



### REE SELF-SUFFICIENCY OF THE EUROPEAN UNION

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The European Union (EU) has set a carbon neutral goal by 2050. This is only possible if Europe adopts sustainable and affordable renewable energy sources. Due to its heavy reliance on electric motors, which transform electrical energy into mechanical motion, the EU will need a sizable quantity of raw materials to further its energy transition. Critical minerals and rare earth elements (REEs) are raw materials required to produce the most efficient renewable technologies, such as electric motors and generators with REE permanent magnets. While EU based firms dominate the global electric motor industry, all of the rare earth magnet materials they use are imported from China and Russia. China exports over 16,000 metric tonnes of rare earth permanent magnets to Europe annually.<sup>1</sup>

**Due to the rising demand for electric vehicles and renewable energy, Europe needs to increase its imports of REEs. In 2021, the European Commission (EC) reported that 98 per cent of EU rare earths were imported from China, prompting Brussels to push member states to increase their own extraction capacities.**

China and Russia are the major suppliers of components for semiconductors, wind turbines, and other new and clean technology manufactured in EU countries. Members of the EU have been trying to diversify their imports and lessen their reliance on a small number of suppliers. Experts claim that Europe possesses sufficient rare earth reserves for the continent to become self-sufficient if only the resources to mine and extract them were available. Therefore, scientists from all around Europe and the surrounding area are cooperating to locate resources and develop more efficient extraction methods.<sup>2</sup> Due to the rising demand for electric vehicles and renewable energy, Europe needs to

increase its imports of REEs. In 2021, the European Commission (EC) reported that 98 per cent of EU rare earths were imported from China, prompting Brussels to push member states to increase their own extraction capacities.<sup>3</sup> The recent discovery of the largest deposit of rare earth oxide in Europe near Kiruna, in northern Sweden, by the iron ore mining company LKAB, represents a big step toward Europe becoming self-sufficient in rare earth elements.

**By identifying sources of raw materials and rare earth products for usage in industries like the automotive, electronics, industrial, and chemical sectors, the EuRare Project aimed to lay the foundation for a European rare earth industry.**

## **EU Initiatives and Projects**

With the unveiling of the EU-funded EuRare Project in 2013, the EU started to build its rare earth industry. By identifying sources of raw materials and rare earth products for usage in industries like the automotive, electronics, industrial, and chemical sectors, the EuRare Project aimed to lay the foundation for a European rare earth industry. The EU started the 7th Framework Programme of the European Commission to support the EuRare initiative. The project ran from 2013 to 2017 with the goal of developing a steady, profitable, and environmentally sound supply of REEs for industries vital to the EU's economy. The EC provided funding for the EuRare Project as part of the raw materials topic NMP.2012.4.1-1 titled 'New environmentally friendly approaches in minerals processing.'<sup>4</sup> One of EuRare's top tasks was to discover mining-friendly areas. More than 30 tonnes of European rare earth ore samples have already been analysed and processed since the project began. The EuRare Project has already found rare earth deposits in Sweden, Finland, Greece, Spain, Greenland, Norway, and Turkey for future investigation.<sup>5</sup>

In 2020, the 'European Raw Materials Alliance' was established to facilitate better domestic mining and processing of strategic minerals, which initiated lithium mining in both Spain and Germany despite strong popular opposition and environmental concerns. Given the constraints of European mining, recycling and the circular economy have also emerged as practical options for the EU.<sup>6</sup> In addition, Germany-based EIT Raw Materials is funding a three-year innovation initiative led by the Rare Earth Industry Association (REIA) to create a blockchain-based Circular System for Assessing Rare Earth Sustainability (CSyARES). As part of this project, BEC GmbH (Germany), Circularise (Netherlands), Grundfos (Denmark), and Minviro (United Kingdom) would work together to increase the openness and longevity of REE supply chains in Europe.<sup>7</sup>

## **Deposits in Europe and Solution**

According to the EC, rare earths are among the most resource-critical raw minerals, meaning they are of the utmost economic importance for Europe's industrial economy, most particularly aerospace and defence. Rare earth permanent magnet scrap is

recovered at a rate of 1 per cent in Europe, which is a huge potential resource with a small environmental impact.<sup>8</sup>

