U.S. Rare Earth Recycling Hubs

The Emergence of Regional Ecosystems for Critical Minerals Recycling

As supply-dependency risks thrust rare earth recycling into the spotlight, this report focuses on the regional hubs taking shape across the United States and examines the steadily advancing reality of rare earth recycling.

WASHINGTON | CORE

June 2026

Recycling as a New Pillar of the U.S. Rare Earth Supply Chain

Rare earth element (REE) recycling has long been viewed primarily through the lens of environmental sustainability and circular economy objectives. However, as the geopolitical landscape surrounding critical minerals has evolved in recent years, recycling is increasingly being recognized as a strategic component of REE supply chains.

REEs have become essential inputs for a wide range of strategic industries, including electric vehicles (EV), renewable energy systems, robotics, semiconductors, aerospace technologies, and advanced defense platforms. As demand for these technologies continues to accelerate, concerns regarding supply security have intensified.

REE is Essential to Advanced Manufacturing

Supply-Chain Vulnerability & Strategic Reframing

Although the United States accounts for nearly 13% of global raw ore production,[1] its domestic REE refining capacity remained virtually nonexistent until the early 2020s,[2] leaving the country heavily dependent on China and other foreign suppliers for downstream processing. The risks associated with this dependence became increasingly apparent in 2025 when China imposed export restrictions on medium and heavy REEs. The restrictions disrupted global supply chains and jeopardized the production of advanced defense assets, including F-35 fighter jets, Tomahawk missiles, submarines, and advanced radar systems.

Current North American demand for REE magnets is estimated at approximately 35,000 tons per year and is projected to double over the next decade.[3] Meeting this demand growth through domestic primary mining alone presents severe scaling challenges in terms of permitting, investment, and scaling. As policymakers and industry leaders search for ways to strengthen supply-chain resilience, attention has increasingly shifted beyond mining.

Consequently, recycling is undergoing a broader strategic reevaluation. Rather than being viewed solely as an environmental activity, recycling is now emerging as an additional source of supply capable of strengthening domestic manufacturing, reducing import dependence, and supporting national security objectives.

Increasingly, end-of-life electronics, EV components, industrial magnets, and manufacturing scrap are viewed not as waste, but as valuable "urban mines." These untapped resources are estimated to contain approximately $67 billion worth of recoverable materials[4] and offer a high-grade feedstock source that bypasses many of the challenges associated with conventional mining and extraction.

Although recycled REEs currently account for less than 5% of global supply,[5] their contribution is expected to grow significantly over the coming decades. According to projections by the International Energy Agency (IEA), recycled materials could ultimately meet up to 20% of global REE demand by 2050,[6] highlighting the increasingly important role recycling may play in future critical mineral supply chains.

Status & Outlook

~13%

The U.S. produces ~13% of global rare earth ore[1]

7 types

In 2025, China restricted exports of 7 rare earth elements[2]

~35,000 t

North American REE magnet demand (~35,000 t/yr) is set to double within 10 years[3]

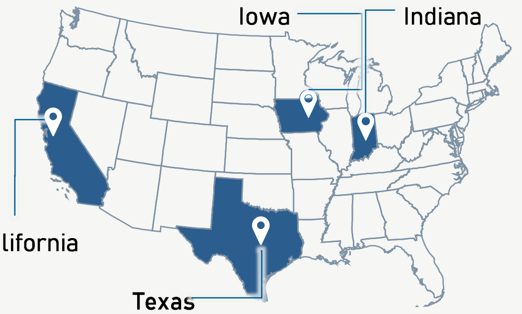
Up to 20%

Recycled rare earths could supply up to 20% of global demand by 2050[6]

The Four Major U.S. Rare Earth Recycling Hubs

The emergence of regional recycling hubs across the U.S. further demonstrates this evolution. Although still in the early stages of development, four states—California, Texas, Iowa, and Indiana—have emerged as the core pillars of the U.S. REE recycling ecosystem.

The Four Key U.S. Rare Earth Recycling Hubs



Source: Washington CORE

01 California

Source: MP Materials[7]

California's ecosystem anchors itself around the Mountain Pass Mine—the only active REE mine in the U.S. and the second-largest globally. In July 2025, MP Materials signed a $500 million contract with Apple to supply end-to-end REE magnets derived entirely from recycled feedstock. In July 2025, the Department of Defense (DOD) invested $400 million in MP, becoming its largest shareholder. To guarantee long-term operational viability, the DOD signed a 10-year purchase agreement establishing a price floor commitment of $110/kg for MP's neodymium-praseodymium (NdPr) metals and magnets—a rate nearly double the current Chinese market baseline.

02 Texas

Source: Noveon Magnetics[8]

Crucially, Noveon Magnetics operates the only active U.S. facility capable of manufacturing high-performance sintered REE magnets. Backed by a $28.8 million DOD award, Noveon has secured high-volume neodymium-iron-boron (NdFeB) magnet supply agreements with global industrial giants such as General Motors, Nidec, and ABB. Complementing this momentum, REEcycle has developed a proprietary chemical process capable of recovering over 98% of REEs from spent magnets, supported by a $5.1 million DOD grant. MP Materials is also constructing a massive $1.25 billion REE magnet manufacturing facility in Northlake, scheduled to begin operations in 2028.

