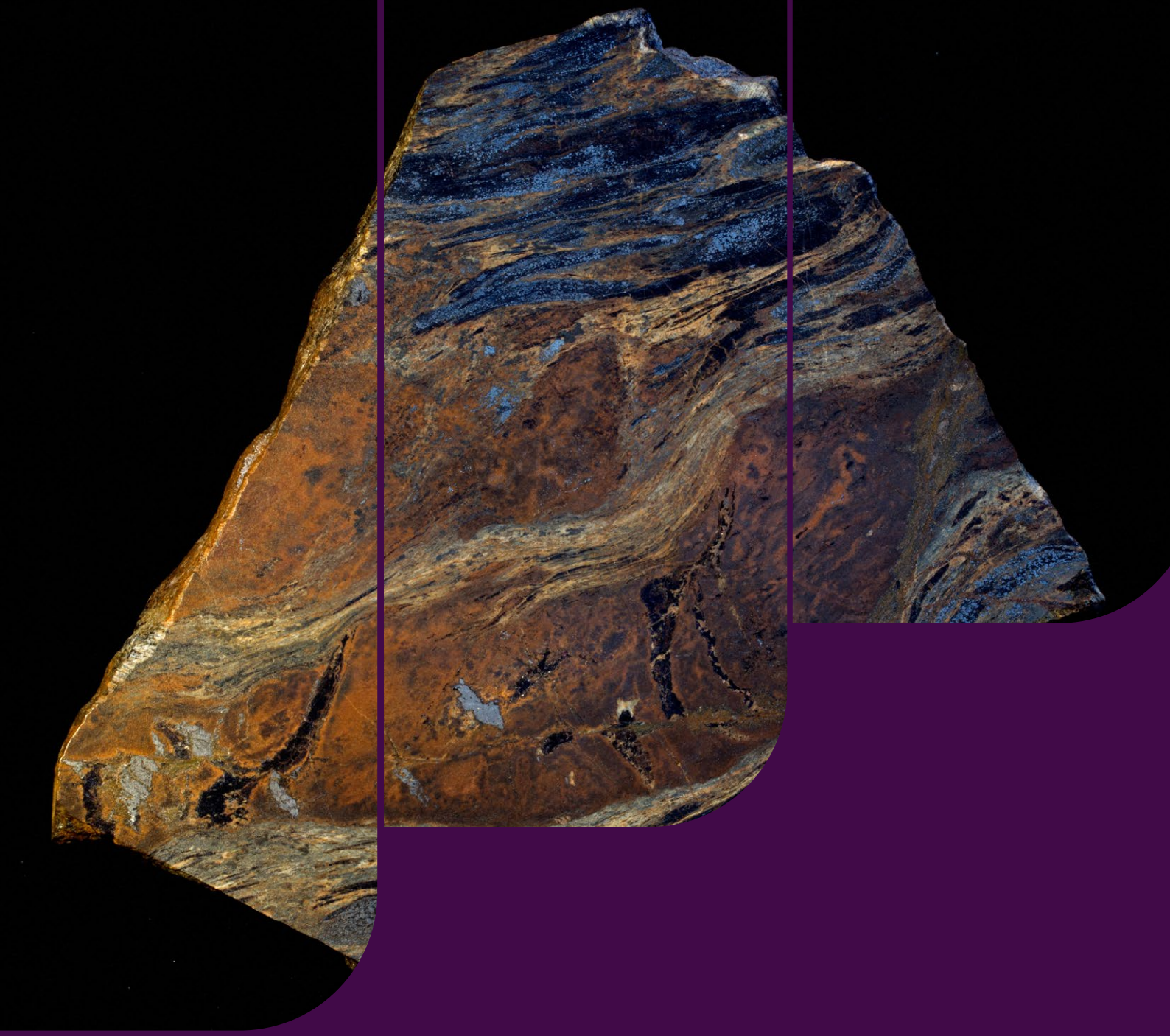

Research Papers

June 2026

China and Rare Earth Supply Chains

Export Controls, Dual-Use Governance and UK Exposure

Henry Sanderson

RUSI

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Methodology

Research for this paper was conducted between January and March 2026 in partnership with the China Programme of the Oxford Institute for Energy Studies. It is primarily based on a review of Chinese official documents, pricing and trade data, and interviews with stakeholders from the rare earth and defence industries, as well as UK government officials. Trade data was obtained from China's customs portal, while pricing data was provided by the UK's Argus Media and China's Shanghai Metals Market. Details of China's export controls come from official government documents. The strength of conclusions is limited by the absence of fieldwork in China or interviews with Chinese officials, and that interviews with companies affected by Chinese export controls did not constitute a representative sample.

Executive Summary

Over the past 15 years, China has gained unprecedented control over its rare earth supply chain. Such control spans domestic mining and intermediate metal production to exports of finished products, including rare earth permanent magnets.

This paper explores the following questions:

- What are the strategic objectives underlying China's April 2025 rare earth export controls, and how do they relate to Beijing's industrial policy goals?
- How have these controls affected trade flows?

Key Findings

- China's rare earth strategy is focused on supporting its giant domestic manufacturing industries and encouraging them to export. At the same time, the strategy seeks full control and visibility over production and exports of certain rare earths via dual-use controls and licence systems.
- China incentivises the export of final products containing rare earths, such as rare earth permanent magnets, rather than rare earths themselves. This allows the country to maintain dominance of midstream processing and to capture value across the supply chain.
- China's April 2025 export controls on seven medium and heavy rare earth elements did little to dent Chinese permanent magnet exports for the full year. Yet, exports of heavy rare earth oxides from China fell, especially to Japan and the US.
- The biggest challenge for UK companies in 2025 was delays to supplies, not a complete cut-off. The UK could consider a government or market-supported stockpile to help avert any temporary or longer-term shortage.
- China's April 2025 dual-use export controls and licences will probably remain in place and not be relaxed as part of any concession in the trade war with the US. These controls and licences allow Beijing to influence foreign countries as the boundary between civilian and military can be vague.

- China's own import dependence on Myanmar for heavy rare earths, however, is a strategic vulnerability. Chinese magnet makers are reducing the amount of heavy rare earths they use, but this will take time and there may be physical limits for some uses.
- Downstream expertise has been lost outside China – from alloy making and powder processing to sintering and large-scale manufacturing – but the UK and Europe are still in a strong position. The only rare earth metal producer outside Asia – the now US-owned Less Common Metals – is in Ellesmere Port in the UK, and the only rare earth separation plant is Solvay's facility in La Rochelle, France. Partnerships with Japanese and US companies could position these assets at the heart of a more diverse supply chain.

Introduction

While the mining and primary production of rare earths is a small market by volume, they have critical enabling functions across the global economy. Rare earth permanent magnets – principally neodymium-iron-boron (NdFeB) and samarium-cobalt – are essential to electric motors in vehicles and robots, offshore wind turbines, defence guidance systems and MRI (magnetic resonance imaging) scanners.

China dominates all stages of the rare earth supply chain – from extraction, to separation, to the processing and manufacturing of magnets. Beijing has only tightened its grip over the industry. China's National Development and Reform Commission (NDRC) said in March that during 2025 it had 'intensified full-chain management of the rare metal industry in regard to resources such as rare earths'.[1] This continues a long-term process that has domestic and international dimensions. Domestically, China has cracked down on what it called 'excessive exploitation' of rare earth resources since 2010, consolidating the industry into two state-owned enterprises with strict production quotas.[2] Internationally, Beijing introduced export controls in April 2025 requiring licence applications for shipments of seven medium and heavy rare earth elements, their compounds, alloys and mixtures. These were samarium, gadolinium, terbium, dysprosium, lutetium, scandium and yttrium. These seven rare earths have applications in defence, nuclear energy, electric vehicles (EVs), wind energy and healthcare.[3] Neodymium and praseodymium – the more geologically prevalent light rare earths – are the backbone elements of most permanent magnets. These were not included in the controls.

1. National Development and Reform Commission (NDRC), 'Report on the Implementation of the 2025 Plan for National Economic and Social Development and on the 2026 Draft Plan for National Economic and Social Development', non-final English translation, Fourth Session of the 14th National People's Congress of the People's Republic of China, 5 March 2026, <https://npcobserver.com/wp-content/uploads/2026/03/2026-NDRC-Report_NON-FINAL_EN.pdf>, accessed 12 April 2026.
2. State Council Information Office of the People's Republic of China, 'Situation and Policies of China's Rare Earth Industry', White Paper, June 2010, <http://english.www.gov.cn/archive/white_paper/2014/08/23/content_281474983043156.htm>, accessed 12 April 2026.
3. SFA (Oxford), 'China Imposes Export Controls on Key REE', SFA (Oxford) Market News and Insights, 5 April 2025, <https://www.sfa-oxford.com/market-news-and-insights/china-imposes-export-controls-on-key-rare-earths/>, accessed 12 April 2026.

The Chinese government has two clear goals for its rare earth industry: to solidify its position as the dominant producer of high-value rare earth magnets that support key industries, including EVs and robots; and to restrict the export of rare earths for use in defence applications in other countries under dual-use legislation. This enables Beijing to limit supplies for military purposes and to use rare earths as a means of exercising political influence. Such influence was exerted against the US and Japan in 2025. Although the trade war with the US provided China with an opportunity to accelerate controls, the framework for controls was already in place.

This paper argues that this is the most important takeaway from the April 2025 restrictions: China has maintained export controls on seven medium and heavy rare earths but has maintained high-volume growth of exports of finished magnet products. Beijing, in effect, retains both its ability to influence and export to foreign markets.

Nevertheless, China's giant rare earth industry has weaknesses and still relies on imports of heavy rare earths. In addition, the imposition of export controls in April 2025, as well as dual-use export controls on Japan in January 2026, have only accelerated a shift away from Chinese supply chains.

Still, competing against China is a giant industrial challenge – not just a mining one – that will require significant government support, whether through price floors, investment or offtakes. Stockpiling should be considered in case of delays to some Chinese exports. However, as it is difficult to identify which imported products contain rare earths from China, complete decoupling is impossible.

The UK cannot diversify unilaterally and partnership with allies will be critical for success. The UK is already home to significant companies and assets, such as Less Common Metals (LCM), HyproMag and Ionic Rare Earths, and aligning their output with allied supply chains will help to enable more competitive production outside China and should be supported by the UK government. By economic value, the magnet metals – neodymium, praseodymium, dysprosium and terbium – account for over 90% of the value of rare earth compounds.[4] Therefore, this paper mainly focuses on these rare earth elements.

4. Emile Detry et al., 'Five Steps for Solving the Rare-Earth Metals Shortage', Boston Consulting Group, 6 July 2023, <https://www.bcg.com/publications/2023/five-steps-for-solving-the-rare-earth-metals-shortage>, accessed 12 April 2026.

Rare Earths and China's Market Dominance

What Are Rare Earths?

