CRM Alliance
Critical Raw Materials

Industrial policy, critical materials and the demand of substitution
For what reasons?

Draft 31/7/2024

The industry finds itself increasingly under pressure to substitute its materials for a range of reasons. The EU and national legislators unfortunately seem to target again and again several materials that at the same time have been identified as critical and strategic for the EU and – due to their properties - have been classified as substances of concern or substances of very high concern.
This approach will have major implications for the EU economy and its industrial base and supply chains.

=> **Consistency between EU policies and legislation is needed**

- **CRM Act[i] - the strive for more resources**

In the context of the CRM Act the criticality of materials have been assessed for two main reasons:
- Supply risk: difficulty to access these materials because of their geological availability and their economic availability and
- Economic Importance:for their importance and weight for the EU economy.

The CRM Act has identified several actions to be followed up in terms of improved exploration, processing, permitting of installations, partnership with other resource rich countries, RTD, improving circularity, and financial support.
However, what it has not addressed it the fact that the current continued EU legislative efforts in some are counterproductive to a stable investment framework for expanding the EU's own industry. The call for substituting critical raw materials where possible due to lack of access unfortunately seems to coincide with another call for substitution in a completely different context and the two together aggravate the situation for the European industry.

- **Advanced Materials[ii] - the strive for new materials**

For example, the Commission has issued a Communication on Advanced Materials with the intention to address the potential shortfall of materials also via RTD into alternatives and substitutes. It targets critical raw materials and eventual shortfalls in supply by proposing as a solution RTD into replacements.

However, what is insufficiently stressed in this context is the importance of the original critical materials for current industrial sectors. Understanding the functionality and performance of the current materials due to their properties and a detailed comparison to new materials and their functionality as well as economic availability is not being addressed. There is a high risk that innovative materials, unless assessed in that respect, will not deliver any solutions. That's why we need to avoid a regrettable substitution and perform a thorough impact assessment to evaluate the socio-economic impact of such substitution, on producers as well as consumers.

Impact 1

Unnecessarily relocating supply chains - impact on strategic products for the EU Green Deal

Applying hazardous classification instead of risk assessment and management leads to negative impacts on the European economy and its supply chains and fosters further dependencies on imports of substances and products that are not dealt with in the same way by other jurisdictions.

The presence of hazardous substances does not inherently imply a negative impact on a product's performance nor a risk for the handling actors. In fact, these substances often enhance performance due to their specific – sometimes unique properties, contributing to the product's functionality, efficiency, or longevity.

There are many examples of products that are key to achieve the objectives of the European Green Deal, but safely contain hazardous substances because of their unique properties. A risk-based approach should always be the way forward for assessing the safety of a substance. Such examples include:

- Stainless steel commonly contains large amounts of nickel, and is used in a wide array of applications, ranging from surgical instruments to railway cars.
- Galvanised steel is coated with zinc, which protects from corrosion, and is namely used in the exterior panels of vehicles.
- Leaded steel improves energy efficiency when machining is needed for end products.
- Battery metals, such as lead, cobalt, graphite and lithium, are used in electric vehicles.
- Vanadium Flow Batteries are highly efficient for large-scale energy storage, making them essential for integrating renewable energy sources like solar and wind into the grid.
- Silver, lead, arsenic, and cadmium are used in solar panels.
- Metal residuals, which include lead, cadmium, and cobalt, are present in metallic products and in nature.
- Mercury-containing lamps are necessary to cure via UV radiation paints.

Impact 2

Jeopardising EU's economic and defence resilience: EU strategic sectors – example Defence and Aeronautics[1]

In 2020 the EU's JRC conducted detailed studies in the requirements of certain raw materials for defence applications. It looked at batteries, fuel cells, robotics, unmanned vehicles, and additive manufacturing.
It stated that *in the case of military application, the following issues are critical:*

- *security of technology (in use under diverse military applications);*
- *consistent quality;*

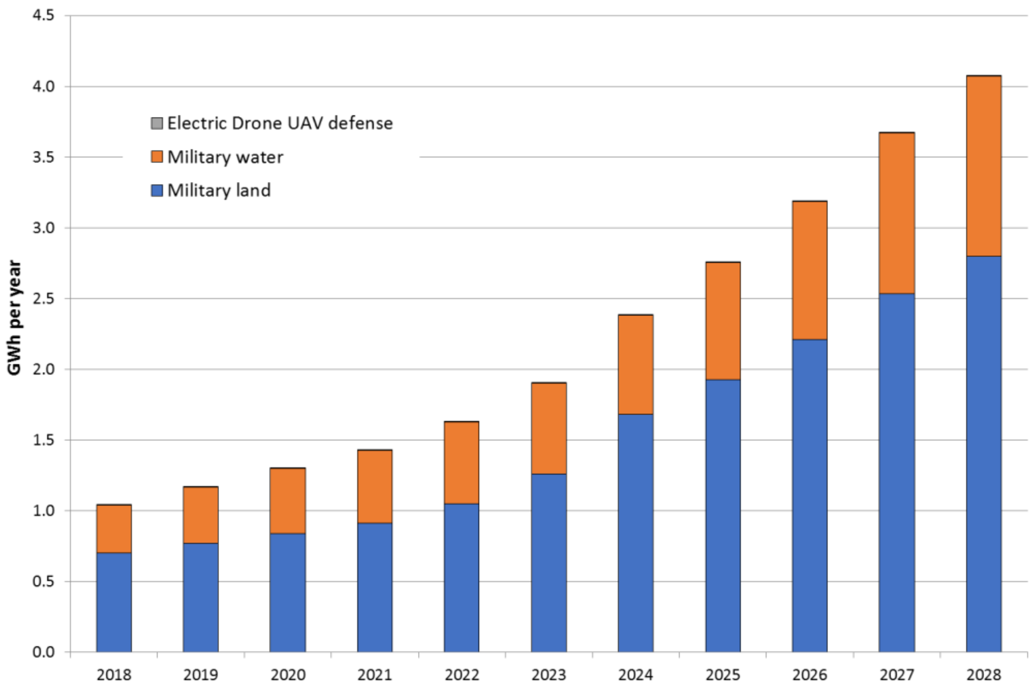
[1] JRC TECHNICAL REPORTS: Material dependencies for dual-use technologies relevant for Europe's defence sector. 2020.

