Rare Earth Elements - *China*'s Strategic Dominance and the *U.S. Response*

"The Middle East has oil, China has rare earths." - Former Chinese leader Deng Xiaoping

Insights

The current US-China trade war under President Trump's second term differs significantly from the first trade war (2018-2020) in both scope and strategy, particularly with the central role of rare earth elements (REEs). During the first trade war, broad-based tariffs were implemented on China, aimed on reducing trade deficits and addressing intellectual property theft. The scope includes mainly consumer goods, industrial products, and agricultural exports. In the current trade war, rare earths are now a front-line strategic asset, with direct impact on defense, EVs, humanoids and clean energy. China had imposed export restrictions on seven heavy REEs and permanent magnets, while US responded with tariffs exceeding 100% at one point on China EVs, semiconductors, and AI-related products.

1. What Are Rare Earth Elements (REEs)?

Rare Earth Elements (REEs) are a group of 17 chemically similar elements critical to modern technologies. Despite their name, they are relatively abundant as compared to base and precious metals but rarely found in concentrated, mineable deposits. These elements possess unique magnetic, optical, and electrical properties, making them indispensable in high-tech, clean energy, and defense applications. As these metals are found together in nature and their properties are similar, separation into oxides is technically challenging.

REEs are divided into:

- **Light REEs (LREEs):** e.g., neodymium (Nd), praseodymium (Pr), cerium (Ce), lanthanum (La)
- **Heavy REEs (HREEs):** e.g., dysprosium (Dy), terbium (Tb), europium (Eu), lutetium (Lu)
- **Rare Earth Oxides (REO)** occur primarily as two types of ores, Bastnasite and Monazite. Bastnasite deposits in China and the United States constitute the largest percentage of the world's rare earth resources. Monazite deposits in Australia, Brazil, China, India, Malaysia, South Africa, Sri Lanka, Thailand, and the United States constitute the second-largest segment.

Chart 1 : World Mine Reserves

World mine reserves	Reserves (Mt)
China	44
Brazil	21
India	6.9
Australia	5.7
Russia	3.8
Vietnam	3.5
United States	1.9
Greenland	1.5
Tanzania	0.89
South Africa	0.86
Canada	0.83
Thailand	0.0045

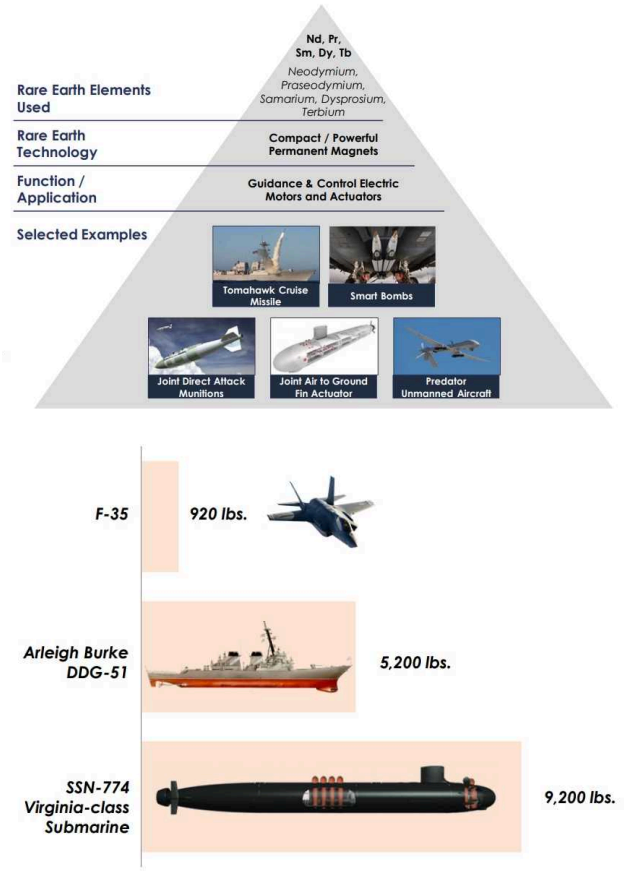
Source: USGS, Morgan Stanley Research
Note: Reserves are TREO and do not specifically breakout individual rare earth reserves

2. Applications of Rare Earth Today and in the Future

Current Uses

- **Defense:** Motors in aircraft and tanks, missile guidance systems, radar/sonar, satellites, and lasers. An F-35 jet contains ~920 lbs of REEs.
- **Automotive:** EV motors, sensors, power steering, and braking systems. EVs use ~3 kg of REEs per car vs. 100 g in ICE vehicles.
- **Electronics:** Speakers, cameras, and mechanical components.
- **Energy:** Wind turbines and HVAC systems.
- **Permanent Magnets:** NdFeB magnets are the fastest-growing application, used in EVs, robotics, and renewable energy.