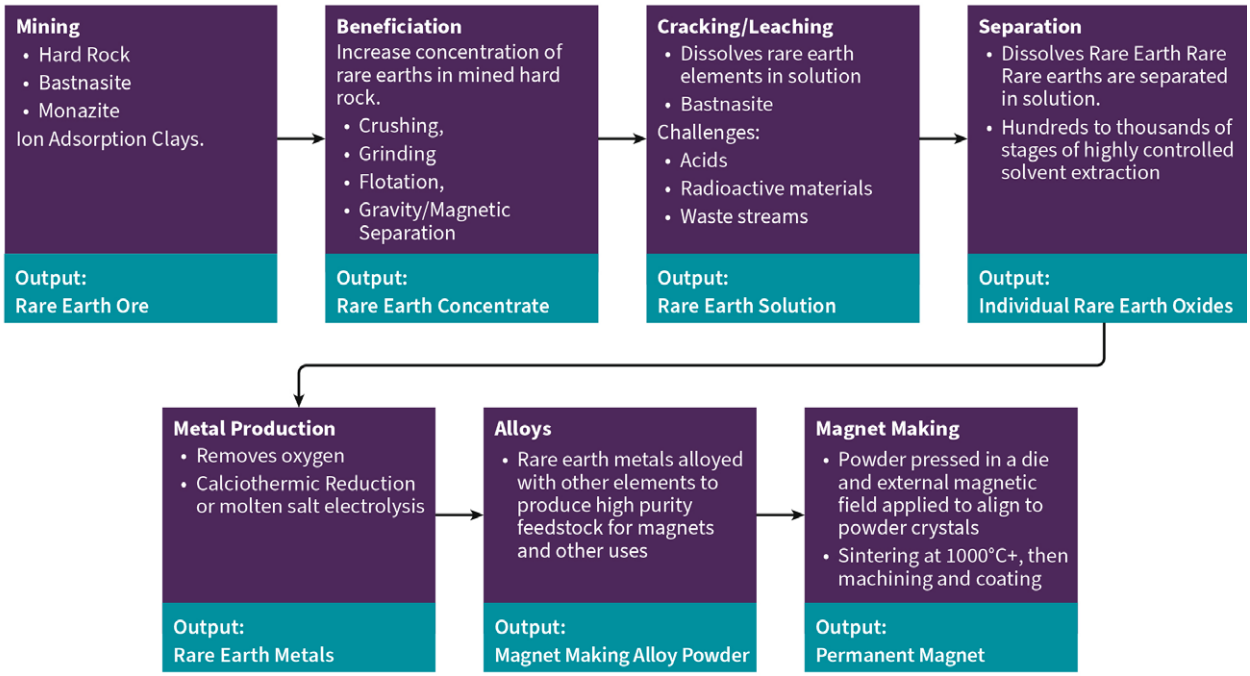
Rare earths are 17 chemical elements, comprising the 15 lanthanides plus scandium and yttrium. Despite their name, they are not rare in nature: the challenge is the commercial-scale separation of individual rare earths and the production of high-purity rare earth metals.

Rare earths cannot be mined individually, so there is a structural oversupply of some elements such as lanthanum and cerium, which are present in much higher quantities in the mined material, and there is a tighter market for heavier rare earths such as dysprosium and terbium, which are found in much lower concentrations. Separation of individual rare earths can involve hundreds of different chemical stages.

While rare earths may not be rare, finding them in economically recoverable concentrations and in minerals that are easier to process is a challenge. Rare earths are found in hard rock sources as well as clays formed by weathering at the earth's surface. The most common minerals that are currently mined for rare earths are bastnasite, monazite and, particularly important for 'heavy' rare earths, ion-adsorption clays.[5] The Mountain Pass mine in California and Bayan Obo in Inner Mongolia – the latter being the world's largest rare earth deposit – are primarily bastnasite operations. Clays in Myanmar are the world's biggest source of heavy rare earths, making the country the fourth-largest overall rare earth producer in 2025, according to the US Geological Survey.[6]

5. Eimear Deady, 'Global Rare Earth Element (REE) Mines, Deposits and Occurrences', British Geological Survey, May 2021.
6. US Geological Survey, 'Rare Earths', <https://pubs.usgs.gov/periodicals/mcs2026/mcs2026-rare-earths.pdf>, accessed 5 June 2026.

Figure 1: Rare Earth Supply Chain, Magnet Example



Source: The author.

In addition, since each rare earth element has a different use and is required in different quantities, each must be individually separated from a rare earth concentrate. The concentrate then needs to be turned into a high-purity metal.

Rare earths are divided into heavy rare earths and 'light' rare earth elements. Until 2025, there was very little commercial-scale production of certain heavy rare earth elements, such as dysprosium, outside China. Dysprosium is added to NdFeB magnets to increase their coercivity (resistance to demagnetisation),[7] which is critical to high-temperature applications from EV motors to aerospace and defence. Table 1 provides an overview of rare earths and their geological prevalence.

7. Less Common Metals (LCM), 'Dysprosium', <https://lesscommonmetals.com/raw-materials/dysprosium/>, accessed 12 April 2026.

Table 1: Lanthanide and Yttrium Abundance in the Earth's Crust and Hard Rock Ores, Arranged by Proportion of Rare Earth Content in Monazite Ore

Atomic Number	Element	Symbol	Abundance (parts per million, ppm)	Monazite Ore (average)	Bastnaesite Ore (average)
58	Cerium	Ce	68	43%	49%
57	Lanthanum	La	32	20%	33%
60	Neodymium	Nd	38	16%	12%
39	Yttrium	Y	30	2.5%	0.2%
59	Praseodymium	Pr	9.5	4.5%	4.3%
62	Samarium	Sm	8	2.5%	0.8%
64	Gadolinium	Gd	8	1.5%	0.2%
66	Dysprosium	Dy	6	0.6%	300 ppm
68	Erbium	Er	4	0.2%	35 ppm
70	Ytterbium	Yb	3	0.1%	5 ppm
63	Europium	Eu	2	0.1%	0.1%
67	Holmium	Ho	1.4	50 ppm	50 ppm
65	Terbium	Tb	1	500 ppm	160 ppm
69	Thulium	Tm	0.5	200 ppm	10 ppm
71	Lutetium	Lu	0.5	200 ppm	1 ppm
61	Promethium	Pm	0	0%	0%

Source: J S McIndoe, 'Lanthanides (Rare Earth Elements): Abundance and Ore Composition', University of Victoria, <https://web.uvic.ca/~mcindoe/424/Ln2.pdf>, accessed 19 May 2026.

Rare earths have uses aside from magnets across the industrial and military spectrum. Yttrium is used to harden jet engines, dysprosium is used in fighter jet components, and terbium and europium are used in phosphors for lighting and displays. Yet, the economic value lies in magnets. The magnet metals account for over 90% of the value of rare earth compounds. Table 2 shows some of the uses of rare earth elements while Table 3 indicates some of the effects of China's recent restrictions.

Table 2: Uses of Selected Rare Earth Elements

Category	Typical Elements	Primary Industrial Applications	Strategic Significance
Light Rare Earths	Lanthanum, cerium, praseodymium, neodymium, samarium*	EV motors, wind turbines, catalysts, glass polishing, magnets for defence and aerospace applications	Essential for clean energy transition, defence, automotives and aerospace
Heavy Rare Earths	Dysprosium*, terbium*, yttrium*, gadolinium*	Stealth aircraft, precision-guided munitions, high-temperature magnets	High scarcity, and critical for national defence and advanced aerospace; gadolinium is also used in MRI scanners
Specialised Elements	Scandium, europium, lutetium*	Laser technology, medical imaging, phosphors, nuclear energy	Niche high-tech applications

Source: The authors.

Note: Promethium, holmium, erbium, thulium and ytterbium are not included because they have limited commercial significance. There is no naturally occurring, mineable promethium.

* Element subject to export controls in China.

Table 3: Strategic Significance of Exports Restricted by China in April 2025

Element	Primary Strategic Applications	Specific System Use Examples
Samarium	High-temperature permanent magnets (SmCo); thermal stability	Missile guidance systems (for example, AMRAAM); stealth coatings; jet engine actuators
Gadolinium	Neutron absorption; MRI contrast agents; nuclear shielding	Nuclear submarine shielding; gamma / neutron radiation detection
Terbium	High-performance NdFeB magnets; green phosphors	EV traction motors; precision actuators; wind turbine generators
Dysprosium	Thermal stability in NdFeB magnets; magnetic coercivity	Offshore wind farms; high-temperature EV motors; missile guidance controls
Lutetium	PET scanners; scintillator materials; cancer therapeutics	High-resolution radiation detectors; targeted radionuclide therapy
Scandium	High-strength Al-Sc alloys; solid oxide fuel cells	Aerospace structural components; 3D printing; fuel cell stacks
Yttrium	Military lasers; radar filters; thermal barriers	Nd:YAG lasers; advanced radar systems; jet engine coatings

Sources: SFA (Oxford), 'China Imposes Export Controls on Key REE', 5 April 2025, <https://www.sfa-oxford.com/market-news-and-insights/china-imposes-export-controls-on-key-rare-earths/\>, accessed 21 May 2026; IEA, 'Rare Earth Elements: Pathways to Secure and Diversified Supply Chains', revised version May 2026, <https://www.iea.org/reports/rare-earth-elements/>, accessed 21 May 2026; EY, 'Rare Earths: Hidden Leverage Beneath the Surface', November 2025, <https://www.ey.com/content/dam/ey-unified-site/ey-com/en-pl/campaigns/documents/ey-rare-earths-elements-study-2025.pdf>, accessed 19 May 2026.

Rare Earths in Chinese Economic Strategy: What is Beijing's Aim?

Rare earth elements have been strategic resources in China since the 1990s, when China began treating rare earths as protected and strategic minerals, restricting foreign participation and starting a policy shift towards domestic control. In 2006, China started to manage production of rare earths.[8] While China first focused on expanding and supporting mined production in the 1990s, it is now focused on the entire supply chain and especially the key downstream industries. These industries are critical to President Xi Jinping's concept of 'new quality productive forces'.[9]

China's Five-Year Plan for 2030, submitted to the National People's Congress in March 2026, stated that the country will 'continuously enhance competitive advantages in rare earths, rare metals and superhard materials, and strengthen the high-quality and efficient comprehensive utilisation of important strategic minerals'.[10] Indeed, rare earths are critical to China's future-facing industries. According to China's metal consultancy Antaike, China's demand for NdFeB magnetic materials in 2025 was primarily concentrated in three major sectors: new energy vehicles (a category including EVs and hybrid vehicles), household appliances and industrial robotics.[11]

8. State Council Information Office of the People's Republic of China, 'Situation and Policies of China's Rare Earth Industry', 2010, <https://english.www.gov.cn/archive/white_paper/2014/08/23/content_281474983043156.htm>, accessed 22 May 2026.
9. Yi Xin, 'China's New Quality Productive Forces: A Force for Good', *Xinhua*, 21 March 2024, <https://english.news.cn/20240321/754d2306adf44c149495a22faac0242e/c.html>, accessed 11 May 2026.
10. State Council of the People's Republic of China, '中华人民共和国国民经济和社会发展第十五个五年规划纲要' ['Outline of the 15th Five-Year Plan for National Economic and Social Development of the People's Republic of China'], *Xinhua*, 13 March 2026, <https://www.news.cn/politics/20260313/085af5de5a4b4268aa7d87d90817df2f/c.html>, accessed 12 April 2026.
11. 安泰科, '2025年我国部分重点终端领域钕铁硼磁性材料需求简析' ['Brief Analysis of NdFeB Magnetic Material Demand in Key End-Use Sectors in China in 2025'], 20 February 2026, available on WeChat, <https://mp.weixin.qq.com/s/TvsU_VozWmex3YiCXI8s7w>, accessed 12 April 2026.

