A close look at the Critical Raw Materials Act
Can the EU secure vital inputs for green and digital transitions?

July 2023

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Executive summary

The newly introduced EU Critical Raw Materials (CRM) Act has significant implications for governments and firms. The Act aims to secure critical raw materials for the green and digital transitions within the region, addressing supply chain vulnerabilities and import dependencies.

Key Provisions of the CRM Act:

1. Domestic Self-Reliance: The CRM Act sets ambitious targets for domestic extraction, processing, and recycling of critical raw materials by 2030. Governments are required to achieve 10% self-reliance on domestic extraction, 40% on processing, and 15% on recycling. This provision aims to enhance supply security and reduce import dependencies.

2. Import Diversification: To mitigate risks associated with overreliance on a single country, the Act encourages import diversification. It sets a limit where no single country should supply more than 65% of the annual needs for each stage of the value chain and each material. This provision aims to ensure a diversified and stable supply of critical raw materials.

3. Sustainable Project Development: The CRM Act promotes the development of sustainable CRM projects through a streamlined permitting process. Projects demonstrating a meaningful and sustainable contribution to securing critical raw materials may receive expedited approval. Governments are encouraged to establish designated agencies to handle bureaucratic processes efficiently and within specific timeframes.

4. International Cooperation: Recognizing the importance of international collaboration, the Act emphasizes partnerships with like-minded countries to secure critical raw materials. Governments are encouraged to establish cooperative relationships to ensure a diversified and reliable supply. This provision aims to mitigate geopolitical risks and trade disruptions.

Areas of weakness include:

1. Human and Technical Resources: The Act does not adequately address the availability of human and technical resources necessary for advancing strategic CRM projects in the short term. The mining and quarrying sector has experienced a decline in output and employment, and there is a need for incentivizing human capital and entrepreneurial capacities in the CRM sector. The Act could benefit from more comprehensive planning and initiatives to promote educational programs, skills development, and innovation in the CRM industry.

2. Limited Role in Global Supply: The Act does not assign the EU a significant role in supporting the global supply of processed CRM materials to developing countries. While the Act encourages upgrading processing capacities in developing countries, it falls short in actively facilitating technology transfers and exports at fair prices for a just transition. The EU could play a more proactive role in assisting developing countries in achieving their own green and digital objectives by promoting sustainable CRM practices and resource management.

3. Challenges of Strategic Projects Abroad: The Act aims to export the "fast-track" model for strategic CRM projects by European firms abroad. However, challenges such as high bureaucracy, corruption, and governance issues in developing countries can jeopardize the success of these projects. The Act does not provide a comprehensive strategy for addressing these challenges and ensuring that strategic projects abroad meet sustainable criteria in a timely manner.

4. Limited Focus on Raw Material Recovery: While the Act acknowledges the importance of recycling, it does not sufficiently address the recovery of raw materials from waste. The recycling rate has increased, but the use of secondary raw materials as a share of total raw material consumption remains relatively low. The Act could benefit from stronger incentives and measures to promote innovation, technology transfer, and circular economy practices for efficient CRM recovery from waste.

5. Challenges of International Cooperation: The Act promotes international cooperation with like-minded countries to secure CRM supply. However, it may face challenges in achieving comprehensive collaboration and overcoming self-interests among countries. Sanctions and trade disruptions have proven difficult to enforce in the past, and ensuring long-term cooperation and shared burden among countries can be complex. The Act needs to address potential barriers and establish effective mechanisms for sustained international cooperation.

Implications for Governments:

1. Economic Opportunities: The CRM Act presents governments with economic opportunities through increased investment in CRM-related activities. Local regions involved in extraction, processing, and recycling may experience job creation, economic growth, and infrastructure development.

2. Environmental Considerations: Governments will need to prioritize environmental sustainability as the Act places an emphasis on responsible CRM practices. Strengthening en-

vironmental regulations, monitoring CRM-related activities, and promoting sustainable resource management are essential. This provision can contribute to improved environmental standards and reduced ecological impact.

3. Collaboration and Partnerships: The Act promotes collaboration between governments, firms, and stakeholders. Governments can engage with firms to foster partnerships, share knowledge, and develop sustainable CRM projects. Such collaborations can lead to technological advancements, knowledge transfer, and capacity building within local communities.

Implications for Firms:

1. Market Opportunities: The CRM Act creates market opportunities for firms operating in the CRM sector. Increased focus on domestic extraction, processing, and recycling can generate higher demand for CRM-related products and services. Firms can expand their operations, secure contracts, and benefit from the growing CRM market within the region.

2. Competitive Advantage: Firms with expertise in sustainable resource management and responsible sourcing can gain a competitive advantage. The Act's emphasis on sustainability allows firms to differentiate themselves, attract customers prioritizing ethical supply chains, and enhance market positioning and profitability.

