

# How to reduce our dependency on critical raw materials by stimulating circularity

ECOS, DUH and RREUSE position on the Critical Raw Materials Regulation proposal



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# Summary

Critical raw materials (CRMs) are used in a growing array of products, including renewable energy technologies, electronic and electrical equipment, and batteries for electric vehicles. Increasing global demand for such products, combined with increasing geopolitical instability, shows that we need to strengthen supply chains in the European Union.

ECOS, Deutsche Umwelthilfe, and RREUSE call for a Critical Raw Materials Regulation that is based on circular principles and promotes both sufficiency and resource-efficiency. This can be achieved by adopting the following circular strategies, in order of importance:



**Rethink and reduce:** lower the demand for CRMs by promoting systemic change;



**Circular design, repair, and reuse:** extend the life of products to keep CRMs in use for longer;



**Collect and recycle:** focus on the separate collection, reuse, and treatment of CRMs, and invest in high-quality recycling to bring them back into circulation.

We urge the European Parliament and Council of the EU to link the text of the Critical Raw Materials Act to an EU-wide material footprint reduction target, to focus on waste prevention rather than recycling, and to enhance recycled content.

The CRM Regulation should focus on the reuse and recovery of secondary raw materials from products and components, while ensuring that CRM value chains meet strict environmental and social requirements. This will ensure the energy transition is climate-proof, material-efficient, and socially just.

# Background

To limit global warming to 1.5°C, EU countries must accelerate the clean energy transition by reducing demand, while rapidly scaling up renewable energy production and electromobility. For this, we need more critical and strategic raw materials (e.g., rare earths, cobalt, and lithium). These are used to produce products like solar panels, wind turbines, and batteries.

## Critical and strategic raw materials used in the energy transition <sup>1</sup>



### Solar photovoltaics:

Silicon, Gallium, Indium, Boron, Germanium, Nickel, Copper, Phosphorous, Antimony, Arsenic, Aluminium, Fluorspar



### Wind turbines:

Rare Earths (magnets), Boron, Silicon, Manganese, Nickel, Copper, Niobium, Aluminium



### Batteries:

Lithium, Cobalt, Nickel, Natural Graphite, Manganese, Phosphorous, Aluminium, Fluorspar

The mining and processing of these minerals generally takes place outside of Europe and can be concentrated in a few countries (for example China <sup>2</sup>). This makes the EU dependent on global supply chains - ones that have faced (and will continue to face) serious disruptions, such as the COVID-19 pandemic and geopolitical tensions. We need supply chain resilience and stock management for CRMs in the EU.

The supply of critical raw materials will become the more and more problematic in the near future as demand is expected to increase significantly. The EU will need approximately 60 times more lithium and 15 times more cobalt for EV batteries and energy storage by 2050, [analysts](#) estimate.

The biggest challenge for the EU is to find a sustainable and stable balance between demand and supply of CRMs. Circular economy strategies play a critical role in reducing the demand for virgin raw materials <sup>3</sup>, as well as increasing EU supply security and resilience.

Announced by European Commission President Ursula von der Leyen in her 2022 State of the European Union speech, the European Commission published a [proposal for a Critical Raw Materials Regulation](#) in March 2023. The Commission intends to strengthen the EU's CRM value chain, within the EU and globally.

This proposal aims to secure the supply chains of critical minerals. Critical raw materials are not only indispensable for the EU to deploy its green and digital transition, but their demand is set to increase drastically worldwide. However, the proposal does not consider that even while enabling essential transitions we should respect planetary

boundaries. To do this, we must also tackle the demand-side. Sufficiency and resource-efficiency must be promoted, as well as recycling. Although the proposal allows for the fast tracking of mining and extraction permits, it falls short on a coherent and robust environmental, social, and human rights-based framework.

**We therefore call on the European Parliament and Member States to reinforce this proposal by considering the following recommendations:**

- 1** Target the **reduced consumption** of critical raw materials;
- 2** Focus on **waste prevention and material reuse**, before recycling;
- 3** Build a **market for secondary** raw materials;
- 4** Stop illegal **imports of products** and components containing CRMs.





# Target the reduced consumption of critical raw materials

The EU should not only look at managing supply, but also demand. Policies must centre around demand reduction (sufficiency). This will help to build the resilience of supply chains by reducing the EU's dependence on imports of large volumes of primary (critical) raw materials. It will also reduce environmental damage and socially unjust practices in countries of extraction.

