

# Rare Earth Magnets

## *Market outlook and investment thesis*

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### **My conviction.**

The Chinese export control regime that took effect on April 4, 2025 changed the global rare earth market in a way most generalist investors have not internalised. MOFCOM Announcement 18 added neodymium-praseodymium oxide (NdPr) to the export licence regime. Approval rates today run 60 to 75% for civilian buyers and approximately zero for military end use. The same molecule now trades at two prices: the SMM Shanghai domestic benchmark sits near \$125/kg, the FOB China export price near \$255. The premium of \$130/kg (104%) is licence-enforced. Arbitrage cannot close it because the regime physically prevents the merchant flow.

This regime is structural, not a temporary trade dispute. The escalation ladder behind it (Figure 9) has eight rungs over 33 months and has never reversed. The October 2025 expansion was suspended in November 2025 by Announcement 70 as part of the Busan summit truce, but the architecture is preserved intact and the suspension expires on November 10, 2026. The export controls are now embedded in the 14th Five-Year Plan critical minerals framework. Removal would require rebuilding political consensus from outside existing institutional commitments. My probability assignment for the November 2026 expiry is 65% partial reimposition, 25% full reimposition, 10% full removal. Both of the first two outcomes are positive for the long basket; only the third breaks the thesis.

The Western supply response is real but slower than consensus assumes. Adamas Intelligence puts global NdFeB demand at 410 kilotonnes by 2030 against 259 in 2024. Announced ex-China capacity sums to 38+ kilotonnes by 2030, but realistic delivered tonnage based on historical industry slippage is 25 to 35 kilotonnes. The 2030 deficit against announced supply is 60 kilotonnes; against realistic supply it widens materially (Figure 6). Most ex-China projects clear the \$110/kg DoW floor with margin (MP Mountain Pass at \$45, Lynas Mt Weld at \$60 all-in-sustaining cost).

The structural change that cements the thesis is the MP Materials and US Department of War agreement signed July 10, 2025: a 15% federal equity stake, a \$110/kg NdPr price floor for ten years implemented as a contract for difference, \$1.0 billion of construction financing, and a 10-year offtake on 100% of MP's 10X plant output into the national security stockpile. This is the first sovereign-anchored commodity contract structure I have seen in critical minerals. It removes the historical worst-case downside (Figure 4) and converts MP from a price-exposed name into an execution-exposed name. The sovereign price floor at the largest producer effectively defines a cost floor for the entire set.

**The trade.** Long the ex-China integrated magnet basket against short Chinese magnet makers (Figure 11). Long: MP Materials 30%, Lynas 20%, Iluka 10%, Neo Performance 5%, Energy Fuels 3%, Aclara/Meteoric 2%. Short: JL MAG Rare Earth 15%, Zhong Ke San Huan 8%, Ningbo Yunsheng 7%. Sized for 8 to 12% portfolio gross with 3 to 5% of NAV at risk. Entry catalyst is the November 2026 binary; supporting catalysts include the Section 232 PCMDP implementation in mid-2026.

**What would change my mind.** The single thesis-breaking outcome is a US-China grand bargain that removes the export control architecture in exchange for broader trade resets. I rate this at 10%. The most credible bear case at higher probability is CRMA-driven recycling at 50%, but it bites the light rare earth fraction only and the heavy weighted long legs (Lynas, Iluka) are by-design resilient. I sit at high conviction on the long basket and medium-high conviction on the short.

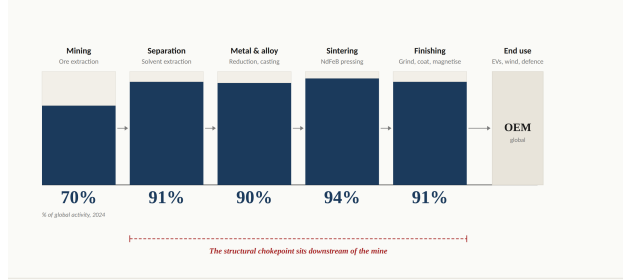
## Where the real problem is

I want to make one observation up front because it reframes everything that follows. The popular framing of the rare earth dependency story focuses on extraction. That framing is incomplete. China does about 70 percent of global mining (270 thousand tonnes of REO, rare earth oxide content, against a 2024 global total of 390 thousand tonnes). That is concerning but not, in itself, a chokepoint that any well-capitalised sovereign would struggle to break.

