

Prospects and challenges for EU rare earth imports from Russia: The case of Germany, France and Italy

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Globalisation and autocracy are locked together



Source: © [Satoshi Kambayashi](#), [The Economist](#), 19 March 2022

Abstract: The European Union (EU) finds itself in a critical need for rare earths, particularly the refined products essential for the production of electric cars, turbines, and other technological applications. However, the refining process is not only energy-intensive but also poses significant environmental risks. Consequently, local communities, as evidenced by instances in Spain and Portugal, vehemently oppose having such operations in their vicinity, advocating a "beggar thy neighbour" policy. The EU currently relies heavily on China, which controls the majority of global processing, commanding 90% of all rare earths and 60% of lithium. In response to these challenges, the EU took a crucial step in November 2023 by reaching a preliminary agreement on the European Critical Raw Materials Act (CRMA). This legislative initiative aims to enhance and diversify the EU's supply of critical raw materials (CRM), foster the circular economy, fortify Europe's strategic autonomy, and explore alternatives to mitigate dependence. Recent transnational crises, including disruptions to supply chains during the COVID-19 pandemic and Russia's invasion of Ukraine, underscore the imperative of secure supply chains across all economic sectors. These crises also underscore the significant influence wielded by major emerging economies, notably the BRICS countries (Brazil, Russia, India, China, and South Africa), which dominate key global supply chains, including those for critical raw materials (CRMs). Russia plays a pivotal role as one of the world's largest suppliers of palladium (40% of global supply), the second-largest supplier of platinum (13%) and nickel (12%), and a substantial contributor of aluminium and copper. Furthermore, Russia possesses the potential to emerge as a major player in the rare earths market due to its extensive reserves. The country also accounts for a considerable share of the EU's acquisitions, including palladium (41%), platinum (16%), cobalt (5%), and lithium (4%). Notably, Russia serves as the primary EU source for platinum group metals processing (iridium, platinum, rhodium, ruthenium; 40%), phosphate rock extraction (20%), lithium processing (4%), and scandium processing (1%). To attain greater independence in external CRM provision, the EU must make significant investments in its mining and processing facilities. However, mining represents merely the initial phase; subsequent steps involve the separation of rare earth elements (REE) from oxides, refining, and alloy forging a complex, highly specialized, multi-stage process. In this regard, relative newcomers like Europe lag behind, as China has solidified its dominant position in each phase through a concerted, long-term industrial strategy supported by state subsidies.

Keywords: [rare earths](#), [energy transition](#), [climate change](#), [pollution](#), [emerging markets](#), [strategic autonomy](#), [Russia](#), [EU](#), [BRICS](#), [Germany](#), [France](#), [Italy](#), [USA](#), [China](#), [Minerals Security Partnership](#), [Critical Raw Materials Act](#), [Industrial policy](#)

JEL-Code: D24, D43, D52, E23, F13, F18, F23, F51, F63, F64, L13, L61, L63, L72, N14, N54, Q33, Q53, Z13

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1. Introduction

The [European Union](#) (EU) desperately needs [rare earths](#), crucial components in various high-tech industries, in particular the refined products that are needed to make electric cars, turbines, etc. Russia, possessing significant rare earth deposits, emerges as a supplier for the EU, despite sanctions imposed because of the Russo-Ukraine war. However, refining is very energy-intensive and extremely harmful to the environment. As a result, local communities in the EU do not want it in their backyards. They prefer a [beggar thy neighbour](#) policy (La Rédaction; 2023; Kohnert, 2024).

As the critical minerals sector expanded, indigenous and environmental protests erupted in major exporting countries such as [Chile](#) and [Argentina](#), as well as in new sites in [Spain](#), [Portugal](#), [Serbia](#) and the [U.S.](#). Their efforts reflected shared suffering. They coordinated awareness-raising campaigns through transnational networks denounced the impacts on water, ecosystems and livelihoods, and called for the enforcement of community consent (Riofrancos, 2023).

Cartoon 1: Wallonia: Return to business² *Rare earth? Not In My Backyard !!*



Source: © La Rédaction (2023)

There is a dual challenge of rapid demand growth and market concentration. Investment in critical raw materials (CRMs) could be linked to political alignment, as is reportedly the case with [China's Belt and Road Initiative](#), which is investing heavily in resource-rich [SSA](#) countries (Le Mouel & Poitiers, 2023; Kohnert, 2024). Such conditionality could reinforce [monopsony](#) power, accentuate concentration and thus make CRM markets less resilient. But the investment challenge also presents an opportunity. New capacity could reduce concentration and help diversify markets. In short, CRM markets are highly dynamic and likely to change soon (Le Mouel & Poitiers, 2023).

The EU is currently reliant on [China](#) which dominates global processing, such as 90 % of all rare earths and 60 % of [lithium](#). For example, around 90% of solar panels and wafers come from China (Blenkinsop & Evans, 2023). In November 2023, the EU reached a preliminary agreement on the [European Critical Raw Materials Act](#) (CRMA). It aims to increase and diversify the EU's supply of critical raw materials (CRM), strengthen the [circular economy](#) and develop substitutes. The new rules will also strengthen Europe's [strategic autonomy](#) (European Council, 2023). The CRMA sets targets for the 17 strategic raw materials, including the base metals [aluminium](#), [copper](#) and [nickel](#), as well as the key battery material lithium and rare earth elements used in permanent [magnets](#) for wind turbines or electric

² Ballon translation: 'Wallonia is a rare earth – Let's preserve it !!'

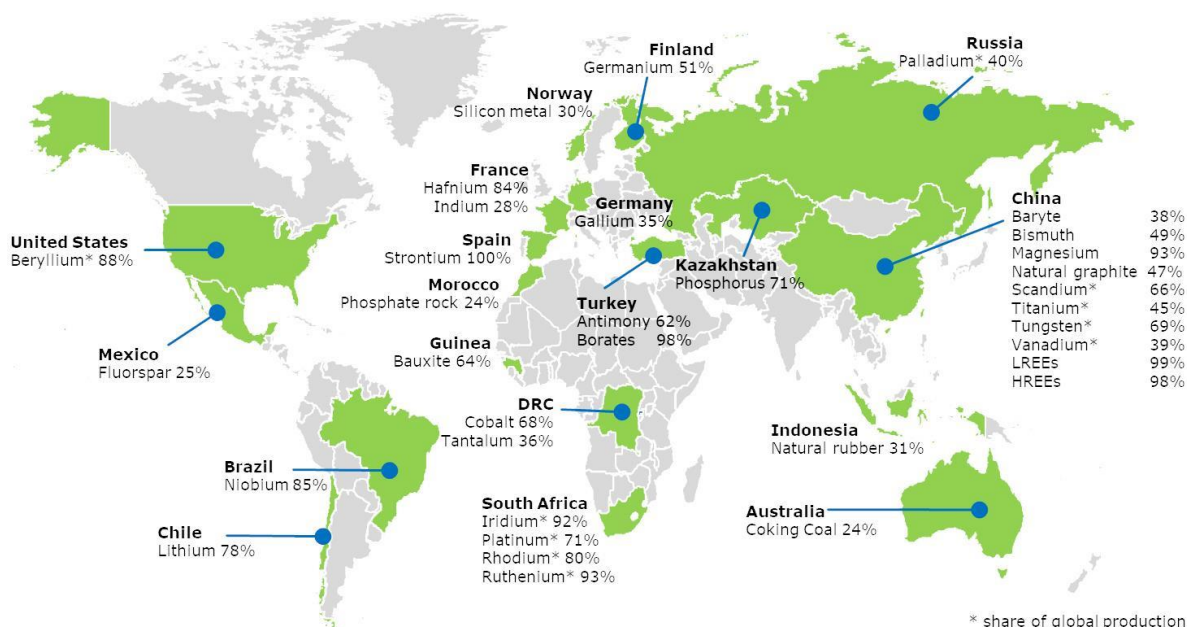
vehicles. The EU should mine at least 10 % of its annual needs by 2030, recycle 25 % and process 40 %. No more than 65 % of the EU's annual needs should come from a single third country (Blenkinsop & Evans, 2023) to avoid being at the mercy of those who might use the minerals as weapons, as Russia has done with hydrocarbons (Hoyer, 2023).