3. Government Support and Funding: The Act includes provisions for government support and funding to stimulate investments in CRM-related projects. Firms can leverage these opportunities to access financial assistance, grants, or subsidies offered by the EU or national governments. This support can aid in research and development, technology adoption, and infrastructure development, enhancing firms' competitiveness in the CRM sector.

Introduction

The EU is committed to the green and digital – 'twin'- transitions. The events in Ukraine have seen the EU grow its ambition concerning the energy transition, aiming to increase the share of renewable energies from 32% to 42.5% of total energy consumption by 2030. The new target doubles the current capacity rate in the EU, potentially multiplying the demand for wind turbines and solar panels by five in the short run. The EU also expects car manufacturers to switch 11 million internal-combustion engines – 20% of global production of passenger vehicles – to fully electric motors by 2035, pushing up the battery market. Meanwhile, the Digital Decade aims for 100% of public services and at least 75% of businesses to become 'digital-intensive', which requires doubling the EU share in the production of semiconductors.

Yet does the EU possess the critical raw materials needed to accomplish the twin transition goals in an equitable and cost-effective manner? **The simple answer is no**. Unlike past industrial revolutions, vital inputs for the manufacturing of green and digital goods involve **relatively scarce natural resources**, for which current production is **highly concentrated** in a handful of countries, all outside the EU. Furthermore, the proliferation of sustainable development plans worldwide has led to a **growing mismatch between the demand and supply of raw materials** that jeopardises the fulfilment of EU goals. To address this mismatch, the European Commission **drafted the Critical Raw Materials Act** in March 2023, which is now set to be discussed in the European Parliament and Council of the EU.

The Commission defines 'critical raw materials' (CRMs) as primary non-food and non-energy resources that are of high economic importance for the EU, and are highly exposed to supply disruptions in the domestic market. The Act sets **domestic capacity-building benchmarks** along the value chain to reduce the EU's vulnerability to shortages to the greatest extent possible. By 2030, the Act determines that the EU must self-rely on 10% of domestic extraction, 40% of processing, and 15% of recycling to meet its yearly CRMs consumption. With respect to demand, the EU must diversify imports to the point that no single country supplies more than 65% of the annual needs for each stage of the value chain and each material.[1]

The strategy to fulfil those commitments involves facilitating the development of new EU-based projects, improving circularity, and fostering international cooperation. This policy report analyses the Act and its proposals, assessing their likely effectiveness in securing CRMs for the EU, and thus enabling the twin transition. It starts by introducing the main themes and the problems the Commission attempts to tackle. It then describes the policy initiatives contained in the Act, divided into domestic and international spheres. Finally, it elaborates on the limits of the Commission's proposals for solving the policy conundrum and what this means for firms, local governments, and consumers.

What are Critical Raw Materials?

[1] All relevant information and links regarding the Critical Raw Materials Act can be found here: https://single-market-economy.ec.europa.eu/sectors/raw-materials/areas-specific-interest/critical-raw-materials/critical-raw-materials-act_en#documents

Since the beginning of time, humanity has used the Earth's elements to manufacture goods to meet its needs, improve living standards, accumulate capital, and pursue warfare. These elements can be found naturally through the mining of metals and metalloids or through chemical processes where materials are mixed with or 'hidden' within others, such as alkalis, alkaline earths, and rare earth elements (REE).

The EU's interest in CRMs started with the 2008 Initiative, which sought to address the challenges associated with the secure and sustainable supply of CRMs within the Union. Every three years, the Initiative assesses and updates a CRM List based on a concrete methodology elaborated by the Joint Research Centre. The last methodological review dates from 2017 and considers the economic contribution and supply risk parameters of several materials, including their 'import dependency', 'substitution elasticity', and 'recycling capacity'. The economic definition has widened over time to include the **relevant inputs for low-carbon shifting**. The 2023 Fifth List contains 34 raw materials, 16 more than the First List in 2008 List, and six new additions since the 2020 Fourth List.[2] Building on this, the Act creates a new category of ***strategic* raw materials** (SRMs) distinguished by the severity of *projected* demand-supply mismatch and their importance for five *strategic* sectors: renewable energies, automotive, digital, aerospace, and defence.

Table 1: Fifth List of Critical Raw Materials (CRM)

Metals & Metalloids	Alkali & Alkaline-Earths	Platinum Group Metals (PGM)	Rare Earth Elements (REE)	Other Materials
Aluminum*	Beryllium	Iridium	Cerium	**Helium**
Antimony	Magnesium	Osmium	Europium	Phosphorus
Arsenic	Lithium	Palladium	Gadolinium	Baryte
Bismuth	Strontium	Platinum	Lanthanum	Cooking Coal
Boron**		Rhodium	Neodymium	**Feldspar**
Cobalt		Ruthenium	Praseodymium	Fluorspar
Gallium			Promethium	Graphite***
Germanium			Samarium	Phosphate Rock
Hafnium			Dysprosium	
Manganese			Erbium	
Niobium			Holmium	
Silicon			Terbium	
Tantalum			Thulium	
Titanium			Ytterbium	
Tungsten			Lutenium	
Vanadium			Scandium	
Copper				
Nickel				