Together, these fields accounted for over 70% of total consumption, with the dominant role of the vehicle sector becoming increasingly prominent.

China's Communist Party seeks to upgrade and improve its domestic rare earth production capacity. Long gone are the days when China was happy to export mined rare earths to foreign countries. The emphasis is now on pursuing high quality development of domestic rare earth resources. This emphasis is apparent in Chinese exports. China mostly exports lower-value surplus rare earths such as lanthanum and cerium. The price differential is stark: lanthanum oxide traded at approximately $1 per kilogram in 2025, compared with $73 per kilogram for neodymium oxide. This mirrors the priority of China's April export controls. Consequently, Beijing placed restrictions on the highest-value rare earth elements, helping to preserve them for domestic use.

China's Production Dominance

China is by far the largest producer of rare earths globally. In 2025, it produced an estimated 270,000 tonnes out of a global total of approximately 390,000 tonnes, according to the US Geological Survey.[12] But its dominance is even more pronounced at the processing and manufacturing stages: China accounts for approximately 91% of global rare earth separation and metal production, and around 94% of sintered NdFeB permanent magnet production.[13] While China's share of rare earth mining has fallen over the past decade, its share of the midstream and downstream markets has increased.

Yet China still relies on imports of certain rare earths. Myanmar remains the country's main source of imports. China's own ionic-clay deposits are depleted and Beijing shut down most domestic mining due to severe environmental damage and illegal operations. Previously, it imported rare earths from the Mountain Pass mine in the US, but this ceased following an agreement between MP Materials and the US Department of Defense.

China's rare earth industry is anchored by a small number of state-backed groups. China Northern Rare Earth is the leading light rare earth producer linked to the Bayan Obo complex in Inner Mongolia, while China Rare Earth Group is the main consolidator of medium and heavy rare earth resources in southern China. As the industry saying goes: 'one in the south, one in the north, one in light rare earths the other in heavy rare earths' (一南一北、一轻一重).

12. US Geological Survey, 'Rare Earths'.
13. International Energy Agency, 'Rare Earth Elements', 2025, <https://www.iea.org/reports/rare-earth-elements/executive-summary>, accessed 9 June 2026.

China's rare earth industry has been consolidated through successive rounds of state direction: by 2021, the sector was organised around six major state-backed groups, and the creation of China Rare Earth Group from three of those groups further concentrated control in two dominant central enterprises. Since 2024, the two groups – China Northern Rare Earth and China Rare Earth Group – have been the only enterprises eligible to receive China's rare earth mining and smelting quotas, effectively making the quota system a duopoly.

Conserving Domestic Resources

Beyond corporate consolidation, China controls the volume of its rare earth industry through annual quotas on mining and smelting / separationn.

These quotas, shown in Table 4 and issued by the Ministry of Industry and Information Technology (MIIT), determine the total licensed output of the industry and are a key instrument of pricing and supply management.

In August 2025, the MIIT, the NDRC and the Ministry of Natural Resources jointly issued updated quota regulations: the Interim Measures for the Administration of Total Quantity Controls on Rare Earth Mining and Smelting Separation.[14] These regulations mandated annual quotas approved by the State Council, allocated based on production capacity, technology and environmental compliance, with enterprises responsible for execution and traceability reporting. For the first time, the regulation also included imported rare earths. Previously, quotas applied only to domestically mined ore; imported concentrates, principally from Myanmar, sat outside the quota framework.

By bringing imports within the quota perimeter, Beijing extended administrative control to the full volume of feedstock entering Chinese processing facilities, regardless of origin. The practical effect is to give China tighter management of the total rare earth supply available for both domestic consumption and export.

Since 2025, rare earth prices have risen in China, amid a backdrop of tighter supplies, suggesting that the quotas are effectively keeping supply controlled. Beijing wants a healthy, profitable industry, which has enough resources to invest in R&D, as well as technological upgrading.

14. 工业和信息化部、国家发展改革委、自然资源部, '稀土开采和稀土冶炼分离总量调控管理暂行办法' ['Interim Measures for the Total Volume Control and Management of Rare Earth Mining and Rare Earth Smelting and Separation'], 工业和信息化部令第71号 [MIIT Order No. 71], 28 July 2025, <https://www.miit.gov.cn/gyhxxhb/jgsj/cyzcyfgs/bmgz/qtl/art/2025/art_65cd2bd5d170440da54ffc631839a724.html\>, accessed 21 May 2026.

Table 4: China Rare Earth Mining and Smelting / Separation Quotas, 2023–25

Year	Mining Quota (t REO)	Smelting / Separation Quota (t REO)	Notes
2023	255,000	243,850	Three batches issued
2024	270,000	254,000	Two batches; ~6% growth; first batch public
2025	Undisclosed	Undisclosed	Internal only

Sources: 工业和信息化部、自然资源部, '关于下达2023年第三批稀土开采、冶炼分离总量控制指标的通知' ['Notice on Issuing the Third Batch of 2023 Total Volume Control Quotas for Rare Earth Mining and Smelting / Separation'], December 2023, <https://www.miit.gov.cn/zwgk/zcwj/wjfb/tz/art/2023/art_f90f35a2b7b74a0c9262e440bea8b353.html\>, accessed 21 May 2026; 工业和信息化部、自然资源部, '关于下达2024年第二批稀土开采、冶炼分离总量控制指标的通知' ['Notice on Issuing the Second Batch of 2024 Total Volume Control Quotas for Rare Earth Mining and Smelting / Separation'], 20 August 2024, <https://www.miit.gov.cn/jgsj/ycls/wjfb/art/2024/art_2c9f259fb1d74de1b740ea2c1325fb0b.html\>, accessed 21 May 2026.

Note: 2025 quotas were not publicly released and figures are based on industry estimates.

China dominates both the separating of rare earths and the production of rare earth metals and magnets. Thus, even if other countries successfully diversify their sources of raw rare earth ore, they will remain heavily dependent on Chinese processing and magnet manufacturing – unless they simultaneously invest in separation, metal and magnet production, a far more capital-intensive and technically complex undertaking. This has been made more difficult as China has restricted the export of rare earth processing technology since at least 2002, with further tightening and updates proposed in October 2025.[15]

Influencing Prices

Rare earth pricing is centred in China. Several Chinese pricing agencies, such as Shanghai Metals Market (SMM), Asian Metal and Mysteel, provide regular prices. There are also two exchanges set up by rare earth producers: the Baotou Rare Earths Exchange and the Ganzhou Rare Metal Exchange. Rare earth prices are published on trading platforms such as Zhonglian Jin (溧阳中联金电子商务网, or zljec.com).

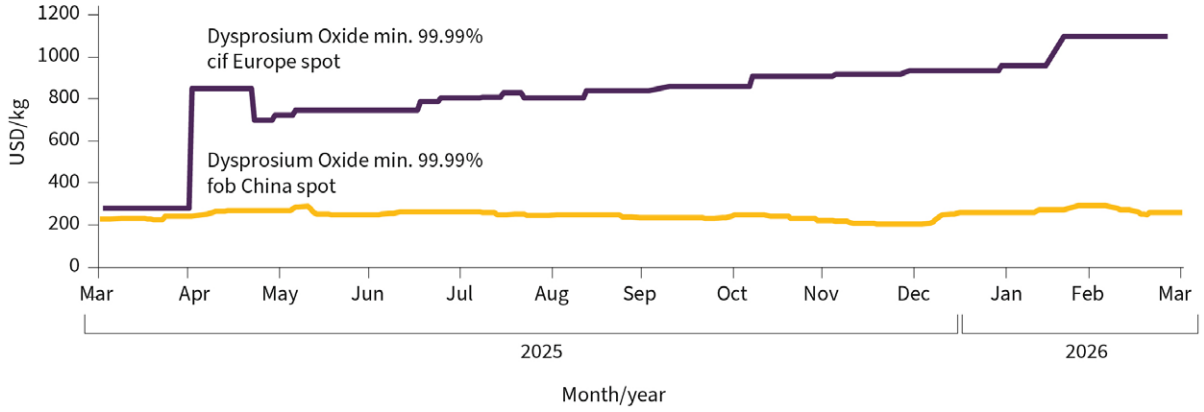
Foreign mining companies generally rely on China-based prices. For instance, the price guarantee given to US miner MP Materials by the US Department of Defense is based on prices produced by Asian Metal, a Beijing-based price provider. It is important to note that China does not set the price, but it effectively controls prices via its rare earth production quotas.

15. 商务部 (Ministry of Commerce of the People's Republic of China, MOFCOM), '商务部公告2025第62号 公布对稀土相关技术实施出口管制的决定' ['Announcement No. 62 of 2025: Decision to Implement Export Controls on Rare Earth-Related Technologies'], 9 October 2025, <https://www.mofcom.gov.cn/zwgk/zcfb/art/2025/art_6cb42957741440c6984de696b70df9ae.html>, accessed 12 April 2026.

Outside China, price benchmarks for rare earths have been launched by companies such as the UK's Argus Media. However, the amount of trade actually conducted outside China that underlies these prices is limited. This raises questions about the liquidity of the prices, according to Canada's Adamas Intelligence.[16]

Still, in the past year, the benchmark prices outside China available for the seven rare earths included in China's April 2025 export controls have risen dramatically. This has bifurcated the global rare earth market.[17] Production of certain rare earths outside China is now more economically attractive, incentivising further investment in these supply chains.

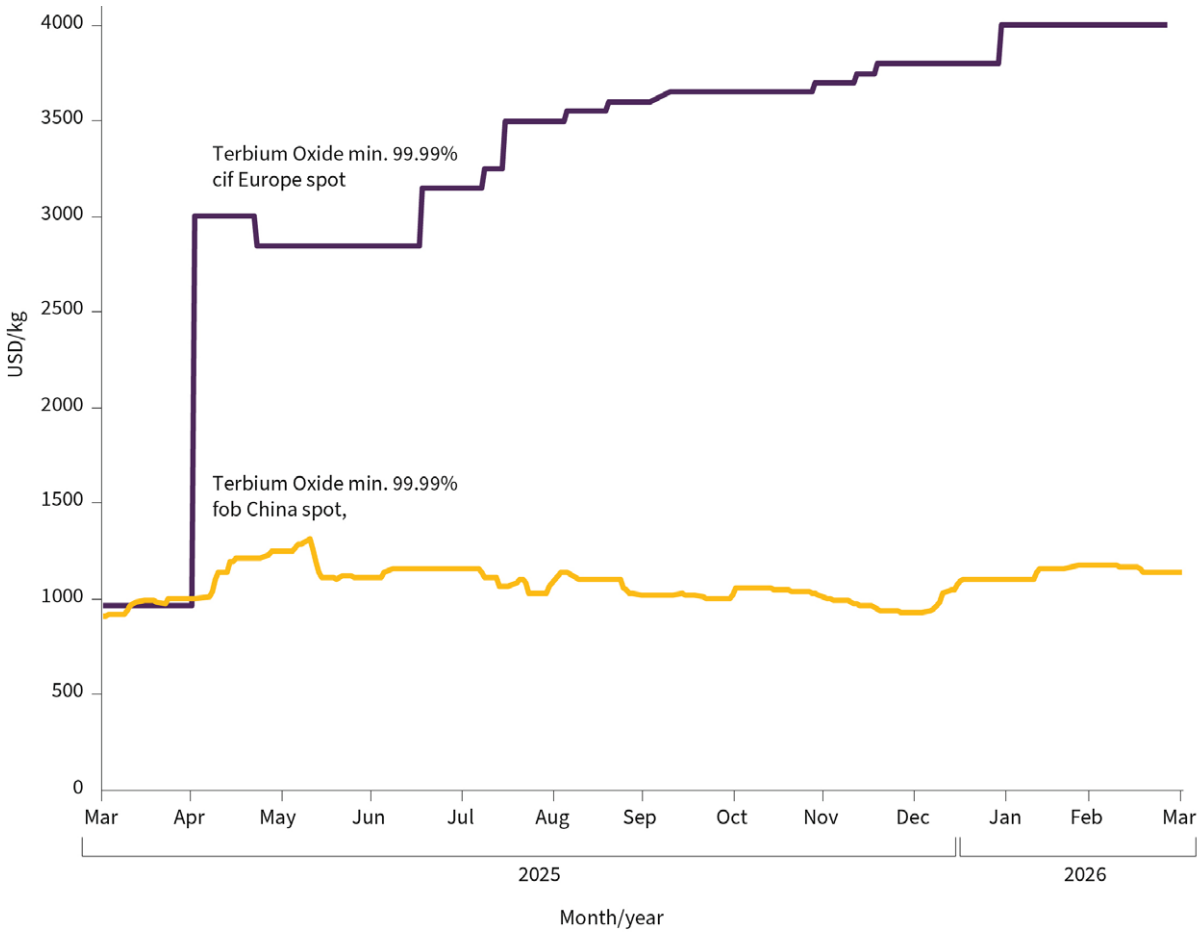
Figure 2: Dysprosium Prices in China and Outside China