What matters more is what happens after the rock comes out of the ground. Rare earth ore must be cleaned of radioactive thorium and uranium impurities, separated into individual elements through 50 to 100 stages of solvent extraction, reduced to metal via molten salt electrolysis, alloyed with iron and boron, and finally pressed and sintered into magnets. Figure 1 shows China's share at each step. Mining is 70 percent. Separation is 91 percent. Metal and alloy production is 90 percent. Magnet sintering is 94 percent (China produced approximately 244 thousand tonnes of Nd-FeB in 2024 against a global total of 259). Finishing is 91 percent. The grip tightens as you walk downstream.

### China owns the magnet, not the mine

China's share of global activity at each stage of the rare earth magnet value chain



Sources: IEA Critical Minerals Outlook 2025, Benchmark Mineral Intelligence, USGS Mineral Commodity Summaries 2026, GlobalData.

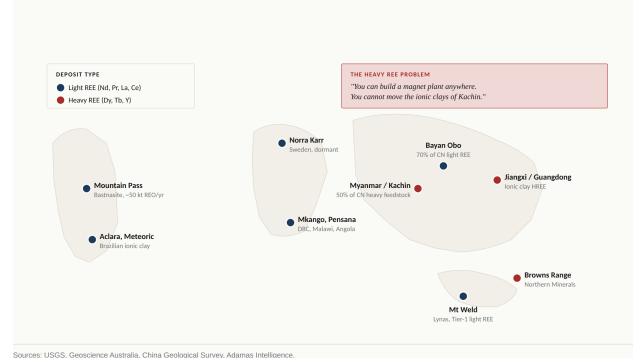
**Figure 1.** Chinese share of global activity at each stage of the rare earth magnet value chain in 2024. The structural chokepoint sits downstream of the mine.

The implication runs through everything that follows. New ex-China mines exist or are in development at Mountain Pass, Mt Weld, Eneabba, plus pre-FID names in Brazil and Africa. None of them displace Chinese supply at the level the magnet OEM (the Tesla, GM, Bosch, Vestas, Siemens Energy buyer) actually purchases unless the entire downstream pipeline is replicated. The December 2023 Chinese ban on the export of separation and magnet technology, codified in the Catalogue of Technologies Prohibited from Export, was designed to prevent exactly that. It froze the ex-China industrial capacity at its then-current level, which is roughly 6 percent of global magnet output. The execution risk attached to the build is the central operational risk in the thesis. I return to it in Figure 8.

There is a second concentration story most generalist investors miss. Rare earths split into two groups, light

## Heavy rare earths sit in two countries

Major economically extractable deposits, schematic. The light fraction is global, the heavy fraction is geographic destiny.



**Figure 2.** Light versus heavy rare earth deposits. Light rare earths are globally distributed. Heavy rare earths (Dy, Tb, Y) are not. The two-country concentration in heavy rare earths is the single largest under-priced tail risk in the complex.

and heavy. The light fraction (neodymium, praseodymium, lanthanum, cerium) drives the bulk of magnet demand. The heavy fraction (dysprosium, terbium, yttrium) gives a sintered magnet its high-temperature stability. A standard NdFeB magnet for an EV traction motor contains 1 to 6 percent dysprosium and 0.1 to 0.5 percent terbium by weight, depending on operating temperature. Without them the magnet demagnetises at the 150 to 180 degrees Celsius typical of an EV motor.

More than 95 percent of the world's economically extractable heavy rare earths come from just two places: Myanmar's Kachin state (which supplied roughly 40 to 50 percent of Chinese heavy REE feedstock in 2024 through the Sino-Myanmar Pipeline corridor) and southern China's ionic clay belt in Jiangxi and Guangdong. Lynas's Mt Weld is the only commercial heavy rare earth source outside this geography, supplemented by small operations at Browns Range and the pre-FID Aclara play in Brazil. Pre-FID means before final investment decision; the project has not been funded for construction.

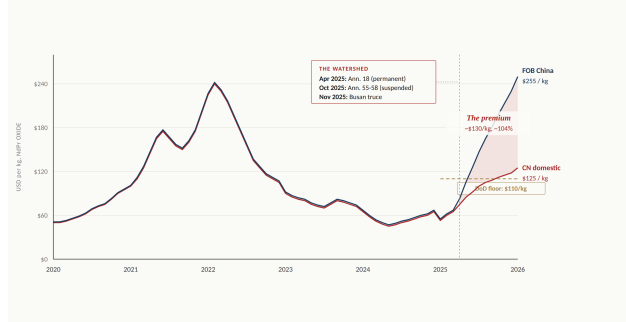
This is geographic destiny, not a function of price. The Myanmar feedstock pipeline runs through territory contested by the Kachin Independence Army following the 2021 coup. In my view it is the highest-impact tail risk in the complex, but I score it as a 20 percent probability tail upside for the long basket, not a downside. Disruption from Myanmar would tighten the heavy REE market sharply in Lynas and Iluka's favour.