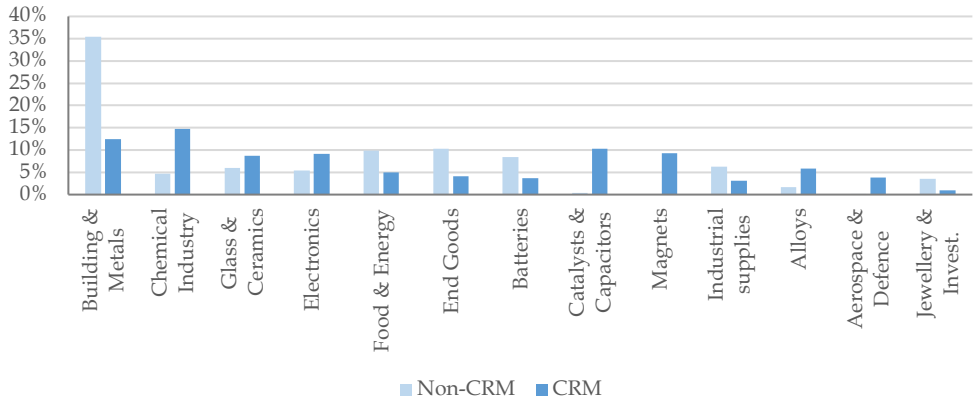
*Includes Bauxite; **Includes Borates; ***Natural

[2] The List is reviewed every 3 years according to the Raw Materials Initiative. The List groups Platinum Metal Groups (PGM) and Rare Earth Elements (REE) materials. If we add elements individually, the list comprises 43 materials out of 81 identified in the Raw Materials Information System. Natural Rubber and Indium were removed from the Fourth List.

Yellow cells reflect strategic raw materials. Copper and Nickel do not meet the CRMs criteria but are considered SRMs in the CRMs Act
Bold letters reflect the new additions compared to the Fourth List
Rare Elements in white are considered Light Rare Elements; in grey, Heavy Rare Elements
Lutenium and Scandium are metals, although they share similar properties to Heavy Rare Elements
Source: author based on European Commission and the Periodic Table of Elements

Figure 1 illustrates the differences in economic usage between CRMs and non-CRMs. As demonstrated, CRMs mainly supply the chemical and electronics industries. Examples of specific applications include Light Rare Earth Elements (LREE) in producing **catalysts** that improve transport emissions**,** tantalum for **capacitors** needed for energy storage**,** and Heavy Rare Earth Elements (HREE) for **permanent magnets** incorporated in wind turbines**.** Another important example is the use of lithium, cobalt, and graphite for **high-density batteries**, which translates into longer autonomy of electrified goods. Lastly, titanium and strontium are essential for the aerospace and defence sector.

Figure 1: Economic uses of raw materials, by critical and non-critical
As % of the subgroup total

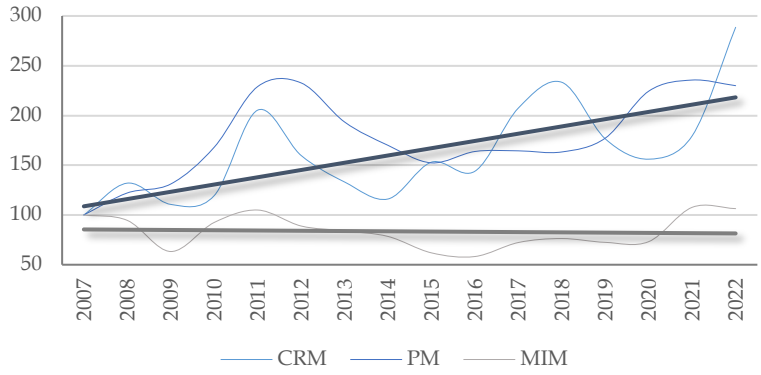


Source: author using Raw Material Information System

Supply risk

Among the CRM-related risks, supply risk – i.e., the probability of a sudden disruption of a large share of a raw material's annual consumption in the EU market – is perhaps the most salient. The effects of the mismatch between CRMs supply and demand have been twofold. First, it has seen price upsurges, **raising the burden of sustainable transition to consumers in importing countries**. In Figure 2, we built a price index composed of the main CRMs imported by the EU and compared it with the major industrial metals (MIM) index of the World Bank's Pink Sheet. In 2022, **European industries paid three times** the 2007 price for CRMs, against only 6% more for industrial metals. Additionally, CRM prices are **three times more volatile**, as proxied by the standard deviation of the series. The figure includes the Precious Metals price index, which can approximate the Platinum Group Metals trend. These metals constitute the largest import share of CRMs by value.