An **EU-wide material footprint reduction target** (that includes CRMs) is needed. This will guide and reduce overall demand across the economy. Demand-side reduction can then be achieved through the systemic change of critical infrastructure, utility delivery, the (re) design of business models and supply chains, ownership models, and (in)efficient product use. A recent study demonstrated that waste management measures alone would only bring marginal benefits for natural resources. Circularity should be approached from a systemic perspective that includes both production and consumption, as well as waste management<sup>4</sup>.

A material footprint<sup>5</sup> reduction target should be the headline indicator for any policy (including the Ecodesign for Sustainable Products Regulation) that wants to deliver on circular economy. Although this intention was announced by the European Commission in its **2020 Circular Economy Action Plan**, no indicator has been developed so far. The CRM Regulation proposal lacks any mention on such an indicator in its chapter on sustainability (Chapter 5), urging national measures without setting any specific targets.

Indicators for material footprint reduction should be both overarching and sector specific. A general material footprint reduction target should be established in horizontal legislation, following the example of the **2030 EU climate target**, and the **EU Climate Law** (Regulation (EU) 2021/1119).

The CRM Regulation should build on this by mandating specific targets to be tackled in product legislation for all products that contain CRMs.

Another important action will be to **substitute CRMs** in manufacturing processes. For instance, Tesla already uses **cobalt-free Lithium Iron Phosphate (LFP) batteries** in almost 50% of its new cars (LFP components are non-toxic and abundant). Tesla intends to switch all of its standard range cars to this technology in the coming years. The CRM Regulation proposal does not address this strategy enough and does not propose any related measures.

## We call for:

- ✓ The European Commission to **set up a horizontal material footprint reduction target that includes critical raw materials**. This should be used as an indicator to support Article 25 on 'National measures on circularity' in the CRM Regulation.
- ✓ The European Parliament and Council to improve the CRM Regulation **by including references to the need for general and product-specific material footprint reduction targets** and parameters that include CRMs.
- ✓ The European Parliament and Council should also introduce more specific **measures on the substitution of critical raw materials** whenever possible.

# Focus on waste prevention and material reuse, before recycling

Circular design requirements for products and energy infrastructure are crucial. To mitigate the demand for CRMs, product lifetime extension measures and a focus on the use of secondary (recycled) materials should be prioritised to reduce dependency on primary raw materials.

As acknowledged in the impact assessment accompanying the CRM Regulation proposal, EU waste management legislation does not currently enhance the circularity of CRMs. Nor does it help to develop a secondary CRM market. This undermines the objective of the CRM Regulation proposal to obtain 15 percent of strategic raw materials from recycling by 2030.

Strong **circular design requirements** must ensure good performance and durability, as well as the reusability and repairability of CRM equipment and components. This will extend the lifetime of products, and the CRMs they contain. All such requirements must be supported by appropriate technical standards. Standards should assess the performance and durability of CRM products, components, and equipment, while providing transparent technical guidance to facilitate the repair, reuse and recycling of CRM products, components and equipment.

## We urge the European Parliament and Council of the EU to:

- ✓ Prioritise measures on circularity according to the waste hierarchy established in the [Waste Framework Directive](#) (Directive (EU) 2018/85), **throughout Chapter 5 and in Article 25 'National measures on circularity' of the CRM Regulation**. Circularity measures should also be harmonised throughout EU Member States.
- ✓ Devise **circular design and lifetime extension requirements** so that components and products containing CRMs can be easily accessed/disassembled for repair, reuse, repurposing, or recycling. Requirements should include removability and replaceability, as well as interoperability, of components including CRMs.
- ✓ **Information on CRMs and their supply chain** included in components and products should be clearly indicated in the digital product passport requirements within the upcoming Ecodesign for Sustainable Product Regulation.
- ✓ **Phase out single-use products** containing CRMs (e.g. portable batteries and disposable single-use vapes).
- ✓ Introduce **mandatory reusability assessment requirements** for CRM equipment and components collected for waste, as well as reuse targets at national level. Tests should determine whether it is technically possible and economically reasonable (including if there is a market) for CRM equipment and components to be reused, repurposed or remanufactured.

# Build a market for secondary critical raw materials

For many products that are rich in CRMs, recycling is still not commercially viable in the EU, with low and volatile CRM prices undermining efforts to improve European CRM recycling rates (which today are close to zero in most cases).

The **collection and separation of CRM products** and components must be improved to collect CRM-rich products into larger quantities to ensure that recycling is economically viable. Then, end-of-life products and infrastructure containing CRMs (e.g. e-waste and renewable energy infrastructure), and the manufacturing of scrap<sup>6</sup> and materials (e.g. black mass from batteries), should be kept within the EU for high-quality recycling.