Sources: Argus Media, rare earth price data provided directly to the authors, April 2026; Argus rare earths pricing service available at Argus, 'Rare Earths', <https://www.argusmedia.com/en/commodities/rare-earths\>, accessed 22 May 2026.

16. Adamas Intelligence, 'The Fallacy of European Rare Earth Prices and the PRAs That Promote Them', February 2026, <https://www.adamasintel.com/the-fallacy-of-european-rare-earth-prices-and-the-pras-that-promote-them/>, accessed 12 April 2026.
17. Ucore Rare Metals Inc., 'Recent Rare Earth Price Increases Continue to Enhance Ucore's Refining Strategy', 23 February 2026, <https://ucore.com/recent-rare-earth-price-increases-continue-to-enhance-ucores-refining-strategy/>, accessed 12 April 2026.

Figure 3: Terbium Prices in China and Outside China



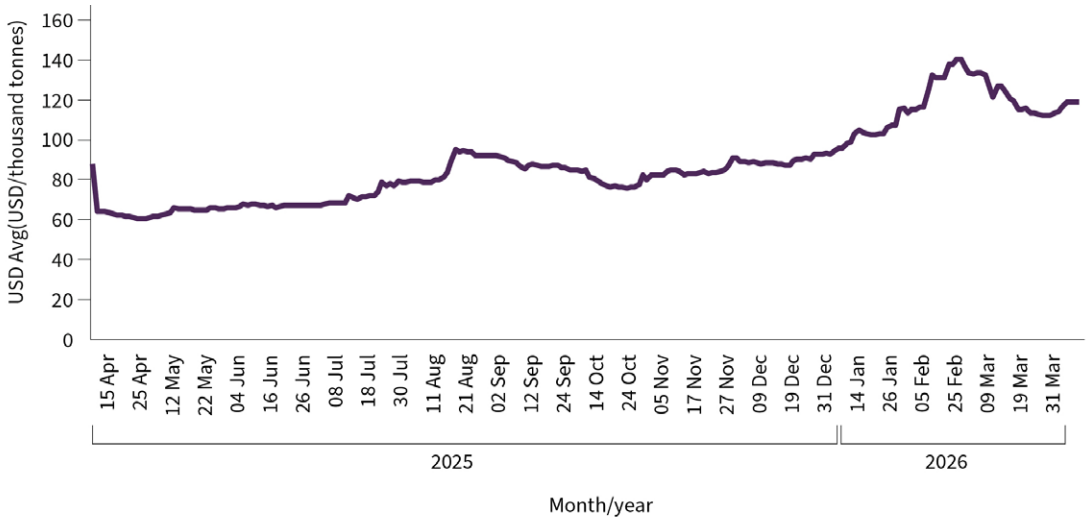
Source: Argus Media, rare earth price data provided directly to the author, April 2026.

Within China, tight supply and rising demand from EVs, wind turbines and robots are driving prices for neodymium-praseodymium (NdPr)[18] (which is not subject to export restrictions). These industries are strategic for China and closely associated to Xi's concept of 'New Productive Forces' to drive the economy. However, prices could easily fall again if Beijing expands its production quotas, meaning foreign markets are at the mercy of China's authorities.[19] Lower prices would challenge the economics of foreign rare earth projects as a result.

18. Due to the cost of separation and their mutual substitutability in end uses, Nd and Pr are not typically separated during processing and are therefore priced together.
19. Eric Onstad, 'Rare Earths Surge Above Price Floor Given to MP Materials', *Reuters*, 18 February 2026.

The annual production quota is the primary domestic price management tool. By controlling output, Beijing can tighten or loosen global supply without touching export licensing at all. For example, the 2023–24 period saw quotas increase substantially, which helped to suppress prices and squeeze project economics outside China. As Wu Chenhui, an independent rare earth analyst, stated explicitly to the *Global Times*: 'China has the absolute power to set prices by adjusting the supply volume'.[20]

Figure 4: NdPr Alloy Prices



Source: Shanghai Metals Market, 'Pr-Nd Alloy: Rare Earth Metals Price Chart', <https://www.metal.com/Rare-Earth-Metals/201102250182\>, accessed 21 May 2026.

China's Fiscal Distortions

Foreign rare earth projects currently remain reliant on Chinese pricing for the viability of their business cases, but Chinese domestic rare earth prices are set inclusive of 13% VAT. This essentially distorts the market because a Chinese magnet maker can receive a VAT refund on export, which offsets the costs of the underlying rare earths and increases their international competitiveness. This refund is not reflected in the rare earth price itself or of processed products such as oxides or metals. The result is that Chinese rare earth magnet producers have, in effect, 13% lower raw material costs than their foreign competitors.[21]

20. *Global Times*, 'China's New Rare-Metal Exchange to Boost Nation's Pricing Power', 20 November 2019, <https://www.globaltimes.cn/content/1175552.shtml>, accessed 12 April 2026.
21. George Bauk et al., 'China's Rare Earth Subsidies and Structural Advantages', Thorium Energy Alliance, May 2023, <https://thoriumenergyalliance.com/wp-content/uploads/2023/05/ChinaSubsidiesStructuralAdvantages-ReleasedMay2.23.pdf>, accessed 12 April 2026.

As Australian producer Lynas put it in 2022:

> A magnet maker outside China who sources rare earths oxide, metal or alloy from inside China pays 13–20% more for raw rare earth material than a magnet maker located inside China. Accordingly, a magnet maker (or another downstream industry participant) is financially incentivised to locate its manufacturing operation inside China in order to obtain refunds of the Chinese VAT.[22]

In addition, processed rare earth products – oxides and metals – imported into China are subject to import duties plus 13% VAT. This systematically disadvantages foreign processors, which can only competitively sell low-value concentrate into China. Processed materials face barriers that make foreign sellers uncompetitive, a situation made possible by China's control of midstream processing. In effect, this encourages foreign magnet makers to set up operations in China, which some magnet companies did in the 2010s.

Myanmar and the Risks of China's Import Dependence

A critical – and frequently overlooked – dimension to rare earths trade is that China itself relies on imports of rare earths for its processing and magnet industries, particularly for heavy rare earth elements. China imported more rare earths in 2025 than it exported overall. This creates risks for China if global trade is interrupted.

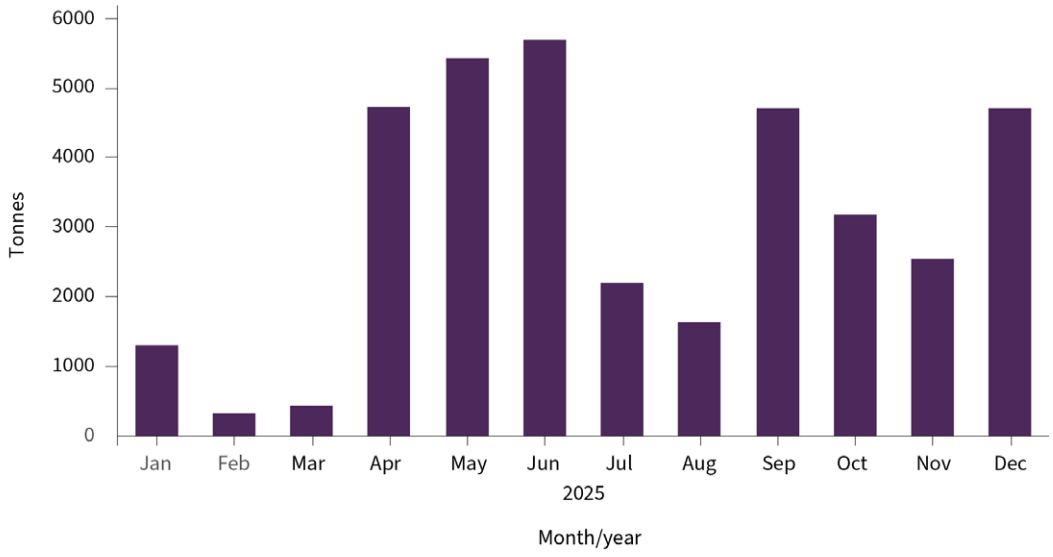
China's largest sources of imports are Myanmar and, until recently, the Mountain Pass mine in the US operated by MP Materials. In 2025, MP Materials stopped exporting ore to China, redirecting its output to domestic US processing.

In the first 10 months of 2025, Myanmar accounted for 52% of China's imports of rare earth raw materials, while the share from US mines fell sharply to 24% and Laotian material made up a further 24%.[23] Yet, because of the civil war in Myanmar, these imports were disrupted in 2025, according to the author's analysis of Chinese customs data.[24]

22. Lynas Rare Earths, comment submitted in response to US Department of Energy request for information, 'Request for Information on Energy Sector Supply Chain Review', Docket No. DOE-HQ-2021-0020-0083, 15 January 2022, <https://downloads.regulations.gov/DOE-HQ-2021-0020-0083/attachment_1.pdf\>, accessed 21 May 2026.
23. 安泰科 , '2025年1-10月中国稀土产品进口情况分析' ['Analysis of China's Rare Earth Product Imports, January–October 2025'], 23 November 2025, republished via Sina Finance, <https://finance.sina.com.cn/roll/2025-11-23/doc-infyksvx6688011.shtml>, accessed 5 June 2026.
24. 中华人民共和国海关总署, [General Administration of Customs of the People's Republic of China] '海关统计数据在线查询平台' ['China Customs Statistics Online Query Platform'], <http://stats.customs.gov.cn/>, accessed 26 May 2026.