The EuRare Project studied the most advanced and promising REE resources in Europe that involve: a) Norra Kärr, with leading-edge materials, in South Central (Sweden) reported a presence of more than 23.6 million tons of Total Rare Earth Oxide (TREO); b) Greenland Minerals and Energy Ltd (GME), the license holder of the Kvanefjeld REE-deposit, located in southern Greenland, reported joint ore reserves of about 1.72 million tonnes TREO; c) Tanbreez Mining Greenland AS, the license holder of the Kringlerne project, reported the presence of more than 4.7 billion tonnes TREO involving 0.5 per cent of light REE and 0.15 per cent of heavy REE; d) Aksu Dıamas, a heavy mineral placer deposit in eastern Turkey, contains 495 million tonnes of TREO. The REE would be produced as a by-product of magnetite production from this deposit.<sup>9</sup>

Jan Mostrom, CEO of the state-owned LKAB, said the recent discovery of the Sweden deposit could become a significant building block for producing the critical raw materials that are absolutely crucial to enable the green transition.” Sweden, which currently holding the EU presidency, is widely regarded as a critical component in the bloc’s plan to achieve mineral independence. However, senior Swedish geologist Erik Jonsson from the Geological Survey’s Department of Mineral Resources stated that Europe lacked the infrastructure to process rare earth metals and manufacture intermediate products. Jonsson claimed that the EU “also need(s) to focus on the entire value chain of these metals, including products like high-efficiency magnets that we (EU) want to use for wind turbines or traction engines in electric vehicles.”<sup>10</sup>

A European fund to invest in critical minerals will begin early this year, seeking billions of Euros in public and private money, which is needed for a transition to zero carbon emissions. Bernd Schaefer, chief executive of the EU-funded EIT Raw Materials, told Reuters that the European Raw Materials Fund would begin with approximately 2 billion euros (US \$2.1 billion). Still, the region will eventually need more than 100 billion euros to generate enough key minerals. This European Raw Materials Fund will support the action plan of the European Raw Materials Alliance, which calls for the EU to generate one-fifth of its own rare earth magnets by 2030 and reduce its dependence on China from 98 per cent to 2 per cent.<sup>11</sup>

## **Implications for India**

India-EU climate-based ties began to take shape with the introduction of the Clean Energy and Climate Partnership (CECP) in 2016, which focused on collaboration in reaching their Paris Accord obligations. Furthermore, cooperation in the areas of climate change, green energy, and environmental protection was prioritised in 2018 as part of an effort called ‘Sustainable Modernization.’ In addition, the 15th and 16th India-EU summits (2020 and 2021) established their joint ‘Roadmap to 2025,’ with a primary

emphasis on the deployment of renewable energy, the development of energy efficiency, and a smart grid system to modernise the electricity market.<sup>12</sup>

In 2021, trade with the EU accounted for US \$95 billion, or 10.8 per cent of India's total goods trade, ranking third behind the US (11.6 per cent) and China (11.4 per cent). The EU's tenth-largest trading partner is India. In 2021, the leaders of the EU and India recommitted to working toward a "balanced, ambitious, comprehensive, and mutually beneficial" trade deal and initiated talks on an investment protection agreement.

It was also agreed that "solutions to long-standing market access challenges" would be a prerequisite for any future trade discussions.<sup>13</sup> In April 2022, during her two-day visit to India, EC President Ursula von der Leyen stressed the need to collaborate toward a green, sustainable, and fair future. She said, "climate change and biodiversity loss are at the top of the EU and India's political agendas."<sup>14</sup>

In the case of rare earth elements and critical minerals, India's potential to become a global supply chain leader has been in doubt despite claimed reserves of 49 major critical minerals and 6 per cent of the world's rare earths. Like the EU, India has been cultivating the long-sown seeds of its mining and mineral potential to realise Aatmanirbharta (self-sufficiency).<sup>15</sup> The EU's aspirations toward REE self-sufficiency may increase the amount of collaboration between India and the EU. India and the EU may jointly develop their independence from China by exploiting unknown quantities of key minerals. In addition, India and EU members can share the expertise and benefits of their respective partnerships with the Quad and the US Rare Earth Alliance.

