

# Understanding the CRM Act

## ENSURING SUPPLY OF CRITICAL RAW MATERIALS TO ENABLE THE GREEN TRANSITION

We are now standing on the brink of a new regulatory era with the proposed Critical Raw Materials (CRM) Act, where compliance requirements can become a catalyst for growth and transformation.

In this context, we'll explore the key issues that the CRM Act seeks to address and discuss the proactive steps that businesses can take to not only comply with these new regulations but also leverage them to enhance customer relationships and business operations. In detail, we will talk about:

- Why critical raw materials matter and what we know about future demand
- Four main challenges inhibiting the sustainable supply of critical raw materials
- What the proposed CRM act is and what it means for businesses

### WHY DO CRITICAL RAW MATERIALS MATTER? AND WHAT DO WE KNOW ABOUT FUTURE DEMAND?

Society is on the verge of a climate crisis [1], and we must slow down global warming so that by 2050 we do not exceed the critical threshold of 2°C above pre-industrial levels. It is well established that the primary cause of temperature rise is the accumulation of greenhouse gases (GHG) in the atmosphere, which are soaring as a result of increasing human activity.

As the next three decades unfold, global GDP is expected to double, and by 2050, the world's population to exceed 2.5 billion people. This growth will demand a significant

increase in energy and raw materials, with an anticipated need to support approximately 50% more urban areas and infrastructure. To mitigate GHG emissions, it's imperative to start transitioning the energy system towards climate neutrality, especially at these early stages of projected growth. Currently, 80% of the energy consumed is derived from fossil fuels [2] which accounts for over two-thirds of total global GHG emissions. Additionally, nearly half of global GHG emissions arise from the way we manufacture and utilize products, cultivate our food, and manage land. A portion of this "half of global GHG emissions" also stems from fossil fuels, underscoring the intricate nature of the system that needs transformation to a climate-neutral state. Addressing emissions requires a comprehensive approach, not just focusing on the elimination of fossil fuels



or solely on material management.

Globally, bold commitments are being made to address the dual challenge of global growth and climate change, exemplified by the EU's Green Deal Industrial Plan [3] and the proposal for a Net Zero Industry Act [4]. These ambitious plans aim to shift industry and transport towards low-carbon technologies, bolstering renewable energy, transport electrification, industry automation, and carbon capture solutions. This transition will require the wider deployment of renewable energy systems, like solar and wind, through more power plants, distributed generation, and integration into existing grids; which will ask for a substantial influx of CRMs.

### WHAT IS A CRITICAL RAW MATERIAL (CRM)?

In short, raw materials are deemed critical if they are essential for an important sector of the economy and



there is a risk of shortage in supply [5]. The most recent EU listing includes 34 strategic and critical raw materials. Criticality is based not only on "geological availability", which refers to the material amounts still present in the ground, it also considers economic, political, environmental, and social factors that affect access to raw materials. By definition, the availability of CRMs is limited – which has caused growing concerns about the long-term supply.

In response, businesses, politicians, and scientists are increasingly trying to predict the future demand for different types of CRMs within various strategic applications. Examples include cobalt and lithium for energy storage, nickel for stainless steel and alloys in renewable energy, copper for cables and inverters, and neodymium for magnets in products like wind turbines. According to the World Bank's forecast, the production of CRMs could see a surge of up to 500% by 2050. This substantial increase is anticipated in order to meet the escalating demand for clean energy technologies [6]. What this means in detail will depend on the type of CRM, but for example:

- One study suggests by 2050, the demand for key metals like Neodymium is projected to increase by  $\times 1.7$  times,  $\times 1.5$  for Copper,  $\times 2.7$  for Nickel,  $\times 5$  for Cobalt, and

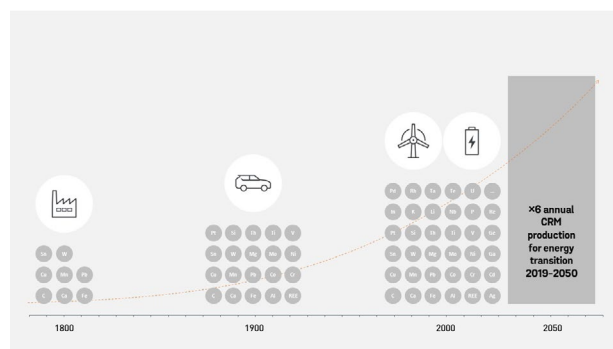
Lithium by a staggering  $\times 22$  [7], compared to 2020 levels.