But mining is just the first step. [Rare earth elements](#) (REE) have to be separated from the oxides, refined and forged into [alloys](#) in a complex, highly specialised, multi-stage process before they can be turned into permanent [magnets](#). Here, too, relative newcomers like Europe have a lot of catching up to do. China has established a dominant position in each step of the process through a concerted, long-term industrial strategy backed by state subsidies (Johnston et al, 2023).

Moreover, recent transnational crises, such as the [disruption of supply chains](#) during the [COVID-19 pandemic](#) and [Russia's invasion of Ukraine](#), have amplified the importance of secure supply chains across all economic sectors. They also highlight the substantial influence of the world's largest emerging economies, particularly the [BRICS](#) countries ([Brazil](#), [Russia](#), [India](#), [China](#) and [South Africa](#)), which dominate many key global supply chains, including those for critical raw materials (CRMs) (Hoyer, 2023).

On 1 February 2023, the EU proposed the [Net Zero Industry Act](#) (NZIA) alongside the CRMA in response to the [US Inflation Reduction Act](#), a \$369bn green subsidy bill that the EU feared would encourage companies to relocate to North America. The NZIA sets a benchmark for European manufacturers to produce 40 % of the EU's annual demand for clean technology products such as solar and wind power systems, battery storage and fuel cells by 2030 (Blenkinsop & Evans, 2023).

Graph 1: biggest supplier countries of CRMs to the EU



Source: [EC](#) report on the 2020 criticality assessment (European Commission, 2020)

[Russia](#) is one of the world's largest suppliers of [palladium](#) (40% of world supply), the second largest supplier of [platinum](#) (13%) and [nickel](#) (12%), and a major supplier of [aluminium](#) and [copper](#), among others. In addition, the country has the potential to become a major player in

the [rare earths](#) market in the future due to its vast (but still largely unexploited) reserves of rare earths (Rizos & Righetti, 2022).

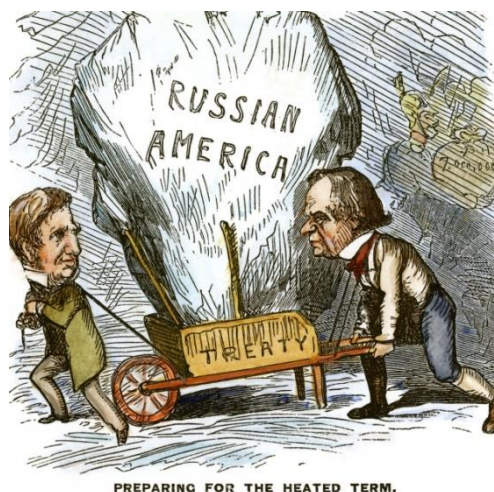
[Russia](#) accounts also for a significant share of EU purchases of [aluminium](#) (17%) and [nickel](#) (17%), for which it is the largest EU supplier, as well as [molybdenum](#) (9%) and [copper](#) (7%). Russia also accounts for a significant share of EU purchases of several CRMs, including [palladium](#) (41%), [platinum](#) (16%), [cobalt](#) (5%) and [lithium](#) (4%) (Rizos & Righetti, 2022). It is the main EU source of [platinum group](#) metals processing ([iridium](#), [platinum](#), [rhodium](#), [ruthenium](#); 40%), [phosphate rock](#) extraction (20%), [Lithium](#) processing (4%), [Scandium](#) processing (1%) (European Commission, 2020). Still, the EU has some difficult decisions to make concerning mining projects within Europe, and it also needs to invest more in its own refineries and processing plants to lay the foundations for a net-zero [circular economy](#) (Hoyer, 2023).

Hardly any [rare earth elements](#) are currently mined in Europe, although large deposits have been discovered in Europe's largest deposit of rare earths in the [Kiruna mine](#) of Sweden. However, it is a long way to a mine. Once discovered, it takes at least 10-15 years before mining can begin and raw materials can be delivered to the market (LKAB, 2023).

The EU's efforts to cut economic ties with Russia and Russia's decision to ban raw material exports could put additional pressure on raw material [supply chains](#) still recovering from the [Covid-19 crisis](#). The financial repercussions of [Russia's Ukraine invasion](#) are also beginning to be felt. For example, the price of [nickel](#), a key material for [lithium-ion batteries](#), has risen by 26 % since the start of the Russian invasion (Rizos & Righetti, 2022).

[Recycling](#) efforts will only be able to meet part of the growing demand for materials from [low-carbon technologies](#). In addition, the EU will need to look for ways to diversify its supplies as it cuts economic ties with Russia. Other options will need to be considered, including sourcing from its own mining reserves, seeking improvements in material efficiency and promoting material substitution options where possible. Developing [strategic partnerships](#) and joint projects with resource-rich countries, such as [Sub-Saharan African](#) states (Kohnert, 2024) and the pre-war partnership with [Ukraine](#), can also help secure access to non-energy minerals (Rizos & Righetti, 2022).

Cartoon 2: Rivals line up in battle for Greenland



Source: © [The Times](#), 20 August 2019; Philip, 2019

Amid rising geopolitical tensions in the [Arctic](#), also [Greenland](#) has attracted the attention of several world powers, in part because of its rare earth deposits. In addition to the neighbouring state of Russia, the USA also showed interest. In 2019, [President Trump](#), for example, insisted, he had not been joking when he asked his advisers to look at the possibility of buying Greenland, because strategically it would be interesting, Trump apparently considered his offer as a [large real estate deal](#). Already before, Greenland's attempts to do business with [China](#) have run into trouble with [Denmark](#), which retains control of Greenland's defence and foreign policy (Philip, 2019). Apart from [Russia](#), the [US](#), [EU](#) and [China](#) have all shown interest in Greenland's resources, but this tug-of-war has stalled since anti-mining parties won the [2021 elections in Greenland](#). The EU's [Critical Raw Materials Act](#) could address some of the concerns that have kept the projects in limbo, but restarting mining on the island would not be a panacea for the EU's quest to reduce its dependence on rare earths (Marabini San Martín, 2023).