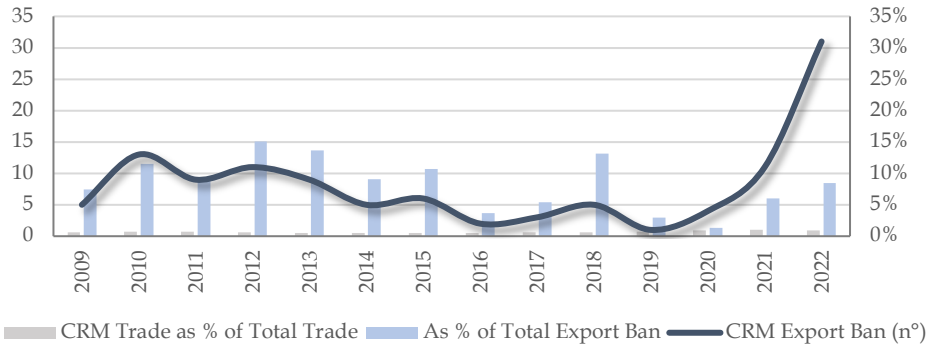
Figure 2: Price trend in metals and critical raw materials by group
100 = 2007



CRM = Critical Raw Materials; PM = Precious Metals; MIM = Major Industrial Metals
Light lines represent annual prices. Thick lines estimate the long-term trend.
CRM is a composed index including antinomy, cobalt, graphite, lithium, magnesium, and rare earth elements (REE). The index reflects import prices from the EU weighted by the 2022 import share based on COMTRADE data.
PM reflects the annual nominal price index in World Bank's Pink Sheet, normalised to 100 = 2007. It is composed of gold, silver, and platinum. We include this index as a proxy for Platinum Group Metals (PGM), considered critical raw materials by the EU.
MIM reflects the Metals & Minerals annual nominal price index in World Bank's Pink Sheet. It is composed of aluminum, copper, iron ore, lead, nickel, tin, and zinc.

The second effect has been the regular imposition of export restrictions by producer countries. Although CRM trade is less than 1% of global trade, the number of CRM export restrictions enforced worldwide between 2009 and 2022 represented 9% of total impositions.[3] **The last two years have witnessed a spectacular increase in such restrictions**, reaching an all-time high in 2022.

Figure 3: Export restrictions on critical raw materials worldwide, in quantity and relative to total export restrictions



Source: author using Global Trade Alert and COMTRADE data. Export bans consider prohibition, quotas, taxes, content requirements, and non-tariff measures.

This process is exacerbated by the recent growth in **geopolitical competition**. The Geopolitical Risk Index elaborated by Caldara and Iacovello is at a 20-year high due to the war in

[3] The average does not consider the year 2020 because of the bias of export ban in medical supplies.

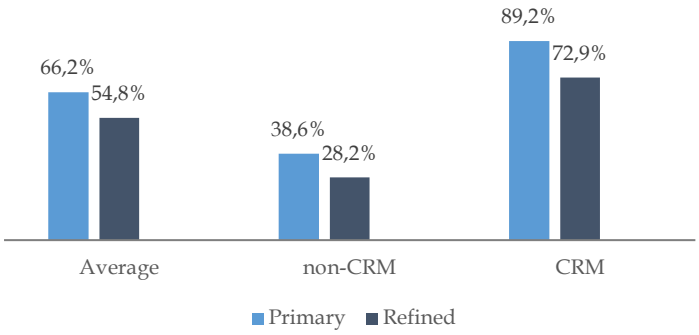
Ukraine and its consequences. Yet, the index had been growing steadily in the 2010s amid economic rivalry between East and West, marking a new landscape for international value chain cooperation.

What is new about EU import dependency in raw materials?

The EU has never been self-reliant in raw materials. The region produces 14.9% of the world's GDP but occupies only 3% of its land area. In terms of topography, the EU is not bestowed with large natural deposits for all except a handful of materials.[4] In 2021, the EU imported **two-thirds of primary raw materials consumed domestically**. This added up to €19 billion and almost 350,000 tonnes. Foreign sourcing is lower for refined raw materials, although still significant at 55%.

For 'critical' raw materials, import dependency is even more pronounced. On average, **89% of primary annual consumption is of non-EU materials** while **73% of refined materials are sourced from abroad**. The EU is almost 100% import-dependent on some CRMs, notably the REE.

