China's Consolidation of Rare Earth Elements Sector

By Tinzar Htun

Introduction

Today China is the biggest global supplier of rare earth elements (REEs), accounting for around 70 percent of global mine production (1.2 million tons) in 2022. More importantly, China holds the dominant role in the downstream process of REE, separating and processing. The only REE processing facility outside of China is the Australian Lynas in Malaysia, which was established with substantive financial support from Japan after a trade dispute with China in 2014. However, the company is facing a risk of partial closure after July 2023 since the Malaysian authority requires the Lynas to remove the radioactive waste generated by the plant. The partial shutdown of the Lynas facility will grant China near-exclusive control over the production and distribution of REEs in the global market.

While China does have significant deposits of REEs, its leverage over the rare earth industry is primarily the outcome of public policies implemented over several decades. As the rare earth industry grew, China emerged as the leader in REE mining on a global scale, and also as the primary processor and consumer of REE due to the government's objective of augmenting the production of value-added final REE products. Public policies implemented by the Chinese government entail government investment in research and development for refining technology, developing trade deals for importing rare-earth minerals for refining, tax rebates, more stringent environmental regulations to address illegal production and smuggling, and industry restructuring.

There are varied and competing narratives around China’s dominance on REEs. The Chinese central government's REE policies have worked to maintain its near monopoly and to gain a greater share of the value chain. On the other hand, domestic dynamics such as economic, social and environmental factors also influence REE policies.

In contrast to China’s global near-monopoly of REE, supply to the REEs market involves small and diverse producers and exporters from China. This limits the Chinese government’s ability to have leverage on price negotiation. As a result, one of the policy initiatives Beijing has pursued is restructuring and consolidating the REE industry. In 2021, China’s State-Owned Assets Supervision and Administration Commission (SASAC) approved the plan to consolidate the “Big Six” REE groups to form a conglomerate, the China Rare Earth Group. This paper provides a background of
the REE industry consolidation in China since early 2000s and the overseas expansion of Chinese firms in sourcing REEs in recent years.

1. Consolidation of REEs
   1.1 2000-2010
Despite its dominant position in the global market, China REE suppliers are often small and fragmented, which is a disadvantage when it comes to negotiating prices with major importing countries. In 2002, the Chinese State Council approved a plan to create two large REE groups, one in the northern region and another in the southern region. The objective was to create a consolidated and coordinated approach for the entire Chinese rare earth industry, covering areas such as production, procurement, pricing, and sales. The restructuring of mining regions would bring various benefits, encompassing political, environmental, social, and economic aspects. The proposed consolidation of the rare earth sector aimed to simplify decision-making and enforcement processes regarding production, export quota control, and pricing, which would benefit the government politically. In addition, the consolidation plan aimed to improve environmental sustainability in mining and refining practices, manage health issues caused by toxic chemicals while increasing tax revenue and investment, and downstream services.

Nevertheless, the REE sector was only regionally consolidated with mixed results, in part due to reluctance from local governments in Southern China. China’s reserves of REEs can be classified geographically into two blocks: light REE deposits located in the North and heavy REE deposits found in the South. In addition, reaching agreements among competing interests of business enterprises and stakeholders was challenging. For instance, local governments tend to favor provincial enterprises because the majority of taxes paid by central enterprises go to the central government. In addition, due to production quotas control, the capacity for separation and smelting of rare earth elements exceeded the production volume. This, along with illegal mining, contributed to the local economy.

Baotou Steel Rare Earth High-Tech Co. (Baotou Rare Earth) was selected as the leader in industry consolidation in northern China’s more concentrated rare earth industry. In 2011, the government of Inner Mongolia declared that Baotou Steel Rare Earth would be the sole state-controlled enterprise for mining and processing ore in the northern region of China. The government of Inner Mongolia also identified 35 other companies and instructed 31 of them, mostly private rare earth firms, to shut down, while the other four companies were instructed to combine with Baotou Rare Earth. On the other hand, the southern region of China, where the heavy REE are concentrated, is characterized by a more fragmented market, with several large companies competing for dominance. China Minmetals and Aluminium Corporation of China (Chinalco), two central state-owned enterprises, have tried to penetrate the rare earth market in Jiangxi Province. However, they found that the local company, Ganzhou Rare Earth Minerals Industry Co. Ltd., had a monopoly over the resources. Consolidation efforts were also undermined by illegal mining, which continued despite central government efforts to crack down. Illegal mining activities contributed to oversupply of REE and resulted in lower prices.