In the following, prospects and challenges associated with [EU](#) rare earth imports from [Russia](#), will be analysed, considering geopolitical, economic, and environmental factors, taking the example of the three main EU member states: [France](#), [Germany](#) and [Italy](#).

2. Case studies: Prospects and challenges for rare earth mining and imports from Russia in three major EU countries

Cartoon 3: *The new EU legislation on raw materials should worry us*



Source: © Contribution externe, 2023

If nothing else, the [Covid crisis](#) and the [Russian war of aggression in Ukraine](#) have shown that the [EU](#) and its member states did well to increase their strategic autonomy from external sources. Securing access to the [non-renewable energy minerals](#) needed to build a new industrial ecosystem is also important to tackle [climate change](#) and meet the decarbonisation targets of the [European Green Deal](#) (Rizos & Righetti, 2022). Rising demand for these materials has created an arena for [geopolitical competition](#).

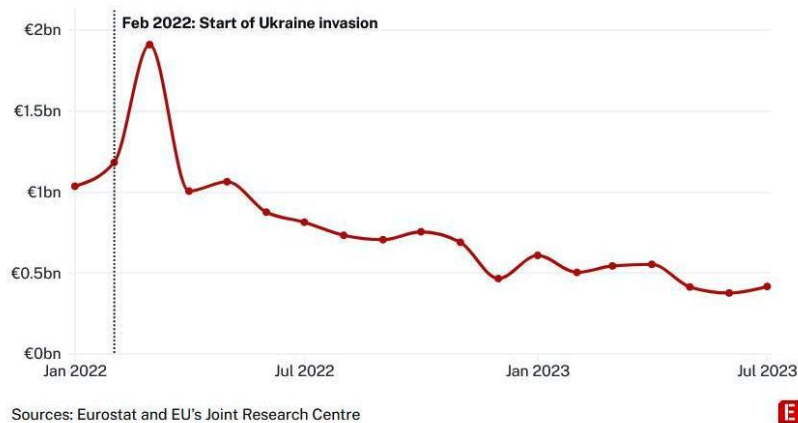
But to date, the [EU](#) has failed to live up to its own objectives, rules and international commitments. Europe's imports not only continue to fund Russia's war economy but also benefit [Kremlin-backed oligarchs](#) and [state enterprises](#). Although the EU has targeted some shareholders, Russian mining companies have faced no restrictions. The loophole is even

more glaring as the US and UK directly sanctioned several companies, further isolating the EU in its [double standards](#) (Hansens & Melchior & Peigné & Schumann, 2023).

Graph 2: Russian critical raw materials still flow freely into the EU

Between March 2022 and July 2023, Europe imported €13.7 billion worth of critical and strategic raw materials from Russia.

Monthly EU imports of critical and strategic raw materials from Russia, in billion euros.



Source: Graphic: Marta Portocarrero ; Hansens & Melchior & Peigné & Schumann, 2023

For example, [Vsmo-Avisma](#), the world's largest [titanium](#) producer, sold at least \$308 million of titanium to the EU between February 2022 and July 2023 through its [German](#) and [UK subsidiaries](#). It is partly owned by Russia's national defence conglomerate [Rostec](#). The two companies have the same chairman, [Sergei Chemezov](#), a close [Putin](#) ally. The two were [KGB](#) officers in [East Germany](#) in the 1980s. Both Chemezov and Rostec are under EU sanctions and have helped supply tanks and weapons to the Russian army (Hansens & Melchior & Peigné & Schumann, 2023). One of Vsmo-Avisma's biggest European customers is [Airbus](#), incorporated in the European Aeronautic Defence and Space Company (EADS) in 2000, jointly owned by the French, German and Spanish governments. Between the start of [Russia's war with Ukraine](#) and March 2023, Airbus imported at least \$22.8m worth of titanium from Russia, a fourfold increase in value and tonnes compared to the previous 13 months (Hansens & Melchior & Peigné & Schumann, 2023).

Still between the start of the war and July 2023, Russia's [Norilsk Nickel](#) (Nornickel), the world leader in [palladium](#) and high-grade [nickel](#), exported \$7.6 billion worth of [nickel](#) and [copper](#) to the EU through [Finnish](#) and [Swiss](#) subsidiaries. It also sent over \$3 billion of [palladium](#), [platinum](#) and [rhodium](#) through [Zurich airport](#). In 2022, almost 50 % of Nornickel's sales went to Europe. [Brussels](#) has not sanctioned the group or its chairman and largest shareholder, [Vladimir Potanin](#), an [oligarch](#) and former deputy prime minister who is subject to US and UK sanctions. Last but not least, aluminium giant [Rusal](#) also uses [tax havens](#) to channel minerals to Europe, where it owns the EU's largest alumina refinery in [Aughinish](#), Ireland, and a smelter in [Sweden](#) (Hansens & Melchior & Peigné & Schumann, 2023). Other European buyers of Russian metals since the start of the Russian Ukraine war include [Germany's GGP Metal Powder](#) (now, [Stiga](#), the largest manufacturer of electrolytic copper powders with a global market share of over 50 %; \$66m for [copper](#)), [French](#) arms manufacturer [Safran](#) (\$25m for [titanium](#)) and [Greece's ElvalHalcor](#) (\$13m for [aluminium](#)) (Hansens & Melchior & Peigné & Schumann, 2023).

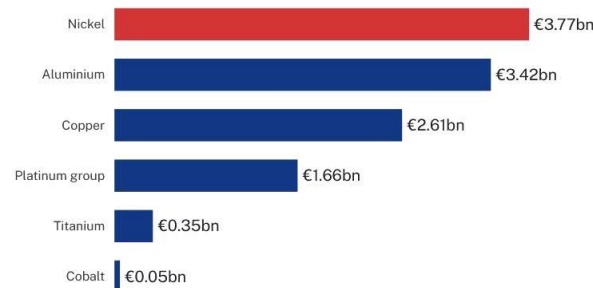
In short, because [EU sanctions](#) require unanimity among all member states, divergent national economic interests often water down packages. As a result, European companies can still pour

money into [Russian](#) mines to extract [nickel](#), [titanium](#) and other key metals. As such, EU sanctions are carefully crafted to appear to achieve their goals while preserving EU interests. In August 2023, [Rusal](#) said Europe still accounted for a third of its revenues. Rusal's main shareholder is the oligarch [Oleg Deripaska](#), who has been sanctioned by the EU and its Western partners (Hansens & Melchior & Peigné & Schumann, 2023).

Graph 3: *Nickel, the most imported critical raw material from Russia since the invasion of Ukraine*

The European Policy Centre estimates that up to 90 per cent of some types of nickel used in Europe comes from Russian suppliers.

EU imports of selected raw materials, March 2022 - July 2023, in billion euros.