In late October 2024, the Kachin Independence Army (KIA), the military wing of the Kachin Independence Organisation (KIO), seized key rare-earth mining areas in northeastern Kachin State near the border with China. The KIO is the political wing of the Kachin independence movement, and the KIA is its armed wing. The area had previously been controlled by the Kachin Border Guard Force led by Zahkung Ting Ying, an armed group aligned with Myanmar's military junta.[25] The KIA then imposed a 20% levy on exported rare-earth concentrates, which disrupted exports. In March, they fell to just over 300 tonnes, a decrease of 89% from the same period one year earlier. China retaliated by closing border gates, but trade seems to have recovered quickly in April 2025 amid talks between the KIA and China. In October 2025, China agreed to reopen the border gates to normal trade. The disruption can be clearly seen in China's import trade data (Figure 5). The KIO now controls most of the country's rare earth mines.[26] Because of the disruption in Myanmar and the loss of US supply in 2025, China rare earth imports fell by 101,062 tonnes overall, a decline of 24% year-on-year.[27]

Figure 5: China's Imports of Rare Earths from Myanmar in 2025



Source: 中华人民共和国海关总署 [General Administration of Customs of the People's Republic of China]' '海关统计数据在线查询平台' ['China Customs Statistics Online Query Platform'], <http://stats.customs.gov.cn/\>, accessed 21 May 2026.

25. Myitkyina Journal, 'Nothing New from KIO / China Meeting', *Burma News International*, 18 December 2024, <https://www.bnionline.net/en/news/nothing-new-kiochina-meeting>, accessed 12 April 2026.
26. Timothy McLaughlin, 'As US and China Feud over Rare Earths, Rebels Control Myanmar's Mines', *Bloomberg*, 18 July 2025.
27. 我的钢铁网 [Mysteel], '海关总署：2025年中国进口稀土101062吨，同比降24%' ['General Administration of Customs: China's Rare Earth Imports Totalled 101,062 Tonnes in 2025, Down 24% Year-on-Year'], 163.com, 19 January 2026, <https://www.163.com/dy/article/KJKLG2SJ0514AHGG.html>, accessed 12 April 2026.

Notably, the heavy rare earths that China relies on for imports were included in the April 2025 export controls, just a month after disruption to Myanmar's exports. One interpretation is that China is ensuring its domestic access to heavy rare earths, and as such, is restricting unnecessary exports. This contrasts with a view that such controls are applied solely as a geopolitical lever.

China's import reliance, therefore, also explains Beijing's decisions on the use of export controls in early 2025. China cannot afford to let higher-value heavy rare earths leave the country. Its reliance on supplies of heavy rare earths from Myanmar remains a fundamental weakness in its otherwise vice-like grip over its domestic rare earth industry.

China's Export Controls: The 2025 Escalation and Its Impact

China has introduced a legal framework for export controls over the past five years, against a backdrop of accelerating US controls on exports of advanced technology to China. China's government has passed the Export Control Law (中华人民共和国出口管制法), effective December 2020,[28] and the Dual-Use Items Export Control Regulations (两用物项出口管制条例), effective December 2024.[29]

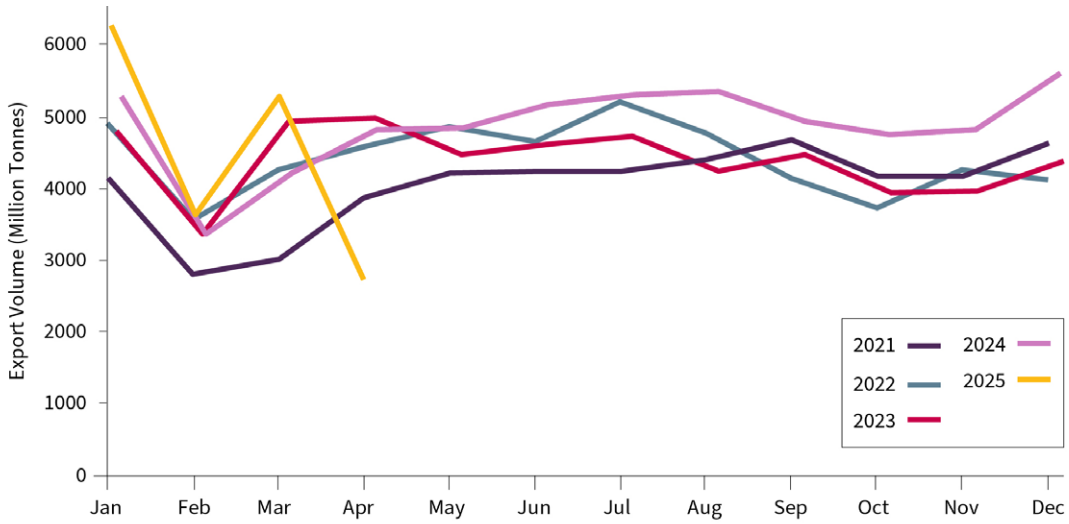
These regulations provided the legal support for the 2025 rare earth export controls, since rare earths are used in many military applications and thus can be considered dual-use items. The Export Control Law specifically allows the state to ban or restrict the export of dual-use items 'to protect national security, safeguard national interests [and] fulfil international obligations'.[30]

28. Standing Committee of the National People's Congress of the People's Republic of China, '中华人民共和国出口管制法' ['Export Control Law of the People's Republic of China'], adopted 17 October 2020, effective 1 December 2020, <http://www.npc.gov.cn/englishnpc/c2759/c23934/202112/t20211209_384804.html>, accessed 12 April 2026.
29. State Council of the People's Republic of China, ' 两用物项出口管制条例' ['Regulations on Export Control of Dual-Use Items'], adopted 30 September 2024, effective 1 December 2024, <https://english.www.gov.cn/policies/latestreleases/202410/19/content_WS67139778c6d0868f4e8ec188.html>, accessed 12 April 2026.
30. Standing Committee of the National People's Congress of the People's Republic of China, '中华人民共和国出口管制法' ['Export Control Law of the People's Republic of China'].

China's Export Controls on Rare Earths: The First Wave in April 2025

China's April 2025 export controls on seven rare earth elements and related products had an immediate impact on the market. As export volumes for magnets fell sharply in April and May, manufacturers across the US, Europe and Asia that rely on Chinese-sourced NdFeB magnets faced acute shortages (Figure 6). Some automotive and industrial manufacturers were forced to cut utilisation rates, and several temporarily suspended production lines. The European automotive industry experienced 'significant disruption', according to the European Association of Automotive Suppliers (CLEPA).[31]

Figure 6: Monthly Exports of Rare Earth Magnets, 2021–25



Source: 中华人民共和国海关总署, [General Administration of Customs of the People's Republic of China] '海关统计数据在线查询平台' ['China Customs Statistics Online Query Platform'].

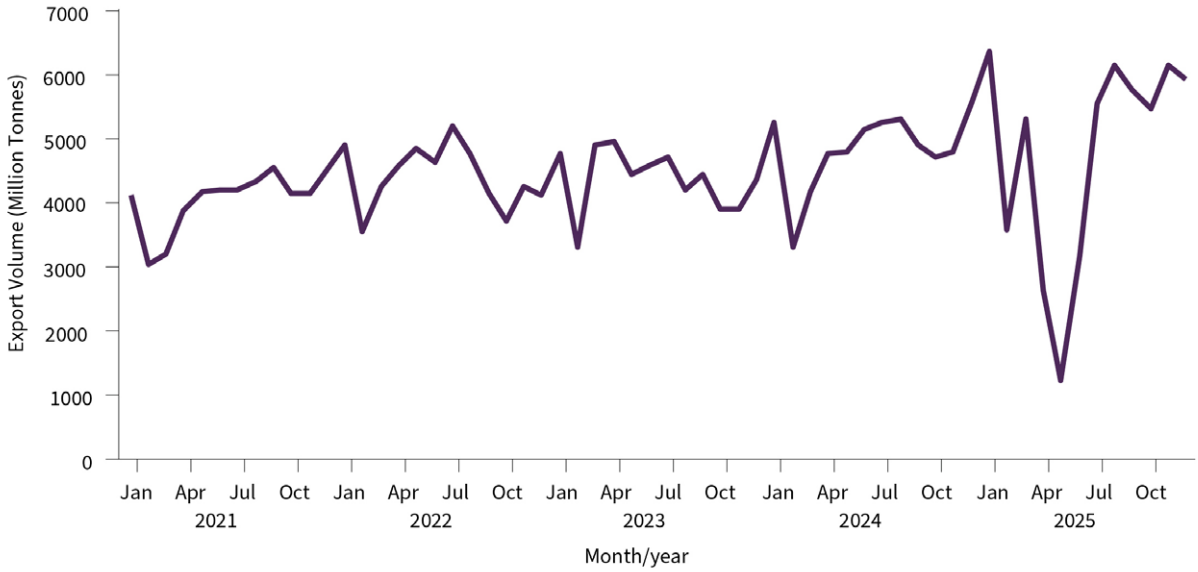
31. CLEPA, 'Urgent Action Needed as China's Export Restrictions on Rare Earths Disrupt European Automotive Supply Chains', press release, 4 June 2025, <https://www.clepa.eu/insights-updates/press-releases/urgent-action-needed-as-chinas-export-restrictions-on-rare-earths-disrupt-european-automotive-supply-chains/>, accessed 12 April 2026.

After the initial delay, however, licences were provided and exports of magnets resumed, with exports ending the year in 2025 higher than in 2024.[32] Magnet exports to the US dropped sharply in April, May and June, but rose to their 2024 average level by July.[33]

Despite export controls and the trade conflict with the US, China's rare earth exports across the value chain in 2025 reached a record high of 62,585 tonnes, a 12.9% year-on-year increase, according to Chinese customs data.[34] Nevertheless, the underlying reality is nuanced. While exports of rare earth permanent magnets rose, exports of the seven controlled elements declined during the year. Exports of dysprosium oxide from China, for example, fell to zero in May after the April controls. Terbium oxide exports also collapsed immediately following the April controls.

The April restrictions indicate that China has maintained a permanent export control on seven medium and heavy rare earths, which are critical to foreign magnet makers, but has maintained and even increased exports of finished magnet products. This gives China the ability to leverage its control over foreign supply chains while still maintaining its giant export machine of rare earth permanent magnet production.

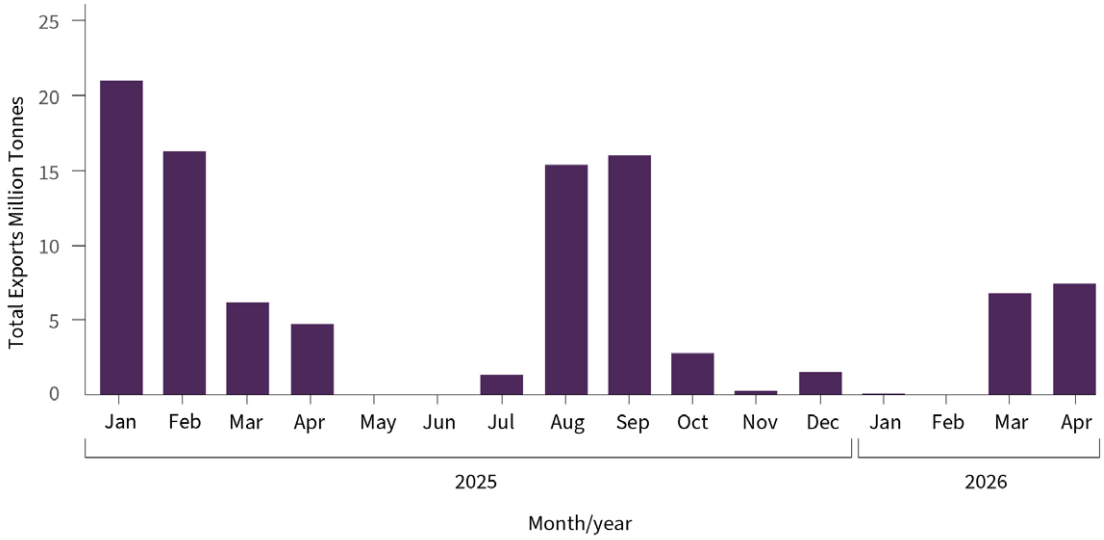
Figure 7: China's Exports of Rare Earth Permanent Magnets Since 2020



Source: 中华人民共和国海关总署, [General Administration of Customs of the People's Republic of China] '海关统计数据在线查询平台' ['China Customs Statistics Online Query Platform'].