## Two prices for the same molecule

The cleanest way to see what April 2025 did is the chart in Figure 3. From 2020 through early 2025 the SMM China benchmark and the ex-China FOB price sit almost on top of each other, the basis held tight by

### Two prices for the same molecule

NdPr oxide, Chinese domestic SMM versus ex-China FOB, monthly average, USD per kg, Jan 2020 to Jan 2026



Sources: SMM, Argus Media, Asian Metal, Benchmark Mineral Intelligence, author calculations.

**Figure 3.** NdPr oxide, Chinese domestic SMM versus ex-China FOB, monthly average, USD per kilogram. The two curves tracked one another almost exactly through 2024. April 2025 broke the correlation.

ordinary licit merchant flow. Spreads rarely exceeded \$5 per kilogram and the historical correlation was 0.97 over the five-year window through March 2025.

Announcement 18 broke the lock on April 4, 2025. Every shipment of rare earths and magnets out of China now requires a government licence. License processing has lengthened from a previous norm of 7 to 14 days to 45 to 90 days for civilian buyers and indefinite suspension for sensitive applications. The arbitrage that historically closed the gap cannot operate, because the licence regime physically prevents the merchant flow.

This is, I think, the single most important point in the note. The premium is not a price signal that incentivises supply. It is a tax on every non-Chinese buyer that funds the Chinese state, and it sits as a structural call option that Beijing can extend, narrow, or weaponise against specific end-use sectors at will.

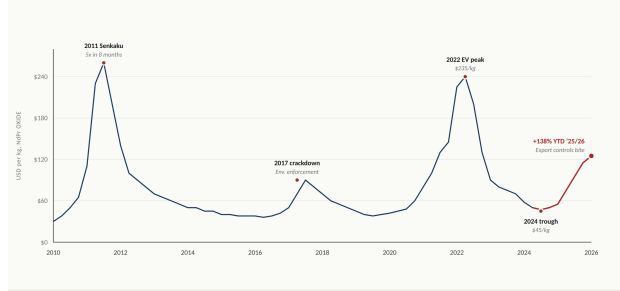
In October 2025 China tried to push the regime further with Announcements 55 through 58, plus 61 and 62. These added holmium, erbium, thulium, europium, and ytterbium, applied a US-style 0.1 percent de minimis rule, and introduced a 50 percent affiliates rule that extends regulation to downstream products containing controlled materials. That package was suspended by Announcement 70 on November 9, 2025 as part of the Busan summit truce. The April 2025 architecture is permanent. The October 2025 architecture is suspended, not removed. I have not seen a major commodity bifurcate this cleanly in my career.

### Why this cycle is different

The cycle pattern in Figure 4 carries a piece of information that I think most analysts have not internalised. Five distinct NdPr cycles since 2010. The 2010 to 2011 spike (peak \$260 per kilogram, up roughly 5x in eight months) followed the Senkaku Islands export halt to Japan. The 2017 bounce came from the Chinese envi-

### Five cycles, every peak set off by Chinese policy

SMM China NdPr oxide, quarterly average, USD per kg, 2010 through Q1 2026



Sources: SMM, Asian Metal, Argus Media, author compilation. Pre-2014 data reconstructed from various survey assessments and read directionally.

**Figure 4.** SMM China NdPr oxide, quarterly average, USD per kilogram, 2010 through Q1 2026. Five complete cycles, every previous peak set off by Chinese policy and every previous trough by Chinese loosening.

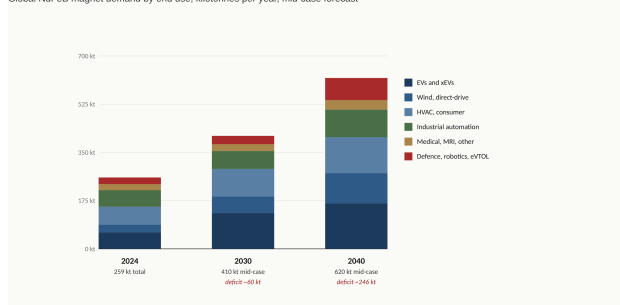
ronmental enforcement crackdown that closed illegal heavy REE producers. The 2021 to 2022 surge (\$235 per kilogram peak) was electric vehicle demand meeting consolidated state miner supply discipline. The 2024 trough at \$45 per kilogram coincided with Chinese inventory destocking and the loss of MP Materials' Chinese offtake.