- *long-term security of supply;*
- *the highest possible energy densities.*

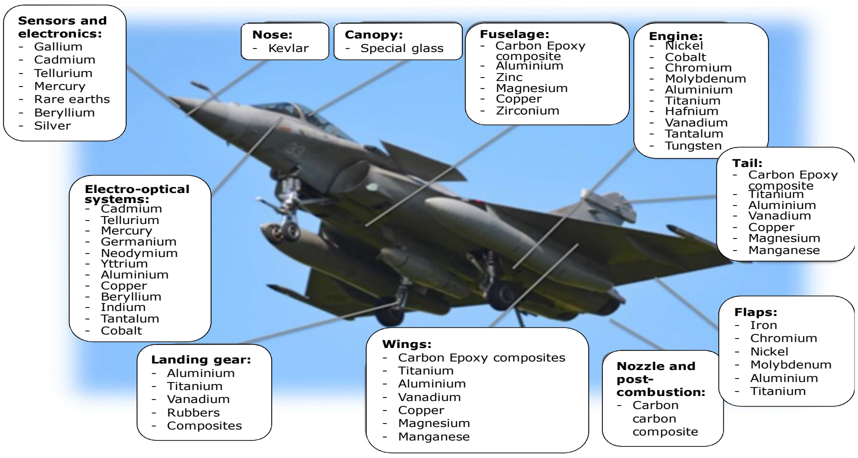
It identified the following critical raw materials for various applications, many of which again are classified in one way or another.

- ***Li-ion batteries**. Cobalt, fluorspar, graphite, phosphorus and silicon metal.*
- ***Fuel cells and hydrogen-related technologies**. Boron, cobalt, magnesium, graphite, palladium, platinum, REEs, rhodium, ruthenium, silicon metal, vanadium.*
- ***Robotics**. Antimony, bismuth, gallium, indium, tantalum and tungsten, in addition to the CRMs required in Li-ion batteries and fuel cells.*
- ***Unmanned (aerial) vehicles**. Beryllium, niobium, hafnium and scandium, in addition to the CRMs needed in robotics.*
- ***3DP.** Cobalt, hafnium, magnesium, niobium, scandium, silicon metal, tungsten and vanadium. Of the non-critical materials, titanium is particularly relevant to metal-based 3DP for aerospace.*
- ***Armor plating, weapon systems and military infrastructure:** Vanadium is commonly used as an alloying element (high-strength steel alloys) in steel production to enhance the strength, toughness, and wear resistance of steel.*

Due to the geopolitical changes the forecasts for demand in all of these material demand forecasts look very similar to the curves presented for batteries in this study.



Example – raw materials in a jet aircraft



Impact 3

Introducing the hazardous classification into other legislation creates further uncertainties for investments and increases economic dependencies

Whether it is the **Sustainable Finance Taxonomy** or the **Green Claims** the proposed EU legislation always falls back on the point of hazard criteria instead of risk management because eliminating materials that are either hazardous or perceived to be non-sustainable seems to be the easier option. But, at the same time the EU legislation continues to develop legislation to address risk for the environment and occupational risks at the same time. However, in doing so whole supply chains are jeopardised because other jurisdictions do not have these requirements and abuse these European restrictions for their economic and technological advantages and continue their economic development from raw material supplier to end-product supplier.
The latest draft of the ISO standard on Sustainable supply chains (**ISO IWA 45:2024)** tries to address sustainability criteria that are important to consider in critical mineral supply chain standards and identified some criteria.[iii] These include, but are not limited to, the following criteria
3.1 Mineral exploration/extraction/ mining/ mineral recovery/ on-site processing/ off-site processing and refining

- *Hazardous Materials (pre and post operations)*

3.2 Circularity and end of life

- *Hazardous Air Pollutants*
- *Hazardous Materials (pre- and post- operations)*

In the chapter 6.4 Environmental management and safety standards

- *Specific requirement on addressing hazardous materials management*

Again, the "hazardous" nature of a material rather than the risks it poses seems to be tackled.

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The Critical Raw Materials Alliance (CRM-A) represents primary producers, traders and associations of raw materials that the European Commission has determined to be critical to the EU economy (CRMs). More specifically, CRMs are those materials which: (a) have a high economic importance for key sectors of the European economy, (b) have a high-supply risk and (c) do not have viable substitutes due to their unique and reliable properties for existing and future applications.

The CRM-A stresses the need of a unique approach in regulation and policymaking when addressing CRMs to avoid overregulation, innovation barriers and loss of EU competitiveness and societal well-being.

Footnotes

[i] REGULATION (EU) 2024/1252 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 April 2024 establishing a framework for ensuring a secure and sustainable supply of critical raw materials and amending Regulations (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1724 and (EU) 2019/1020

[ii] COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS Advanced Materials for Industrial Leadership COM(2024) 98 final, 27.2.2024

[iii] Sustainable critical minerals supply chains. ISO IWA 45:2024, Draft, Date: 2024/05/10