In sum, during this period, efforts to consolidate the sector were influenced by conflicting factors. The Central government wanted to streamline the industry and to gain better leverage in global pricing, while also wanting to address environmental degradation in the REE mining. On the other hand,
reluctance from local governments and ongoing illegal mining limited consolidation of the sector, particularly in the South.

1.2 2010-2020 and Present

During this period, China continued to consolidate the REE sector for similar economic and environmental reasons. With growing demand for REE in new technologies such as smart phones, renewable energy and electric vehicles, geopolitical considerations drove the consolidation policies further. The consolidation results were more successful compared to earlier efforts in the 2000s.

In 2011, China banned REE exports to Japan following diplomatic tensions. Consequently the United States, the European Union (EU) and Japan initiated a WTO dispute in 2012, on which the WTO ruled that China breached WTO rules. Afterwards, China intensified local and national consolidation of the REE sector by implementing different REE policies such as putting higher resource tax rate, stringent environmental requirements, cracking down on illegal mining and smuggling to reduce number of suppliers and illegal export. During this period, the Chinese government implemented “the Plans for Developing the Rare Earth Industry 2009-2015," with the goal to establish three large rare earth production districts and two production systems nationwide. The mining rights and separation quotas were consolidated around six enterprises, later to be known as the "Big 6." The Big 6 acquired smaller companies that were unable to compete due to strict regulations that gave an advantage to the larger firms. China's Ministry of Industry and Information Technology (MIIT) put a moratorium on issuing new REE mining rights until at least July 2011 and new REE separation projects until at least 2015. As a result, by 2012 the number of REE mining rights decreased from 113 to 67, and 90 percent of these 67 mining rights were held by three enterprises: Ganzhou Rare Earth Group, Minmetals, and Chinalco. Additionally, the number of authorized REE producers and traders authorized to export REE products decreased from 47 in 2006 to 22 in 2011.

1.3 Present

China's State-Owned Assets Supervision and Administration Commission (SASAC) authorized the establishment of the China Rare Earth Group in December 2021, which has now become the world's largest producer of strategic REEs. This merger includes three of the "Big Six" SOEs that are major players in the rare earth industry: Chinalco, Minmetals, and Ganzhou Rare Earth Group. Additionally, China Iron & Steel Research Institute Group and Grinm Group Corporation Ltd, which are two research firms, were included in the conglomerate. The move reinforces the direct control of the central government over China's rare earth industry, as the country seeks to consolidate its position.
as a dominant player in the global market and to further develop downstream sectors. Furthermore, the inclusion of research firms shows the government’s desire to develop downstream sectors as well. See the ratio of the shares in Figure 2.

Furthermore, China’s 2016-2020 Five-Year Plan strongly emphasizes developing value-added production in industries such as rare earth functional materials, special steels, alloys, and rare metal materials with high-purity level. To support this goal, the MIIT released draft Regulations on Rare Earth Management in January 2021. The proposed regulations aim to strengthen oversight of the entire industry chain of rare earth metals, from mining to exports, including refining, product transport, and sales. The new regulations also seek to prohibit the purchase and sale of rare-earth products that are extracted illegally, and it seems that Chinese central governments want to reduce fragmented suppliers in the sector and to address environmental concerns. These proposed regulations represent a significant expansion of the current regulations, which focus primarily on the production stage of the rare earth industry.

![Figure 2: Shares Ratio of China Rare Earth Group Co. Ltd](Image)

Source: China Briefing From Dezan Shira and Associates

2. Overseas Expansion

Chinese state-owned enterprises have been expanding their operations overseas in Africa, Southeast Asia, and South America. The sourced minerals include REEs and critical minerals such as lithium, nickel and cobalt. Sourcing foreign REEs is China's long-term strategy to address its supply security and will safeguard the Chinese industry from domestic resource depletion, declining ore grades, and the increasing cost of mining due to strict environmental regulations. Furthermore, the big six REE State-Owned Enterprises (SOEs) in China are shutting down unprofitable and environmentally harmful mining operations. Figure 3 shows overseas REE projects with various forms of Chinese companies’ involvement.

