

Raw Materials Information System (RMIS)

Overview, latest developments & focus on Critical Raw Materials

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UNECE Resource Management week – UNRMS Short Course, April 23rd, 2024

Joint Research Centre

(JRC)



ANTICIPATE



INTEGRATE



IMPACT

Our purpose

The JRC is the European Commission's in-house science service. It provides independent, evidence-based knowledge and science, supporting EU policies to positively impact society.

JRC sites

Headquarter in **Brussels**
and research facilities located
in **5 EU Countries:**

Belgium (Geel)

Germany (Karlsruhe)

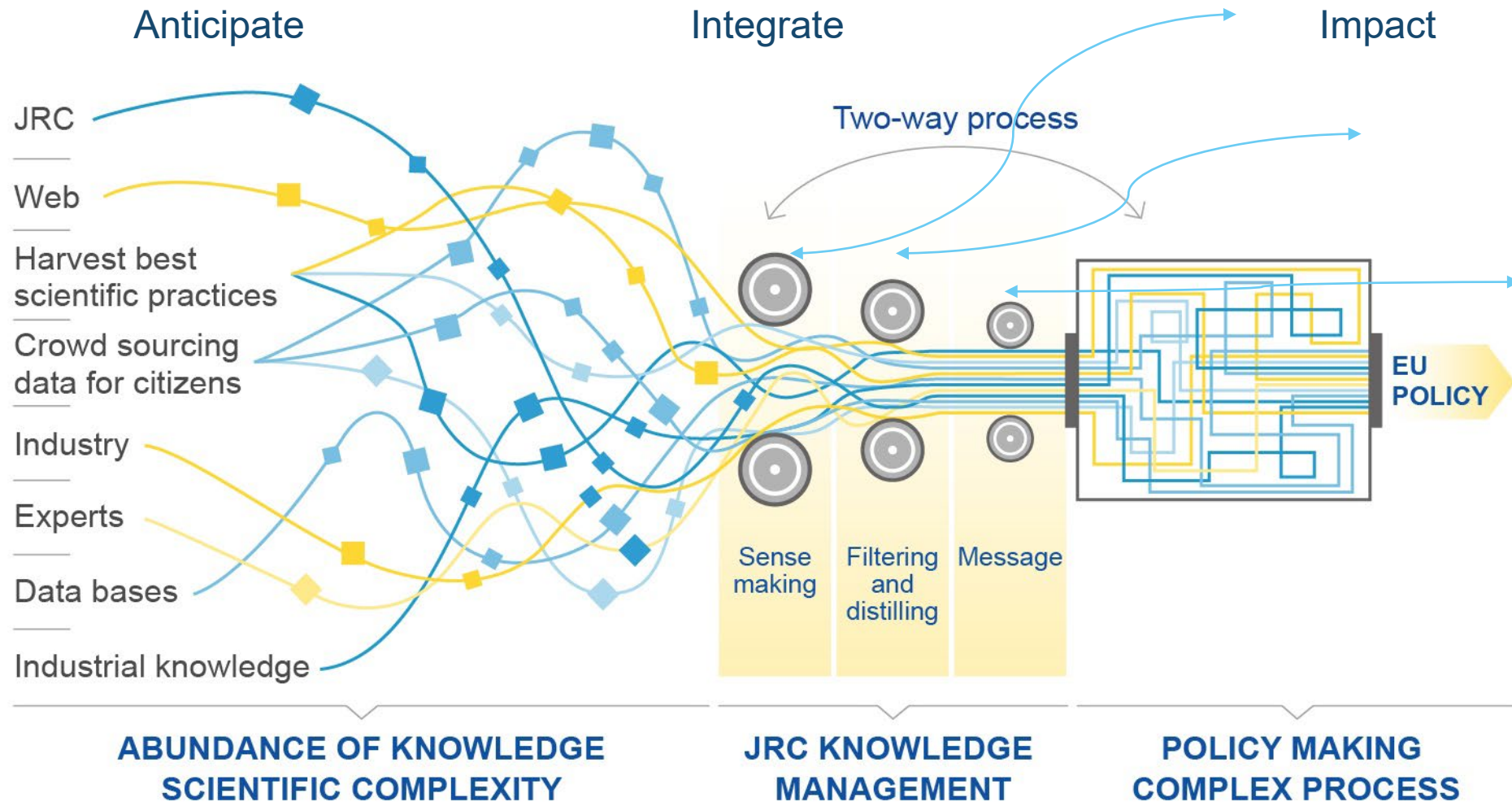
Italy (Ispra)

The Netherlands (Petten)

