

Strategic Leverage or Supply Trap? Navigating the U.S.–China Rare Earth Elements Challenge

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Executive Summary

The standoff between the United States and China over rare earth elements (REEs) has reached a pivotal moment, one that will shape economic security, industrial competitiveness, and geopolitical risk for years to come. China is the clear heavyweight in this arena, accounting for roughly 60–70% of global rare earth mine production and holding an even tighter grip, about 80–95%, on the refining, separation, and magnet manufacturing that turns raw material into strategic assets (USGS, 2024; CSIS, 2025; Adamas Intelligence, 2025). The U.S. is trying to catch up, with new mining output and facilities like MP Materials’ “Independence” plant in Fort Worth now coming online (MP Materials, 2025; U.S. DOE, 2022). But even with these advances, America lags far behind in refining, separation, magnet manufacturing, and the accumulation of patents and know-how (CSIS, 2025; WIPO, 2024).

Recent negotiations lay bare this imbalance. When China imposed export controls on seven REEs and related magnets in April 2025, U.S. industries felt the shock instantly. Although a June 2025 framework agreement aimed to smooth shipments, it left critical issues unresolved, especially for magnets with military applications (Reuters, 2025; CSIS, 2025).

The core lesson for policymakers is this: Just having rare earth ore isn’t enough. What matters is the technology, processing capability, industrial scale, and intellectual property that turns ore into value. To address these vulnerabilities, U.S. strategy should: (1) diversify supply chains away from Chinese bottlenecks, (2) invest heavily in domestic processing and recycling infrastructure, and (3) reduce demand through efficiency and substitution.

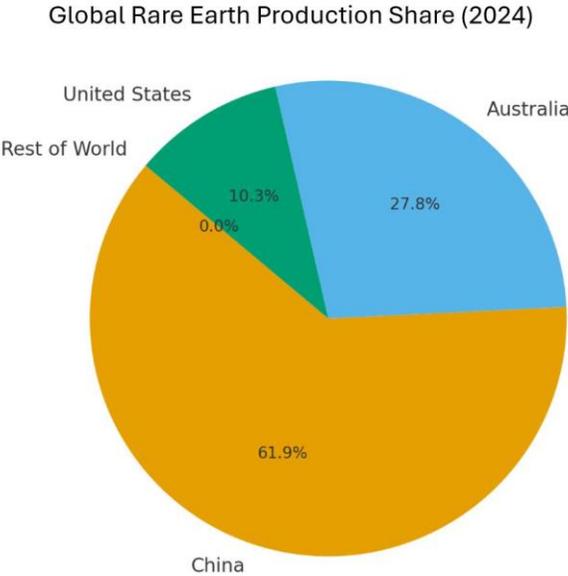
This paper examines the current U.S.–China rare earths dynamic, analyzes the industrial economics at play, and offers policy recommendations to build greater resilience and competitiveness.

1. The State of Play: China’s Dominance and U.S. Weaknesses

1.1 Mining and Production Shares

China is still the world’s top producer of rare earth oxides. According to the U.S. Geological Survey, China supplied approximately 60–70% of global REO production in recent years (USGS, 2024). Other nations, such as Australia, Brazil, and Myanmar, contribute as well, but their market share is much smaller (InvestingNews, 2025). With reserves estimated at around 44 million tons, China’s leadership is further solidified (USGS, 2024). This dominance is visually captured in Figure 1, which illustrates the global distribution of rare earth oxide mine production by regions in 2024.

Figure 1
Estimated global rare earth oxide mine production by region, 2024, showing China’s dominant share.



(Sources: USGS, 2024, 2025; CSIS, 2025; U.S. DOE, 2022; Adamas Intelligence, 2025)

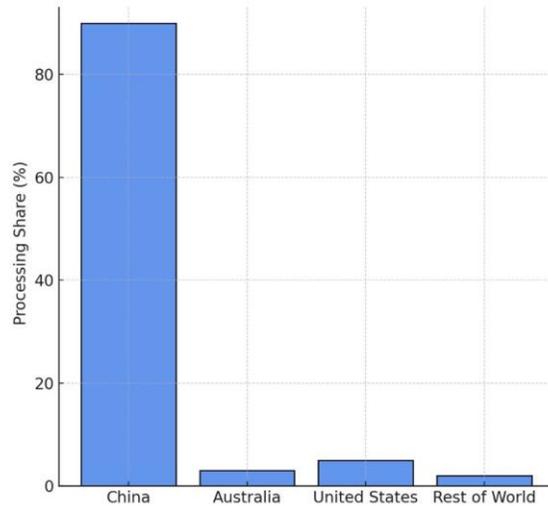
1.2 Processing, Separation, and Magnet Manufacturing

When it comes to processing, China’s dominance is even starker. In 2024, China was responsible for approximately 69% of rare earth oxide (REO) output and nearly 90% of global processing capacity, a stranglehold that underscores its position as the world’s pivotal player in rare earths (USGS, 2024; CSIS, 2025). This commanding share is illustrated in Figure 2, which presents the estimated distribution of rare earth processing capacity by region

Figure 2

Estimated share of world rare earth processing capacity by region, 2024.

