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EEDF 2024

The Circular Economy as a Supplier of Critical Resources for the Transformation

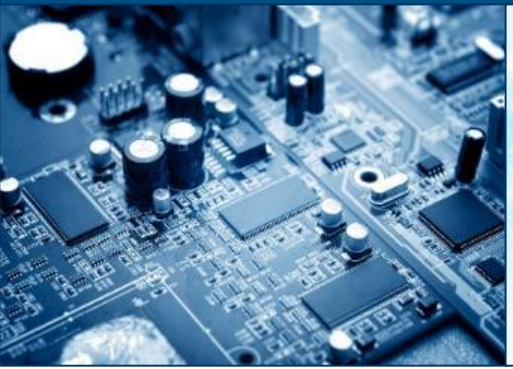
Global challenges in the supply of raw materials

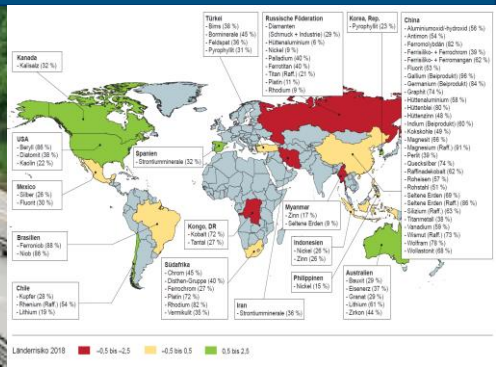
Change in demand for raw materials due to future technologies

Rising demand for raw materials due to population growth

Bottlenecks in the supply of certain raw materials and primary products

Increasing dependency due to high concentration of supply





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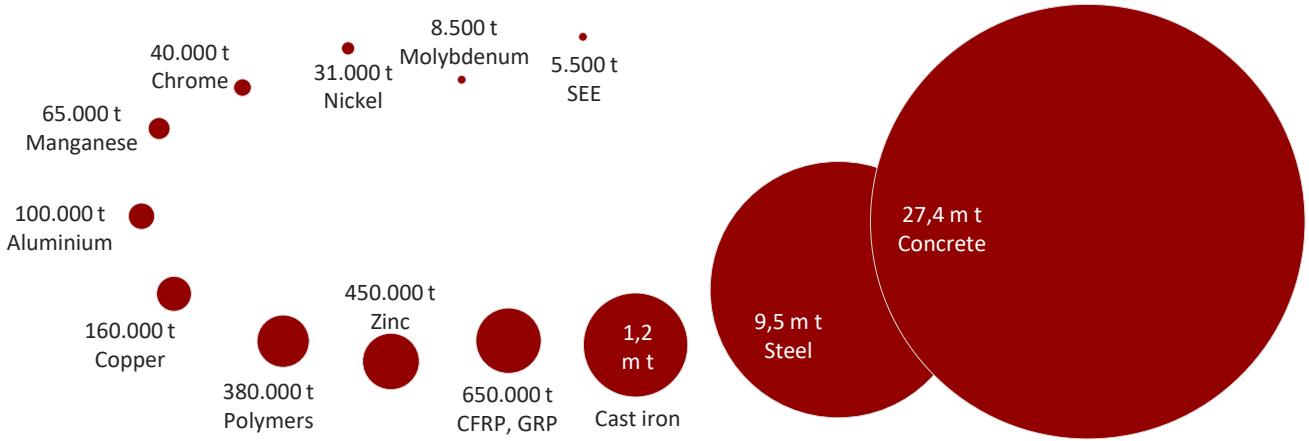
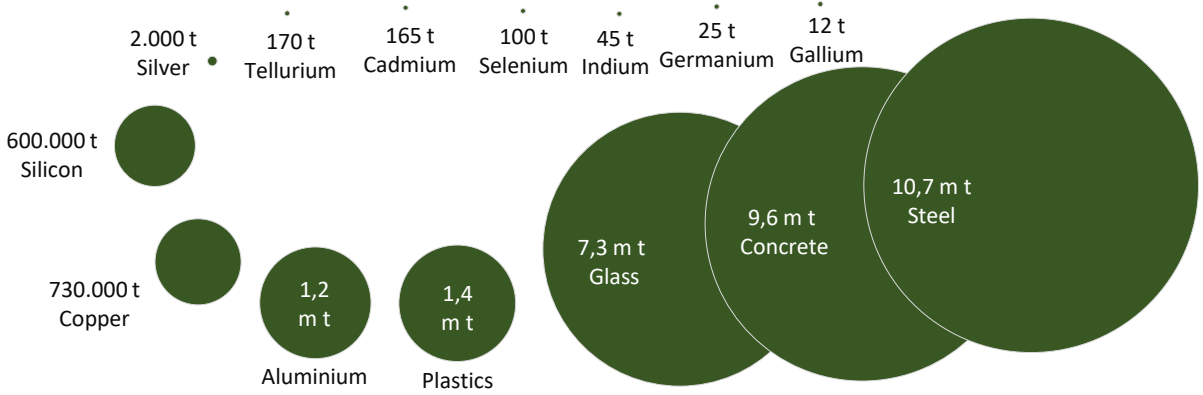
Raw material requirements for future technologies (RE)

