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Rare Earth Rivalry: Mid-Stream Power, Security Stakes, and ASEAN's Choice

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Rare Earth Elements, or REE, have gradually become a tangible underpinning of technological superiority between the United States and China, as it is more than just a trade issue, but also a basic basis for economic and military conflict. To put that in context, global mine REE production is expected to reach 390,000 t by 2024, with China accounting for approximately 270,000 t, the United States accounting for 45,000 t, and Myanmar 31,000 t and Thailand 13,000 t trailing behind (U.S. Geological Survey, 2025). It is vital to mention that REE is important since it can generate motion and stability for the machine when it is moving, it is also important because of its unmatched power-to-weight ratio and durability in high temperatures (Depraiter & Goutte, 2023). The IEA also estimated that the manufacturing of magnets derived from REEs would expand by between 4 and 7 times by 2040 (Ghorbani et al., 2025). With that said, REE is important not only for strategic reasons but also with the demand is more than supply.

Rare-earth element (REE) deposits are found across the globe, but the processing and midstream conversion, the critical steps that turn mined ore into usable materials, are still concentrated in only a few countries. While China currently operates a large share of the world's refining and separation facilities, this reflects processing capacity rather than dependence on Chinese-owned resources.

I. Evolving Roles of China and the United States

Looking at the statistics, the Chinese have made tremendous progress, aside from having the deposit, the processing concentration is at approximately 85% of the global capacity for REE refinement and separation (Liu et al., 2023). It is not an overnight transition, but one that began decades ago, during Deng Xiaoping's reign, when he proposed a strategy and established an expert and working group to investigate and strategize how to extract this resource, given its investment in this area about a couple of decades ago, it is unsurprising that this long-term investment in technology, workforce training, and infrastructure has positioned China as a leading processor and supplier (Li, 2025). In 2010, China expected to increase its REE exports to Japan, causing the price to rise dramatically (Alfaro et al., 2025). This clearly reflects China's influence and experiences in this field and Chinese commitment to keep this edge is not going away anytime soon. In 2021, China also launched the China Rare Earth Group, which combines six state-owned firms, signaling a desire to concentrate efforts on increasing REE output (Htun, 2023). That being said, the Chinese influence extends not just internally, but also to mountain pass production in the United States, Vietnam, and Myanmar, reflecting the international nature of the supply chain (Murty, 2024). At present, much of the global ore still undergoes final processing in China.

On the contrary, the United States and the European Union, perhaps recognizing the importance of diversified supply of REE, are shifting from mining to manufacturing, implying that they are also attempting to upgrade their own mid-processing technology within their own countries for resilience (Andrews-Speed & Hove, 2023). For example, the United States is supporting the domestic separation and magnet process by awarding multiyear contracts to companies to create the material. It is also important to note that, in 2022, the United States has proposed two initiatives, the Defence Production Act (DPA), which aims to push and accelerate domestic REE production,

and the Minerals Security Partnership (MSP), which aims to strengthen its partnership with Australia, Canada, and the United Kingdom in order to ensure supply chain resilience (Vivoda et al., 2025). The EU, on the other hand, enacted the EU Critical Raw Materials Act to achieve 10% extraction, 40% processing, and 25% of the recycling by 2030 (Koese et al., 2025). These efforts highlight a broader trend toward building resilience rather than reliance on any single country.

To put it simply, the REE rivalry is not primarily about who has ore, but about how it can be converted from a grand scale into a technology product through processing, extraction, and conversion. It demonstrates how mid-stream is costly, can lead to power control, and can be used for security purposes, as the technology can lead to economic rivalry and provide a technological foundation for the military. The next section of the article will look into the REE's economic and security aspects.

II. Economic and Security Considerations

As previously said, mining is merely the first stage; converting the ore into a usable magnet is the key. The supply chain for REE is complex because it requires qualified experts and advanced technology (Opare et al., 2021). It is not a straightforward operation, and currently, less than 1% of the REE in the end product may be recycled due to a lack of qualified technology and experts (Rachovides et al., 2024). Currently, China is promoting the purchase of domestically produced final products, which not only benefits the domestic value chain but also helps maintain employment, profits, and expertise within the country (Park et al., 2023). Furthermore, having the ability to supervise the entire manufacturing process allows China to support and maintain its high-tech industries while ensuring resilience of supply. With REE, China can develop quickly and without relying on foreign factors in areas such as electric vehicles (EVs), wind turbines, and defence manufacturing at a reasonable cost (Aguiar de Medeiros & Trebat, 2017). Analysts suggest that China's REE strategy has contributed to the growth of high-value industries such as EVs and clean energy, which are projected to expand substantially, to put things in perspective, Chinese exports are expected to be around $489 million in 2024, and EV vehicles will be around $305.57 billion (Bao, 2025; Wang, 2024). It is vital to highlight that rare earths alone do not provide economic benefits, instead, their incorporation into other technological industries does. When China dominates the entire process, mining ore with fewer issues than the West's protests of environmental standards, and with cheap labor, the value of its end product is lower, making it challenging for other regions to match China’s current cost and scale advantages (Park et al., 2023). China’s position is also the outcome of sustained industrial strategy and legitimate investment in technology, labor, and infrastructure. Similar strategies are emerging elsewhere as governments seek to enhance their own clean-energy and defense manufacturing capabilities