Chart 2 & 3: Rare Earths and permanent magnets are required for key defense applications.



Source: Company data, Congressional Research Service, Rare Earth Industry and Technology Association, Morgan Stanley Research

Future Outlook

- **Humanoids & Embodied AI:** Each humanoid robot may require ~0.9 kg of REEs. By 2050, humanoids could drive up to $800 billion in cumulative REE demand.
- **Clean Energy Transition:** Wind and solar technologies will increasingly rely on REEs for efficient energy conversion and storage.

3. China's Dominance and Strategic Leverage

China possesses some of the world's richest rare earth deposits, especially ion-adsorption clays in southern China, whare are rich in heavy rare earth elements (HREEs) like dysprosium and terbium. China controls 65% of mined NdPr supply, 88% of refined NdPr, >90% of NdFeB magnet production and >99% of refined HREEs. This dominance is the result of decades of strategic planning, investment and policy execution, where it spans the entire supply chain – from mining to refining to manufacturing. Refining REEs is technically complex and environmentally hazardous. China has built extensive infrastructure and accepted the environmental costs, while other countries have been slower due to stricter regulations.

This dominance is not just economic—it's strategic. China has used REEs as a geopolitical tool:

2010: Halted REE exports to Japan during a diplomatic crisis.

2019–2021: Threatened export controls amid trade tensions with the U.S.

2025: Imposed export controls on seven HREEs and permanent magnets, tightened export licenses, and implemented tracking systems to monitor end-use and prevent re-export.

China's control allows it to regulate global supply, influence pricing, and exert pressure in trade negotiations. Its infrastructure enables targeted restrictions and oversight, making REEs a calibrated tool of strategic influence.

4. U.S. Strategy to Reduce Dependence

The U.S. has launched a multi-pronged approach to counter China's dominance:

Policy and Funding Initiatives

- Defense Production Act (DPA): $750 million allocated, including $439 million for REE projects.
- Inflation Reduction Act (IRA): Offers 10% production tax credits and up to 30% capex funding for critical mineral projects.
- DOE Loan Programs: Supports REE extraction and processing through clean energy financing.
- Critical Materials Institute (CMI): Advances technologies for REE recovery, substitution, and recycling.

Domestic Production

- MP Materials: Operating Mountain Pass mine and building a magnet facility in Texas.
- USA Rare Earth: Developing the Round Top mine and a magnet plant in Oklahoma.
- Noveon: Building refining and magnet capacity in Texas.

International Collaboration

- Partnering with allies like Australia, Canada, and Brazil to diversify supply chains.
- Brazil launched an $815 million Critical Minerals Fund in 2025 to accelerate REE development.

5. Challenges

Despite progress, the U.S. faces many hurdles. The first is refining bottlenecks. While the US has rare earth mines, it lacks sufficient refining capacity. Therefore, most mined REE concentrates still need to be sent to China for processing. Second is the environmental and regulatory hurdle, as REE extraction and refining are environmentally intensive, involving radioactive byproducts and toxic chemicals. Third is the economic viability, where Chinese producers benefit from economies of scale, government subsidies, and lower labor costs. In view of all these hurdles, many experts suggest the U.S. may achieve substantial REE self-sufficiency by 2032–2035, but full independence will require sustained investment, innovation, and international cooperation.

6. Investment Opportunities

Ticker / Fund	Market Cap / AUM (USD) as of July 31, 2025	YTD 2025 Returns (%) as of July 31, 2025	2024 Returns (%)	P/E	Expense Ratio	Key Notes
MP Materials (MP)	$11.8B	294.23%	-21.41%	na	na	U.S.'s sole large integrated rare earth mining and processing company; backed by Defense Dept; strategic significance
Energy Fuels (UUUU)	$2.3B	77.19%	-28.65%	na	na	U.S. uranium & REE producer, key in U.S. critical minerals diversification
Lynas (LYC/LYSCF)	$7.49B	62.83%	-10.20%	225.9	na	Australia-based, largest producer of separated rare earths outside China
Iluka Resources (ILU/ILKAF)	$1.6B	1.98%	-23.48%	10.65	na	Australia-based, key non-Chinese supplier of rare earth oxides, emerging key player in rare earth
REMX (Rare Earth ETF)	$0.55B	26.17%	-36.62%	na	0.58%	Offers diversified exposure to global rare earth and strategic metal producers globally
LIT (Lithium & Battery ETF)	$0.95B	0.49%	-19.95%	na	0.75%	Includes some REE exposure through EV supply chain companies globally