- Another study concluded that, to phase out fossil fuels and fully deploy the first green technology units, a substantial volume of CRMs will be needed. The volumes of CRM required are significantly higher than the volumes supplied in 2019:  $\times 40$  times for Neodymium,  $\times 189$  for Copper,  $\times 400$  for Nickel,  $\times 1733$  for Cobalt, and  $\times 9921$  for Lithium [8].

This has caused an ongoing debate around the sufficiency of known reserves to meet the peak demand for CRMs. Although the Earth's crust and seabed might hold enough of these resources to sustain the transition, it remains uncertain whether they can be extracted in economically sound and sustainable ways, to meet demand for CRMs.

Growing material complexity and demand from technology.

Transitioning to green energy will require advanced technologies and resources, including CRMs, limited in supply



### WHAT ARE THE FOUR MAIN CHALLENGES INHIBITING THE SUSTAINABLE SUPPLY OF CRITICAL RAW MATERIALS?

Establishing a sustainable supply chain for CRMs in support of EU's green energy transition presents a multifaceted challenge. In general, there are four main factors that contribute to its complexity:

- declining resource quality,
- geographical concentration of CRM resources,
- heavy reliance on imports within the EU, and
- the potential for disruptive crisis events.

The **quality of virgin resources** has been declining, primarily attributed to lower ore grades and the increasingly complex mineralogy of the deposits. Over the past century, ore grades for major metals have dropped by 10-70% due to the depletion of high-grade ores.

Nonetheless, technological advancements in exploration, extraction, and processing have made it possible to explore,

extract, and process previously non-economical ores, thereby offsetting some of these challenges. Unfortunately, the decline in ore grades significantly amplifies the emissions stemming from primary raw material production, as extraction and processing operations now require larger quantities of rocks to yield equivalent metal outputs. Therefore, the accounting of energy consumption should not ignore the phases of extraction and refining of raw materials, which itself contribute significantly to GHG emissions.

The **geographical concentration of CRM extraction, processing, and refining** poses challenges to the strategic independence of the EU. It increases the complexity and risk within the supply chain and escalates transportation needs as well as supply chain vulnerabilities. China serves as an illustrative example, as its strategic governmental policy and lack of environmental precautions have granted it a significant stronghold in the processing of many CRMs, i.e., lithium, cobalt, REE (Rare Earth Elements), nickel, and more [9]. In response to the EU and US restrictions on chip-manufacturing-tech exports, China has tightened its grip on germanium and gallium by imposing internal controls on these resources. Germanium and gallium are essential for semiconductor and solar technology production and China presently leads the global market, producing 60% of germanium and 80% of gallium.

The European Union relies heavily on imports for its CRM supply, with local production accounting for a mere 3-5% of total consumption. At present, the EU imports about 90% of metals like cobalt and lithium and almost 100% of Rare Earth Elements. This includes light REEs such as cerium and neodymium, used in mobile phones and electric motors, and heavy REEs like dysprosium and terbium, critical components in screens and clean energy technology [5]. Collectively, these factors greatly impact the supply of CRMs, rendering it highly vulnerable to disruptions and price fluctuations.

**Unforeseen crises**, such as the ongoing war in Europe or the recent pandemic, have contributed to supply shortages and disruptions. While efforts to restore the supply chain are underway, it is crucial to build greater resilience in anticipation of similar sudden and disruptive events in the future

As we grapple with rising consumption and escalating energy demands, the pursuit of CRMs which are vital for the green transition becomes increasingly challenging. The CRM Act serves as the European Union's strategic shield in this formidable endeavour.

## WHAT IS THE PROPOSED CRITICAL RAW MATERIALS ACT? AND WHAT DOES IT MEAN FOR BUSINESSES?

The European Union has taken a proactive stance to ensure a secure and sustainable supply of CRMs. The proposed CRM Act is a strategic initiative aimed at diversifying the EU's imports, mitigating supply risks, enhancing circular material flows, as well as fortifying the EU's global engagement.