The collection of CRM-rich equipment could be stimulated through deposit-return systems or similar financial incentives. **Market incentives** (such as the ones mentioned by the Waste Framework Directive, Annex IV) could also be created to spur the economic viability of recovering CRMs and to stimulate the use of recovered CRMs in new products. As well as this, platforms must be created where demand for recycled components, materials, and CRMs can meet supply. **Cost-effective methods to disassemble WEEE**, isolate CRM bearing components, and upgrade/concentrate CRMs should also be scaled up for industrial adoption.

The EU-funded project **CEWASTE** developed normative requirements to improve the recycling rates of CRMs from e-waste and batteries by producing and pilot testing requirements for collection, transport and treatment of products containing sufficiently high concentrations and amounts of critical raw materials. These requirements should be integrated into the European standard for e-waste treatment (EN 50625 series) and as minimum requirements in the revised WEEE Directive to make them legally binding.

To reduce our dependence on virgin raw materials, recycled materials should be re-integrated when manufacturing new products. To achieve this, we need **minimum recycled content targets of CRMs** in key products and components. The success of this measure depends on the **correct and separate collection and sorting** of equipment and components containing CRMs, and on ensuring full access to recyclers.

As stressed in the previous section, the aim to increase recycling should not contradict the waste hierarchy (as defined in the Waste Framework Directive). The collection of products and waste containing CRMs must not damage potentially reusable items during collection. Access to the waste stream should only be granted to accredited operators. A recent study revealed that up to 45% of waste from electrical and electronic equipment collected in Bavaria could be prepared for reuse by improving collection logistics<sup>7</sup>, leading to higher environmental protection and resource efficiency, while also creating more local jobs in comparison to recycling<sup>8</sup>.

Finally, a European legal act should outline the **methodology for the calculation and verification of the amount of CRM recovered from (post-consumer) waste**. It should use segregation or a batch-level mass balance approach, with proportional allocation (to assess the recovery rate in each product model and batch per manufacturing plant, if mixed with raw materials), as we suggested for plastics recycling<sup>9</sup>. This method should then be homogeneously applied throughout the EU, to allow for comparable accounting that relies on third-party certification to ensure trustworthy claims.

High-quality recycling of CRMs is not supported by strong, sector specific EU legislation. For instance, generic, weight-based collection and recycling targets for waste from electrical and electronic equipment (WEEE) in the



EU lead producers and Member States to focus on overall tonnages, rather than on the quality recycling of small amounts of CRMs. In general, most Member States fail to meet the currently required WEEE collection target of 65%, thus preventing their sound treatment. At the same time, insufficient separation and sorting of CRM equipment from other WEEE during collection leads to insufficient concentrated volumes to recycle CRMs. The [WEEE Directive](#) (Directive 2012/19/EU) has proven to be outdated and ineffective, with NGOs having already called for its revision <sup>10</sup>.

The CRM Regulation proposes to change this situation by strengthening the EU's recycling capacity to provide at least 15% of the total consumption of strategic raw materials. However, this target is completely disconnected

from the provisions included in the chapter on circularity. It also needs to be properly supported by sector-specific legislation. The same approach used for the [upcoming EU Battery Regulation](#), which sets specific CRM recovery targets, should be integrated in a systematic way within other pieces of legislation. For example, the Ecodesign for Sustainable Products Regulation (ESPR), for which a proposal is currently being discussed. And, the Waste Framework Directive, the WEEE Directive, and the [End of Life Vehicles Directive](#) (Directive 2000/53/EC). These points should also be reflected in the upcoming Standardisation Request on "Critical raw materials for batteries of electric vehicles," as announced by the European Commission in its 2023 [Annual Union Work Programme for European Standardisation](#) <sup>11</sup>.