Sources: Eurostat and EU's Joint Research Centre

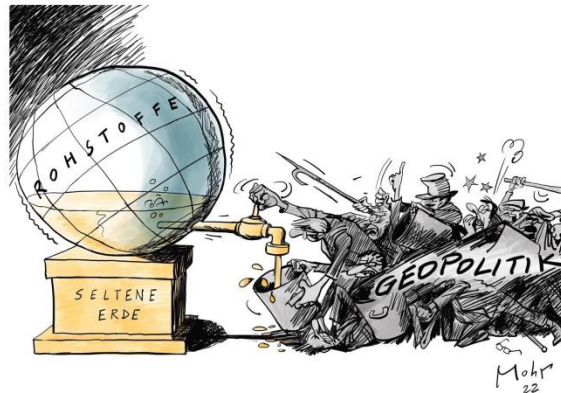


Source: Graphic: Marta Portocarrero; Hansens & Melchior & Peigné & Schumann, 2023

In order to at least partially alleviate these supply bottlenecks, some potential benefits could be achieved through [circularity](#) and [recycling](#) approaches for components and materials used in [green technologies](#). Estimates suggest that the establishment of collection and recycling facilities in the [EU](#) could help meet future EU demand and significantly reduce import dependency provided, the [right policy framework](#) would be established (Rizos & Righetti, 2022). However, recycling alone will not be sufficient to meet the growing demand for these materials. Other options will therefore have to be considered, including the development of [strategic partnerships](#) and joint projects with resource-rich countries other than Russia and China. The EU will also need to source from its own mining reserves, seek improvements in [material efficiency](#) and promote material substitution options where possible (Rizos & Righetti, 2022). However, there is so far little willingness to change course as shown by the strong imbalance of flows of permanent magnet REEs along the value chain, with Europe relying largely on the import of finished products (magnets and applications) (Guyonnet, et al. (2015).

2.1 Germany: Prospects and challenges for rare earth mining and imports from Russia

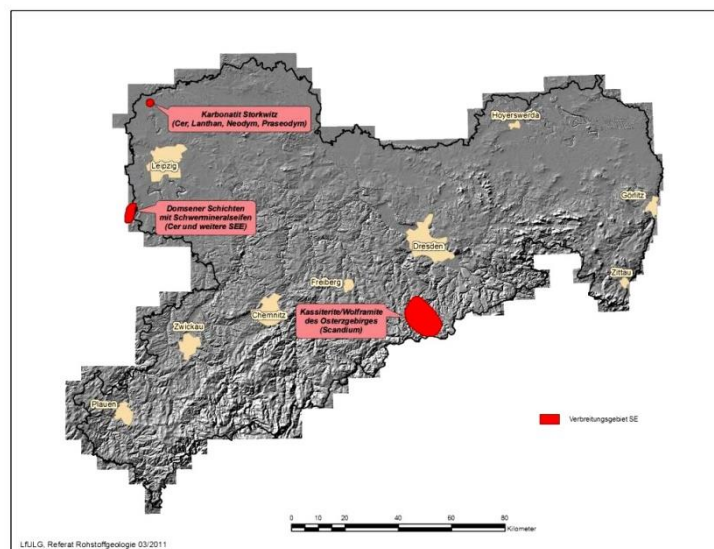
Cartoon 4: *It's getting tight*
Geopolitics, raw materials and rare earth



Source: © Burkhard Mohr, [Generalanzeiger](#), 2022

The only known deposit of [rare earths](#) in [central Europe](#) is located near [Storkwitz](#) in the district of [Northern Saxony](#), Germany (Faszination-Rohstoffe, 2018). The deposit was declared uneconomic in 2017. The [carbonatite](#) body beneath the village was discovered during the search for [uranium](#) deposits in the [GDR](#) but was never mined. New drilling was carried out in 2012 by [Ceritech](#) AG, but the results were very disappointing. The so-called [JORC](#) resource calculation showed that the Storkwitz deposit contains approximately 20,100 tonnes of rare earth oxides and 4,000 tonnes of [niobium](#). However, the rare earth content (0.48% SEE₂O₃) is too low for economic mining and processing is too expensive, even if raw material prices remain high. In 2015, the exploration and mining rights were returned to the Saxon Mining Authority.

Graph 4: *Rare earths in Saxony*



Source: LfULG, 2011; Faszination-Rohstoffe, 2018

Rare earths were also thought to be present in [Bavarian](#) clays. These so-called ion-adsorption clays are mainly mined in China for the extraction of rare earths. As part of an exploration programme for rare earths, clay deposits in Bavaria were investigated for their REE potential.

However, the investigation revealed only slightly elevated levels compared to the composition of the 'normal' earth's crust. Therefore, this study did not provide any evidence of economically interesting enrichment in Bavarian clay deposits (Faszination-Rohstoffe, 2018). It would also be desirable to include REEs in [soil monitoring](#) programmes to study the dynamics of REE mobilisation, including monitoring in plants and wildlife, in order to improve our knowledge of REEs in the environment and to detect harmful changes in their concentrations at an early stage and prevent [environmental problems](#) (Mihajlovic & Rinklebe, 2018; Mihajlovic et al., 2019).

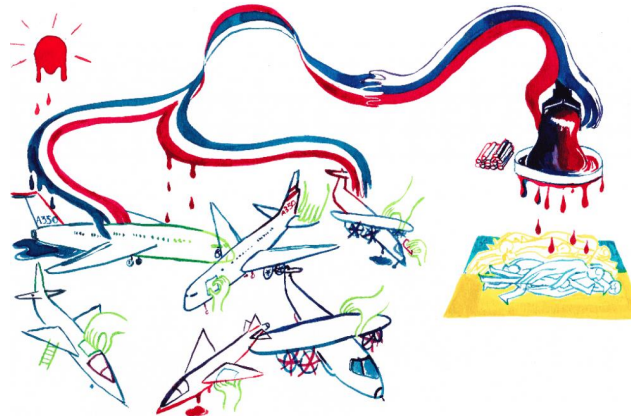
The [German economy](#) depends on imports for over 90 % of its supply of raw materials. Many of these raw material imports come from just a few producing countries. The delivery risks are sometimes extremely high, including for [rare earths](#), [lithium](#) and [magnesium](#). To increase the security of raw material imports, European customers could pool their procurement of critical raw materials to counteract the market power of the few suppliers, such as [Russia](#) (Menkhoff & Zeevaert, 2022). German companies like [GGP Metal Powder](#) (the largest manufacturer of electrolytic copper powders with a global market share of over 50 %; \$66m for [copper](#)), still continued to buy Russian metals since the start of the [Russian Ukraine war](#) (Hansens & Melchior & Peigné & Schumann, 2023). At a geostrategic level, the German government needs to consider how to secure the country's energy supply, who is still a suitable [strategic partner](#) and what values need to be upheld. These preparations include the [deglobalisation](#) of raw material imports and the establishment of [zero-waste recycling systems](#), [supplier diversification](#) ([offshoring](#), nearshoring and [friendshoring](#)) and the promotion of new technologies (Reimann, et al (2023).