Every previous peak was driven by a discrete Chinese policy decision. Every previous trough was driven by Chinese loosening or oversupply. The cycle, in every previous instance, was Chinese-led. The current cycle has one feature none of its predecessors had: a non-Chinese price floor at the largest ex-China producer (Section 7 covers the deal mechanics). I think this asymmetry is the most under-appreciated structural change in the modern history of the commodity. The cycle line in the chart matters less than the change underneath it.

### Demand and supply

#### Demand more than doubles by 2040

Global NdFeB magnet demand by end use, kilotonnes per year, mid-case forecast



Sources: Adamas Intelligence, Project Blue, IEA Critical Minerals Outlook 2025, GS robotics 2035 outlook, GWEC, BI.

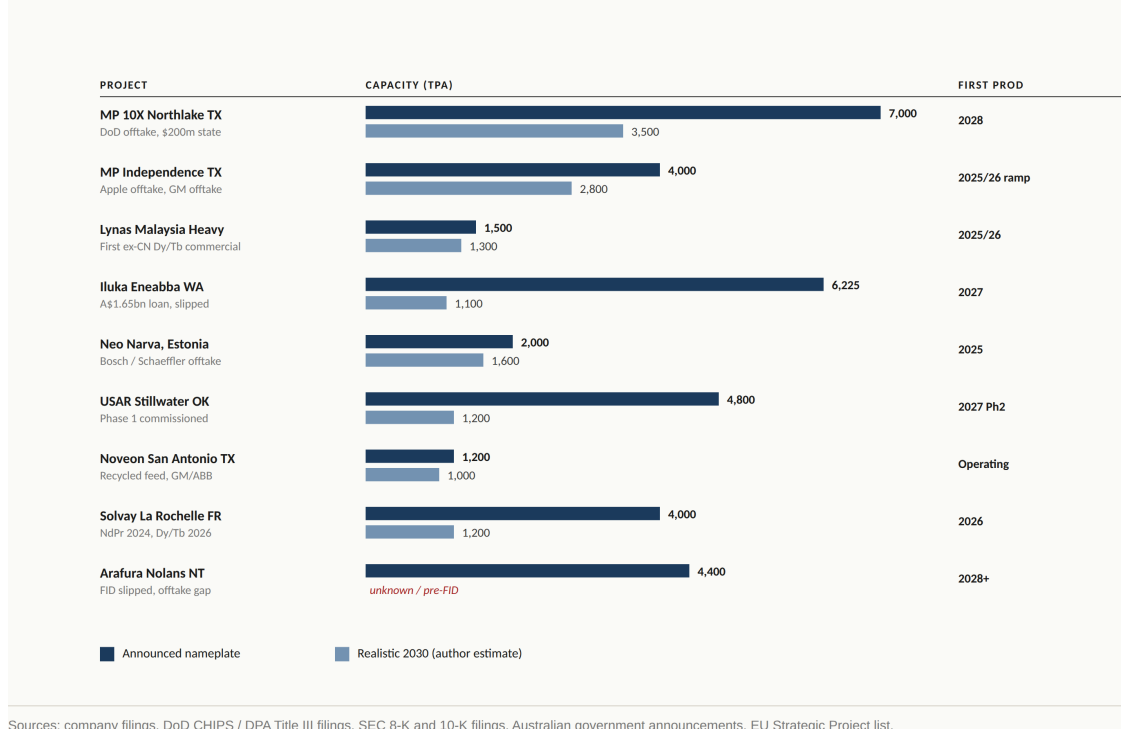
**Figure 5.** Forecast NdFeB magnet demand to 2040, kilotonnes per year, mid-case. EVs and wind anchor the near term. Robotics, defence, and industrial automation contribute meaningfully later.

The demand backdrop is supportive without requiring heroic assumptions. Adamas Intelligence's mid-case has global NdFeB demand growing from approximately



## Announced capacity is roughly half what will deliver

Tonnes per annum NdFeB magnet capacity, announced versus our adjusted 2030 estimate



Sources: company filings, DoD CHIPS / DPA Title III filings, SEC 8-K and 10-K filings, Australian government announcements, EU Strategic Project list.

**Figure 8.** Announced ex-China NdFeB magnet capacity versus realistic 2030 output, tonnes per annum. Realistic delivered tonnage is 50 to 65 percent of announced nameplate by 2030.

in 2022 with first product targeted for late 2025; current guidance is late 2027 with capex revised from A\$1.2 billion to A\$1.65 billion (a 38 percent overrun) and the offtake structure still partially open.