Figure 4: EU import dependency on raw materials
Imported materials as % of domestic consumption

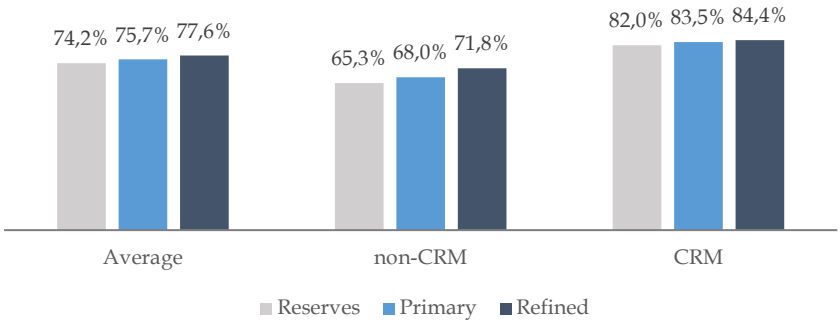


Figures reflect the simple average per individual raw material
Source: author using Raw Material Information System

Exposure to imported CRMs is high since global reserves and production are more unevenly distributed than non-CRMs. The most popular measure of concentration is the Herfindahl-Hirschman Index (HHI), built upon complete information on country shares and ranging from 0 – perfect competition – to 10,000 –monopoly. The HHI simple average for CRMs is **4,443** on reserves and **4,256** on production, against **2,245** and **1,881 respectively** for non-CRMs. On average, **three countries concentrated more than 80% of CRM global reserves and production**.

Figure 5: Geographical concentration of raw materials
% accumulated by the top-3 countries

[4] These are mostly building stones and natural cork. In addition, two hundred years' history of industrial production have led to exhaustation of deposits of coal, iron, and other major metals.



Figures reflect the simple average per individual raw material
Source: author using Raw Material Information System

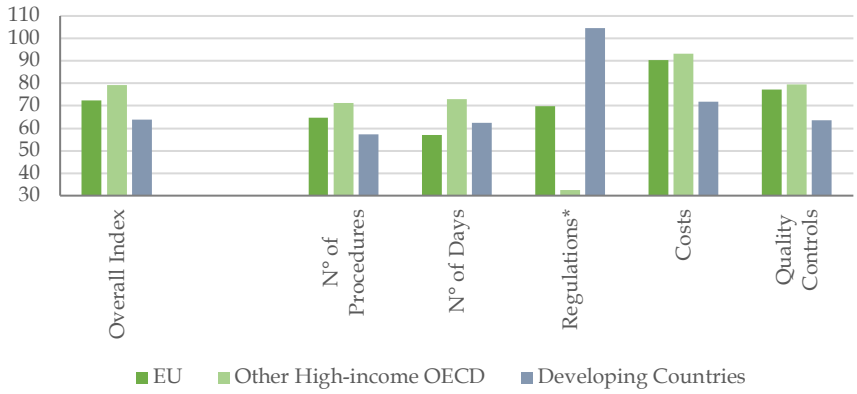
The long road to securing critical raw materials

The strategy to secure CRMs for the twin transition involves **domestic** and **global** dimensions. In the domestic realm, the EU seeks to gain *autonomy* by increasing extraction and processing capacity. In the global arena, it aims to push the private sector to establish a sustainable *friendshoring* of CRMs.

A fast track

Self-reliance is the most straightforward way to reduce exposure to trade shocks. Besides land scarcity, the Commission envisages three problems that lead to the underproduction of CRMs in the EU: **extensive bureaucracy**, **low financing**, and **low mineral occurrence**. Regarding the first, the countdown to 2030 is hampered by long waiting times required to obtain a mining permit. While detailed data on permits are not available for the mining sector, we can take the construction sector as a proxy variable for bureaucratic complexity in countries. In this place, the EU sits between developing (high bureaucracy) and other high-income OECD (low bureaucracy) countries. When looking at these data breakdowns, the EU underperforms in terms of length and volume of procedures before a permit can be granted, and on business restrictions. Its relatively high bureaucracy disadvantages the EU against other high-income OECD countries in its attempts to increase CRM autonomy and lead the sustainable transition race.

Figure 6: Dealing with construction permits
Score (0 -worst- to 100 -best)



*The index has an opposite interpretation (1 = more business friendly)
Figures express the simple mean by group
Other High-income OECD are Australia, Canada, Iceland, Israel, Japan, Korea Rep., New Zealand, Norway, Switzerland, the United Kingdom, and the United States
Source: author using World Bank's Doing Business (2020)

To solve this issue, the CRM Act proposes that member states **employ a 'fast track' for permitting CRM projects** in their territories**,** at least for 'strategic' projects which display a significant and sustainable contribution to securing CRMs, in a reasonable timeframe. To award the 'strategic' label, firms will now have to submit these projects directly to the Commission for review. The 'fast track' involves designating **a single agency** to deal with bureaucracy and limiting the **granting decision** to a maximum of one year for processing and recycling stages and two for mining activities. Furthermore, the proposal provides that any dispute concerning a strategic project is **treated as urgent** and resolved more quickly.

However, streamlining bureaucracy affects only the number of procedures and days until a permit is granted. The Act **does not provide a fast-track to surmounting the project's environmental and social impact evaluation** since sustainability is a key goal, something which exposes an underlying tension between demand and sustainability. Thus, projects that already have the approval of local communities and have conducted sound environmental tests are in a better position when applying for the strategic label than new projects altogether.