It is also worth mentioning the establishment and expansion of key industries in the [green energy](#) transition, which contribute to sustainable [energy security](#). One example is the construction of the Swedish battery cell factory [Northvolt](#) in [Norderwöhrden](#), in Dithmarschen near [Heide](#), decided in January 2024, which is supported by substantial state subsidies of €700. It is a €4.5 billion green flagship project, created in the international subsidy race to reduce dependence on the [Chinese battery monopoly](#). The settlement can indeed create a future. The district of Dithmarschen is structurally weak but has an important resource, i.e. renewable energy and onshore wind power (Güßgen, 2024).

The involvement of [civil society organisations](#) in securing a sustainable energy supply is essential. There are three major gaps in Germany's raw materials policy to date. Firstly, the German government supports the German economy in increasing material efficiency, but it has neither integrated global environmental limits on resource consumption nor the need for an ecological turnaround into its policy. There is a lack of binding statements, targets and measures to reduce raw material consumption in absolute terms. Second, initiatives such as the [UN Global Compact](#), the [Extractive Industries Transparency Initiative](#) (EITI) or the [certification](#) of supplies are first steps towards greater [transparency](#) and control in the area of minerals such as [coltan](#), but they are not enough. Approaches to improve the transparency of payment flows and production and [supply chains](#), as well as regulation through the [Dodd-Frank Act2](#) in the US and the EU [Transparency Directive](#), must be consistently pursued and implemented. To prevent [human rights](#) abuses, there is a need for legally enshrined and binding obligations for companies in the extractive sector, as well as regulations for financial service providers and investors. Furthermore, options for compensation for human rights violations are essential. Thirdly, the lack of democratic and civil society participation in the design and implementation of the German raw materials strategy is regrettable. Neither parliament nor civil society was sufficiently involved in the conception of the strategy, although raw materials policy affects all social actors and sectors (parliaments, churches, trade unions, civil society organisations, science and consumers) (Fuchs & Reckordt, 2016).

2.2 France : Prospects and challenges for rare earth mining and imports from Russia

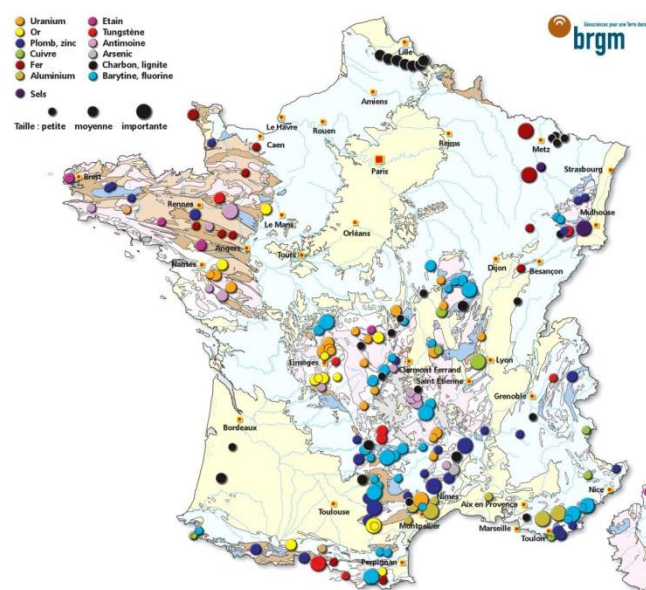
Cartoon 5: *French industry funds Putin's war*



Source: © Izoard, 2023

In [France](#), the main geological sites likely to be exploited for [rare earths](#) are located in [Brittany](#), [French Guiana](#) and [French Polynesia](#). In Brittany, deposits exist in [Ille-et-Vilaine](#), [Côtes-d'Armor](#) and [Finistère](#) (Viel, 2023). But presently they are too modest to justify the opening of an extraction sector. Only in case of a surge in prices, the Ille-et-Vilaine site would allow marginal production. Also, in [French overseas departments](#), like in French Guiana, research or exploitation permits are granted for "bouquets" of minerals which include rare earths, but no large deposits have been identified. Under current conditions, France therefore does not have rare earth mining potential (Viel, 2023). On May 19, 2016, the [French Senate](#) published a report on "The strategic issues of rare earths and strategic and critical raw materials" to address this important issue (Tesson, 2018).

Graph 5: *Map of the main former mines that were exploited in France*



Source: Minéral-info, 2024

Although historically [France](#) has never been a dominant country on the international mining scene, it has played a leading role in the past and has acquired a mining tradition and vocation for several substances, such as coal, iron, tin, gold, antimony, aluminium (bauxite), tungsten, uranium and lead-zinc, among others (Minéral-info, 2024). Among the substances exploited, [France](#) occupied a significant place in the world production of [tungsten](#) (3rd European producer until 1986, with the mines of [Salau](#) and the [Échassières](#) district), [antimony](#) (1st world producer at the beginning of the 20th century with the [mines of La Lucette](#) and the district of [Brioude-Massiac](#)), and [gold](#) (with a world-class deposit, that of [Salsigne](#)) (Minéral-info, 2024). However, reopening these mines will inevitably involve obtaining mining permits (unless less democratic procedures are used, as in countries such as [China](#)), and the inevitable production of [pollution](#), both from mining and from processing the metals. Most likely, the local population would protest, "Not in my backyard!" (Tesson, 2018).

Graph 6: mining_potential_of France ([BRGM](#))



Source: Tesson, 2018

However, [France](#) benefits from its advantages. For example, four French companies have developed innovative technologies that make it possible to better separate rare earths, while reducing water and energy costs, and minimizing environmental impacts. In case of reopening mines, French companies would have to be both recycling operators and producers of rare earths, each in a different sector, i.e. automobiles for [Carester](#), wind turbines for [MagREEsources](#), high-performance magnets for [Orano](#), home automation and small electric motors for [REEfine](#) (Viel, 2023). Only technological breakthroughs will allow a substitution of rare earths. Concerning electric or hybrid vehicles, research first focused on the disappearance of the use of magnets. For example, the first models of [Tesla](#) vehicles were equipped with alternating current induction motors without rare earths. In March 2023, Tesla announced a more efficient, less expensive engine with no trace of rare earths. This will halve

the cost of producing electric cars, making them suitable for the mass market. But the new process remains an enigma. For [offshore wind turbines](#), new technologies based on [superconductors](#) could reduce or even eliminate the reliance on rare earths (Viel, 2023).

For the time being, French industry, particularly the aviation industry, continues to rely on Chinese and Russian imports of rare earths. For example, [Occitan](#) industries, involved in [Airbus](#) production, will have done everything to avoid sanctions likely to damage their profits (Izoard, 2023). The same goes for the [French](#) arms manufacturer [Safran](#) (\$25m for [titanium](#)) (Hansens & Melchior & Peigné & Schumann, 2023). Securing REE supply chains is a strategic issue for defence companies, both immediately and in the long term. At a time of high geopolitical tensions, the sovereignty and independence of the French and European [defence industrial base](#) (DIB) are also at stake. Nearly six out of ten materials used in the DIB are critical (Calzada, 2020).