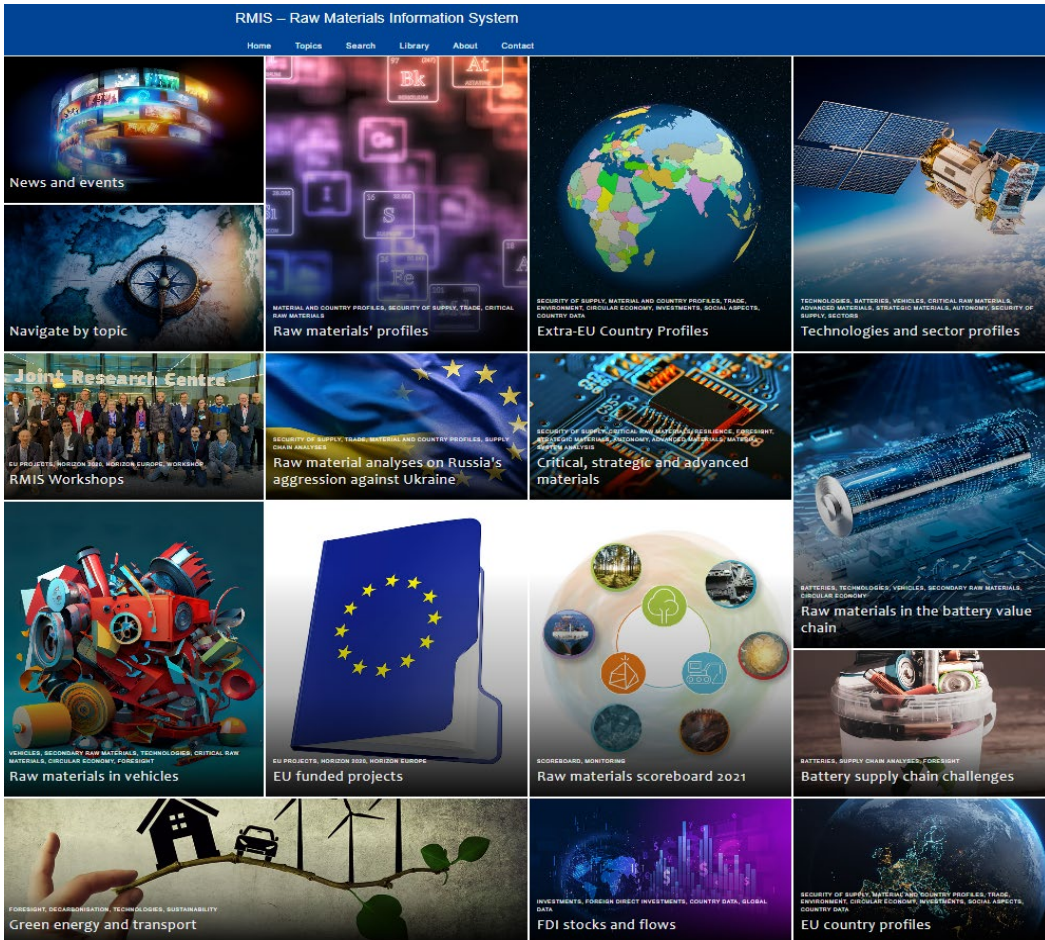
Spain (Seville)



Dealing with the information overload



Raw Materials Information System (RMIS): Context & scope



- Mandated by 2015 Circular Economy Action Plan, reinforced under the 2020 CRM Action Plan and 2024 CRM Act
- Scope includes metals & minerals from primary & secondary sources.
- Facilitates availability, coherence and quality of knowledge at EU level to support EU raw materials policy – especially for critical & strategic materials.
- Facilitates & complements interactions with Member States & key EU / extra-EU stakeholders
- 2024 RMIS roadmap just published!



RMIS content & topics

RMIS Topics

ADVANCED MATERIALS AFRICA ARTISANAL MINING AUTONOMY BATTERIES
CIRCULAR ECONOMY CLIMATE CHANGE COUNTRY DATA
CRITICAL RAW MATERIALS DECARBONISATION DUE DILIGENCE EMPLOYMENT
ENVIRONMENT EU PROJECTS FOOTPRINT FOREIGN DIRECT INVESTMENTS
FORESIGHT GLOBAL DATA GOVERNANCE HEALTH DEVICES HORIZON 2020 HORIZON EUROPE
INDUSTRIAL EMISSIONS INVESTMENTS LAND USE LEGISLATION LIBRARY
LIFE CYCLE ASSESSMENT MATERIAL AND COUNTRY PROFILES
MATERIAL SYSTEM ANALYSIS MEMBER STATES MINERAL INVENTORY MINES LOCATION MONITORING
OPEN STRATEGIC AUTONOMY POLICY POLLUTION RESILIENCE RESPONSIBLE SOURCING
SCOREBOARD SECONDARY RAW MATERIALS SECTORS SECURITY OF SUPPLY
SOCIAL ASPECTS STRATEGIC MATERIALS SUPPLY CHAIN ANALYSES
SUSTAINABILITY SUSTAINABLE DEVELOPMENT GOALS
TECHNOLOGIES TRADE VEHICLES

The Raw Material Information System (RMIS)

Further strengthening EU Raw Materials Knowledge Base for industrial competitiveness

KNOWLEDGE PRODUCTION

- Data collection & analysis (incl. forecast) on raw materials trade, supply (**risk/de-risking**), demand, and **sustainability**
- Focus on **Critical/Strategic RMs**, and related **sectors & technologies**
- Focus on **strategic value chains** (mobility, batteries,...)