32. '中华人民共和国海关总署, '海关统计数据在线查询平台' ['China Customs Statistics Online Query Platform'].
33. Silverado Policy Accelerator, 'China's Rare Earth Exports to the United States', data dashboard, last updated 22 April 2026, <https://silverado.org/data-dashboards/infographic-chinas-exports-us-rare-earths/>, accessed 21 May 2026.
34. 我的钢铁网 (Mysteel), '海关总署：2025年中国进口稀土101062吨，同比降24%' ['General Administration of Customs: China's Rare Earth Imports Totalled 101,062 Tonnes in 2025, Down 24% Year-on-Year'].

Figure 8: China's Dysprosium Oxide Exports, 2025



Source: '中华人民共和国海关总署, '海关统计数据在线查询平台' ['China Customs Statistics Online Query Platform'].

The Second Wave of Export Controls: October 2025 and Extraterritorial Reach

On 9 October 2025, MOFCOM (China's Ministry of Commerce) issued two further announcements (公告2025年第61号 and 第62号) that significantly extended the scope of controls and, if implemented, would amount to the strongest controls that China has ever placed on its rare earth exports. The October measures covered rare earth elements and products, related equipment and technologies across the entire supply chain: mining, cracking and separation, metal production, magnetic material manufacturing and secondary resource recovery.[35]

Most significantly, MOFCOM suggested, for the first time, extraterritorial jurisdiction within its export control regime, requiring foreign entities to obtain Chinese government licences when exporting certain controlled rare earth items from one country outside China to another. This would significantly impact projects in third countries, such as Vietnam.

35. 商务部 (MOFCOM), '商务部公告2025年第61号 公布对境外相关稀土物项实施出口管制的决定' ['Announcement No. 61, 2025: Decision to Implement Export Controls on Relevant Rare Earth Items Outside the Territory'], 9 October 2025, <https://www.mofcom.gov.cn/zwgk/zcfb/art/2025/art_7fc9bff0fb4546ecb02f66ee77d0e5f6.html>, accessed 12 April 2026; 商务部 (MOFCOM), '商务部公告2025年第62号 公布对稀土相关技术实施出口管制的决定' ['Announcement No. 62, 2025: Decision to Implement Export Controls on Rare Earth-Related Technologies'].

This measure applied to products manufactured using Chinese-origin rare earths above a 0.1% value threshold, or using Chinese mining, processing or magnet-making technologies. Chinese legal commentators described this explicitly as '中国版"长臂管辖' – China's version of 'long-arm jurisdiction' – a deliberate mirror of the US Foreign Direct Product Rule.[36]

On 9 October 2025, an official MOFCOM spokesperson's statement justified the measures by stating that medium and heavy rare earths have important military implications and that China, as a responsible major power, was implementing export controls to maintain world peace, regional stability and fulfil non-proliferation obligations ('依法对相关物项实施出口管制，目的是更好维护世界和平与地区稳定，履行防扩散等国际义务').[37]

China developed its frameworks for control over the global rare earth industry before US President Donald Trump's imposition of tariffs in the first half of 2025. However, Trump's trade war gave Beijing the opportunity to use this control for political influence. The October controls were clearly a reaction to US tariffs. Following a meeting in South Korea between Trump and Xi on 7 November 2025, MOFCOM officially announced that China would suspend implementation of six announcements made on 9 October – numbers 55, 56, 57, 58, 61 and 62 – from 7 November 2025 until 10 November 2026.

Yet, critically, the April 2025 controls were not suspended. This means that China has maintained its control over key heavy and medium-heavy rare earth exports and suggests a different internal rationale behind the April and October announcements. That export controls have different strategic functions and are layered on top of one another highlights the challenge of intuiting Beijing's intentions and the risk of misunderstanding and miscalculation.

36. 锦天城律师事务所 (AllBright Law Offices), '中国版长臂管辖' ['Analysis of Extraterritorial Provisions'], October 2025, <https://www.allbrightlaw.com/CN/10475/b3c1aed898229ebb.aspx>, accessed 12 April 2026.
37. 商务部新闻发言人答记者问 [MOFCOM Spokesperson's Statement], 9 October 2025, <https://www.gov.cn/zhengce/202510/content_7044134.htm>, accessed 12 April 2026.

The Third Wave: Export Controls on Japan

In January 2026, China's MOFCOM announced a prohibition on exports of dual-use items to Japan, in response to remarks by Prime Minister Sanae Takaichi that Japan would come to the defence of Taiwan if it were attacked. This marked a significant escalation of China's export controls since rare earths and rare earth metals are considered dual-use items.[38] 'Export of all dual-use items to Japanese military users, for military purposes, and for any other end-user purposes that could enhance Japan's military capabilities is prohibited', the announcement said.

MOFCOM followed up a month later with a 'controlled list' targeting 20 Japanese companies for dual-use controls.[39] Another 20 were added in a separate announcement to a 'watch list' (关注名单).[40] According to *Bloomberg*, China supplied about 76% of the rare earths imported by Japan in January 2026.[41] There are several Japanese companies on the lists which probably use rare earth permanent magnets or rare earth products.

From the Controlled List (Announcement No. 11 – an outright ban):

- **Mitsubishi Heavy Industries subsidiaries** (in shipbuilding, aero engines and marine machinery): Rare earth magnets are essential for EVs, propulsion systems and aerospace components.
- **Kawasaki Heavy Industries Aerospace**: Jet engines and aircraft use neodymium magnets and other rare earths.
- **IHI Corporation subsidiaries:** IHI is a major jet engine manufacturer (jet service, aerospace and aero manufacturing).
- **Nippon Electric Company (NEC) Network and Sensor Systems / NEC Aerospace Systems:** Defence electronics and radar systems rely heavily on rare earths.
- **Japan Aerospace Exploration Agency (JAXA):** Spacecraft and satellites use rare earth-based magnets and materials.

38. 商务部 (MOFCOM), '商务部公告2026年第1号 关于加强两用物项对日本出口管制的公告' ['Announcement No. 1 of 2026 of the Ministry of Commerce on Strengthening Export Controls of Dual-Use Items to Japan'], 6 January 2026, <https://www.mofcom.gov.cn/zwgk/zcfb/art/2026/art_8990fedae8fa462eb02cc9bae5034e91.html>, accessed 12 April 2026.
39. 商务部 (MOFCOM), '商务部公告2026年第11号 公布将20家日本实体列入出口管制管控名单' ['Announcement No. 11 of 2026 on Placing 20 Japanese Entities on the Export Control List'], 24 February 2026, <https://www.mofcom.gov.cn/zcfb/dwmygl/art/2026/art_f344bbdbfaef487dad12a45bed1c8722.html>, accessed 12 April 2026.
40. 商务部 (MOFCOM), '商务部公告2026年第12号 公布将20家日本实体列入关注名单' ['Announcement No. 12 of 2026 on Placing 20 Japanese Entities on the Watch List'], 24 February 2026, <https://www.mofcom.gov.cn/zwgk/zcfb/art/2026/art_bac18400512d408a8d4c2f964e36ac11.html>, accessed 12 April 2026.
41. Yusuke Maekawa and Tsuyoshi Inajima, 'Japan Leans More on China for Rare Earths Despite Lower Imports', *Bloomberg*, 26 February 2026.

From the Watch List (Announcement No. 12):

- **TDK Corporation**: One of the world's largest manufacturers of rare earth magnets (neodymium).
- **Subaru Corporation**: Manufactures hybrid / electric vehicles, which depend on rare earth permanent magnets in motors.
- **Hino Motors**: Commercial vehicles and hybrid powertrains.
- **Sumitomo Heavy Industries**: Industrial machinery with electric motors.
- **Nitto Denko**: Advanced materials manufacturing.
- **Mitsui Bussan Aerospace**: Aerospace trading and components.

Nonetheless, Japan has been the most successful country outside China in diversifying its rare earth supply chain. In 2010, China temporarily cut supplies of rare earths to Japan following a collision with a Chinese fishing boat in disputed waters. Japan's state-owned Japan Organisation for Metals and Energy Security (JOGMEC) went on to financially support Australia's mining company Lynas in producing rare earths in Australia and Malaysia.[42]

In 2025, Lynas started processing heavy rare earths in Malaysia. It plans to build processing facilities in the country with a capacity to produce 5,000 tonnes a year of heavy rare earth feedstock. In March 2026, Lynas announced that it, JOGMEC and Sojitz Corporation had agreed an updated supply agreement for 5,000 tonnes per year of NdPr rare earths with a $110/kg floor price. Lynas agreed to supply to the Japanese market up to 75% of all heavy rare earth oxides produced by Lynas.[43] Japanese companies such as Shin-Etsu Chemical Co. have also invested in rare earth magnet plants in Vietnam.[44] In 2026, JOGMEC invested €110 million with Iwatani Corp into France's Caremag SAS to secure supplies of heavy rare earths.[45]

42. Keith Bradsher, 'Amid Tension, China Blocks Vital Exports to Japan', *New York Times*, 22 September 2010.
43. Lynas Rare Earths Ltd, 'Lynas and JARE Sign Mineral Exploration & Development MOU', 13 March 2026, <https://wcsecure.weblink.com.au/pdf/LYC/03068283.pdf>, accessed 12 April 2026.
44. Shin-Etsu Chemical Co., Ltd, 'Shin-Etsu Chemical to Construct a Rare Earth Magnet Manufacturing Plant in Hai Phong Province in Vietnam', press release, 21 April 2014, <https://www.shinetsu.co.jp/en/news/news-release/shin-etsu-chemical-to-construct-a-rare-earth-magnet-manufacturing-plant-in-hai-phong-province-in-vietnam/>, accessed 12 April 2026.
45. Yuka Obayashi, 'Japan's JOGMEG, Iwatani to Invest $120 Million in French Rare Earths Project', *Reuters*, 17 March 2025.

Table 5: JOGMEC's Investments in Foreign Rare Earths Projects

Year	Project	Location	Amount	Notes
2011	Lynas	Australia / Malaysia	$250 million (m)	Light rare earth elements; equity and loans via Sojitz JV
2020	Lofdal	Namibia	$12 m	Heavy rare earths
2022	Lynas additional exploration	Australia	$9 m	Mount Weld exploration top-up
2023	Lynas heavy rare earth elements expansion	Australia / Malaysia	AUD 200 m ($134 m)	First JOGMEC heavy rare earth elements equity deal
2025	Caremag / Japan France Rare Earths	France	Up to €110 m	First standalone refinery investment
2025	REAlloys memorandum of understanding	US / Canada	TBD	First US partner; no funding yet committed

Source: The author, based on JOGMEC's Japanese-language news releases and Japan's Ministry of Economy, Trade and Industry (METI) press releases. See JOGMEG, <https://www.jogmec.go.jp/>; METI, <https://www.meti.go.jp/>.