The French economy is at risk of being involved in the more or less long term in clashes over metals which promise to be no less deadly than oil wars. All the major industrial projects of the decade, whether carried out by [China](#), [Russia](#) or Western powers, are based on an exponential demand for metals required for low-carbon technologies (Izoard, 2023).

2.3 Italy: Prospects and challenges for rare earth mining and imports from Russia

Cartoon 6: *Italian rare earth mines have been abandoned in recent decades*



Source: © Rozzino, *La Voce*, 15 July 2023

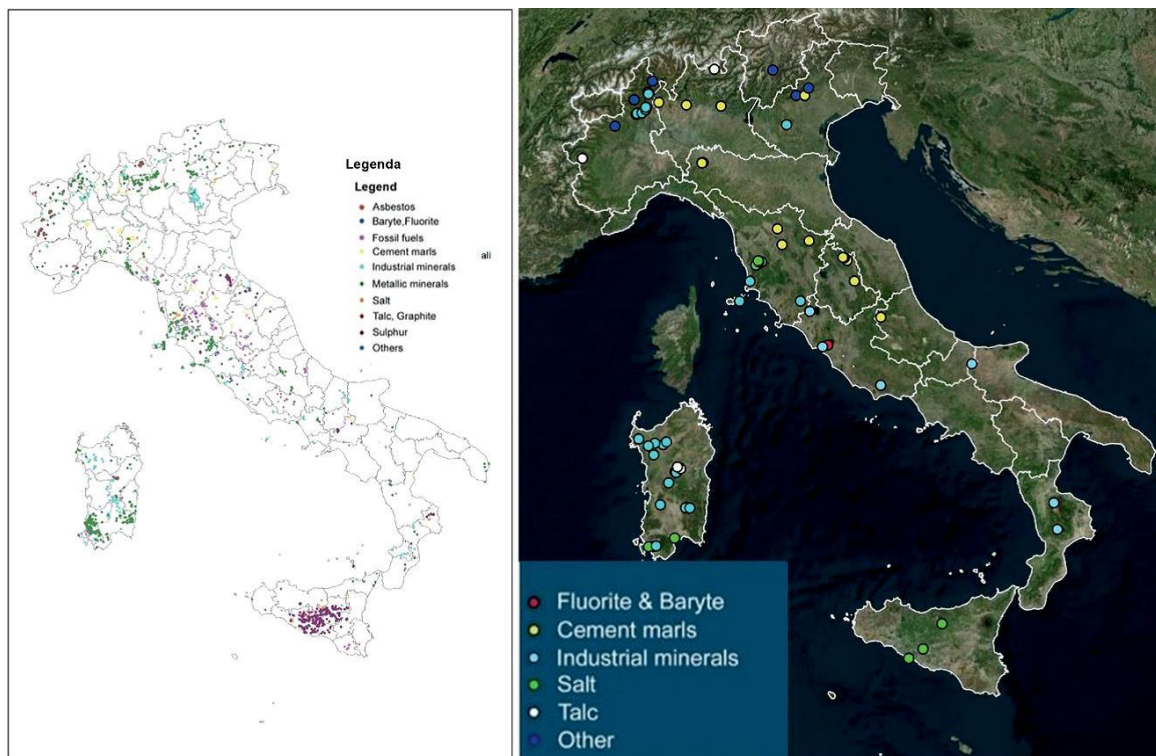
In [Italy](#), despite a rich history of mining, a decision was made to import the majority of mineral resources from abroad, as it was more economically sustainable. However, over the past decade, there has been increased awareness of the [deglobalisation](#) of raw material imports, particularly after the introduction of the [EU Green Deal](#) (Lucarini & Fumanti & Martarelli & Serra, 2024). The [Ministry of Business and Made in Italy](#) (MISE), and the Ministry for the Environment were already working on the mapping of extraction sites, starting with the maps of mines closed thirty years ago. The rules for extraction and processing should be ready by the end of 2023 (The editors-24 Italia, 2023).

Italian rare earth mines were abandoned 30 years ago, partly due to exhaustion, and partly because it was more convenient to import these minerals from abroad (Rozzino, 2023). Thus, the historic [Riso-Parina](#) mining complex, in the [province of Bergamo](#), was closed by [Eni](#) over twenty years ago. Now it is meant to reactivate a [zinc](#) and [lead](#) mine ([blende](#) and [galena](#)). The

Australian Mining Company [Altamin](#) has obtained several exploratory research permits in Italy (Tarabini, 2023).

[Rare earth](#) deposits are mainly found in the regions of the Alpine arc, from [Friuli](#) to [Piedmont](#), and then in [Liguria](#), [Tuscany](#), northern [Lazio](#), [Abruzzo](#) and [Sardinia](#). [Cobalt](#) is found in Friuli, [magnesium](#) and [copper](#) in [Veneto](#). Cobalt, manganese, magnesium, barite and copper have been found in [Trentino](#), while copper, barite, cobalt and beryllium have been found in [Lombardy](#). Cobalt, graphite and manganese are found under the [Piedmont](#) Alps. [Liguria](#) has the largest Italian deposit of [titanium](#), in the mountains of the [Beigua Park](#), between Genoa and Savona, as well as copper, graphite, manganese and barite. Tuscany is rich in copper and antimony and also has manganese and magnesium. In northern Lazio, there are some deposits of cobalt, manganese and barite. [Barite](#) is also found in [Sardinia](#), along with copper and antimony. There are several deposits of bauxite and one of manganese in the Abruzzo Apennines. Bauxite is also found in northern [Campania](#) and various areas of [Apulia](#). Manganese, barite and graphite are found in [Calabria](#), and antimony and manganese in [Sicily](#). (Rozzino, 2023).

Graph 7: *Distribution of Italian mines operating between 1870 and 2018 (left) and current mining concessions (right)*



Source: ISPRA; Lucarini & Fumanti & Martarelli & Serra, 2024

Rome claims, that Italy is a ‘leader’ in [recycling](#), with an important capacity to recover critical raw materials. However, it is necessary to increase collection rates and develop the industrial supply chain. Recycling could satisfy up to almost a third, 32 % of Italy's annual requirement for strategic raw materials (The editors-24 Italia. 2023). The correct assessment of the environmental and health impact of rare earth mining is required by Italian Legislative Decree 152/006 (Barbieri, et al, 2020). However, it is still early days for concrete studies from the mining regions of Italy.

Italy is exposed to [Russia](#) for critical raw materials which enter into the production of almost 107 billion euros, linked to the supply of [palladium](#) (35%), [rhodium](#) (33%), [platinum](#) (28%) and primary [aluminium](#) (11%) (Licata, 2022).