Cumulative raw material requirements for:
82 GW net addition of **wind power** by 2030*
(59 GW on land, 23 GW at sea)
*period from 2021-2030



Cumulative raw material requirements for:
161 GW net addition **PV** by 2030*
*period from 2021-2030



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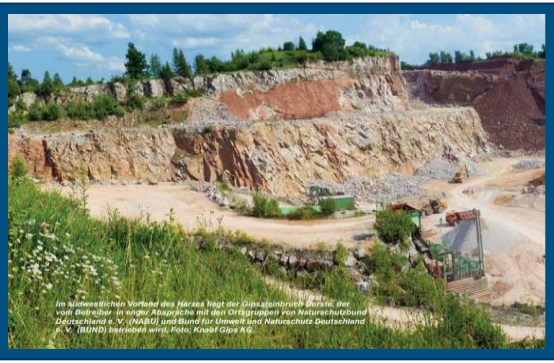
Quelle: DERA 2022

Pillars of German raw materials supply



Import, mainly of metallic raw materials

Domestic extraction of mineral raw materials

Recycling/secondary raw materials

- Metallic raw materials
- Mineral raw materials/construction raw materials
- Paper
- Glass
- Plastics

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Raw materials strategy of the Federal Government (2020)

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Contains 17 measures on raw material supply, domestic raw materials, imports and recycling:

1. Responsible raw material extraction
2. Securing and disclosure of geological data
3. Promoting primary raw material extraction in Germany and Europe in the metals sector
4. Securing domestic raw materials
5. Transformation of mining regions - Sustainable mining closure
6. Creating raw material awareness—strengthening acceptance for domestic raw material extraction
7. Creating a level playing field in the supply of raw materials
8. International raw materials policy and foreign trade promotion by the Government
9. Guarantees for untied loans (“UFK guarantees”)
10. Further development of DERA (German Raw Material Agency) raw material monitoring
11. Sustainable raw material management in developing and emerging countries
12. Circular economy and secondary raw materials as a source of raw materials
13. Round table on recycling with private business sector
14. Strategy for resource efficiency in lightweight construction sector
15. Corporate due diligence in supply and value chain
16. Strengthening international cooperation through dialogue on standards
17. Cooperation with the EU Commission on the sustainable supply of raw materials

BMWK key points for updating the raw materials strategy 2022

Eckpunktepapier des Bundesministeriums für Wirtschaft und Klimaschutz (BMWK): Wege zu einer nachhaltigen und resilienten Rohstoffversorgung

A. Ausgangslage

Die Sicherstellung einer nachhaltigen Rohstoffversorgung ist eine der zentralen Grundlagen für die deutsche Wirtschaft und die Erreichung der Klimaziele. Dabei ist die Ausgangslage definiert durch folgende Faktoren:

Der **Ausstieg aus den fossilen Technologien und die Transformation** hin zu treibhausgasneutralen Technologien führt zu einem erheblichen Mehrbedarf an entsprechenden mineralischen Rohstoffen und insbesondere an Metallen wie z.B. Lithium, Nickel, Kupfer, Magnesium, Titan, Gallium, Germanium, Seltenen Erden und Iridium (siehe Abb. 1). Verschiedene Analysen und Studien gehen bei einzelnen dieser Metalle von mehrfachen Bedarfen der derzeitigen Weltproduktion für diese Zukunftstechnologien aus. Auch wenn sich neue Verfahren mit reduzierten oder anderen Rohstoffbedarfen entwickeln werden, gilt: Je schneller die Transformation hin zu fossilfreien Technologien vollzogen wird und je mehr Länder dies ebenfalls tun, desto schneller wächst dieser Mehrbedarf an.