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[22] Source: China Briefing From Dezan Shira and Associates

[23] Figure 3 shows overseas REE projects with various forms of Chinese companies’ involvement.
Shenghe Resources Holding Co., Ltd. plays an important role in many overseas RE projects (Madagascar, Greenland, Australia and USA). Shenghe has an affiliation with the Ministry of Land and Resources, while the China Geological Survey is Shenghe's major shareholder. Shenghe attempted to construct an REE extraction facility at Kvanefjeld in Greenland. This facility would have generated 10% of the world's rare earth. The project came to a halt due to oppositions from Inuit Ataqit, a political group supporting environmental causes. Last year Xiamen Tungsten Corporation (XTC) formed a joint venture (JV) with rare and precious metal manufacturer Chifengjilong Gold Mining Co (Chifeng Gold) to conduct rare-earth resource exploration in Laos. As per the agreement, XTC will provide assistance for exploring rare-earth minerals in Laos, and in exchange, Chifeng Gold will aid in securing an exploration license in Laos.

Figure 3: RE Projects with Chinese Involvement as of 2019
Source: Marc Schmid (2019), Global Times

While China is the dominant producer of REE, in 2019 it also rose as the largest importer of REE ores. Over half of the unrefined heavy REEs imported to China comes from Myanmar. While some earlier reports suggest that these imports may actually be from illegal mining operations in southern provinces of China and then imported through Myanmar, recent investigations by AP and Global Witness indicate that REE mining, especially dysprosium and terbium, is indeed taking place in northern Myanmar. The region is a semi-autonomous territory controlled by militias. Many people from China have migrated to the area to work in the new mines. One estimate suggests that up to 16,000 individuals moved from Ganzhou, Jiangxi province, to Myanmar to mine rare earths between 2016 and 2019. Since stricter environmental regulations were introduced in southern Chinese provinces in 2016, REE mining activities have shifted from China to Myanmar. Although there is no public data, AP reports that at least two of the other four major heavy rare earth processing companies in China, Minmetals and Guangdong Rare Earth Group, are sourcing REEs from Myanmar.
While it is true that China has been investing in rare earth mining projects in other countries to secure supplies, it is not entirely clear whether the recent expansion is a centrally directed policy or state-owned enterprises pursuing their interests.

**Conclusion**

China has been able to dominate the REE industry not just because of its domestic reserves but also due to its public policies. Chinese government’s competing objectives include maintaining control over the REE supply chain and enhancing the environmental performance of its REE sector. Additionally, as the demand for REE grows with the energy transition technologies, desire to establish the downstream sector and geopolitics are also influencing factors. The government has transformed the REE industry from a decentralized, cottage industry into a unique, centralized conglomerate after nearly two decades of consolidation efforts.
References

9 Chen et al., “China’s Rare Earth Dominance: The Myths and the Truths from an Industrial Ecology Perspective.”
11 Chen et al., “China’s Rare Earth Dominance: The Myths and the Truths from an Industrial Ecology Perspective.”
12 China’s Rare Earth Industry and Export Regime: Economic and Trade Implications for the United States (R42510), n.d.
16 Ferreira and Critelli.
19 Chen et al., “China’s Rare Earth Dominance: The Myths and the Truths from an Industrial Ecology Perspective.”
20 Hayes-Labruto et al., “Contrasting Perspectives on China’s Rare Earths Policies: Reframing the Debate through a Stakeholder Lens.”
23 Mancheri et al., “Effect of Chinese Policies on Rare Earth Supply Chain Resilience.”
24 Schmid, “Mitigating Supply Risks through Involvement in Rare Earth Projects: Japan’s Strategies and What the US Can Learn.”
25 Ferreira and Critelli, “China’s Global Monopoly on Rare-Earth Elements.”
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