The second problem is finance, which is a market failure issue. Investments in mining are naturally **long-term** (starting with un-monetised exploration), **sunk** (drilling and mining are site-specific), and **uncertain** (with output and future price unknown). Firms and entrepreneurs try hard to pool money for extracting activities, but often struggle to achieve this. To compound matters, the EU lacks the technical resources and the flexibility to direct state aid effectively. Acknowledging this, the Commission commits to working with InvestEU to scale up investments on strategic projects via the pooling of resources, and to create a dedicated subgroup bringing together experts from different levels.

The last issue identified by the EU is low mineral occurrence. Due to the geographical features of Europe – topography, small area, and the widespread distribution of metals and minerals across land – the EU can never be self-reliant on CRMs. Perhaps in view of this, the Act aims for only 10% of annual consumption to be extracted domestically, something

which leads to its second strategy for reducing exposure to import-supply disruptions: *friendshoring*.

Friendship in IR

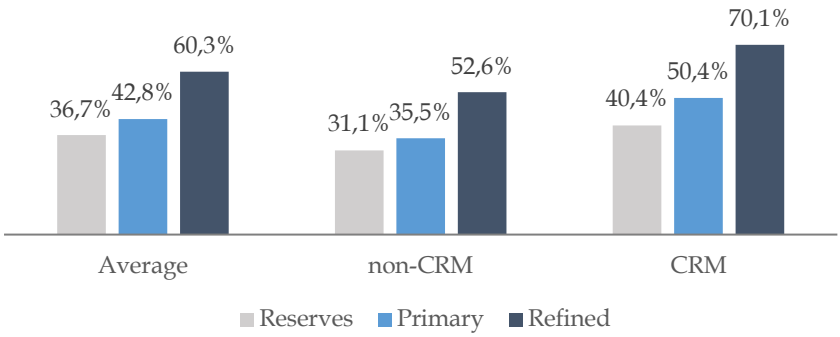
The high concentration of CRM reserves and production is not the only problem. A bigger concern in times like these is **where resources are located**. In the last years, terms like *reshoring* or *nearshoring* have become common in the context of deglobalisation and shortages of medical supplies during the 2020 public health crisis. However, the Russian invasion of Ukraine and its consequences have popularised the concept of *friendshoring*, that is, **securing inputs and end-markets from like-minded countries** to avoid the 'weaponisation of trade'.[5] The EU was plunged into a 'guerrilla' trade war when exports of Russian gas dropped by half almost overnight, leading to the worst energy crisis since the Oil Shock in the 1970s.

If sunk investments and long-term pay-offs are defining features of mining, then ***friendshoring* plays a more significant part in CRMs than in 'footloose' manufacturing**. But to whom do *friends* or 'like-minded' partners refer? In mainstream international relations, countries have neither friends nor enemies, but interests. Even institutional approaches consider cooperation a rational selfish motivation to maximize own welfare. On the other side, prominent thinkers, such as John Ikenbenerry[6] and Alexander Wendt[7], suggest that **democracy** and **open trade** constitute a bond of friendship between countries. According to this definition, 'like-minded' countries for the EU would include high-income OECD member countries and developing countries with which the bloc conducts free trade agreements.

According to this definition, it can be argued that '**non-like-minded' countries produce 50% of CRMs** against **35% of non-CRMs**. Indeed, this market concentration is more profound in the processing stage, which is crucial for obtaining 'hidden' or mixed materials. China and Russia appear among the top producers of two in every three and one in every two CRMs, respectively. The mean share of China is 40% in primary production and 62% in processing. Thus, given the recent surge in geopolitical competition, the **EU's twin transition is heavily exposed to trade weaponisation, given its reliance on unfriendly or belligerent actors**.

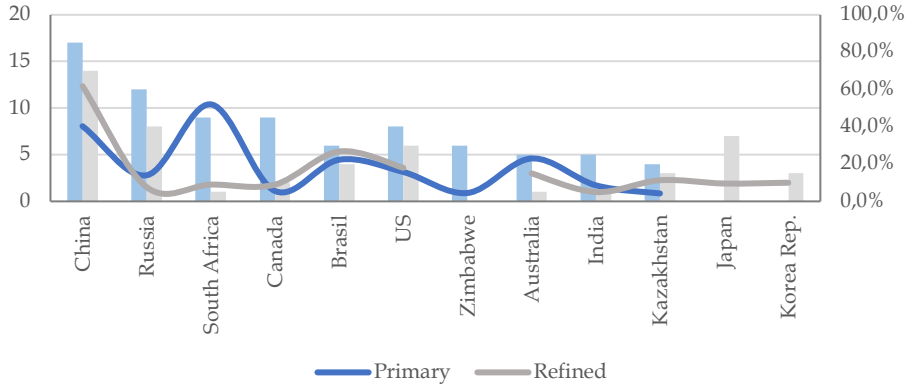
Figure 7: Geographical concentration of raw materials
% accumulated by non-like-minded countries

[5] Drezner, D. W., Farrell, H., & Newman, A. L. (Eds.). (2021). *The uses and abuses of weaponized interdependence*. Brookings Institution Press.
[6] Ikenberry, G. J. (2014). The illusion of geopolitics: The enduring power of the liberal order. *Foreign Aff.*, *93*, 80.
[7] Wendt, A. (1999). *Social theory of international politics* (Vol. 67). Cambridge University Press.