KNOWLEDGE INTEGRATION

- Across **JRC** Directorates & teams
- Across **DGs: GROW, ESTAT, TRADE, ENV, RTD, INTPA, ...**
- From **EU-funded / Horizon** projects
- From other entities at EU level (EIT-RM, EGS, HaDEA, EEA,...), MSs, and non-EU (USGS, UN,...)



POLICY SUPPORT

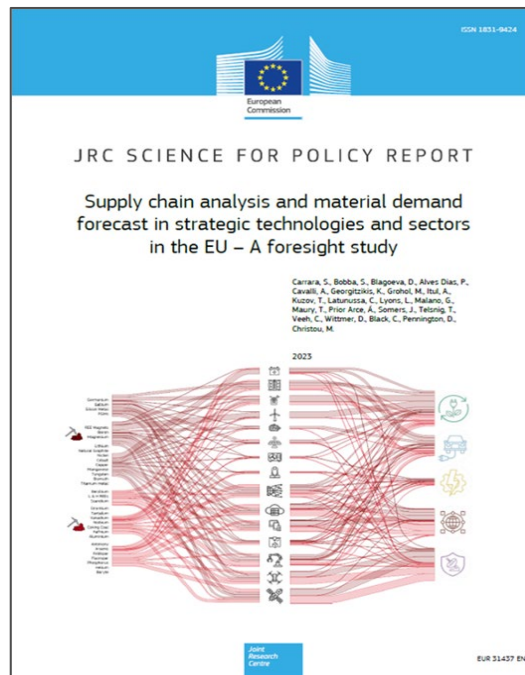
- Data and analysis for **Impact assessment** (e.g. for CRM Act), **implementation, and monitoring of policies**
- Data & analysis for ad-hoc request/briefings (individual countries, raw materials, etc.)

KNOWLEDGE DISSEMINATION & OUTREACH

- **RMIS** among the **most visited** science/knowledge platform of the EC
- Continuous interactions with broad stakeholders' network via various meetings & events
- **Reports, briefs, newsletters, roadmaps**

Example of Policy Support: the CRM Act

- The **Critical Raw Materials Act** is supported by analysis and **projections of materials demand** necessary to meet our energy – and digital transition targets and security/defence agenda.
- JRC performed these projections, together with analysis of supply chain vulnerabilities in the **Foresight study** that helped to underpin scientifically the CRM Act. The definition of **Strategic Raw Materials** is based on this study.



Examples of other JRC sectorial analyses of material demand projections: Wind and Solar PV, Dual-Use Techs, Substitution, batteries, e-vehicles

JRC **Foresight** supporting the CRMA:
15 technologies in 5 key sectors

Foresight Analyses on EU's supply-risk

Focus on Russian invasion of Ukraine

Material-specific briefs for potash, titanium, coking coal, rare gases, nickel, PGMs,...

SCIENCE FOR POLICY BRIEF

Potash: Impact assessment for supply security



HIGHLIGHTS

- EU's import dependency on potash has been increasing since 2018. Total EU imports of all forms of potash peaked in 2020, of which more than half were sourced from Russia and Belarus.
- Russia and Belarus are crucial to the global potash supply. Together they accounted for about 35% of global potash production in 2020. Russia and Belarus are the world's second and third largest potash exporters after Canada. Ukraine does not produce potash.
- The sanctions imposed on Belarus and Russia will impact potash flows to international markets in the short term. The extent of disruption to potash supply worldwide is highly uncertain.
- A significant share of potash exports originating from Belarus and Russia are destined for Brazil, China, India, Indonesia and the EU.
- The global potash market may be subject to further price volatility, adding to soaring fertiliser prices and food security concerns.
- Canada could compensate for potash supply disruption in the event of severe supply deficits in 2022. The EU could orientate its imports towards Canada in the short term.
- In the medium term, EU domestic supply from ongoing mine projects is expected to reduce dependence on Belarusian and Russian imports from 2025 onwards.

QUICK GUIDE - This briefing is one of a series of overviews about potential supply disruption of non-food, non-energy raw materials due to Russia's war against Ukraine.

SCIENCE FOR POLICY BRIEF

Titanium metal: Impact assessment for supply security



HIGHLIGHTS

- Russia is a substantial source of titanium for the aerospace industry globally, making supply chains vulnerable to disruption. Two-thirds of wrought titanium metal in Europe is consumed by the aerospace sector.
- The EU is particularly exposed to imports of wrought titanium from Russia (16% of import value in 2020). The EU imports unwrought titanium and powders from both Russia (9% of 2020 import value) and Ukraine (8% of 2020 import value).
- The EU relies fully on imports of titanium sponge. Dependence on imports of wrought titanium products is significant.
- Imports of titanium metal in the EU are mostly in the form of wrought products (89% by value in 2020). The EU is the top importer globally of wrought titanium (all products & articles).
- An imminent shortage of titanium is not expected worldwide. High inventory levels and lower titanium demand in the post-pandemic period can mitigate impacts in the short-term. Spare capacity in Japan and Kazakhstan, and emerging capacity in Saudi Arabia, are capable to fill supply gaps for unwrought titanium.
- The most plausible sources for the EU in order to shift supply from Russia in the medium-term are its existing trade partners, Kazakhstan and Japan for unwrought titanium, and the US and the UK for wrought products.