Graph 8: « no titanium ! »³



Source: © [Rai, Rare earths in Italy](#), YouTube, 20 September 2021

4. Conclusion

Cartoon 7: Conflict between national and transnational power: The Russian Trap



Source: © Harris 2022

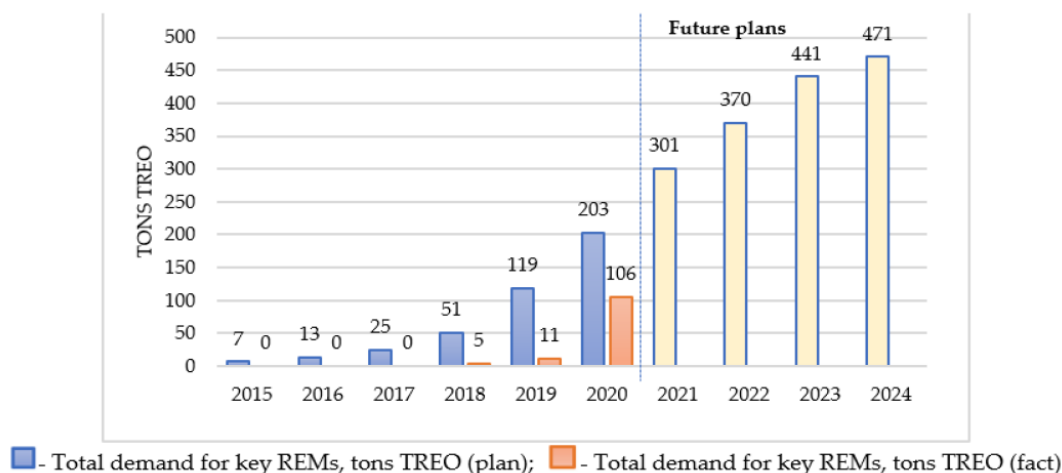
The EU's reliance on Russian rare earths raises questions about geopolitical dependencies. With an increasing demand for these critical minerals, the EU seeks diversified sources to secure its supply chain and applies risk management strategies to navigate potential challenges. Diversification of rare earth sources, strategic stockpiling, and diplomatic engagements are explored as potential measures to enhance the resilience of the EU's rare earth supply chain.

Global [energy transition](#) trends are reflected not only in the dynamics of the [oil](#) and [gas](#) markets but also in the development of related sectors, like the demand for different types of metals and minerals. Not only are minerals like rare earth elements ([REE](#)) strategic, they are

³ “No titanium mining!” - Environmentalists' appeal at mountain cross of potential [titanium](#) mines in [Beigua Natural Regional Park](#), Italy. [Liguria](#) has the largest Italian deposit of titanium, in the mountains of the Beigua park, between Genoa and Savona, as well as copper, graphite, manganese and barite (Rozzino, 2023).

expected to experience astonishing demand growth due in large part to their role in the energy transition (Johnston, 2022). [Russia](#), for example, was the world's third-largest producer of [nickel](#), accounting for 10 % of global supply. The same holds for [aluminium](#). Russia's RusAl is one of the world's largest producers and Russia supplies 6 % of global production. As with nickel, prices jumped after the [invasion of Ukraine](#), both on fears of direct disruption and concerns about soaring energy prices that could shut in production in [Europe](#) (Johnston, 2022). Other metals of interest in the Russia crisis include [titanium](#), [scandium](#), and [palladium](#). The European [Airbus](#) continues to rely on Russian supply. Titanium is strategic for aerospace and defence applications and Russia is the world's third-largest producer of titanium sponge, the specific application that is critical for titanium metal (Johnston, 2022). Scandium is another key rare earth metal for which Russia is one of the three largest global producers. Used extensively in aerospace and defence sectors, Russia had hoped to significantly increase its production of rare earth elements over the next decade, but such plans may be scuttled by the [Russo-Ukraine war](#). Finally, [palladium](#) is one of the most notable critical minerals affected by the Ukraine crisis because it is a critical input to the automotive and semiconductor industries and Russia supplies nearly 37 % of global production (Johnston, 2022).

Graph 9: Russian total demand for key REMs, 2015-2024



Source: Cherepovitsyn & Solovyova, 2022

Russian palladium illustrates one of the key [geopolitical](#) problems of critical minerals. Alternative supplies are often located in equally challenging markets, for example in [Sub-Saharan Africa](#) (Kohnert, 2024). The second largest palladium producer is [South Africa](#), where the mining sector has been wracked by strikes for the past decade (Johnston, 2022). The impact of a potential disruption to Russian metal exports, for example, due to Russian aggression in Ukraine and the subsequent [sanctions on the Russian economy](#) imposed after the [annexation of Crimea in 2014](#), shows that size is not the only factor shaping the consequences of a loss of Russian metal supply. Much depends on market dynamics, such as the availability of alternative supplies and substitutes (Johnston, 2022). But switching supplies is easier said than done, given the long, multi-year project development and permitting cycles for new supplies, and the concentration of many existing alternative supplies in regions challenged by political instability and/or weak environmental and labour standards, like in Sub-Saharan Africa (Kohnert, 2024). A shortage of critical minerals would be particularly bad timing for the [EU](#) as it seeks to accelerate the development of mineral-intensive [renewable energy](#) resources such as wind, solar and batteries (Johnston, 2022).

Furthermore, rare earths mining is a controversial issue. While it contributes to the achievement of global [sustainable development](#) and [climate change resilience](#) goals, mining and extraction can have disastrous consequences for the [natural environment](#) (Cherepovitsyn & Solovyova & Dmitrieva, 2023).

Cartoon 8: *Deep-sea mining is making the seabed the hottest real estate on Earth*



Source: © Jason Ford; Copley, 2020

In 2015, [Russia](#) used data from an earlier sub-marine expedition in 2007 to support a claim to seabed resources in 1.3 million square kilometres around the [North Pole](#) (Copley, 2020). This was interpreted by some as a latter-day [land grab](#), but it is actually a move in line with international laws built on a vision of the ocean floor being a '[common heritage](#)'. Russia isn't alone in claiming resources on the [Arctic seabed](#), and nations are seeking to extend their rights to ocean resources elsewhere. Meanwhile, commercial enterprises, for example from [Norway](#), are gearing up to [mine deep-sea](#) mineral deposits (Frost, 2024). As international bodies prepare to decide about the legitimacy of different mining ventures and how to protect biodiversity in the waters beyond national boundaries, the race is on for deep-sea experts to understand how these decisions will affect ecosystems on the ocean and how we could protect unique marine ecosystems (Copley, 2020).

Finding a balanced mix of globally traded and indigenous [REE](#) will be important for [Europe's green deal](#). Complete [strategic autonomy](#) is neither realistic nor desirable, but [diversification of supplies](#) and imports of critical raw materials will be necessary in the coming years (Umbach, 2023). This must include developing Europe's domestic mining, processing and refining capacity to reduce EU imports and unwanted geopolitical dependencies, especially on [Russia](#) and [China](#). This should be strategically considered in advance and designed with appropriate foresight, including lessons learned from the ongoing Russian aggression in Ukraine (Umbach, 2023). The introduction of [electro-mobility](#) is expected to reduce dependence on natural gas and oil, at least in the transport sector. Indeed, the foreseeable structural change will create several new security challenges, suggesting that [energy security](#) is a much more complex area than has been assumed in the past. China and Russia in particular are currently striving for strategic control of the world's largest [lithium](#) reserves. [Energy security](#) will remain geo-strategically relevant, even under conditions of [decarbonisation](#) of the economy and transport (Umbach, 2023).