Figures reflect the simple average per individual raw material
Source: author using Raw Material Information System

Figure 8: Top 12 producers of Critical Raw Materials
Number of appearances (columns) and mean production share (lines, right axis)



Shares only apply where the country has production
Non-like-minded countries: China, Russia, India, and Kazakhstan
Source: author using Raw Material Information System

In the CRMs Act discourse, *friendshoring* appears as the logical response. Indeed, the proposal connects directly with the Global Gateway, an EU strategic framework which prioritises value-driven investments and economic partnerships with third countries. The Commission's proposal to secure CRMs *friendshoring* has three components: **diversifying imports**, **expanding overseas production**, and **pooling buyer market power** in a **'raw materials friend's club'**. In 2021, the EU relied on a single country for more than two-thirds of its imports for each material, whether primary or refined. According to Figure 7, non-like-minded global reserves of CRMs are less concentrated than production. Thus, import diversification requires **collaborating with *friend* countries with low current output but constituting large reserves to increase low-risk supply**. Investing in friends would avoid the weaponisation of trade in the future.

The formation of a 'critical raw materials friends club' aims to unite the **top-buyer (like-minded) countries**. The EU pools 55% of world imports together with traditional allies such as Japan, Korea, the US, and the UK. The main purpose of the club would be to offset the pricing power of oligopolistic suppliers. Indeed, different from industrial metals or even oil, CRMs are not commoditised in global trading centres. Without market transparency, there

is no price arbitration, which is a decisive factor in firms' market entry and exit. Just like the OPEC meets in Vienna to manage oil supply, it is hoped this critical raw materials club could confer on a regular basis to agree on a common purchasing price.

The weaknesses of the EC proposal

The CRM Act sheds light on the discrepancy between the green and digital targets and resource availability in the EU. Furthermore, it promotes a concrete roadmap to close the gap in the least possible time. Still, the proposal falls short in several important ways.

1. **Extraction**

The Act fails to assess the available human resources required to advance strategic projects in the short run. The mining and quarrying sector has significantly declined in the EU, resulting in a loss of jobs and a decrease in firms. Between 1995 and 2021, the sector's output has halved and now accounts for 0.3% of EU GDP. Meanwhile, the sector lost 200,000 people and 15% of firms. Therefore, greater volumes of human capital and entrepreneurship in the EU mining sector must be fostered, to build towards the 10% target for exploration and extraction. Thus, the Act needs to go further by including educational and retraining programs in Earth sciences, as well as in big data and artificial intelligence, applied to the mining and quarrying sector. Still, both **assessment and recruitment of skilled workforce are delegated to private firms** as part of what they need to execute the strategic projects when submitting to the Commission.

2. **Processing**

The EU relies less on imports of processed materials. However, the Commission **does not assign the region any role in the global supply of processed CRM to developing countries**, to help them achieve their own green and digital objectives. The EU has the responsibility to stimulate technology transfers and exports at fair prices help the developing world achieve its own green and digital objectives. True, the CRMs Act does encourage upgrading processing capacities in developing countries to achieve 'mutually beneficial' investments, but this is only reserved for a handful of *friend* countries in Sub-Sahara and Latin America with significant CRM deposits and for the final consumption of Europeans. Furthermore, if the EU wants to move on to the 40% self-reliance target in the processing stage, not all strategic projects abroad can entail the industrialisation of primary materials in the host country.

3. **Strategic projects abroad**

The Act explicitly aims to export the 'fast-track' model to strategic projects by European firms abroad. However, high bureaucracy and corruption in developing countries seriously jeopardise the EU's plans and goals. Figure 6 illustrates the gap between high-income OECD and developing countries in building permits. If we also consider the World Governance Index (WGI), which comprises more than bureaucracy and includes corruption, conflict management, and the rights of indigenous people, among others, we see other significant differences.[8] The WGI ranges from -2 (worst governance) to 2 (best governance), and

[8] The WGI is used in the Raw Material Information System to help European firms allocate resources.

whereas high-income OECD countries constituting significant reserves (Australia, Canada, the US, and Chile) average 1.14 points, 'friendly' developing countries (South Africa, Zimbabwe, Morocco, Brazil, Mexico, Peru, and Turkey) score -0.34 on average.