QUICK GUIDE - This briefing is one of a series of overviews about potential supply disruption of non-food, non-energy raw materials due to Russia's war against Ukraine.

SCIENCE FOR POLICY BRIEF

Coking coal: Impact assessment for supply security



HIGHLIGHTS

- Caking coal is one of the essential raw materials for iron steel production.
- The trade of caking coal is highly concentrated on the import side, with Australia being the dominant global supplier and Russia the world's third largest producer and exporter.
- EU's dependency on caking coal imports rose from 2015 to 2019 due to declining domestic production. The reliance on Russian imports decreased since 2018. Russia accounted for 11% of EU imports of caking coal in 2021.
- Replacing Russian supply in the EU is feasible. The alternatives to Russian imports are limited to geographically distant sources, i.e. Australia, the United States of America, Canada, and Mozambique, which are current EU trade partners.
- Trade options that could ensure substitution of Russian imports in the EU: all additional imports from Australia, the USA, Canada and Mozambique in 2022-2024 are directed only to the EU and other countries that are phasing out Russian imports. If non-Russian supply in the rest of the world is re-orientated to the EU and other countries that are phasing out Russian imports and replaced elsewhere by deflected Russian trade flows.
- The risk of supply disruption due to the Russo-Ukrainian war is rising due to the current tight market balance globally, which is projected to last at least until 2024. Competition for non-Russian supply is expected to intensify.

QUICK GUIDE - This briefing is one of a series of overviews about potential supply disruption of non-food, non-energy raw materials due to Russia's war against Ukraine.

SCIENCE FOR POLICY BRIEF

Rare Gases (Krypton, Neon, Xenon): Impact assessment for supply security



HIGHLIGHTS

- Russia and Ukraine are significant sources of rare gases (Krypton, Neon, Xenon). Russia's invasion of Ukraine affects the rare gases supply.
- The EU sourced about half of its rare gases imports from Russia and Ukraine in 2021. China and the US are the potential sources for EU's import diversification.
- Industry strategies could mitigate the impacts in the short term. The supply disruption might be severe with associated price inflation until production capacity is developed elsewhere combined with conservation/recycling/substitution strategies to handle shortages.
- EU's resilience to supply chain disruption in the short term is reinforced through its sizable production base for rare gases. In addition, domestic capacity could be theoretically expanded and EU-based companies are world leaders in rare gas separation. EU's ambition to strengthen its semiconductor industry by 2030 requires the expansion of production capacity for rare gases to prevent shortages in the medium term.
- As Ukraine is a leading producer of purified neon gas, a critical input for the manufacture of semiconductors, neon's supply diversion poses the greatest challenges. A neon scarcity worldwide could substantially impact industrial supply chains reliant on semiconductors.
- Impacts are probable in the broader EU manufacturing sector by worsening the shortage of imported semiconductors for key industries.

QUICK GUIDE - This briefing is one of a series of overviews about potential supply disruption of non-food, non-energy raw materials due to Russia's war against Ukraine.

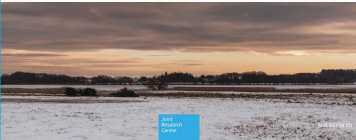
Trade-related country fiches for Ukraine, Russia, Belarus, Kazakhstan, China...

JRC TECHNICAL REPORT

Russian trade in non-food raw materials

Focus on EU-Russia trade relations

Unguru, M., Georgitzki, K., Chioappa, C., Garbosa, E.



2022

JRC TECHNICAL REPORT

Ukraine's trade in non-food raw materials

Focus on EU-Ukraine trade relations

Unguru, M., Georgitzki, K., Chioappa, C., Garbosa, E.



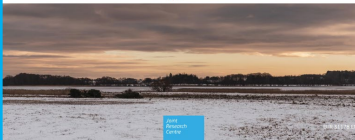
2022

JRC TECHNICAL REPORT

Belarus' trade in non-food raw materials

Focus on EU-Belarus trade relations

Unguru, M., Georgitzki, K., Chioappa, C., Garbosa, E.



2022

JRC TECHNICAL REPORT

China's trade in non-food raw materials

Focus on EU-China trade relations

Unguru, M., Georgitzki, K., Chioappa, C., Garbosa, E.