Die Internationale Energieagentur (IEA) schätzt beispielsweise, dass die Nachfrage nach kritischen Rohstoffen, die zur Erreichung der Ziele des Pariser Abkommens benötigt werden, zwischen dem Jahr 2020 und dem Jahr 2040 im Bereich der Seltenen Erden um das Siebenfache und für Lithium sogar um das 42-fache steigen könnte (IEA 2021). Ähnliche Prognosen trifft auch die Deutsche Rohstoffagentur (DERA) für den Anstieg der weltweiten Rohstoffgewinnung. Danach werden für Lithium, je nach Szenario, im Vergleich zur heutigen weltweiten Gewinnung bis zu sechsmal höhere Mengen benötigt (DERA 2021).

Abbildung 1: Bedarfe an mineralischen Rohstoffen für verschiedene Technologien (Quelle: IEA 2021)

Alle Analysen zeigen zudem, dass die ungenügende Versorgung mit diesen Rohstoffen ein erhebliches Risiko für die Erreichung der globalen Klimaschutzziele darstellt.

- Increased diversification in the supply of raw materials
  - Monitoring of supply chains, promotion of strategic raw material projects at home and abroad, examination of storage options.
- ESG Standards (Environmental and Social Governance)
  - Working with partner countries to promote effective international and European ESG standards.
- Developing the circular economy and recycling
  - Complementing and expanding existing regulatory frameworks (e.g. collection of data, quotas, economic incentives, end of waste status).

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https://www.bmwk.de/Redaktion/DE/Downloads/E/eckpunktepapier-nachhaltige-und-resiliente-rohstoffversorgung.pdf?__blob=publicationFile&v=4

Developing the circular economy and recycling

Objectives in the circular economy

- Improved durability and easier to repair products, strengthening "design for recycling“
- Increase the Circular Material Use Rate (CMUR) from currently "only" approx. 13 per cent
- Improving the collection of recyclable materials
- Improving the quality of secondary raw materials, particularly metals and mineral raw materials
- Establishment and development of a circular and recycling economy, especially for raw materials in future technologies (e.g. lithium, rare earths, ...) in Germany and the EU

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Bild: https://www.europarl.europa.eu/news/de/headlines/economy/20151201STO05603/kreislaufwirtschaft-definition-und-vorteile

Supporting measures – Monitoring („**Recyclingatlas 2023**“)

Metal recycling is well established, there are many locations in Germany!