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Résumé : *[Perspectives et défis pour les importations européennes de terres rares en provenance de Russie : études de cas d'Allemagne, de France et d'Italie]* – L'Union européenne (UE) se trouve confrontée à un besoin critique de terres rares, en particulier de produits raffinés essentiels à la production de voitures électriques, de turbines et d'autres applications technologiques. Cependant, le processus de raffinage est non seulement énergivore, mais pose également des risques environnementaux importants. Par conséquent, les communautés locales, comme en témoignent les exemples en Espagne et au Portugal, s'opposent avec véhémence à de telles opérations dans leur voisinage, préconisant une politique du « chacun pour soi ». L'UE dépend actuellement fortement de la Chine, qui contrôle la majorité de la transformation mondiale, avec 90 % de toutes les terres rares et 60 % du lithium. En réponse à ces défis, l'UE a franchi une étape cruciale en novembre 2023 en concluant un accord préliminaire sur la loi européenne sur les matières premières critiques (CRMA). Cette initiative législative vise à améliorer et à diversifier l'approvisionnement de l'UE en matières premières critiques (CRM), à favoriser l'économie circulaire, à renforcer l'autonomie stratégique de l'Europe et à explorer des alternatives pour atténuer la dépendance. Les récentes crises transnationales, notamment les perturbations des chaînes d'approvisionnement lors de la pandémie de COVID-19 et l'invasion de l'Ukraine par la Russie, soulignent l'impératif de garantir des chaînes d'approvisionnement sécurisées dans tous les secteurs économiques. Ces crises soulignent également l'influence considérable exercée par les principales économies émergentes, notamment les pays BRICS (Brésil, Russie, Inde, Chine et Afrique du Sud), qui dominent les principales chaînes d'approvisionnement mondiales, notamment celles des matières premières critiques (CRM). La Russie joue un rôle central en tant que l'un des plus grands fournisseurs mondiaux de palladium (40 % de l'offre mondiale), le deuxième fournisseur de platine (13 %) et de nickel (12 %) et un contributeur substantiel d'aluminium et de cuivre. En outre, la Russie possède le potentiel de devenir un acteur majeur sur le marché des terres rares grâce à ses vastes réserves. Le pays représente également une part considérable des acquisitions de l'UE, notamment le palladium (41 %), le platine (16 %), le cobalt (5 %) et le lithium (4 %). La Russie est notamment la principale source de l'UE pour la transformation des métaux du groupe du platine (iridium, platine, rhodium, ruthénium ; 40 %), l'extraction de la roche phosphatée (20 %), la transformation du lithium (4 %) et la transformation du scandium (1 %). Pour parvenir à une plus grande indépendance en matière de fourniture externe de CRM, l'UE doit réaliser des investissements importants dans ses installations d'extraction et de transformation. Cependant, l'exploitation minière ne représente que la phase initiale ; les étapes suivantes impliquent la séparation des éléments de terres rares (REE) des oxydes, le raffinage et le forgeage d'alliages, un processus complexe, hautement spécialisé et en plusieurs étapes. À cet égard, les nouveaux arrivants comme l'Europe sont à la traîne, la Chine ayant consolidé sa position dominante à chaque étape grâce à une stratégie industrielle concertée à long terme soutenue par des subventions publiques.

Zusammenfassung : *[Perspektiven und Herausforderungen für EU-Importe seltener Erden aus Russland: Fallstudien aus Deutschland, Frankreich und Italien]* – Die Europäische Union (EU) hat einen dringenden Bedarf an Seltenen Erden, insbesondere an raffinierten Produkten, die für die Produktion von Elektroautos, Turbinen und anderen technischen Anwendungen unerlässlich sind. Allerdings ist der Raffinierungsprozess nicht nur energieintensiv, sondern birgt auch erhebliche Umweltrisiken. Folglich lehnen lokale Gemeinschaften, wie Beispiele in Spanien und Portugal zeigen, solche Operationen in ihrer Nähe vehement ab und befürworten eine „Beggar-thy-Neighbour“-Politik. Die EU ist derzeit stark von China abhängig, das den Großteil der weltweiten Verarbeitung kontrolliert und über 90 % aller Seltenen Erden und 60 % des Lithiums verfügt. Als Reaktion auf diese Herausforderungen hat die EU im November 2023 einen entscheidenden Schritt unternommen, indem sie eine vorläufige Einigung über den European Critical Raw Materials Act (CRMA) erzielte. Diese Gesetzesinitiative zielt darauf ab, die Versorgung der EU mit kritischen Rohstoffen (CRM) zu verbessern und zu diversifizieren, die Kreislaufwirtschaft zu fördern, die strategische Autonomie Europas zu stärken und Alternativen zur Verringerung der Abhängigkeit zu erkunden. Die jüngsten transnationalen Krisen, darunter Unterbrechungen der Lieferketten während der COVID-19-Pandemie und der russischen Invasion in der Ukraine, unterstreichen die Notwendigkeit sicherer Lieferketten in allen Wirtschaftssektoren. Diese Krisen unterstreichen auch den erheblichen Einfluss großer Schwellenländer, insbesondere der BRICS-Staaten (Brasilien, Russland, Indien, China und Südafrika), die wichtige globale Lieferketten, einschließlich derjenigen für kritische Rohstoffe (CRMs), dominieren. Russland spielt eine zentrale Rolle als einer der weltweit größten Lieferanten von Palladium (40 % des weltweiten Angebots), als zweitgrößter Lieferant von Platin (13 %) und Nickel (12 %) und als wesentlicher Lieferant von Aluminium und Kupfer. Darüber hinaus verfügt Russland aufgrund seiner umfangreichen Reserven über das Potenzial, sich zu einem wichtigen Akteur auf dem Markt für Seltene Erden zu entwickeln. Auf das Land entfällt auch ein beträchtlicher Anteil der EU-Akquisitionen, darunter Palladium (41 %), Platin (16 %), Kobalt (5 %) und Lithium (4 %). Insbesondere dient Russland als wichtigste EU-Quelle für die Verarbeitung von Metallen der Platingruppe (Iridium, Platin, Rhodium, Ruthenium; 40 %), die Gewinnung von Phosphatgestein (20 %), die Verarbeitung von Lithium (4 %) und die Verarbeitung von Scandium (1 %). Um eine größere Unabhängigkeit bei der externen CRM-Bereitstellung zu erreichen, muss die EU erhebliche Investitionen in ihre Bergbau- und Verarbeitungsanlagen tätigen. Allerdings stellt der Bergbau lediglich die Anfangsphase dar; Nachfolgende Schritte umfassen die Trennung seltener Erdelemente (REE) von Oxiden, die Raffinierung und das Schmieden von Legierungen, ein komplexer, hochspezialisierter, mehrstufiger Prozess. In dieser Hinsicht hinken relative Newcomer wie Europa hinterher, da China seine dominierende Stellung in jeder Phase durch eine konzentrierte, langfristige Industriestrategie, die durch staatliche Subventionen unterstützt wird, gefestigt hat.