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# Critical Minerals Under Pressure

China's Export Controls and the Race for Alternative Supply

**19/20**

MINERALS CHINA REFINES (IEA),  
AVG ~70%

**~90%**

CHINA SHARE OF RARE-EARTH  
PROCESSING

**100%**

US IMPORT RELIANCE: GALLIUM  
& GRAPHITE



## EXECUTIVE DASHBOARD

A year of escalating Chinese export controls has made one fact unavoidable for any company that builds physical things: the supply risk in critical minerals does not sit at the mine. It sits in the midstream, and in the license.

## THEESIS

China's leverage over critical minerals is fundamentally a **midstream chokepoint**, refining, separation, and magnet-making, not a mining monopoly; and since 2023 Beijing has converted that dominance into an active, escalating, increasingly extraterritorial export-licensing regime it can tighten or relax at will. The binding exposure is not whether a mine exists, but whether the midstream and the license stand between an operator and the material, against substitution timelines measured in years.

## KEY STATISTICS

**19 / 20**

minerals for which China is the dominant refiner, avg ~70%<sup>1</sup>

**~90%**

China share of rare-earth processing & separation<sup>4</sup>

**>93%**

China share of magnet manufacturing<sup>4</sup>

**~99%**

China share of heavy-rare-earth processing<sup>4</sup>

**100%**

US net import reliance: primary gallium & natural graphite<sup>3</sup>

**29 / 50**

US critical minerals for which China leads production<sup>3</sup>

**\$59.8k/t**

antimony record high, Fastmarkets, Jul 2025<sup>16</sup>

**10-30%**

premium OEMs paid for non-Chinese magnets<sup>17</sup>

**Scope & method.** Open-source intelligence only, verified against allowlisted Tier 1-4 sources. Facts are cited; assessments carry confidence and rationale; figures that could not be confirmed against primary or specialist sources were excluded rather than estimated. Basket: rare earths and permanent magnets (core); gallium, germanium, graphite, and antimony as supporting cases of the same control pattern. Timeliness: CURRENT, with a 2 to 6 month shelf life.

## KEY JUDGMENTS

Six judgments anchor this assessment. Each is tied to the cited evidence in the sections that follow and carries an explicit confidence level.

**1** **High** The binding constraint is the midstream, not the mine. China refines roughly 70% of the minerals the IEA tracks and processes ~90% of rare earths; diversifying mine offtake without diversifying processing leaves the real exposure untouched.<sup>1, 4</sup>

**2** **High** Export licensing is now a standing instrument of statecraft, not a one-off. It has widened from gallium and germanium in 2023 to rare earths in 2025, and in October 2025 reached, for the first time, technology and foreign-made products containing Chinese inputs.<sup>5, 6</sup>

**3** **High** US structural exposure is worst where reliance is near-total: 100% net import reliance on primary gallium and on natural graphite, and more than 50% on germanium.<sup>3</sup>

**4** **Moderate** The November 2025 suspensions are tactical de-escalation, not structural relief. The licensing architecture, the case-by-case discretion, and the prohibition on exports to military end-users all remain in place.<sup>8, 15</sup>

**5** **High** The disruption has already reached the production line. In 2025 automakers ran hand-to-mouth on rare-earth magnets and paid premiums of 10 to 30% for non-Chinese supply.<sup>17</sup>

**6** **Moderate** Western industrial-policy responses are substantive but slower than the lever. The US price-floor-and-equity model and the EU's 2030 benchmarks run on multi-year build timelines while a licensing rule can change in weeks.<sup>10, 13</sup>

## SECTION 01 • STRUCTURE

# The Chokepoint Is the Midstream

Critical-minerals risk is usually told as a mining story. The data locates it one step downstream, in the processing that turns ore into a usable input, and that is where China's position is close to absolute.

The intuitive picture of mineral dependence is geological: who controls the deposits in the ground. That picture is misleading. Mining is comparatively distributed across countries; the bottleneck sits in the midstream, the refining, separation, and metallization steps that convert raw ore into oxides, metals, and finished components. It is there, not at the mine, that supply is actually gated.