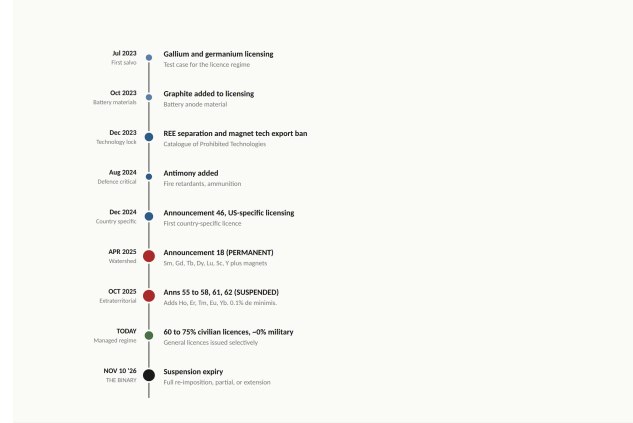
The gap between announced and delivered tonnage is what the trade in Figure 11 ultimately captures. The long basket sizes against companies that deliver. The short basket sizes against the assumption that announced ex-China capacity arrives on time, which in aggregate it will not, leaving the Chinese magnet makers with their existing Western OEM relationships intact for longer than the consensus assumes but at structurally compressed margins.

## How China got here

The Chinese export control architecture is not a single event. It is a sequence of nested rungs (Figure 9). The first rung in July 2023 was gallium and germanium licensing, a clear test case given those metals' role in semiconductor manufacturing. October 2023 added graphite. December 2023 banned the export of REE separation and magnet production technology, which is the single most important rung in my view because it froze the ex-China industrial capacity at its then-current level. April 2025 was the watershed (Announcement 18, rare earths and magnets added).

## The escalation ladder runs in one direction

Chinese critical-materials export-control architecture, July 2023 through April 2026



Sources: MOPCOM announcements, EU Parliament Think Tank, China Briefing, Pillsbury Clark Hill, Freshfields, CSIS, author analysis.

**Figure 9.** Chinese critical materials export control architecture from July 2023 through April 2026. Each rung adds elements, broadens scope, or extends jurisdiction. The line goes one direction.

October 2025 attempted the largest expansion yet with the FDPR-style de minimis rule and the 50 percent affiliates rule that explicitly mirror US export control architecture; that package was suspended in November 2025 but is architecturally complete and ready to be reactivated.

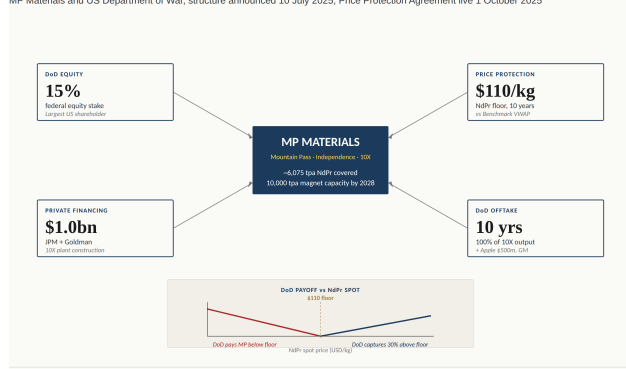
The Chinese state has not, in this sequence, stepped

down from any rung it has climbed. There has been one tactical pause (Announcement 70) and zero strategic retreats. Suspension is not removal. Announcement 70 is a managed pause designed to maintain the bilateral relationship through the post-Busan period and to give Chinese officials political cover to negotiate ad hoc relief for specific Western firms in exchange for concessions. My base case is that the suspension expires or, more likely, is partially reimposed in a calibrated form that preserves Chinese policy optionality without provoking a coordinated Western response. The path dependency runs one direction.

## The deal that changes the bear case

### The first sovereign-anchored commodity contract

MP Materials and US Department of War, structure announced 10 July 2025. Price Protection Agreement live 1 October 2025



Sources: MP Materials Form 8-K July 2025, Q3 2025 results, Q4 2025 results, Payne Institute MP/DOD partnership explainer.

**Figure 10.** The MP Materials and Department of War agreement, structure announced 10 July 2025. Four pillars: federal equity, price floor, financing, offtake.