### We urge the EU institutions to:

- ✓ Ensure high-quality recycling through a proper collection and separation of CRM-containing products. Incentivise this with dedicated deposit-return systems or similar financial incentives.
  - Revise the outdated Waste Electric and Electronic Equipment (WEEE) Directive as soon as possible.
  - Ensure the proper reporting of **collection, preparation for reuse, reuse, treatment and recycling** of products and components that contain CRMs. This will ensure safe and effective collection and prevent wrong disposal.
  - Define collection quantities related to the quantities placed on the market to ensure a system that is the least susceptible to fraud.
  - Integrate CEWASTE normative requirements (and further standards depending on the waste stream) in a revised WEEE Directive to define requirements for treatment, collection, logistics and preparation for reuse of products and components containing CRMs.
- ✓ Mandate targets of recycled content CRMs in specific products and equipment in their dedicated legislation (obtained mostly from post-consumer waste, and a limited share of manufacturing scrap) <sup>12</sup> and enforce administrative penalties if the targets are not met.
- ✓ Underpin all targets with a European legal act that lays down a **methodology for the calculation and verification of the amount of CRM recovered from (post-consumer) waste**. This should follow the segregation or batch-level mass balance approach, with proportional allocation.
- ✓ Propose legislation covering every product that contains critical raw materials and update any legislation that is outdated or ineffective (including the WEEE Directive and the End-of-Life Vehicles Directive).

# Stop illegal imports of products and components containing CRMs

Massive amounts of non-compliant products containing CRMs are sold to EU consumers via online platforms (such as Amazon or AliExpress). These are often highly dangerous and environmentally damaging. Unfortunately, most of these products are usually sold by sellers from outside of the EU. This might foster unfair competition with EU sellers which are usually subject to more extensive checks.

This problem grows daily because of the rapid increase of online sales. Various studies show that products are frequently dangerous for consumers and the environment, such as non-functional smoke alarms, and products that contain hazardous substances. On top of this, cheap or fast fashion electronic products with a short lifespan waste resources and often do not consider environmental obligations (e.g., extended producer responsibility fees, or repair services).

Illegal imports via online platforms are an enormous, cross-cutting problem. Recent pieces of legislation, such as the Digital Services Act (DSA) and General Product Safety Regulations (GPSR), have failed to provide a horizontal solution that ensures product compliance and holds offending vendors accountable. The problem of illegal imports needs to be urgently addressed in all environmental and consumer legislation.

If online platforms are ineffectively regulated, current and future legislation will continue to be circumvented – especially, by (non-EU country) sellers who put their products on the single market via uncontrolled online sales – at the expense of the environment, consumer safety, and compliant businesses.

## We urge the European Parliament and Council of the EU to:

- ✓ Ensure that all economic operators placing products on the EU market via online platforms are liable for their compliance to the CRM Regulation.
- ✓ Define online platforms as economic operators (e.g., importers) with sufficient due diligence obligations, including checking that economic operators provide information on CRMs through the digital product passport (similar to the German model of checking product registration and manufacturing obligations).
- ✓ Ensure that online platforms take full responsibility for the products they enable the sale of if no other EU-based economic operator is liable under the CRM Regulation.
- ✓ Incentivise online platforms to play an active role in preventing non-compliant products by using modern technologies (e.g., AI picture recognition), providing more transparent information to consumers and authorities, and financing the cost of market surveillance infrastructure.
- ✓ Increase enforcement by, for example, strengthening customs controls and increasing the use of scalable digital tools (e.g., web crawlers) to improve market surveillance.