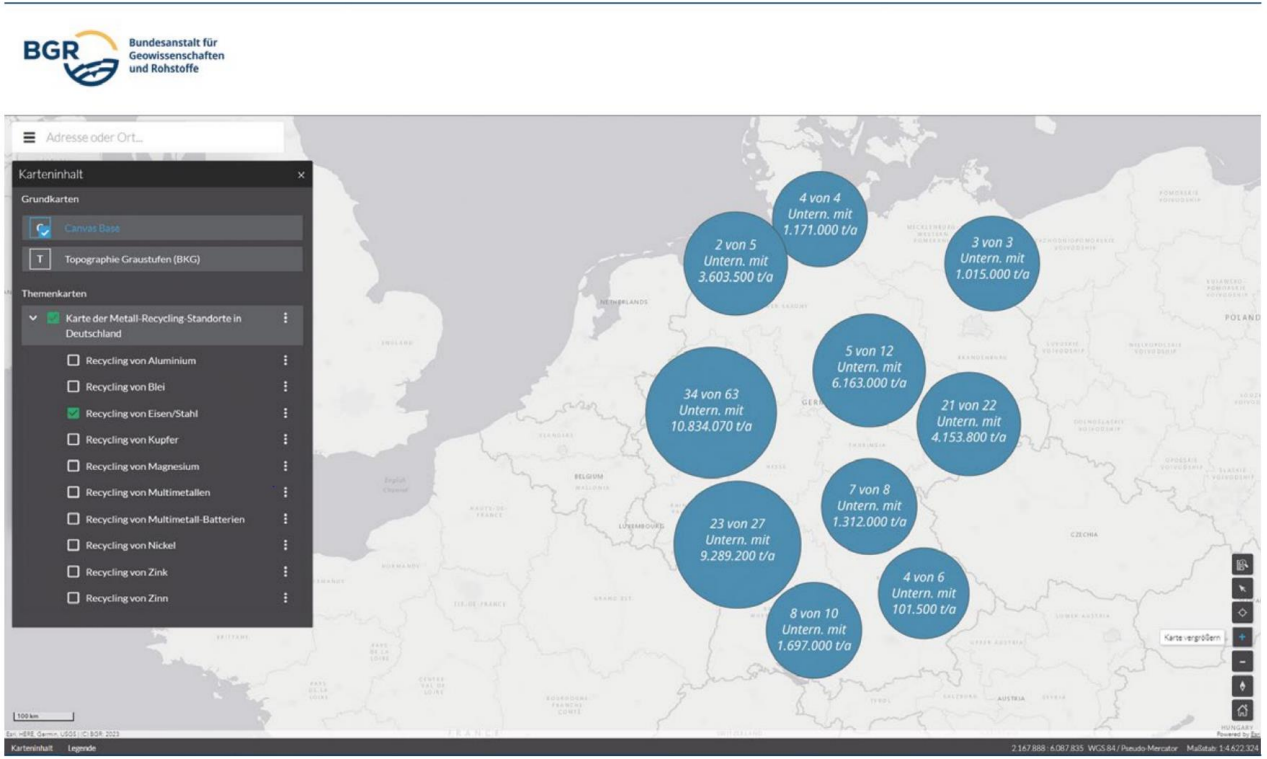

Abb. 3: Ausschnitt aus dem Recyclingatlas für die Metallerzeugung im Geoportal der BGR
from the DERA recycling atlas Sept. 2023. example iron/steel

https://www.deutsche-rohstoffagentur.de/

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Suggestions to be implemented*

- More circular and recyclable product design.
- Clear legal definition of the beginning and end of waste status, especially for building materials.
- Improving the separation of waste, strengthening enforcement.
- Revision and updating of existing regulations and standards.
- Increase demand for recycled raw materials, e.g. by focusing public procurement.
- Discharge of harmful substances.
- Better use of the possibilities of digitalization, for the availability of data

*e.g. as part of the national circular economy strategy

EU Ecodesign for Sustainable Products Regulation (ESPR)

Scope of the ESPR (European Commission proposal of March 2022):

- all products with the exception of food and fodder, medicinal products for human and veterinary use, plants and animals.
- Requirements on durability, reuse, upgradeability, reparability, hazardous substances, energy and resource efficiency, use of recyclates, reprocessing, recycling, CO_2 and environmental footprint.
- Regulations on the Digital Product Passport (DPP), sustainable public procurement, a ban on the destruction of unsold goods and an ecodesign label (in addition to the EU energy label).
- Specific ecodesign requirements will follow later.

Current studies on the circular economy and climate action

Examples with a focus on CO2 emissions:

The **status report of the German circular economy** (2020) sees potential savings of **100 million tons of CO_2** through the circular economy (savings achieved so far plus future potential).

Agora (2023) estimates a **CO_2 reduction potential of 25% by 2045** in a combination of climate-neutral production with a circular economy approach for steel, cement and plastics (cumulatively approx. 200 million tons of CO_2).

Partly different considerations, reference values, sectors, points in time...

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Greenhouse Gas Emissions from Waste

- In accordance with the UNFCCC (Framework Convention on Climate Change), only the emissions from a very small part of the circular economy are reported in source category 5 (Common Reporting Format - CRF) "Waste and other".
- In order to avoid double reporting, only direct, non-energy emissions from landfills, from mechanical-biological treatment, from composting and from wastewater treatment are recorded in this sector.
- **However**, this structure does not adequately reflect the entire spectrum of services and potentials of the circular economy for CO_2e reduction.

Objective: Comprehensive overview of the circular economy

- Study on "**Climate protection potential of the circular economy**" by project partners ifeu, IREES, Öko-Institut and Prognos.
- **Objective**: a summary and at the same time comprehensive overview of the climate action potential that can be realized by the circular economy by 2030 in **addition** to the current contributions to CO_2e reduction.
- Existing studies have so far failed to do this, or have done so inadequately, because:
  - No differentiation between "anyway measures" and additional potential.
  - Measures are unsystematic, without reference to circular economy legislation.
  - Different reference years, unclear delimitation of sectors, etc. ...

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→ Study is now available for approval. Results are still preliminary.