The concentration in that layer is extreme and, importantly, still rising. The International Energy Agency finds that China is the dominant refiner for 19 of the 20 strategic minerals it tracks, at an average market share near 70%, and that refining concentration has increased across nearly all of them since 2020; the combined share of the top three refining nations climbed from about 82% in 2020 to roughly 86% in 2024.<sup>1</sup>

<sup>2</sup> For rare earths the asymmetry is starker still: China holds around 70% of mining but approximately 90% of processing and separation and more than 93% of magnet manufacturing.<sup>4</sup>

## The exposure is the midstream, not the mine.

Heavy rare earths, the elements most critical to high-performance magnets and defense systems, are the most concentrated of all. China accounts for roughly 99% of global heavy-rare-earth processing, and the one meaningful non-Chinese alternative, a refinery in Vietnam, was shut in 2024, leaving an effective monopoly over the step that matters most.<sup>4</sup> The same pattern recurs across the wider basket. China has produced more than 90% of the world's primary gallium since 2014; the United States reports 100% net import reliance on primary gallium, 100% on natural graphite (about 43% of it sourced from China), and more than 50% on germanium.<sup>3</sup> In 2023, China was the leading producer for 29 of the 50 minerals on the US critical-minerals list.<sup>3</sup>

This concentration is not easily unwound. Refining and separation are capital-intensive, environmentally permitted, and chemically specialized; building qualified capacity elsewhere is a multi-year undertaking even when the ore is available. That durability is precisely what converts a commercial position into strategic leverage.

## ASSESSMENT · HIGH CONFIDENCE

The decision-relevant exposure is the midstream, not the mine. A company can diversify its ore sourcing and still route every ton through a single country for the refining or separation step that gates supply. We assess that diversification programs measured only in mine offtake materially understate exposure, because they leave the binding constraint, processing and qualification, untouched.

*Rationale: refining concentration is both higher than mining concentration and rising (IEA), and the heavy-rare-earth step is a near-monopoly with the lone alternative now offline (CSIS).*

## SECTION 02 · POLICY

## A Widening Net

Structural dominance becomes leverage only when a state chooses to use it. Since 2023 China has built and exercised an export-licensing architecture that has widened steadily in coverage and, in 2025, in reach.

The sequence is now well documented. Licensing requirements for gallium and germanium arrived in July 2023, for graphite in October 2023, and for antimony and superhard materials in August 2024. On 3 December 2024 China escalated from licensing to prohibition, banning in principle the export of gallium, germanium, antimony, and superhard materials to the United States and tightening end-use review on graphite.<sup>4, 6</sup> In February 2025 it added tungsten and tellurium.

The decisive move came on 4 April 2025, when China placed seven medium-and-heavy rare earths, samarium, gadolinium, terbium, dysprosium, lutetium, scandium, and yttrium, together with related compounds, metals, and permanent magnets, under case-by-case export licensing, with a statutory review window of around 45 days.<sup>1, 5</sup> The licensing model is itself the instrument: it is not a blanket ban but a dial, allowing Beijing to approve, delay, or deny on a buyer-by-buyer, end-use-by-end-use basis, and to read the resulting applications as a real-time map of who depends on what.

The October 2025 wave marked a qualitative shift. It added five further rare earths and, for the first time, extended controls beyond physical goods to govern technology and know-how and to reach foreign-made products that contain Chinese rare-earth inputs, an extraterritorial design that deliberately mirrors the logic of US semiconductor rules.<sup>5, 7</sup> Analysts reading the two waves together note a shift in motive: the 2023 to 2024 controls functioned largely as a response to US semiconductor and advanced-computing restrictions, while the 2025 rare-earth measures operated primarily as instruments of the broader tariff and trade conflict.<sup>9</sup>

In November 2025 China suspended the October measures for one year in exchange for the United States suspending a "50% ownership" rule; the April 2025 rare-earth controls remained in force, the gallium, germanium, and antimony ban shifted to licensing management reportedly through late November 2026, and the prohibition on exports to military end-users stayed in place throughout.<sup>8, 15</sup>

#### ASSESSMENT • HIGH CONFIDENCE

Export licensing has become a standing instrument of Chinese statecraft, not a one-off retaliation. We assess the November 2025 suspensions as tactical de-escalation rather than structural relief: the legal architecture, the case-by-case discretion, the extraterritorial reach, and the military-end-user carve-out all remain, which means the lever can be re-tightened on short notice.