Estimated Global Rare Earth Processing Capacity (2024)



(Sources: USGS, 2024, 2025; CSIS, 2025; U.S. DOE, 2022; Adamas Intelligence, 2025)

China essentially owns the entire value chain, from mine to separation, alloying, and magnet production:

- Roughly 80–95% of separation and refining capacity for heavy rare earths is controlled by China (CSIS, 2025; USGS, 2024).
- In magnet manufacturing, China’s share is about 80–93%, including over 58,000 tons of permanent magnet exports in 2024 (Adamas Intelligence, 2025).

1.3 U.S. Progress and Persistent Gaps

The U.S. has made some headway, MP Materials’ Fort Worth “Independence” facility began producing commercial neodymium-praseodymium (NdPr) metal and trial magnets in 2024–25 (MP Materials, 2025). Still, America’s midstream and downstream capabilities are in their infancy, and China’s decades-long head start in learning, IP, and cost efficiency is a daunting barrier (DOE, 2022; CSIS, 2025).

Key challenges:

- The U.S. continues to depend on China and other nations to process its own rare earth ore (Econofact, 2025).
- Domestic permitting, environmental regulations, and lack of clustered supply chains make it slow and expensive to build capacity at home (Econofact, 2025).

- Chinese companies hold most of the patents in rare earth processing and magnet tech, so simply mining more ore doesn't guarantee competitive output (WIPO, 2024; NewSecurityBeat, 2024).

The upshot: The U.S. remains structurally exposed.

1.4 Why This Matters: Industry, Defense, and Geopolitical Risk

Rare earths aren't just an industrial curiosity, they're essential for electric vehicles, wind turbines, robotics, missiles, guidance systems, aerospace, and consumer electronics (Econofact, 2025). China's April 2025 export restrictions sent shockwaves through U.S. and allied industries, leading to fears of production delays and rising costs (CSIS, 2025; Al Jazeera, 2025). Even after the June 2025 deal, military-use magnets are still a sticking point (Reuters, 2025).

Control over rare earths is a strategic lever, plain and simple.

2. Negotiations and Confrontations: U.S.–China, 2024–2026

2.1 Timeline of Recent Events

- **April 2025:** China's Ministry of Commerce restricts exports of seven REEs and magnets, citing dual-use concerns and as retaliation for U.S. tariffs (CSIS, 2025; Al Jazeera, 2025).
- **May 2025:** U.S. and China agree to a 90-day tariff truce in Geneva, but REE restrictions persist (Reuters, 2025; MetalMiner, 2025).
- **June 2025:** In London, a framework deal is announced, China promises to expedite rare earth and magnet exports; the U.S. concedes on some visa policies but maintains stiff tariffs (PBS, 2025; Reuters, 2025).
- **Post-June:** Implementation falters. China holds significant control, especially for exports with possible military applications (Reuters, 2025).

2.2 Issues at Stake

- **Export Licensing and Dual-Use Magnets:** China requires special licenses for REEs and magnets, especially where military use is suspected (CSIS, 2025).
- **Tariffs and Tech Controls:** The U.S. uses export controls (e.g., on AI chips) as leverage; China links rare earth access to U.S. technology policy (Reuters, 2025; Investors.com, 2025).
- **Supply Chain Decoupling vs. Interdependence:** While the U.S. seeks self-reliance, China touts its indispensability to global supply, giving Beijing leverage (PBS, 2025; Reuters, 2025).
- **Allied and Alternative Supplier Strategies:** The U.S. and its partners are pursuing non-Chinese supply chains (e.g., Australia, Japan) to mitigate risk (CSIS, 2025; AlInvest, 2025).

2.3 Implications

- **Short-Term Relief, Long-Term Uncertainty:** The June 2025 agreement averts an immediate crisis, but China's dominance in refining and magnet production remains unchallenged (Reuters, 2025).
- **Ongoing Industry Risk:** Key sectors, especially automotive and defense, remain exposed (Al Jazeera, 2025).
- **China's Leverage:** By controlling critical bottlenecks, China can influence the pace and terms of exports, giving it substantial bargaining power (Reuters, 2025; CSIS, 2025).
- **U.S. Opportunity Cost:** Without closing its downstream gaps, the U.S. risks long-term dependency and strategic weakness (Econofact, 2025).