I want to add detail to the deal mechanics I outlined in the conviction box. The 15 percent equity stake closed at approximately \$400 million in primary issuance plus warrants, with two board seats out of nine. The Price Protection Agreement establishes the \$110 per kilogram NdPr floor as a CFD against the Benchmark Mineral Intelligence VWAP (volume-weighted average price), payable to MP if spot trades below the floor for any monthly settlement period over a ten-year term ending September 30, 2035. The \$1.0 billion JPMorgan and Goldman financing for the 10X plant is supplemented by a separate \$150 million Department of War heavy rare earth loan for a future dysprosium and terbium circuit. The 10-year offtake covers 100 percent of 10X output (7,000 tpa of finished magnets), supplemented by an Apple \$500 million pre-purchase agreement and a General Motors offtake covering Independence-grade alloy.

The Treasury payoff is asymmetric and worth dwelling on. Above \$110, the United States captures 30 percent of the upside on every kilogram MP sells until cumulative payments to the Treasury equal cumulative payments to MP, after which the upside share resets to 10 percent. At \$45 spot (the 2024 trough level)

the Treasury would have written MP a cheque for \$65 per kilogram on every tonne sold, which on the 6,075 tpa NdPr covered by the agreement would have been approximately \$395 million in annual subsidy. That is the change in the cycle pattern. The deal does not change the price; it changes the floor of the distribution of possible prices, and that asymmetry is the entire investment case for the long basket.

## How I would express the view

Lynas at 20 percent of gross is the only fully integrated ex-China producer of all four magnet rare earth elements (Nd, Pr, Dy, Tb), with Mt Weld carrying approximately 76 years of mine life at current rates and JARE strategic protection. JARE is the Japan Australia Rare Earths agreement, structured as a roughly \$250 million working capital facility from JOGMEC and Sojitz that effectively guarantees Japanese strategic demand through 2038. Iluka at 10 percent provides the cleanest dysprosium-terbium torque outside the China-Myanmar geography, supported by an A\$1.65 billion Australian government Critical Minerals Facility loan. At full ramp in 2028 it should produce approximately 5,500 tonnes of NdPr and 725 tonnes of combined dysprosium and terbium oxide, the largest single ex-China heavy rare earth source by a factor of four.

Neo Performance at 5 percent owns the only sintered NdFeB plant in Europe (Narva, Estonia, 2,000 tpa) with Bosch and Schaeffler offtakes covering approximately 70 percent of nameplate. Energy Fuels at 3 percent shipped the first commercial pounds of US-produced terbium in July 2025 and has FID expected Q1 2026 on the Donald Project. Aclara and Meteoric at 2 percent combined provide pre-revenue Brazilian ionic clay heavy rare earth optionality.

JL MAG Rare Earth produced approximately 30,000 tonnes of NdFeB in 2024, making it the world's largest magnet maker, and trades at approximately 28x trailing earnings against a five-year average of 22x. As Western OEMs qualify non-Chinese suppliers, JL MAG's growth pipeline structurally compresses. Zhong Ke San Huan and Ningbo Yunsheng provide additional torque against the same rebalancing, with smaller market caps (\$2 billion and \$1.2 billion respectively against JL MAG's \$8 billion) and higher beta to Chinese policy news flow. Chinese A-share execution is via Stock Connect (the Hong Kong-Shanghai Stock Connect cross-border trading link), HKEX (the Hong Kong listing of JL MAG H share, ticker 6680), or synthetic swap with prime broker counterparty.

## Long ex-China integrated names, short Chinese magnet makers

Recommended portfolio construction. Weights are gross-of-long and gross-of-short respectively. Catalysts and risks discussed in body text.

NAME	TICKER	WEIGHT	THESIS
<b>LONG, EX-CHINA BASKET — 70% OF GROSS</b>			
MP Materials	MP US	30%	DoD floor at \$110/kg, 15% federal equity, 10X plant commissions 2028. Cleanest sovereign-backed name.
Lynas	LYC AU	20%	Only ex-China integrated producer of all four magnet rare earths. Mt Weld Tier-1 reserve.
Iluka	ILU AU	10%	A\$1.65bn government loan funds the cleanest ex-China heavy rare earth play. Full ramp 2027.
Neo Performance	NEO CN	5%	Narva is Europe's only sintered NdFeB plant. Bosch and Schaeffler offtakes signed.
Energy Fuels	UUUU US	3%	First US Tb shipment in July 2025, Donald JV FID Q1 2026. Uranium tailwind.
Aclara + Meteoric	ARA, MEI	2%	Brazilian ionic clay heavy rare earths. The only credible alternative to Myanmar at scale.
<b>SHORT, CHINESE MAGNET MAKERS — 30% OF GROSS</b>			
JL MAG Rare Earth	300748 CH	15%	World's largest NdFeB magnet maker, peak earnings, Western OEM qualification compresses pipeline.
Zhong Ke San Huan	000970 CH	8%	Legacy magnet maker, lower margins, wind exposed in a structurally impaired Western wind cycle.
Ningbo Yunsheng	600366 CH	7%	Smaller mainland magnet maker, retail-traded, higher beta to Chinese policy news.