2023

JRC TECHNICAL REPORT

Kazakhstan's trade in non-food raw materials

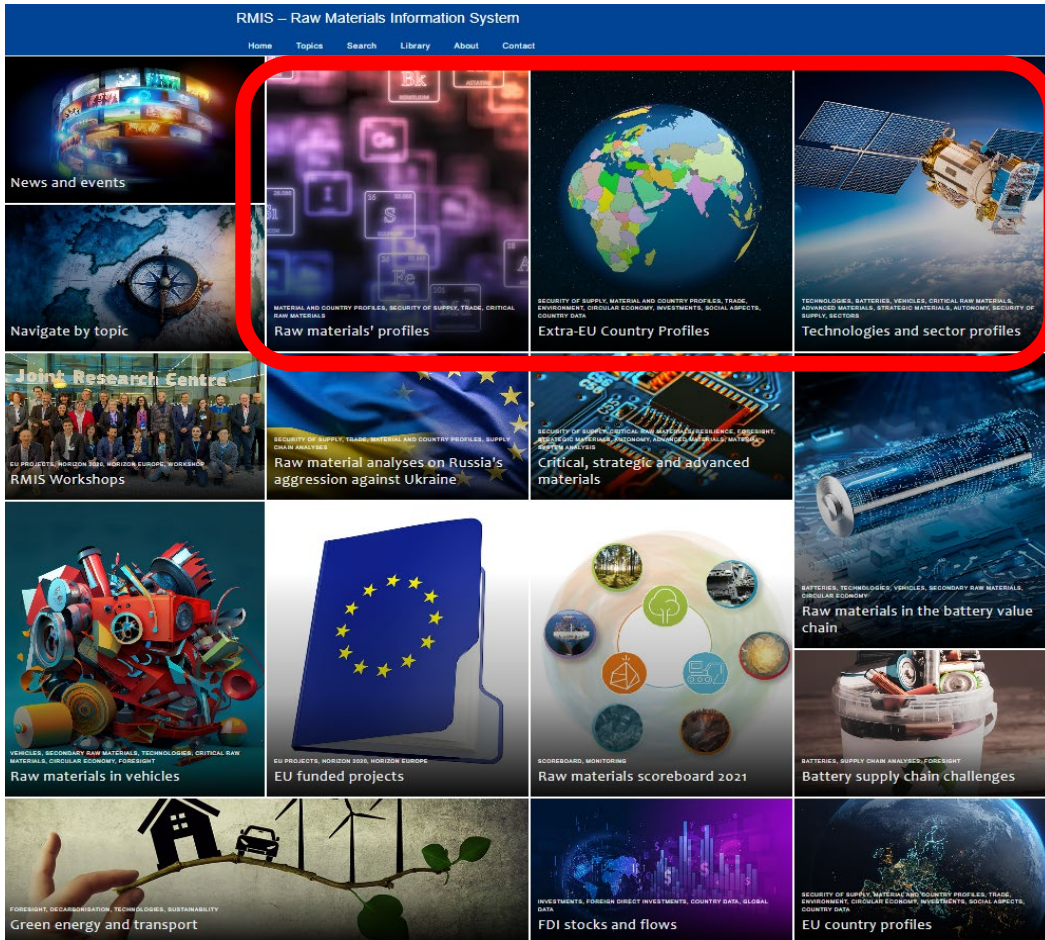
Focus on EU-Kazakhstan trade relations

Unguru, M., Georgitzki, K., Chioappa, C., Garbosa, E.