03 Iowa

Source: Ames National Laboratory[9]

Hosting the Department of Energy's (DOE) Critical Materials Innovation Hub (CMI), led by Ames National Laboratory, Iowa serves as one of the nation's leading centers for advanced research into critical material recycling. Ames scientists have developed a novel acid-free dissolution recycling (ADR) process. The ADR technology was licensed to several companies, such as Critical Materials Recycling (CMR), for commercialization and scale-up. In 2025, in partnership with Microsoft and Western Digital, CMR successfully processed nearly 50,000 pounds of end-of-life hard disk drives harvested from Microsoft's data centers. The operation achieved a 90% material recovery rate while reducing carbon emissions by an estimated 95% compared to conventional primary mining.

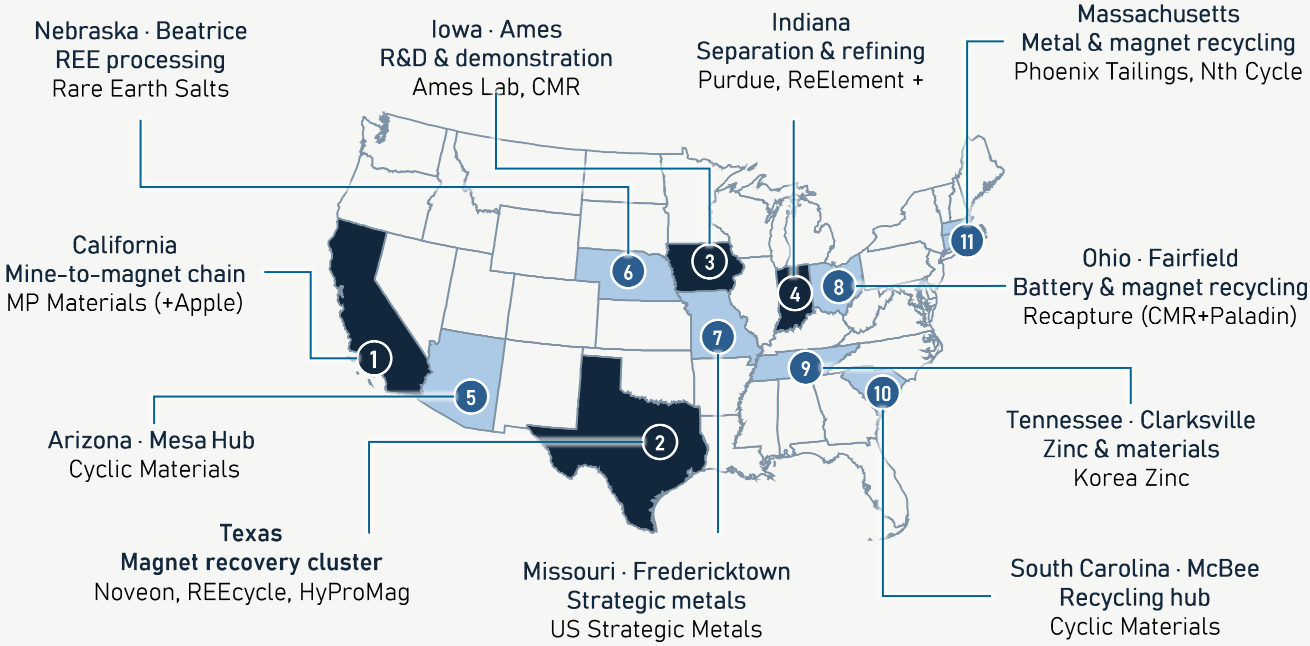
04 Indiana

Source: ReElement[10]

In Indiana, the REE recycling ecosystem is uniquely driven by a powerful synergy between academic research and commercial scaling, with Purdue University acting as the technological anchor. Purdue researchers have developed and patented a "ligand-assisted chromatography" technology, enabling the precise separation and purification of high-purity REEs and battery-grade materials. ReElement Technologies has successfully piloted a multi-feedstock refining system backed by a $2 million DOD award, and is currently constructing a large-scale commercial refinery in Marion, targeting an initial production capacity of 1,000 metric tons per year of ultra-pure REE oxides starting in 2026.

Expanding National Ecosystem Beyond the Four Core Hubs

Rare Earth Recycling Hubs Across the U.S.



Source: Washington CORE

Although the four major hubs currently lead the transition toward commercial-scale recycling, REE recycling activities are scaling far beyond these primary regions. Over the past several years, recycling-related projects have emerged in Arizona, Massachusetts, Missouri, Nebraska, Ohio, South Carolina, and Tennessee, among others. While these projects vary considerably in scale and technological focus, they collectively form a nationwide REE recycling ecosystem.