The EU must consider the quality of governance and environmental protection levels in these countries when implementing strategic projects. High-income OECD countries are located in the first quartile of the Environmental Protection Index (EPI), but the developing world is more heterogeneous: while Latin American countries rank in the median, Sub-Saharan countries find at the bottom quartiles. Accordingly, it is worth asking **if European firms can develop strategic projects abroad that fit the Act's sustainability criteria**, and thus whether the tension between sustainability, speed, financial expediency is applicable in the international domain as well.

4. Recycling

The EU has already made outstanding progress in recycling. Indeed, the recycling rate of municipal waste went from 27.3% in 2000 to 49.6% in 2021. In 2019, 90% of wasted metals and 52.9% of non-metallic minerals from industrial use were treated instead of landfilling or incineration, versus 80% and 48.6% respectively in 2010.

However, it is one thing is to recycle, and **another entirely different is to recover raw materials from waste**. In fact, whereas the recycling rate has almost doubled in the last decade, the use of secondary raw materials as a share of total raw material consumption increased only from 17.4% to 18.5% in the case of non-metallic minerals and has slightly decreased from 16.7% to 16.4% in metals. Product design favouring short life cycles and no dismantling hamper recovering CRMs contained in e-waste, such as lithium, cobalt, and graphite. Although the EU aims to include durability, reparability, and recyclability in the Ecodesign Directive, the electronic and electric sector is too global to influence product and business designs from Brussels.

The EU has not placed as much focus on influencing product and business designs to prioritise durability, reparability, and recyclability. Innovations related to recycling and secondary raw materials -as defined by the Circular Economy Monitoring Framework- are only a small fraction of EU innovations (0.18%) and have kept relatively constant over time. In fact, the West in its entirety has never been an intensive innovator of recycled products and relied more on new extracted materials imports. Conversely, Asia Pacific accumulated almost 90% of circular innovations. For every patent applied by an EU inventor, there are 13 in China. Consequently, the region heavily depends on China not only for CRM imports **but also on technology transfers to recycle them**.

5. International 'friend' cooperation

On the international side, sanctions and boycotts have repeatedly proved ineffective, highlighting the limitations of aggregated economic power. According to Wendt's analysis, countries become 'friends' only if their interests align. Given different priorities, economies, and political contexts, it is not clear whether like-minded countries in the OECD are prepared to share the burden of plugging CRM shortages.

Furthermore, Wendt explicitly noted that friendship in international relations exists mainly in security matters**, with countries demonstrating markedly different commercial and economic interests**. The Act thus needs to address the potential threats to within-region cooperation and consider the relationship with outside regions.

What is going forward?

Overall, the flaws described above do not strike at the heart of the CRMs Act. Most likely, they will **slow down the pace at which the current demand gap will close**. By 2030, not all CRMs will reach the targets for yearly consumption, at least not in the four stages - extraction, processing, recycling, and importing - simultaneously. Moreover, the Act explicitly states that a lack of progress on a small subset of CRMs should not call for new actions, already acknowledging that ambition is high for Earth's elements that are scarce and concentrated in competing countries. Still, the **EU is better off with than without** a roadmap to securing CRMs in the region.

The CRMs Act is a **comprehensive response** to the current supply-side insufficiencies to meet the twin transition, involving questions of business administration, resource allocation, overseas production, and international coordination. It opens big opportunities for firms in the mining, processing, and recycling sectors to access streamlined paperwork and funding, if they can demonstrate how their projects contribute to securing CRMs in the short and medium run. The Commission will act as an enabling partner, promising a non-burdensome assessment of strategic projects and carefully listening to the needs for financing and workforce. Additionally, the domestic targets will help left-behind regions to recover part - at least stop the bleeding - of jobs destruction due to trade openness and incentive recyclers with sound secondary markets.

Local governments can benefit from the new Act as well. Indeed, mining and recycling are eminently **site-specific activities with dense local spillovers**. Given this, local administrations' agencies could claim the management of streamlined strategic projects while concentrating the required resources and manpower as the CRMs Act envisages.

Lastly, the Act serves as an anti-inflationary tool. Despite its ambition, the proposed policies focus more on improving the efficiency of existing resources through private-public synergies or solving finance market failures than spending expansion. At the same time, targeting supply risks will tackle the distributive consequences of CRMs. Few suppliers and the non-existence of trading centres have translated into a long-term increase in relative prices, meaning a significant **wealth transfer from consumers in importing countries to concentrated producers** in naturally endowed countries. The green and digital transitions are sustainable so long as they are affordable, leaving no one behind.

Concluding remarks

The CRMs Act sheds light on the discrepancy between the targets set by the EU as part of the green agenda and the projected demand for specific raw materials whose yield is concentrated in a handful of countries. The Act seeks creative ways to close the demand gap and sets additional targets by 2030 regarding raw material extraction, processing, recycling,

and import diversification. The Act may not be the perfect tool, but the EU, its local governments and firms, will largely be better off with than without it.