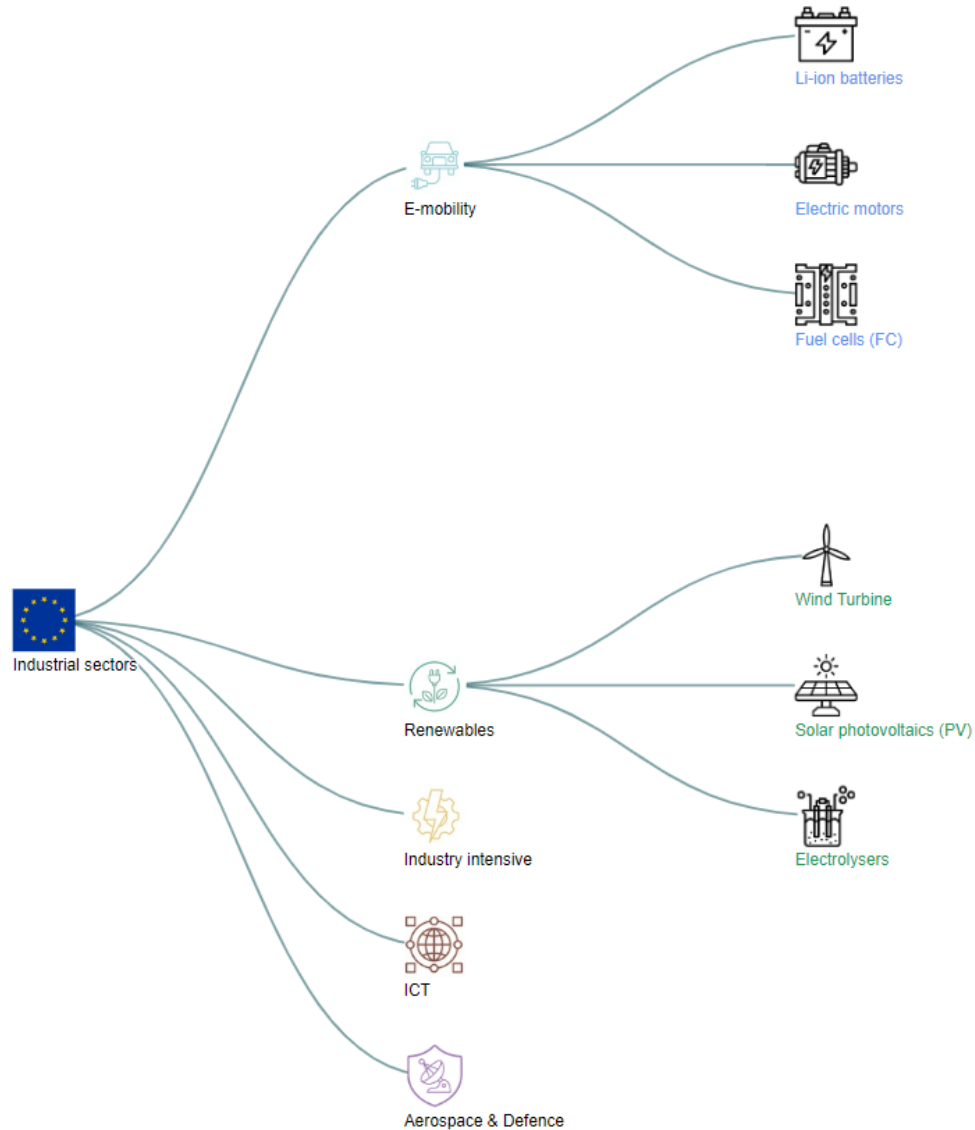
2023

Various types of "profiles" in RMIS



- Technologies and Sectors profiles
 - 5 strategic sectors
 - 15 technologies
- Country profiles
 - EU27 (forthcoming!)
 - Africa
 - Latin America & Caribbean
- Raw Materials' profiles
 - 100 raw materials, including all critical and strategic RMs

Technologies & Sectors Profiles

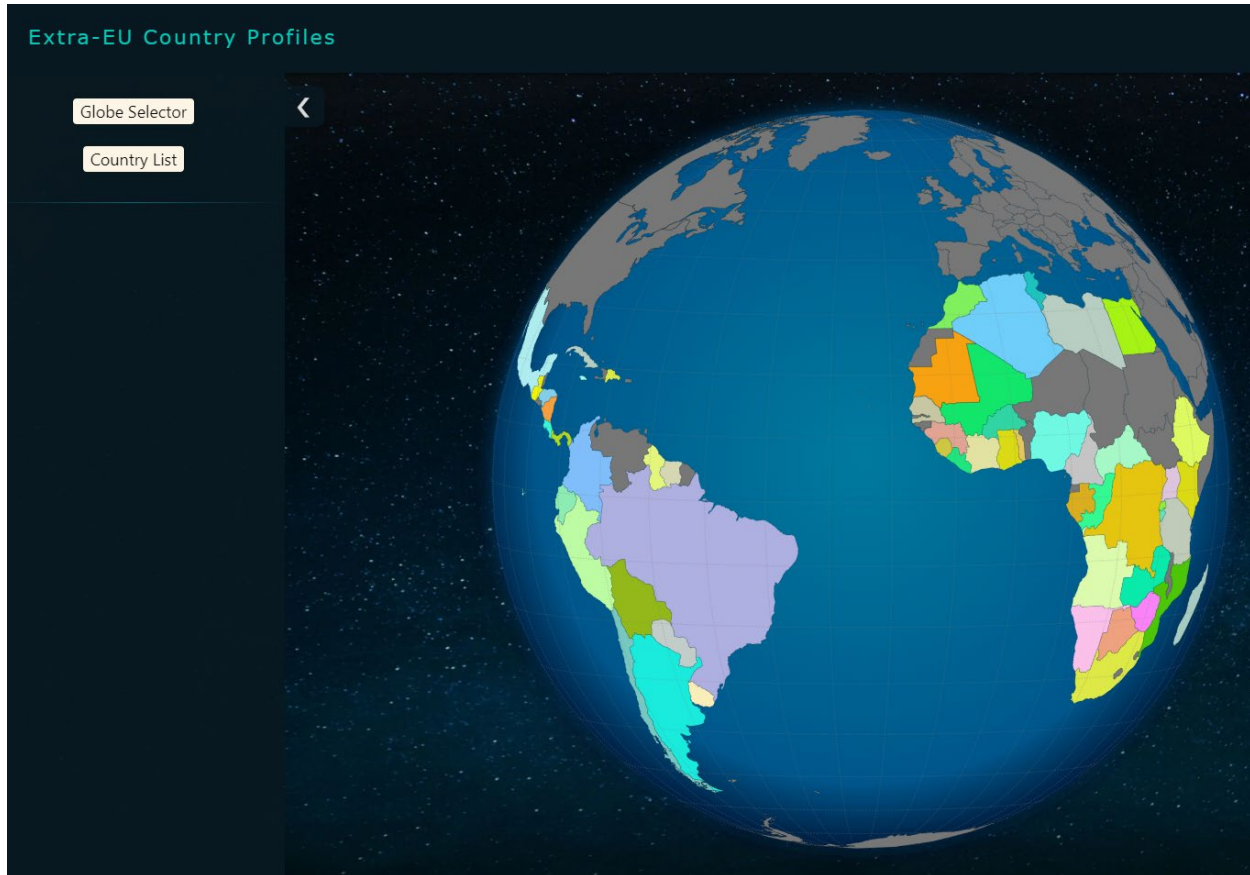


Analysis on the supply chain structure of **15 key technologies** for **5 strategic sectors**:

- relevant materials, components and assemblies;
- potential bottlenecks;
- supply risk;
- future demand;
- policy-relevant scenarios or market trends.

Country Profiles

Available for Africa, LAC and soon... EU 27!



Country profiles coverage:

- EU27 (forthcoming!)
- Africa
- Latin America & Caribbean

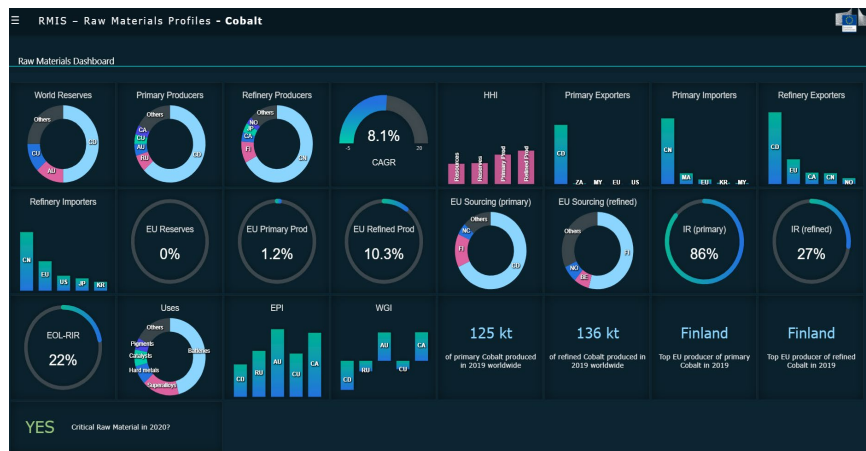
Country profiles – clusters of indicators included:

- Trade: 5+ indicators
- Trade policies: 3 indicators
- Investments & regulatory framework: 3 indicators
- Governance & social aspects: 4 indicators
- Environment: 3 indicators
- Waste & Circular Economy: 4 indicators
- GIS based maps including active/inactive projects and their characteristics, as well as info related to various environmental aspects