*Rationale: the 2023 to 2025 record shows consistent widening (Global Trade Alert); the suspension preserved the licensing machinery and the defense prohibition (EPRS, Oregon Group).*

#### SECTION 03 • TRANSMISSION

## From Control to the Production Line

A control regime matters to a CFO only through its transmission to operations. In 2025 that transmission stopped being theoretical.

The clearest signal came from the automotive sector, where rare-earth magnets are a small-dollar but non-substitutable input. Reuters reported Ford running hand-to-mouth on magnets at a US assembly plant, depleted magnet inventories among Hyundai-group suppliers, and original-equipment manufacturers willing to pay premiums of 10 to 30% for non-Chinese supply.<sup>17</sup> A component that represents a rounding error on the bill of materials can halt a line when it cannot be sourced, and in 2025 it did.

The minor metals told the same story in price. After China imposed antimony licensing in August 2024, exports reportedly fell by roughly 97% on trade estimates, and Fastmarkets assessed antimony at a record high near \$59,750 per tonne in July 2025 before prices moderated.<sup>16, 24</sup> These are different commodities, but the shape is identical: a licensing action upstream, a price or availability shock downstream, and a scramble for qualified alternatives that do not yet exist at scale.

**The decisive cost is the qualification clock, not the spot price.**

The most important distinction for planners is between two exposures that are routinely conflated. The first is price: a restricted input reprices in days, and for most buyers an elevated price, however painful, is

absorbable. The second is qualification: replacing a refined input or a magnet often requires re-qualifying the finished part, a process that runs from several quarters to multiple years in aerospace, automotive, and medical applications. The price exposure is a cost; the qualification exposure is a question of whether an alternative can be used inside the decision-relevant window at all.

#### ASSESSMENT • MODERATE CONFIDENCE

For most operators the binding risk is the qualification timeline, not the headline price. Firms that pre-qualified alternative refined inputs before a control event preserved optionality; those that had not faced a multi-quarter gap that no purchase order could close. We assess that procurement teams treating these events as price shocks rather than availability shocks systematically under-prepare.

*Rationale: documented 2025 auto-line disruption and premium-paying behavior (Reuters), combined with standard multi-quarter qualification norms in regulated manufacturing; the qualification-timeline point is an analytic judgment, not a single-source fact.*

#### SECTION 04 • RESPONSE

## The Counter-Build, and Its Lag

Western governments have moved from rhetoric to capital. The direction is right; the tempo is the problem.

In the United States, the response has taken an unusually direct, industrial-policy form. In July 2025 the Department of Defense and MP Materials announced a partnership that, on the company's account, includes a price-floor commitment of \$110 per kilogram for NdPr, the praseodymium-neodymium oxide at the heart of high-performance magnets; a \$400 million DoD purchase of convertible preferred stock that positions the department to become the company's largest shareholder at roughly 15% on an as-converted basis; a \$150 million loan to expand heavy-rare-earth separation; and a ten-year commitment that all magnets from a planned facility be purchased.<sup>10</sup> Independent analysts read the structure as a deliberate use of guaranteed price and guaranteed demand to de-risk a domestic magnet supply chain that the market alone would not finance.<sup>11, 12</sup>

The European Union has chosen a benchmark-and-permitting model. The Critical Raw Materials Act, in force since May 2024, sets binding 2030 targets: the bloc should extract at least 10%, process at least 40%, and recycle at least 25% of its annual consumption of strategic raw materials, and no single non-EU country should supply more than 65% of consumption for any one of them.<sup>13, 14</sup> Both responses are real and well-capitalized. Neither is fast.

That is the crux. A refinery, a separation train, or a qualified magnet line takes years to build and certify; a licensing rule can be rewritten in weeks. The policy direction reduces long-run exposure, but it does not

close the near-term window, and it is in that window that the lever operates.