Despite these efforts, Japan continues to rely on China for processed high-purity heavy rare earths such as dysprosium and terbium.

MOFCOM's announcement, however, confirms Beijing's willingness to use dual-use controls for political punishment, which should be a warning to Western countries which continue to rely on Chinese rare earth magnets.

Collecting Intelligence

Alongside its controls, China is using licensing to gather data and intelligence about who uses its rare earth products and how. The MOFCOM licensing process for the first-wave controls requires considerable detail on uses and end-buyers outside China. The process has also created an additional administrative cost. German automakers, for example, were required to produce a commitment letter with each batch of magnets stating they would not be used for military purposes, according to SMM.[46]

This has created an intelligence gain for Beijing: while Western companies do not have complete visibility over their own supply chains, China is gaining unprecedented insight into Western dependencies through licence application data.[47]

46. Shanghai Metals Market (SMM), 'Dependency & Independence: European Rare Earth Analysis', 26 August 2025, <https://news.metal.com/newscontent/103497154-dependencyindependence-european-rare-earth-analysissmm-analysis>, accessed 12 April 2026.
47. *Reuters*, 'China Increases Scrutiny over Rare Earth Magnets with New Tracking System', 5 June 2025.

How Far Can China Use Its Rare Earth Supply Chains to Influence Others?

China demonstrated its willingness to deploy rare earths to exercise influence most starkly in 2010, when rare earths exports were halted to Japan following the aforementioned boat collision. Although Beijing never formally acknowledged the embargo, its effect was immediate: dysprosium oxide prices rose from $91/kg in January 2009 to $2,377/kg by August 2011.[48] Consequently, Japan accelerated its diversification and the US, the EU and Japan jointly filed a WTO complaint in 2012.[49]

During Trump's first term, while visiting a leading rare earth magnet maker, J L Mag, in 2019, Xi raised the prospect of China using its control of the rare earth supply chain for influence. State media explicitly posed the question 'will rare earths become a counter-weapon?' ('稀土会成为反制武器吗'), and commentary in *Xinhua* noted that US dependence on Chinese rare earths made the US 'uncomfortable'.[50]

China began building leverage with its export control law in 2020. Export controls in 2025 marked a shift from signalling to sustained operational use. This probably influenced Trump's decision to reduce US tariffs on China.

China's dominance of the entire mine-to-magnet supply chain for rare earths is key to the country's attempts at influence. Foreign countries must therefore build the entire supply chain if they want to fully move away from China and diversify. In addition, China can control prices with greater accuracy than before due to the consolidation of the sector and the tightened production quota system. The export licensing system also gives Beijing an additional means of influencing prices by restricting exports.

48. Ryan Castilloux, 'Charts: Rare Earth Export Restrictions, Price Spikes and the Risks of Demand Destruction', Adamas Intelligence, published on Mining.com, 25 April 2025, <https://www.mining.com/featured-article/charts-rare-earth-export-restrictions-price-spikes-and-the-risks-of-demand-destruction/>, accessed 12 April 2026.
49. WTO, 'China — Measures Related to the Exportation of Rare Earths, Tungsten and Molybdenum', Request for Consultations by the US(WT/DS431/1), the EU (WT/DS432/1) and Japan (WT/DS433/1), 13 March 2012. The panel found that China's export quotas and duties were inconsistent with WTO rules. The Appellate Body upheld the findings on 7 August 2014.
50. *Xinhua*, '习近平江西考察第一天：行程背后有深意' ['Xi Jinping's First Day Inspecting Jiangxi: The Deeper Significance Behind the Itinerary'], 21 May 2019, <https://www.xinhuanet.com/politics/xxjxs/2019-05/21/c_1124523643.htm>, accessed 12 April 2026. Following Xi's visit, an NDRC spokesperson addressed whether rare earths could serve as a counter-weapon, stating: '如果有谁想利用我们出口稀土所制造的产品，反用于遏制打压中国的发展，那么我想赣南原中央苏区人民、中国人民，都会不高兴的' ('If anyone seeks to use products made from our rare earth exports to contain and suppress China's development, then the people of the former Central Soviet Area in southern Jiangxi, and the Chinese people, will not be happy'). See 国家发展和改革委员会 (NDRC), '国家发展改革委有关负责人就稀土产业发展相关问题答记者问' ['NDRC Spokesperson Answers Reporter Questions on Rare Earth Industry Development'], *Xinhua*, 28 May 2019; Wu Yue He, '美方不要低估中方反制能力' ['The US Should Not Underestimate China's Capacity for Countermeasures'], 人民日报 [*People's Daily*], 29 May 2019.

Beijing has limited its downside risks because it is the largest consumer of products that use rare earth elements. Chinese EV sales represent two-thirds of the global EV market each year and it is the biggest installer of offshore wind capacity in the world.

Yet, the question remains: how long can China sustain such leverage before it damages its own ability to be an exporter of rare earth magnets and other products? Automakers such as General Motors have already invested heavily in building a domestic non-Chinese supply chain of rare earth permanent magnets. The company signed a deal with US-based Noveon Magnetics in 2025 and a binding long-term supply agreement with the US' e-VAC in 2023.[51] Despite this, General Motors was reportedly affected by China's export controls of April 2025, with a ship carrying magnets to the company forced to turn around mid-journey, according to one source.[52]

Western Efforts to Diversify

China's actions in 2025 accelerated investment outside China in supply chains outside China, especially in rare earth permanent magnet manufacturing in the US. The US government has committed almost $3 billion across equity, loans and direct grants to rare earth companies from 2025 to 2026.[53]

Up to 50,000 tonnes of sintered NdFeB capacity has been announced, planned or is under construction in the US, potentially available by 2030, according to US magnet expert John Ormerod.[54] Before 2025 there was no production capacity. The expected capacity would be much higher than current US imports of around 3,000 tonnes. Most notably, Germany's Vacuumschmelze has built a magnet manufacturing plant in South Carolina, which opened in 2025. In France, the expansion of Solvay's rare earth plant in La Rochelle could meet 30% of Europe's rare earth magnetic demand by 2030.[55]

51. Noveon Magnetics, 'Driving American Industry: General Motors & Noveon Magnetics Sign Multi-Year Agreement to Deliver American-Made Rare Earth Magnets', press release, 6 August 2025, <https://noveon.co/general-motors-noveon-magnetics-sign-multi-year-agreement>, accessed 21 May 2026; Vacuumschmelze (VAC), 'Vacuumschmelze (VAC) Announces Binding Supply Agreement with General Motors (GM) to Support EV Growth', press release, 30 January 2023, <https://vacuumschmelze.com/02_Pressreleases/2023/01-23%20Press%20Release_GM_Contract_en_2023_01_30.pdf>, accessed 12 April 2026.
52. Author interview with rare earth executive, London, March 2026.
53. US Department of Defense, 'Department of Defense Strategic Partnership with MP Materials', 10 July 2025; Vulcan Elements, 'Vulcan Elements Forges $1.4 Billion Partnership with the United States Government and ReElement Technologies', 3 November 2025, <https://vulcanelements.com/vulcan-elements-forges-1-4-billion/>, accessed 9 June 2026; National Institute of Standards and Technology, 'The Department of Commerce's CHIPS Program Announces a Letter of Intent with USA Rare Earth…', 26 January 2026, <https://www.nist.gov/news-events/news/2026/01/department-commerces-chips-program-announces-letter-intent-usa-rare-earth>, accessed 9 June 2026.
54. John Ormerod, 'Current Status of the Sintered NdFeB Magnet Manufacturing Industry in the US (January 2026)', LinkedIn post, January 2026, <https://www.linkedin.com/posts/jormerod_ndfeb-rareearth-rarearths-activity-7421600100507967489-m6tE>, accessed 5 June 2026.
55. SMM, 'Dependency & Independence'.

Nevertheless, there are many Chinese suppliers of cheaper rare earth magnets for use in smaller applications, such as the motors that adjust powered car seats, that will be harder to replace.[56] It is also uncertain whether China's role will be reduced further upstream, especially in heavy rare earth production and rare earth metal production, where there are only a few active companies. Europe and the US are still reliant, therefore, on Chinese dysprosium and terbium raw materials, especially for large civilian industries.

Table 6: Production of Rare Earth Metals, Alloys and Heavy Rare Earth Separation Outside China

Company	Location	Capacity/Products	Status
LCM	UK (now USA Rare Earth subsidiary)	Light and heavy rare earth permanent magnet metals and alloys – Sm, SmCo, NdPr, Dy, Tb, Y, Gd – by metal-making and strip casting; processes oxide feedstocks from mined and recycled sources; total plant alloy capacity ~2,500 t/yr (all products)	Only proven producer outside China of both light and heavy rare earth magnet metals and alloys at scale
Lynas Rare Earths	Malaysia / Australia	Produced separated dysprosium (Dy) and terbium (Tb) in 2025; building Malaysian capacity for ~5,000 t/yr of heavy rare earth feedstock	First commercial separation outside China of heavy rare earths
Iluka Resources (Eneabba)	Australia	Pilot rare earth metals from mineral sands	Early commercial
MP Materials	US (Texas and California)	Commenced commercial production of NdPr metal in 2025; commissioning heavy rare earth (Dy/Tb) separation at Mountain Pass from mid-2026; samarium to follow by 2028	Scaling in 2026

Source: Author synthesis from published announcements.

China, therefore, will still have the ability to influence foreign supply chains for the foreseeable future. However, having become a less reliable supplier, it may lose some of its longer-term influence over foreign companies, especially those in the defence sector.

56. Author interview with rare earth executive, London, March 2026.

UK Exposure to China's Export Controls

The UK's exposure to China's rare earth export controls is broad and cuts across multiple sectors: defence, automotive, clean energy, healthcare and advanced manufacturing. Yet, the picture is complicated by the opacity of UK supply chains, where indirect dependencies through components and sub-assemblies mean that many companies do not have full visibility over their own exposure to Chinese rare earth inputs. The European Central Bank has estimated that more than four-fifths of Europe's large companies are within three supply chain steps of a Chinese rare earth producer.[57] The figure is probably broadly applicable to UK firms, given similarly deep integration into European manufacturing supply chains.

The UK mostly imports finished products containing rare earths from China, such as magnets embedded in components. It also imports smaller quantities of rare earth permanent magnets directly. It imported 973 tonnes of magnets from China last year, according to HM Revenue & Customs, an increase of 8% from 2024.[58] However, the real level of imports of rare earth magnets and rare earths embedded in components and products will be much higher and is not reflected in the data.