The rapid expansion of REE recycling would not be possible without significant investment from both the public and private sectors. The DOD, DOE, and U.S. Export-Import Bank (EXIM) have played a particularly prominent role through research grants, long-term procurement commitments, direct loans, and direct equity investments intended to accelerate domestic REE production capabilities. Such measures reflect concerns regarding supply-chain vulnerabilities and the importance of REE materials for national security applications.

Private-sector investment is expanding alongside government support. In 2025, venture capital investment in U.S. REE-related startups reached $628 million. This represents a staggering 3,000% increase year-on-year.

In many cases, REE recycling projects are supported by partnerships involving international companies. Canada's Cyclic Materials is expanding its U.S. footprint through a $20 million commercial facility in Arizona, alongside a major $82 million recycling campus in South Carolina. Concurrently, Australia's Ionic Rare Earths has formed a partnership with US Strategic Metals to deploy its patented hydrometallurgical extraction technologies to process and recover REEs from legacy mine tailings in Missouri. South Korea's Korea Zinc, in a joint venture with the DOD and Department of Commerce (DOC), is also orchestrating a landmark $7.43 billion critical minerals smelter in Tennessee, designed to recycle 620,000 metric tons of legacy smelting byproducts to reclaim gallium, germanium, and indium by 2029.

For many years, REE recycling was often viewed as a niche activity dependent upon policy support or environmental incentives. However, accelerating private-sector participation demonstrates that industry stakeholders now see recycling as a competitive source of supply capable of generating long-term economic value.

$628 million in 2025 VC Investment
3,000% increase year-on-year

Building a More Resilient Rare Earth Supply Chain with Recycling

The emergence of REE recycling hubs across the U.S. reflects a broader shift in how policymakers and industry leaders approach critical mineral security. Historically, discussions surrounding REE supply security focused primarily on expanding mining and securing access to foreign materials. While these efforts will remain essential, recent developments suggest that recycling is increasingly being recognized as a complementary source of supply capable of enhancing resilience across the entire value chain.

The development of regional recycling ecosystems in California, Texas, Iowa, and Indiana demonstrates that the U.S. is pursuing a more diversified approach to REE security. Rather than relying solely on primary extraction, policymakers are increasingly seeking to recover value from end-of-life products, manufacturing scrap, and other secondary feedstocks. This approach not only strengthens domestic supply chains but also supports the growth of refining, magnet manufacturing, and other downstream industries.

Importantly, the U.S. recycling ecosystem is unlikely to develop in isolation. Existing partnerships with Australian, Canadian, European, Japanese, and Korean firms indicate that international cooperation will remain an important component of industry development. For foreign companies with expertise in recycling, refining, separation, and advanced manufacturing technologies, the growth of the U.S. REE recycling sector may create new opportunities for investment, technology collaboration, and commercial expansion.

As geopolitical competition, supply chain uncertainty, and demand for advanced technologies continue to intensify, recycling is poised to play an increasingly important role in the future REE industry. The emerging network of U.S. REE recycling hubs therefore represents more than the emergence of a new industrial sector. It signals the development of a new pillar for critical mineral security.

References

1. https://pubs.usgs.gov/periodicals/mcs2026/mcs2026-rare-earths.pdf
2. https://www.csis.org/analysis/consequences-chinas-new-rare-earths-export-restrictions
3. https://prismmarketview.com/u-s-accelerates-rare-earths-push-to-break-chinas-supply-chain-dominance/
4. https://www.wastedive.com/news/recyclers-feedstock-urgent-critical-minerals-demand-eri-remade/814555/
5. https://atlasinstitute.org/rare-earth-rivalries-the-geopolitical-rise-of-critical-minerals/
6. https://www.iea.org/data-and-statistics/charts/secondary-supply-volumes-and-share-of-total-demand-for-rare-earths-in-the-announced-pledges-scenario-and-net-zero-emissions-by-2050-scenario-2023-2050
7. https://mpmaterials.com/history/
8. https://noveon.co/
9. https://www.ameslab.gov/news/science-friday-how-to-recycle-rare-earth-elements
10. https://www.reelementtech.com/

About the Author

Hojun Song | Senior Research Analyst

Senior Research Analyst at Washington CORE. He conducts comprehensive research and analysis across a broad range of fields, drawing out the connections among technology, policy, and business. Leveraging deep experience in rigorous research and strategic consulting, he analyzes complex data, evaluates policy impacts, and delivers practical insights to a diverse client base. He holds a Master of Arts in Law and Diplomacy (MALD) from the Fletcher School at Tufts University and a B.A. in International Area Studies and Economics from Yeungdong Global University, South Korea.

WASHINGTON | CORE

Washington CORE is an independent research and consulting firm headquartered in Washington, D.C., providing strategic research, analysis, and advisory services. As the landscape around political, economic, and business trends and technological innovation continues to shift, we pair high-quality research and advisory services with a unique global network of experts across fields to deliver the best solutions.
https://www.wcore.com

We welcome inquiries regarding this report.
https://www.wcore.com/home/contact-jp/#form-jp