The CRM Act's preliminary targets for 2030 aim to safeguard CRM supply chains, reduce dependency, and strengthen the EU's position in the raw materials market through investments, planning, and partnerships, promoting efficiency and sustainability in the sector. Here is how it's planned to be done:

### Four targets.

1. Extracting at least 10% of the CRMs needed within the EU
2. Refining at least 40% of the EU's annual CRM consumption locally from primary resources
3. Using recycled CRMs for at least 25% of the EU's annual consumption
4. Avoiding EU's dependency on a single country for more than 65% of a CRM's supply

EU countries will need to establish plans - emphasizing waste collection, product reuse, secondary CRMs (material obtained from recycling), recycling technology, and workforce training.

**Speed up the permit process.** Extraction permits will now take 24 months, and processing and recycling just 12 months, which will be a significant gamechanger considering that opening a mine in Europe takes between 10 and 20 years [10, 11], where on average only 4.5 years are dedicated to construction and commissioning [12].

**Invest more in research and innovation.** This includes both public and private funds. Part of this is a €200 million investment in Circularity Hubs to better recycle and recover materials [13]. This ties in with plans to update the End-of-Life Vehicles Directive to boost recycling [14].

**Diversify and monitor.** By looking to work with a wider range of CRM suppliers and keeping a close eye on the demand for CRMs to make sure they're on the right track.

While the feasibility of these ambitious goals may be debatable, the CRM Act introduces several powerful mechanisms to drive a sustainable energy transition, mitigate the risks of CRM supply shortages, and most importantly, promote circular economy models. One mechanism includes measures to monitor and enforce the circularity of essenti-

al resources and products.

For instance, products incorporating permanent magnets will have to comply with circularity standards, providing information on their recyclability and the content recycled. The expectation is that the Act will also encourage active public participation, promote eco-friendly practices, and provide tangible benefits to communities. This way, it intends to strike a balance between social concerns and environmental issues in the mining and processing sectors of the EU.

### **WHAT ROLE WILL BUSINESSES PLAY IN THE EXECUTION OF THE CRM ACT?**

Businesses will play a critical role in the execution. Embracing innovative product design, adopting circular economy business models, and ensuring sustainable sourcing of materials will all be key to meeting future expectations. To succeed, three actions are critical:

**1. Material responsibility and traceability:** Companies must assume greater responsibility by deepening their understanding of the materials used in their products. They should closely track CRM components, minimize their usage wherever possible, and design products with efficient end-of-life material recovery in mind.

**2. Strategic partnerships:** Collaborating within the supply chain and forming strategic eco-system partnerships can promote the use of recycled and recyclable resources. By working together, businesses can optimize product design for resource efficiency and implement circular economy actions that promote value retention, such as reuse, remanufacturing, and recycling.

### **3. Promote innovation through compliance:**

Companies manufacturing products with content from one of the listed strategic CRMs will need to comply with the EU's CRM regulation. Businesses should view compliance with regulations as an opportunity to drive innovation. By proactively adhering to regulatory requirements and seeking innovative solutions, companies can push the boundaries toward novel practices that ensure a sustainable supply and use of CRMs.

### **WHAT HAPPENS NEXT WITH THE CRM ACT?**

The proposed CRM Act will be discussed and agreed upon by the European Parliament and the Council of the EU before its adoption and entry into force. In Parliament, the proposal has been referred to the Committee on Industry, Research, and Innovation which has already proposed a list of amendments, as well as running a public hearing. The recent Council's position [15], includes three focus areas: more ambitious targets for processing and recycling, streamlined permit procedures for strategic projects, and calls for more frequent reviews of the CRMs list. The next steps will involve negotiations between the Council presidency and the European Parliament.

### **SHARE YOUR THOUGHTS**

What do you think?

How are you planning to work with CRMs and future-proof production?

It would be great to hear your thoughts and any questions you may have, email us at [circularconsulting@stenarecycling.se](mailto:circularconsulting@stenarecycling.se)

## SOURCES AND LINKS

This is the first part of our three-part series on “Critical Raw Materials – Strategies for resilience”. Find the series on [www.stenarecycling.com](http://www.stenarecycling.com). Please note that the information in this article is not exhaustive and was last edited in November 2023. For more details, see sources throughout the article.

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