While annual import volumes remained relatively flat over the full year of 2025, month-by-month data reveals significant volatility, consistent with anecdotal evidence of delays in receiving export licences from China. After the April 2025 export controls, UK imports of permanent magnets fell to just 59 tonnes in June 2025, compared with over 100 tonnes in June 2024, before recovering.[59]

57. Mattia Banin et al., 'How Vulnerable is the Euro Area to Restrictions on Chinese Rare Earth Exports?', *ECB Economic Bulletin* (No. 6, 2025).
58. HM Revenue & Customs, 'UK Trade Info', <https://www.uktradeinfo.com/>, accessed 21 May 2026.
59. *Ibid.*

This pattern reflects the operational reality of China's licensing system: disruption comes not through outright prohibition but through administrative delay, which creates acute problems for companies with just-in-time supply chains. Large UK companies are relatively price-inelastic. The biggest concern is not cost but rather the prospect of delays that interrupt production schedules.

For the UK, the licensing process itself creates an additional risk, coupled with the risks felt by the UK's defence sector. The defence sector is a sensitive dimension of UK exposure and a structural intelligence asymmetry that has not yet been addressed. Like German automakers, UK defence-adjacent companies sourcing through Chinese suppliers must provide commitment letters. The inability to provide credible end-use assurances may result in licences being denied or delayed on national security grounds. Small and medium-sized enterprises in the defence supply chain – and more generally – are particularly exposed as they may lack dedicated compliance functions or direct relationships with MOFCOM.

The automotive industry in the UK is also exposed due to the use of Chinese rare earth permanent magnets in traction motors. The industry suffered from delays to export licences in 2025. While the industry could switch to magnets that do not contain rare earths, there would be a performance trade-off.

The UK's clean energy ambitions create further exposure to rare earth supply chains. Offshore wind turbines – particularly direct-drive designs, which are the dominant configuration for offshore installations – rely on large-format NdFeB permanent magnet generators.[60] With the UK hosting the largest installed offshore wind capacity in Europe and with ambitious targets for further expansion, the cumulative tonnage of rare earth magnets required for turbine manufacturing represents a substantial and growing demand pipeline that is currently almost entirely dependent on Chinese supply.[61]

While exposed to imports, the UK is better positioned than most Western countries to participate in a mine-to-magnet supply chain. LCM at Ellesmere Port is the only scaled commercial producer of rare earth metals and alloys outside Asia. Ionic Technologies focuses on hydrometallurgical recycling to produce rare earth oxides from secondary feedstocks. HyProMag manufactures sintered NdFeB magnets from recycled material and is one of the few integrated magnet production operations outside China and Japan.[62]

60. Dolf Gielen and Martina Lyons, *Critical Materials for the Energy Transition: Rare Earth Elements* (Abu Dhabi: International Renewable Energy Agency, 2022).
61. International Energy Agency, 'Rare Earth Elements', 2025, <https://www.iea.org/reports/rare-earth-elements/executive-summary>, accessed 11 May 2026.
62. LCM, 'Metal and Alloy Production in the Western World: A Supply Chain Alternative', <https://lesscommonmetals.com/metal-and-alloy-production-in-the-western-world-a-supply-chain-alternative/>, accessed 11 May 2026; Ionic Technologies, 'Process', <https://ionictechnologies.com/process/>, accessed 11 May 2026; HyProMag, 'About', <https://hypromag.com/about/>, accessed 11 May 2026.

The UK's Critical Minerals Strategy, published in November 2025, is the most significant policy response to date.[63] The strategy sets a target of meeting 30% of critical mineral needs domestically by 2035 and caps reliance on any single foreign supplier at 60% for each mineral. It explicitly identifies LCM's Ellesmere Port plant as a strategic national asset and signals that the government is exploring stockpiles of critical minerals, magnets and battery cells, particularly for defence applications, as well as engagement through NATO's critical mineral stockpiling project.

The strategy has limitations. It does not resolve the question of where the UK sources the heavy rare earth oxides such as dysprosium and terbium that LCM and others need to produce their alloys and magnets. Both elements are on China's April 2025 controlled list and there is currently no commercial-scale source outside China of separated heavy rare earth metals, other than Lynas' nascent Malaysian facility. Ionic Technologies' project in Belfast would also be able to supply separated dysprosium and terbium oxides, potentially sourced from magnet waste streams and purified for reuse.

More fundamentally, the UK suffers from high energy prices, infrastructure constraints and the decline of its chemicals industry which is required to provide chemical feedstocks for cracking and separation and to participate in chemical recycling loops.

In addition, while countries such as Japan operate a government-backed strategic stockpiling system for critical industrial inputs, with buffer inventories designed to cover months of disruption in highrisk materials, the UK is only beginning to explore targeted critical mineral stockpiles. It currently relies mainly on market inventories and diversification measures.

Stockpiling is not a solution to diversification, but it can help to smooth volatility during periods of acute shortages. In many niche mineral markets, small differences between supply and demand can lead to price spikes, meaning that stockpiles can be effective in reducing price volatility. Still, this requires a body with the capacity to closely monitor markets. China's State Reserve Bureau regularly intervenes in markets at opportune times to build stockpiles of metals, for example. Rumours that the State Reserves Bureau will buy metals are a persistent influence on market pricing – thereby highlighting how stockpiling can influence prices.

Europe is moving ahead with plans to develop a critical minerals stockpile as part of its RESourceEU Action Plan, which was passed in December 2025.[64] A new Critical Raw Material Centre will develop a pilot stockpiling programme under the legislation.

63. HM Government, 'Vision 2035: Critical Minerals Strategy', 22 November 2025, last updated 23 January 2026, <https://www.gov.uk/government/publications/uk-critical-minerals-strategy>, accessed 12 April 2026.
64. Henry Sanderson, 'Europe's New Critical Minerals Plan Will Unlock New Resources, but Permitting and Chinese Involvement Remain Key Hurdles', OIES Energy Comment, 11 December 2025, <https://www.oxfordenergy.org/publications/europes-new-critical-minerals-plan-will-unlock-new-resources-but-permitting-and-chinese-involvement-remain-key-hurdles/>, accessed 12 April 2026.

Conclusion

This paper has shown that China's dominance of the rare earth supply chain is not an accident of geology. Rather, it is the product of decades of deliberate policy, from the consolidation of its mining and processing industries into two state-owned enterprises to the introduction of export licensing that gives Beijing granular visibility over who uses its materials and for what purpose. Understanding that dominance in full is the starting point for any UK response.

China's strategic objective is to maintain its world-leading manufacturing industry and preserve its technical and innovative edge through this decade and beyond. Rare earths are a central part of that toolkit: rare earth permanent magnets are essential inputs for EVs, robotics, wind turbines and AI – industries with an exceptionally large growth outlook.

That scale of demand growth explains why Beijing treats rare earth dominance as a core industrial strategy objective rather than merely a trade lever or question of resource governance. This is clearly reflected in the outline of China's 15th Five-Year Plan, which runs to 2030, and which states that China should 'continuously enhance its competitive advantages in rare earths and rare metals'.[65]

The broader emphasis of the plan on high-quality development (高质量发展) and scientific and technological innovation (科技创新) signals that China intends to capture more value from rare earths. It seeks to move up the supply chain into magnets, motors and finished components, rather than returning to the export of cheap raw materials that characterised the industry in earlier decades. Long gone are the days when China was content to export mined ore.

The most important finding of this paper is that China's April 2025 export controls were not a blunt instrument. In fact, Beijing maintained, and indeed grew, exports of finished rare earth permanent magnets while simultaneously restricting the seven medium and heavy rare earth elements that foreign magnet makers need as inputs.

65. State Council of the People's Republic of China, '中华人民共和国国民经济和社会发展第十五个五年规划纲要' ['Outline of the 15th Five-Year Plan for National Economic and Social Development of the People's Republic of China'], *Xinhua*, 13 March 2026, <https://www.news.cn/politics/20260313/085af5de5a4b4268aa7d87d90817df2f/c.html>, accessed 12 April 2026.

The effect is surgical: China retains its giant export machine while denying competitors the raw materials they would need to build their own. Chinese magnet producers benefit further from a structural 13% cost advantage through VAT rebates on magnet exports, a subsidy that has no equivalent outside China and with which the UK's own magnet industry must contend.

As Li Wei, member of the Standing Committee of the CPPCC, academician of the Chinese Academy of Engineering, and deputy chief engineer of China Iron & Steel Research Institute Group, said to *China Metallurgical News* in March 2026: 'overall, China's rare earth industry is transitioning from scale expansion to quality and efficiency enhancement, marking a critical window for transformation and upgrading'.[66]

Chinese producers retain a commercial interest in sustaining export relationships, which means a full cut-off in exports of all rare earth-containing products remains unlikely. At the same time, Beijing has demonstrated a clear willingness to use rare earths for geopolitical influence, restricting exports to Japan in 2010 and again in 2026, and imposing global controls in 2025. Its dual-use export controls served as a direct counterweight to US restrictions on high-technology chip exports to China and to the sweeping 'Liberation Day' tariffs imposed in April 2025. The direction of travel is towards more selective, targeted use of export restrictions as a tool of statecraft, not their abandonment.

There is an additional security challenge for the West to consider. Through its licensing system, China is accumulating unprecedented intelligence on Western supply chain dependencies. That asymmetry is as much a vulnerability as the supply chain gaps themselves and closing it should be treated as a matter of urgency.

It is therefore essential for the UK to diversify its rare earth supply chain to maintain resilience against future disruptions. The target of producing about 1,000 tonnes of NdFeB magnets per year domestically is a worthwhile objective, since this would help to cover UK demand and reduce direct exposure to Chinese supply. But supply downstream diversification alone will not be sufficient if the structural fiscal advantages enjoyed by Chinese producers further upstream are not offset through government support. Such support could be in the form of price floors, offtake agreements or targeted investment of the kind that the US and Japan have begun to deploy.

66. 刘经纬 (Liu Jingwei) and 金子涵 (Jin Zihan), '李卫委员：稀土作为关键材料，必须从依赖'资源优势'转向依靠'技术优势' ['CPPCC Member Li Wei: Rare Earths as a Key Material Must Shift from Reliance on "Resource Advantages" to Reliance on "Technological Advantages"'], 中国冶金报, 10 March 2026, republished via Sina Finance, <https://finance.sina.com.cn/wm/2026-03-10/doc-inhqpaer6243249.shtml>, accessed 12 April 2026.

If US rare earth and magnet production commitments materialise on schedule, there could eventually be surplus Allied supply available to the UK. Processing facilities under development in Vietnam and Malaysia also offer a further potential source of supply diversification. Taken together, these developments point towards a more distributed supply landscape by the end of the decade, but this will require active UK policy engagement to access.

The UK could benefit from strategic partnerships that complement its own domestic assets. The acquisition of LCM by USA Rare Earth in 2025 opens the UK up to the US rare earth supply chain, for example. However, at the same time, it introduces US control of a UK asset that could become strategically important for defence.[67] LCM is also building a plant in France, which could strengthen links with Europe's supply chain.[68] Building relationships with Japan would further strengthen these links, since Japan is the second-biggest producer of rare earth magnets after China.

China has spent decades building its position, yet China's 2025 export controls have woken up the West. The rhetoric is translating into global action, and the UK needs to ensure it is not left behind.

67. LCM, 'LCM Acquired by USA Rare Earth in a Transformative Strategy', 29 September 2025, <https://lesscommonmetals.com/lcm-acquired-by-usar/>, accessed 12 April 2026.
68. LCM, 'Less Common Metals Establishes Strategic Presence in France to Support EU Supply Chains', 20 May 2025, <https://lesscommonmetals.com/less-common-metals-establishes-strategic-presence-in-france-to-support-eu-supply-chains/>, accessed 12 April 2026.

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