Author construction. Sized for 8 to 12% portfolio gross with 3 to 5% NAV at risk under stress. CN A-share access via Stock Connect, HKEX, or synthetic swap.

**Figure 11.** Recommended portfolio construction. Long the ex-China integrated magnet basket, short the Chinese magnet makers. Weights are gross of long and gross of short respectively.

### The central catalyst

The richest binary in the calendar is November 10, 2026 (Figure 12). Around it, several supporting catalysts compress the variance of the trade. The Section 232 PCMDP implementation expected mid-2026 hardens the procurement preference rules. PCMDP is the Permanent Critical Minerals Defense Procurement framework, the US analogue to China's licence regime, established by Proclamation 11001 in January 2026 with a \$3 billion stockpile appropriation under the Defense Production Act Title III. The Department of War ban on Chinese rare earths in defence procurement, scheduled for full effect in 2027, applies to all Tier 1 prime contractors and Tier 2 sub-prime contractors and forces qualified Western alternatives into the supply chain regardless of price. The EU Critical Raw Materials Act second round of strategic project nominations, due mid-2026, accelerates the European supply build with priority permitting and access to the European Investment Bank's \$5.4 billion critical minerals lending facility.

Project commissioning catalysts include Lynas's heavy rare earth circuit ramp through 2026 to 2027 (first commercial dysprosium and terbium shipments), USAR Stillwater's Phase 2 expansion from 600 to 1,200 tpa (mid-2027), Iluka Eneabba commissioning in 2027, and MP's 10X first metal in 2028. Corporate catalysts include the MP Q1 2026 results print on May 7, Lynas

FY 2026 results, and the Department of War profit-share trigger in late 2028 when MP is projected to cross the \$140 million EBITDA threshold that activates the 30 percent upside share.