Scope of the study

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Preliminary results

- Compared to 2020, the CO_2e reduction potential through **material flow-specific measures** is estimated between **16 million t. CO_2e to a maximum of 46 million t. CO_2e** until 2030.
  - Depending on whether a scenario that is more or less likely taking place anyway is assumed, or whether all realistic potentials are fully exploited.
- The main potential for reducing emissions results in particular from improved collection and recycling of **ferrous and non-ferrous metals, construction and demolition waste and plastics**.
- A **further 40 million tons of CO_2e** can be saved by 2030 **through framework-setting measures.**

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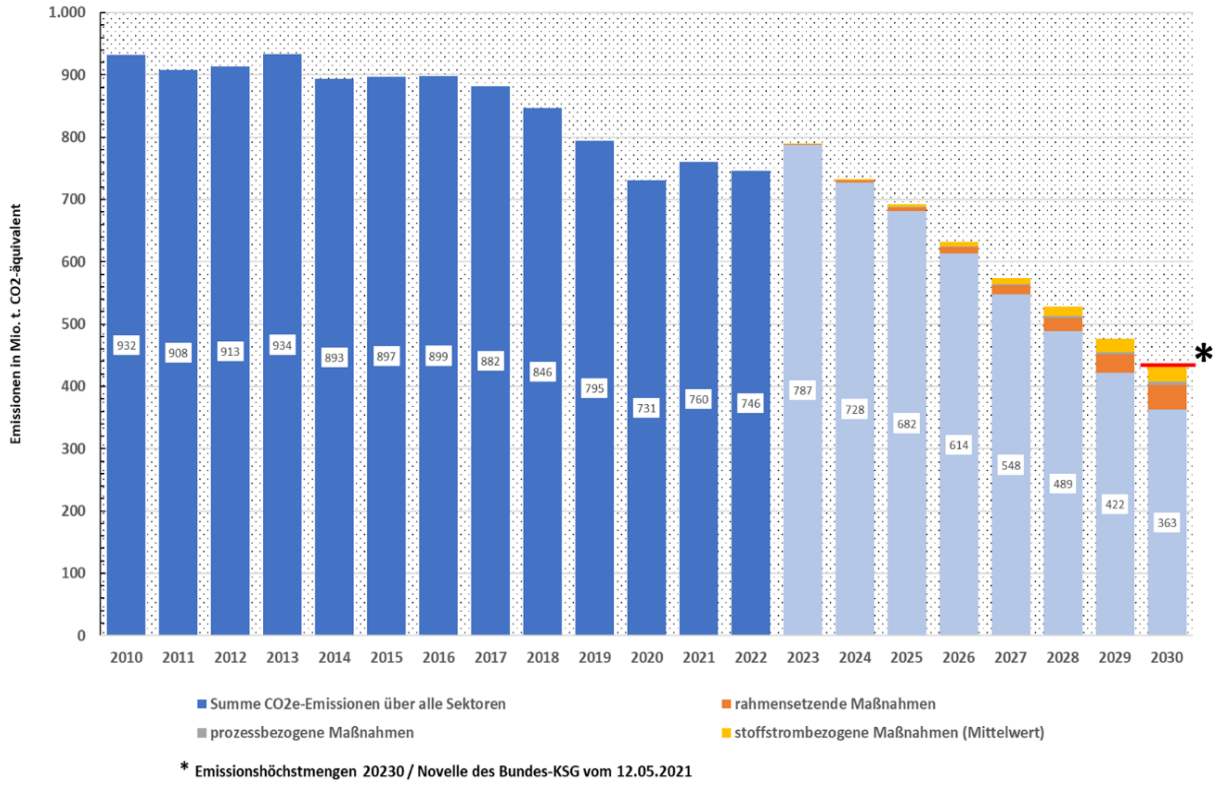
In total around 95 million tons of CO_2e .

Preliminary results: GHG reduction potentials



Depending on the level of ambition, the climate protection contributions of the circular economy that can be achieved compared to 2020, can be estimated at a **total of up to 95 million tons of CO_2e by 2030**.

This sum describes the possible climate protection potential of a circular economy.

However, this requires a high level of commitment from all stakeholders for the organization and implementation of the measures as well as the creation of markets for the recyclates.

Preliminary results with focus on industrial production

Of the max. achievable potential through **material flow-specific measures** of around 46 million t. CO_2e, around **37 million t. CO_2e** (81%) are attributable to three main sectors, including:

- approx. 19.5 million t. CO_2e (= 43 %) to sector **2.C Industry: metal production**,
- approx. 9.1 million t. CO_2e (= 20 %) to sector **2.B Industry: Chemical industry** and
- approx. 8.3 million t. CO_2e (= 18 %) to sector **2.A.1 Industry: Cement production**.

The remaining approx. 8.8 million t CO2e (= 19 %) are distributed among other CRF sectors in a range between 1 % and 5 %.

CRF: „Common Reporting Format“ according to the UNFCCC

Quelle: Prognos 2023

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Thank you for your attention!

Anton Hufnagl, Deputy Head of Division

General Issues of Bilateral Climate and Energy Cooperation