Aside from the economic challenge, there is also a security risk in that the same REE magnet product can be employed in military systems. REE-based magnets are also critical inputs across both civilian and defense technologies, from EV motors and wind turbines to aerospace and naval systems, as well as satellites and space systems, or REEs such as Yttrium in the gain medium of high-power solid-state lasers (Mancheri et al., 2019). This is already another economic and security powerhouse, including defence suppliers. Because the export of raw or processed REE from China is limited in comparison to the end product, there is less processed REE available for others to follow up with China for this military grade industry and production (“The United States takes actions,” 2025). With this, United States, EU, and Japan also aims to ensure diversified sourcing and reduce potential vulnerabilities in critical sectors. Such cases could explain why the United States is making efforts under the Defence Production Act (DPA), which the Department of Defence is directly funding, to establish a specialised REE supply chain that is not reliant on China as well as its allies, such as the EU, who use the CRMA to ensure future security, and Japan, which stockpiles REE in collaboration with Australia, for example (Vivoda et al., 2025).

Overall, it demonstrates that REE is now becoming an arena in which big powers compete not only because of their economic potential, but also because they are on the verge of ushering in a new phase and face of modern weapons. Specifically, those that control REE would have a competitive advantage over others.

III. ASEAN’s Opportunities and Responsibilities

Following the trends outlined above, it is undeniable that a few trends will emerge, such as friend-shoring, in which the move to develop REE production and processes outside of China will grow, with the West leading the way (Vivoda & Matthews, 2024). This also indicates that all parties will continue to tighten technological and managerial controls, which are crucial for the end product, in order to maintain a competitive edge in terms of economics and security (Baskaran & Schwartz, 2025). Also, demand for REE will continue to rise; however, the process of finding, mining, separating, and producing an end product takes time, it is also because supply is less than demand (Leal Filho et al., 2023). With that said, ASEAN can be wired to both the network side of China and with China, allowing it to position itself as a raw material supplier as well as a mid-stream partner (Nicolas, 2023).

This prospect is founded on an already established basis, such as Malaysia, which is the region's non-China LREE separation/processing hub, and Myanmar, Vietnam, Thailand, and Indonesia, which all provide minor mine production and reserves. Suppose there is a sound value chain setup (Seah & Huda, 2024). In that case, ASEAN can capitalize on this opportunity to move up the value chain, including but not limited to attracting investment in mid-stream processing (separation of REEs) and even downstream manufacturing (e.g., magnet production), which will create skilled jobs and transfer technology (Seah & Huda, 2024). This will also increase the geostrategic importance and power of ASEAN, particularly ASEAN Centrality, and will help diversify ASEAN economies away from an overreliance on single commodities. Particularly, ASEAN remains a collaborative partner in global supply networks rather than being drawn into great-power competition.

That being said, despite what appears to be an infant stage, ASEAN can benefit by leveraging the production chain it already has to build advanced, high-value industrial ecosystems, particularly by transforming into a hub of 21st-century technology supply chains. However, careful, cohesive, and responsible government is required, as is the avoidance of becoming a simple pawn in the rivalry between superpowers.

Conclusion

The chokepoint is REE's mid-tier process, which involves processing and converting REE into useful material for subsequent use in industry. In other words, power lies with those who own or are capable of converting ore into qualified oxides and magnets, and then into other products such as motors, actuators, and generators, all of which can be used to power AI, clean energy, and defence. That being said, China currently holds a leading share of this capacity. However, others, such as the United States, the European Union, Japan, and Australia, are also seeing this trend and shifting from mining to manufacturing in order to bring the entire production process to their own countries, rather than just relying on China. Countries are attempting to build resilience and prepare for anticipated future shocks, particularly those based on the economy and industry.

On the other hand, ASEAN has the opportunity to transition from upstream to midstream production, such as extending Malaysia's midstream pipeline to Vietnam, Thailand, Myanmar, and Indonesia, thereby supporting upstream output. That being said, it is also necessary to develop a vision for the future, focusing on sectors such as recycling or enhancing skills to accelerate the qualification cycle. When combined, it creates resilient economic security for the region, allowing it to prosper and become a hub for collaboration rather than a mere pawn in geopolitical rivalries. By focusing on innovation, recycling, and skills development, the region can enhance economic security and contribute to a more diversified, cooperative global REE network, one that supports clean energy, advanced technology, and shared prosperity.

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