3. Economic and Industrial Policy Analysis

3.1 The Economics of the Value Chain: Ore Alone Isn't Enough

It's a common misconception among policymakers: owning the ore means owning the advantage. In reality, the highest-value activities are further down the chain, separation, alloying, and magnet production. According to the U.S. Department of Energy, transforming ore into finished magnets involves multiple complex steps: beneficiation, separation (using solvent extraction or ion exchange), metal production, alloying, powder metallurgy, magnet manufacturing, and recycling (DOE, 2022). China dominates each one.

Unless the U.S. invests in all these stages, it won't match China's cost structure or scale. The permitting and environmental costs in the U.S. mean that achieving parity could take a decade or longer (Econofact, 2025).

3.2 Where China Holds the Chokepoints

China's grip is tightest in three key areas:

- **Separation and Refining of Heavy REEs:** Nearly 90% of global capacity is in China (CSIS, 2025).
- **Magnet Manufacturing:** China produces 80–93% of the world's NdFeB magnets (Adamas Intelligence, 2025).
- **Recycling and Reclamation:** China is also the leader in recycling magnets and alloys (DOE, 2022).

Without access to processing and magnet manufacturing, even countries with raw ore can't quickly scale up industrial capacity.

3.3 The Geopolitics of Rare Earths

The rare earth conflict isn't just about economics; it's a matter of national security and industrial policy. For example:

- U.S. defense systems, from fighter jets to missile guidance, depend on rare earth magnets. China's export restrictions create direct risks for American security (The Guardian, 2025).
- The U.S. and its allies see rare earth supply chains as vital for strategic autonomy, fueling investment and subsidies to build capacity at home or with partners.
- China's frequent use of export controls is a form of strategic signaling, applying pressure without an outright ban (Reuters, 2025).

3.4 The Cost and Environmental Hurdles of Competing with China

Building refined rare earth capacity outside China is expensive. Permitting, waste management, capital costs, and long lead times all complicate the picture for new entrants (Econofact, 2025). China's early, aggressive investments in the 1980s and 1990s gave it the scale and cost advantages that others now struggle to match. Competing means accepting higher costs or relying on subsidies.

4. Policy Recommendations: Building Resilience and Competitive Edge

Given the current imbalance, the U.S. and its allies should follow a three-pronged approach: Diversify, Domesticate, and Manage Demand.

4.1 Diversifying Supply Chains and Alliances

- Forge long-term partnerships with resource-rich allies (e.g., Australia's Lynas, Canada, Brazil) to develop non-Chinese processing hubs (CSIS, 2025).
- Back joint ventures in midstream and refining outside China, sharing technology and risk.
- Create strategic stockpiles of critical REEs and magnets to cushion against supply shocks.
- Align incentives and standards among allied nations (U.S., Japan, EU, Australia) to reach scale and cost-competitiveness.

4.2 Building Domestic Capability and Accelerating Scale

- Substantially increase investment in U.S. separation, metal production, magnet manufacturing, and recycling, using public-private partnerships and targeted incentives.
- Streamline permitting and regulatory processes, without sacrificing environmental standards, to speed up capacity buildout (Econofact, 2025).
- Invest in R&D for advanced separation and magnet technologies to close the gap with China (DOE, 2022).
- Prioritize recycling infrastructure for used magnets and REE components, reducing reliance on primary ore.

4.3 Managing Demand and Substitution Risks

- Encourage manufacturers to design products that use fewer or cheaper REEs or shift toward alternative magnet chemistries.

- Support research into non-REE or low-REE magnet technologies and other material substitutes for key applications.
- Use industrial policy, such as public procurement preferences, to stimulate demand for domestically or ally-sourced REEs and magnets.
- Require transparency and traceability in supply chains, especially for defense and high-tech sectors.

4.4 Negotiation Strategy and Risk Mitigation

- In talks with China, recognize that true leverage lies downstream in processing and magnet manufacturing, not just ore. Push for trade deals that specify licensing terms, timelines, and dual-use export constraints (Reuters, 2025).
- Include enforceable conditions in agreements, such as export license quotas and independent monitoring.
- Don't place too much faith in Chinese commitments; continue building alternate supply chains as insurance.
- Develop contingency plans for sudden supply disruptions, with stockpiles and alternative input pathways.

5. Conclusion

The rare earth standoff between the U.S. and China is a microcosm of 21st-century industrial geopolitics, where resources, technology, manufacturing scale, and national security are deeply intertwined. China's dominance runs from mine to finished magnet, but the U.S. and its allies are not without options. The path forward is clear: move beyond simply mining ore and focus on the technology, processing, and scale necessary for true competitiveness. While careful negotiation can buy time, only a comprehensive strategy, diversifying supply chains, investing in domestic capability, and managing demand, can deliver lasting resilience.

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