# Conclusion

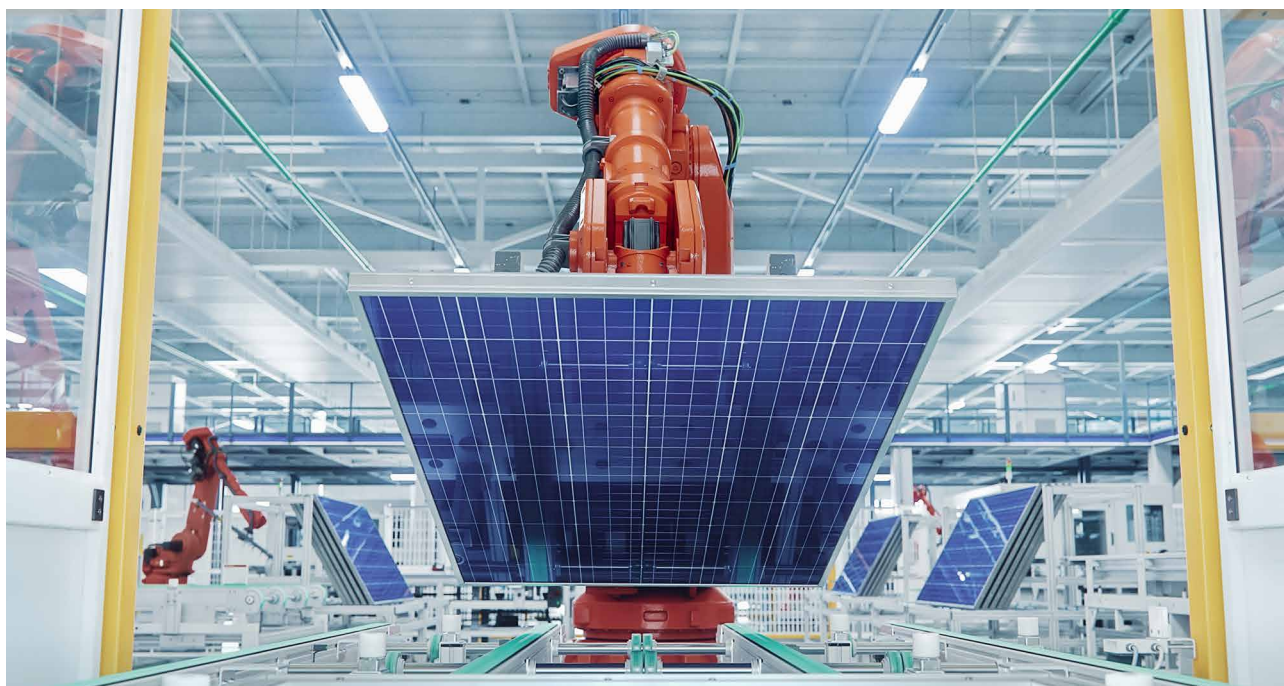
The energy transition should not only be based on renewable energy sources and the technologies that accompany it, but also on the principles of sufficiency, circularity and efficiency. The proposal for a Critical Raw Materials Regulation, together with the revision of other related and important files, such as the directives on WEEE and end-of-life vehicles, as well as the ongoing discussions around the Ecodesign for Sustainable Products Regulation, will contribute to ensuring that the energy transition respects the environment, planetary boundaries, and consumers. Even more importantly, though, we must rethink the way we produce and consume – and this must be reflected in legislation. The Regulation could and should do much more to address the existing problem with the demand of CRMs.

Provisions on circularity need to be clearly linked to an overall material footprint reduction target, which includes

critical raw materials, and be based on the waste hierarchy. An effective framework should be able to ensure circular design that prevents products containing CRMs from becoming waste. It should also be able to address the proper collection and treatment needed to recover CRMs from products and recycle them accordingly.

While this paper has focused primarily on the circular economy aspects of CRMs, we should also highlight the need to reinforce other aspects of the CRM Regulation proposal. Mining and extractive industries represent a high risk for human, social, and environmental rights. The Regulation should properly tackle this, especially in the so-called “strategic projects”.

Only this way will the energy transition be climate-proof, material-efficient, and socially just.



# Notes and references

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- 2 European Commission, [Study on the EU's list of Critical Raw Materials](#) (2020), Factsheets on Critical Raw Materials.
- 3 Circular economy approaches have the potential to curb material demand: global virgin material use in the passenger car market could be 80% reduced in 2050 compared to the BAU scenario of ever- increasing car sales and material use increases ([Systemiq](#), 2022).
- 4 Marco Bianchi, Mauro Cordella, [Does circular economy mitigate the extraction of natural resources? Empirical evidence based on analysis of 28 European economies over the past decade](#), Ecological Economics, Volume 203, 2023.
- 5 Material footprint (or raw material consumption (RMC)) represents the total amount of extracted raw materials needed to produce the goods and services consumed by residents of the EU.
- 6 Although manufacturing processes have to be optimised in order to avoid manufacturing scrap.
- 7 L. Messmann, S. Boldoczki, A. Thorenz. A. Tuma (2019) Potentials of preparation for reuse: A case study at collection points in the German state of Bavaria, p. 1543.
- 8 RREUSE (2021) Job creation in the re-use sector: data insights from social enterprises, p. 1.
- 9 ECOS, Zero Waste Europe, Rethink Plastics Alliance, [Determining recycled content with the 'mass balance approach' 10 recommendations for development of methods and standards](#), 2021.
- 10 ECOS, DUH, EEB, RREUSE, [Call to revise EU legislation for waste electric and electronic equipment](#), 2022.
- 11 The objective for this standardisation deliverable to be request would be to “adapt the value chain of minerals and materials used for battery production to sustainable sourcing practices and to support the efficient functioning of recycling markets to increase the availability of quality secondary raw materials.”
- 12 The development of solid criteria for green/mass balance claims would allow producers to make clear and accurate statements about the amount of recyclable content in products, facilitating the work of collection and recovery of CRMs.



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