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## Notes:

<sup>1</sup> Roland Gaub, et. al. “Rare Earth Magnets and Motors: A European Call for Action”, Rare Earth Magnets and Motors Cluster of the European Raw Materials Alliance, [https://eit.europa.eu/sites/default/files/2021\\_09-24\\_ree\\_cluster\\_report2.pdf](https://eit.europa.eu/sites/default/files/2021_09-24_ree_cluster_report2.pdf). Accessed on 4 February 2023.

<sup>2</sup> Joe Turner, “Europe’s rare earth deposits could shore up tech industry”, *Horizon: The EU Research & Innovation Magazine*, March 9, 2015, <https://ec.europa.eu/research-and-innovation/en/horizon-magazine/europes-rare-earth-deposits-could-shore-tech-industry>. Accessed on 5 February 2023.

<sup>3</sup> “Europe’s largest deposit of rare earth metals discovered in Sweden”, CGTN, January 14, 2023, <https://newseu.cgtn.com/news/2023-01-14/Europe-s-largest-deposit-of-rare-earth-metals-discovered-in-Sweden-1gzpmfsMmLC/index.html>. Accessed on 5 February 2023.

<sup>4</sup> Eimear Deady, et. al., “Research and development for the Rare Earth Element supply chain in Europe”, National Environment Research Council, December 19, 2017, [http://www.eurare.org/docs/EURAREbrochure\\_vfinal.pdf](http://www.eurare.org/docs/EURAREbrochure_vfinal.pdf). Accessed on 6 February 2023.

<sup>5</sup> Turner, n. 2.

<sup>6</sup> Insa Wrede, “The EU’s risky dependency on Critical Chinese Metals”, *Deutsche Welle*, April 15, 2022, <https://www.dw.com/en/the-eus-risky-dependency-on-critical-chinese-metals/a-61462687>. Accessed on 6 February 2023.

<sup>7</sup> Neha Mishra, “Global Initiatives to Secure Critical Minerals Supply Chain”, Centre for Air Power Studies, June 11, 2022, <https://capsindia.org/global-initiatives-to-secure-critical-minerals-supply-chain/>. Accessed on 6 February 2023.

<sup>8</sup> Gaub, n. 1.

<sup>9</sup> Efthymios Balomenos, et. al. “The EURARE Project: Development of a Sustainable Exploitation Scheme for Europe’s Rare Earth Ore Deposits”, *Journal of Johnson Matthey Technol. Rev.*, 67, no. 2 (2017): 142 doi: 10.1595/205651317X695172, <https://technology.matthey.com/article/61/2/142-153/>. Accessed on 7 February 2023.

<sup>10</sup> Ibid.

<sup>11</sup> Eric Onstad, “European fund for critical minerals projects to launch next year”, Reuters, June 17, 2022, <https://www.reuters.com/markets/europe/european-fund-critical-minerals-projects-launch-next-year-2022-06-17/>. Accessed on 7 February 2023.

<sup>12</sup> Christian Egenhofer, Milan Elkerbout, Irina Kustova, and Mihir Swarup Sharma, “India-EU climate relations: Outcomes and recommendations from the ORF & CEPS India-EU Track 1.5 Dialogue on Climate Action and Ambition”, November 13, 2021, <https://www.orfonline.org/research/india-eu-climate-relations/>. Accessed on 7 February 2023.

<sup>13</sup> Manu Pubby, “Ukraine crisis: India examines exposure to Russian arms”, *The Economic Times*, March 06, 2022, <https://economictimes.indiatimes.com/news/defence/ukraine-crisis-india-examines-exposure-to-russian-arms/articleshow/90024351.cms>. Accessed on August 01, 2022.



<sup>14</sup> “European Union to pursue trade deal with India to reduce its ties to Russia”, *Business Standard*, April 24 2022, [https://www.business-standard.com/article/economy-policy/european-union-to-pursue-trade-deal-with-india-to-reduce-its-ties-to-russia-122042401053\\_1.html](https://www.business-standard.com/article/economy-policy/european-union-to-pursue-trade-deal-with-india-to-reduce-its-ties-to-russia-122042401053_1.html). Accessed on 7 February 2023.

<sup>15</sup> Neha Mishra, “Self- Reliance of Indian Rare Earth Industry: Lessons from Canada”, Centre for Air Power Studies, September 28, 2022, <https://capsindia.org/self-reliance-of-indian-rare-earth-industry-lessons-from-canada/>. Accessed on 5 February 2023.



Centre for Air Power Studies

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