy supply and lowering energy prices and taxes through an 'all-of-the-above' energy abundance strategy focused on domestic production would help manufacturing industries to flourish. This should include renewables, nuclear and natural gas. As a first step, the European Commission could encourage Member States to bring mothballed nuclear power plants and other forms of energy production back online. Likewise, Europe should reduce the regulatory burden to accelerate the rapid expansion of energy grids. Expanding funding for R&D and mobilising private capital for start-ups and scale-ups (overcoming 'the valley of death') would also facilitate the creation of future European chokepoints[18].

Finally, a European economic de-risking and deterrence policy focused on fostering 'European indispensability and allied autonomy' can help prevent the Trump administration from weaponising gas and high-tech exports, and in a worst-case scenario from annexing European territory too. In January 2026, the administration backed off its threat to impose an additional 10% tariff on European countries if they opposed US plans to take control of Greenland. The US government's retreat came after the EU threatened to impose €93 billion in retaliatory trade measures. This suggests that the US's economic pain threshold is much lower than China's. The profits of key US businesses depend (partially) on stable economic relations with Europe, including Silicon Valley tech companies, New York banks, and American arms producers. They would stand to lose out if Europe retaliates, which likely played a role in President Trump's decision to withdraw his threat over Greenland. The US political system holds either presidential or mid-term elections every two years, during which the economy is usually a major issue[19]. Furthermore, European connections to Congress, state-level politicians and American citizens are much deeper than those with China, giving Europe greater lobbying power and influence. The 2024 National Defense Authorization Act (NDAA), which bans the White House from unilaterally withdrawing the US from NATO, is an example of institutional safeguards. By contrast, dealing with China, a highly hierarchical authoritarian state with a high tolerance for economic pain, requires both economic deterrence and a rapid reduction of Europe's most dangerous dependencies.

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(18) Teer, J., Bosticco, R. and Calcara, A., *Autonomy or indispensability? Identifying the EU's semiconductor lodestar*, Chips Diplomacy Support Initiative (CHIPDIPLO), December 2025 (https://www.institutmontaigne.org/en/publications/autonomy-or-indispensability-identifying-eus-semiconductor-lodestar).

(19) Expert interview with Max Bergmann, Director, Europe, Russia, and Eurasia Program at the Center for Strategic and International Studies (CSIS), 1 April 2026.

METHODOLOGY

This *Chaillot Paper*'s findings are based on three workstreams: (1) Desk research and data analysis; (2) a structured EU expert, industry and policymaker consultation, consisting of a *Delphi*-method intra-EU workshop (33 participants) in December 2024[1], and 40 interviews with EU experts, policymakers, and upstream and downstream industry representatives between 2024 and 2026; and (3) a global expert, industry and policymaker consultation, based on 15 interviews with American, Canadian, Australian and Japanese policymakers and experts in 2025 and 2026. The report further benefited from engagement with a wide range of experts, policymakers and industry representatives from the United States, India, Canada, Japan, Taiwan and South Korea during dialogues and study trips to Boston, New York, Washington, New Delhi, Tokyo and Taipei.

(1) Teer, J. and Seaman, J., 'Starting with the end in mind: De-risked gallium, germanium, and rare earth value chains by 2030', EUISS, 9 December 2024 (https://www.iss.europa.eu/sites/default/files/2025-03/EUISS%20workshop%20outcomes%3B%20De-risked%20Ga%20Ge%20and%20REE%20value%20chains%20-%20FINAL.pdf).

ABBREVIATIONS

AI
Artificial Intelligence

ASML
Advanced Semiconductor Materials Lithography

CCP
Chinese Communist Party

CEO
Chief Executive Officer

CRM
Critical Raw Material

CRMA
Critical Raw Materials Act

DoD
Department of Defense

EIB
European Investment Bank

ETS
Emissions Trading System

EU
European Union

EUCCC
European Union Chamber of Commerce in China

EUISS
European Union Institute for Security Studies

EV
Electric vehicle

EXIM
Export-Import Bank of the United States

GACC
General Administration of Customs of the People's Republic of China

GDP
Gross domestic product

IEA
International Energy Agency

IEEPA
International Emergency Economic Powers Act

IMF
International Monetary Fund

IP
Intellectual Property

JOGMEC
Japan Organization for Metals and Energy Security

MOFCOM
Ministry of Commerce of China

NATO
North Atlantic Treaty Organization

NDAA
National Defense Authorization Act

NdFeb
neodymium-iron-boron

NDS
National Defense Stockpile

R&D
Research and Development

REEs
Rare earth elements

REOs
Rare earth oxides

SmCo
samarium-cobalt

SOE
State-owned enterprise

STEM
Science, Technology, Engineering and Mathematics

UAV
Unmanned aerial vehicle

US
United States

USD
United States Dollars

USGS
US Geological Survey

In 2025, China showed how control over critical raw materials can reshape global power. By tightening and calibrating exports, Beijing disrupted supply chains, raised production costs and exposed the dangers of deep dependencies across Europe, the United States and beyond. What began as retaliation against Washington has evolved into a geo-economic weapon used to gather intelligence, reinforce China's industrial dominance, and coerce and deter those who act against Beijing's 'core interests'.

This *Chaillot Paper* shows how these measures advance the country's larger ambitions: to insulate China from external shocks through the pursuit of industrial self-sufficiency while preserving its access to global markets. It charts the risks for Europe's security and prosperity, and sets out urgent steps to diversify supply, strengthen deterrence and regain leverage – before these dependencies deepen further and cause even greater economic damage.

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