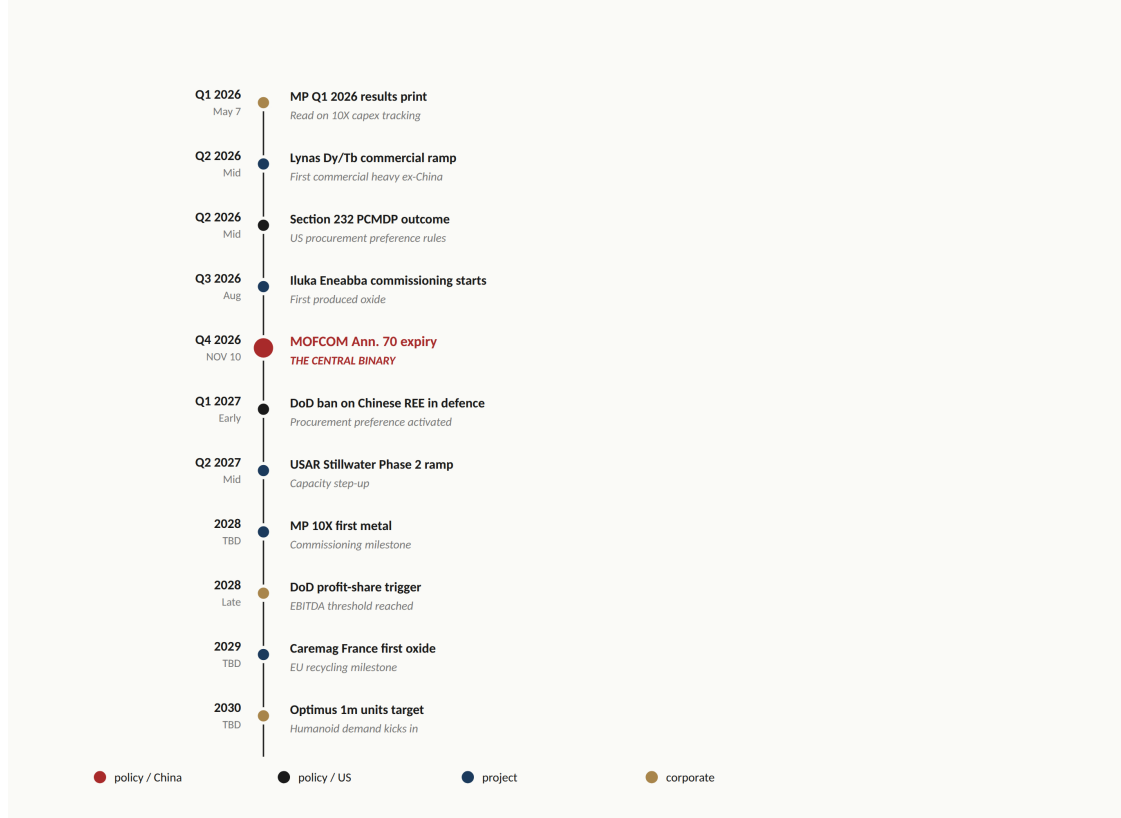
### What could go wrong

The most credible bear leg is CRMA-driven recycling (Figure 13). The European Critical Raw Materials Act sets a binding target of meeting 25 percent of EU rare earth demand from recycled feed by 2030, supported by a roughly \$600 million Innovation Fund allocation. Cyclic Materials, Caremag (the Solvay and Carester joint venture), Geomega, and Hyproma are the named players. Cyclic alone targets 1,000 tpa of recycled NdPr by 2027 from end-of-life motor stators and hard disk drive voice coil motors. I take this seriously, but it bites the light rare earth fraction only. Recovery of dysprosium and terbium is a much harder chemistry problem, dispersed at sub-percent levels and requiring additional separation stages, and is unlikely to be solved at commercial scale this decade. Lynas and Iluka are largely resilient by design.

The thesis-breaking bear leg is the grand bargain. China has invested significant political capital in the regime; the export controls are now embedded in the 14th Five-Year Plan critical minerals framework. The bilateral relationship sits in long-term strategic competition. A clean removal would require a level of trust

## The catalyst calendar centres on November 10, 2026

Major events through 2030, with the MOFCOM Ann. 70 expiry as the central binary

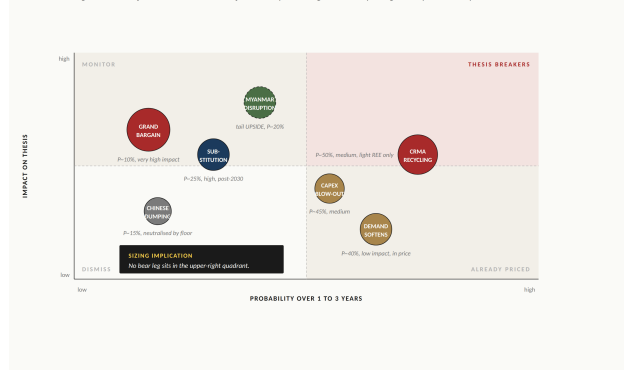


Sources: MOFCOM announcements, MP Materials filings, Lynas FY 2025 results, Iluka schedule, USA Rare Earth news flow, Section 232 Proclamation 11001.

**Figure 12.** Catalyst timeline from Q1 2026 through 2030. The November 10, 2026 expiry of MOFCOM Announcement 70 is the highest-conviction binary in the complex.

### No bear leg sits in the upper-right quadrant

Bear case scoring on a 1 to 3 year horizon. Probability times impact. Larger circle equals greater portfolio impact.



Author scoring. Circle area scales with portfolio impact. Position is probability times impact.

**Figure 13.** Bear case scoring on a one-to-three year horizon. Probability times impact. No bear case sits in the upper-right corner.

that does not currently exist. I rate this at 10 percent probability and very high impact, which is why it sits where it does in the matrix.

The remaining bear cases (capex blow-outs at MP or Iluka, demand softening from EV penetration disappointment, Chinese inventory dumping, substitution

to non-rare-earth motor architectures such as Tesla's reduced-rare-earth Model 3 motor or the Renault eM1 induction motor) all sit in quadrants where probability or impact is meaningfully lower. None of them sit in the dangerous upper-right corner. That negative space is the structural punchline of the matrix.

## Conclusion

The two-price world is here, structural, and licence-enforced. The Western supply response is real but slower than the consensus assumes once execution slip-page is properly accounted for. The MP Materials and Department of War agreement removes the historical worst-case downside. The November 10, 2026 expiry of MOFCOM Announcement 70 is the entry point. The basket in Figure 11 is the cleanest expression of the view I know how to construct. I sit at high conviction on the long basket and medium-high conviction on the short, sized at 8 to 12 percent portfolio gross.