#### ASSESSMENT · MODERATE CONFIDENCE

Western responses are substantive but structurally slower than the instrument they answer. We assess that the next two to three years carry the highest residual exposure: the counter-build will not yet have produced qualified capacity at scale, while China retains a control lever it can move at will. Policy reduces the long-run risk; it does not neutralize the near-term one.

*Rationale: the scale of the DoD-MP commitment and the EU benchmarks is real (company disclosure; EU regulation), but both are multi-year build programs set against a fast, discretionary control lever.*

#### SECTION 05 · OUTLOOK

## Three Scenarios, 6 to 12 Months

Construction confidence reflects analytical quality, not probability. Each scenario carries a risk velocity and a signal to watch.

### Baseline · Managed detente

CONSTRUCTION CONFIDENCE: HIGH · VELOCITY: GRADUAL

The November 2025 suspensions hold. Gallium, germanium, antimony, and the October rare-earth measures stay in licensing-managed limbo while the April 2025 rare-earth controls and the military-end-user prohibition persist. Commercial flows continue at a friction cost; defense and dual-use buyers stay constrained. Prices stay elevated but below the 2024 to 2025 peaks.

**SIGNAL TO WATCH: LICENSE-APPROVAL CADENCE; ANY QUIET TIGHTENING OF END-USE CONDITIONS.**

### Deterioration · Re-tightening

CONSTRUCTION CONFIDENCE: MODERATE · VELOCITY: RAPID (DAYS TO WEEKS)

A trade or security trigger leads China to let the suspensions lapse or to enforce the extraterritorial October design, pulling foreign-made products with Chinese inputs into scope. Magnet and heavy-rare-earth availability tightens sharply; prices spike; qualification backlogs lengthen and reach more sectors than autos.

**SIGNAL TO WATCH: EXPIRY OF THE ONE-YEAR SUSPENSION WINDOW WITHOUT RENEWAL; NEW DESIGNATIONS OR END-USE DENIALS.**

## Stabilization · Durable thaw

CONSTRUCTION CONFIDENCE: LOW · VELOCITY: GRADUAL TO STRUCTURAL

A broader US-China understanding converts the suspensions into rollback and predictable licensing. Prices normalize and the acute risk recedes. The strategic chokepoint nonetheless remains, because midstream concentration is structural and erodes only as Western capacity qualifies, over years rather than quarters.

**SIGNAL TO WATCH: CODIFIED MULTI-YEAR LICENSING COMMITMENTS RATHER THAN ROLLING ONE-YEAR SUSPENSIONS.**

### ASSESSMENT · MODERATE CONFIDENCE

Across all three scenarios the structural chokepoint persists. Even the IEA's diversification case has China supplying a majority of refined output for key minerals into the mid-2030s.<sup>1</sup> We assess the realistic planning question is not whether access will be restored, but at what license-conditioned cost, and on what qualification timeline. Firms should plan to the Baseline and pre-position for the Deterioration case rather than wait for the Stabilization case to arrive.

*Rationale: midstream concentration is rising and slow-moving (IEA), so policy and price can change faster than the underlying structure.*

### SECTION 06 · WATCH

## What to Monitor

The indicators that would tell a leadership team the environment has moved, before the move reaches the line.

- **License cadence.** Approval timing and end-use conditions for the April 2025 rare-earth controls, the measures that were not suspended.
- **Suspension windows.** The one-year expiries: rare earths, and gallium, germanium, and antimony to roughly 27 November 2026.
- **Lead times and premiums.** Heavy-rare-earth and magnet delivery times, and any return of the 10 to 30% non-Chinese premium seen in 2025.
- **Counter-build milestones.** Western midstream progress (DoD-MP separation and magnet capacity; EU CRMA strategic-project permitting), measured against qualification, not groundbreaking.

**SOURCE REGISTRY**

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## Publishable Market Research

**Timeliness: CURRENT.** Control terms are actively shifting; this assessment carries a 2 to 6 month shelf life. A material change (a suspension lapse, a new designation, or enforcement of the extraterritorial October design) triggers an update addendum.

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[contact@aegeanintel.com](mailto:contact@aegeanintel.com) · [aegeanintel.com](https://aegeanintel.com)