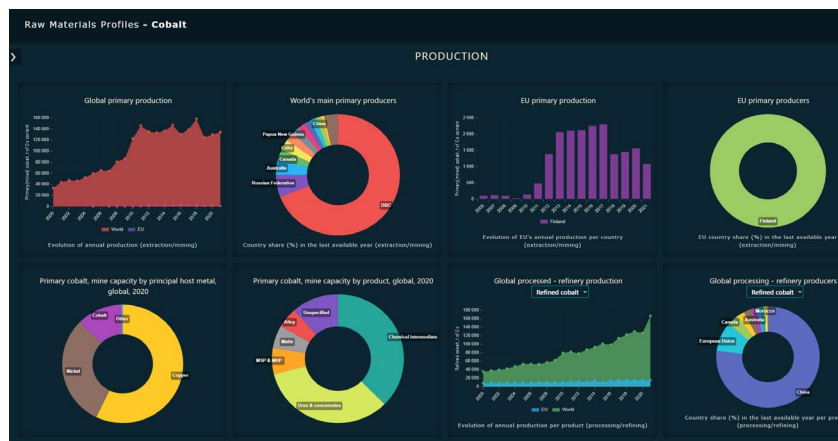
Raw Materials' Profiles

Covers 100 materials, complements EC Critical Raw Materials assessment

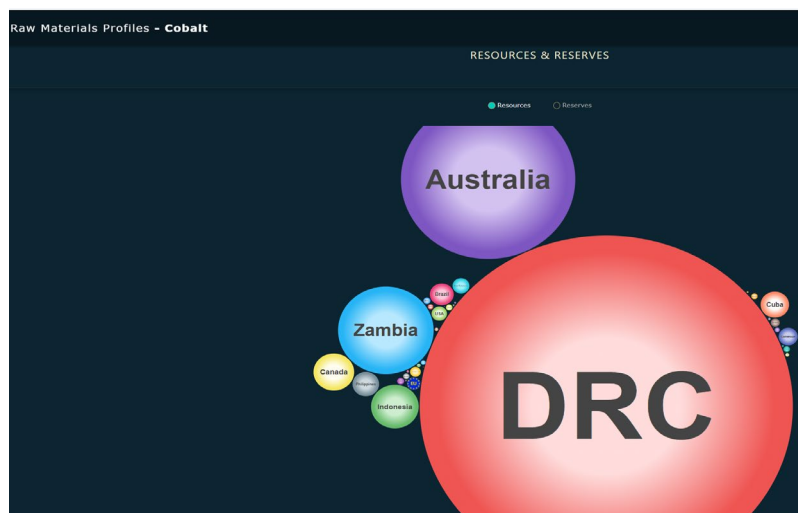
Dashboard



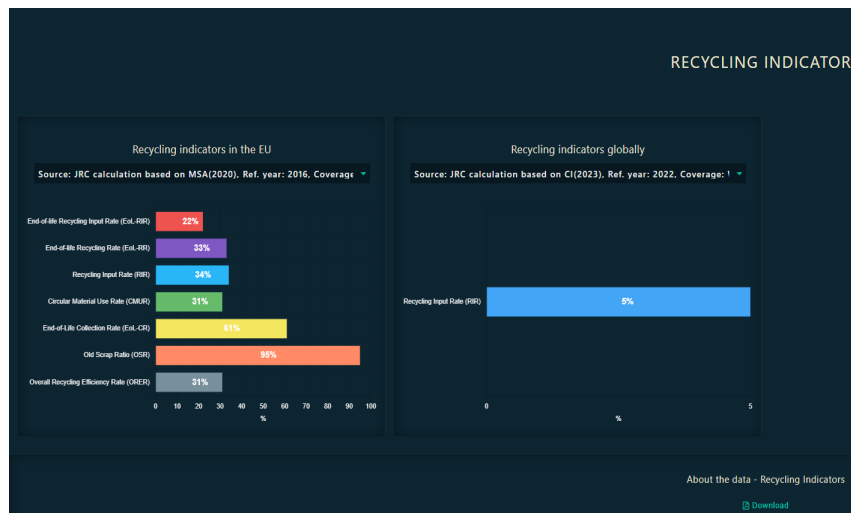
Production module



Resources & reserves module



Recycling indicators module



Forthcoming modules:
Trade
Uses / demand
GIS-maps
...& more

Raw Materials' Profiles

Dashboard

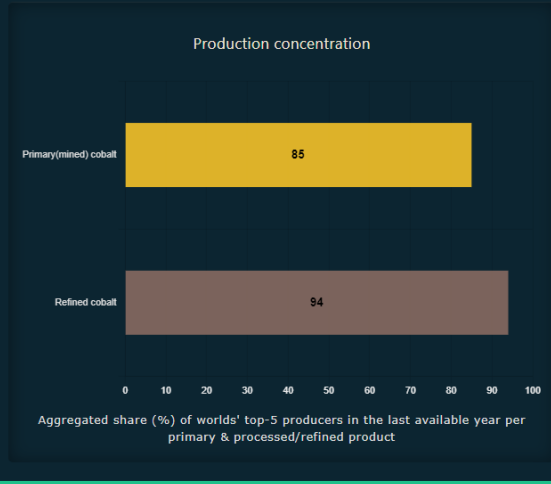
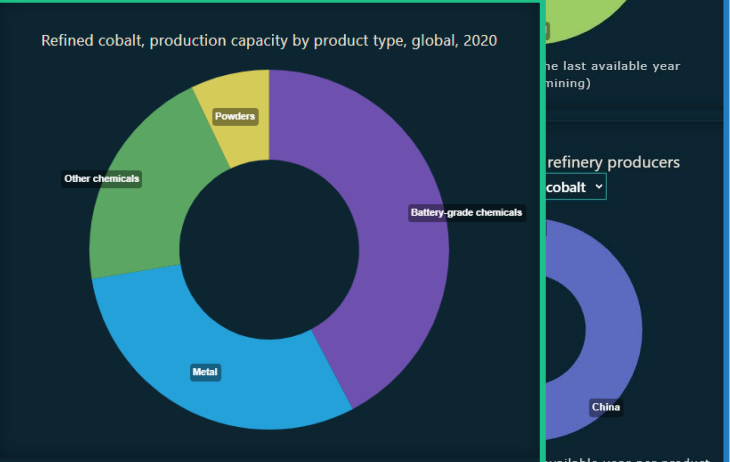
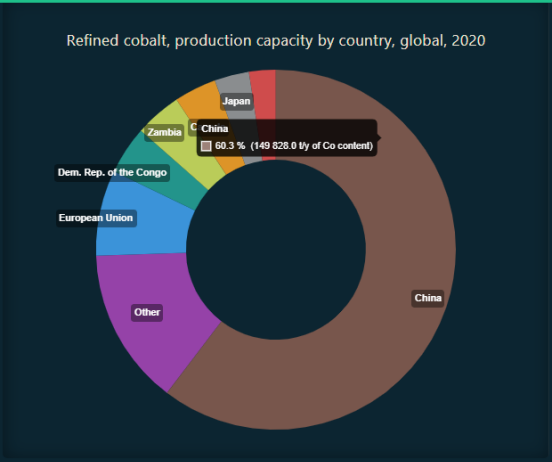
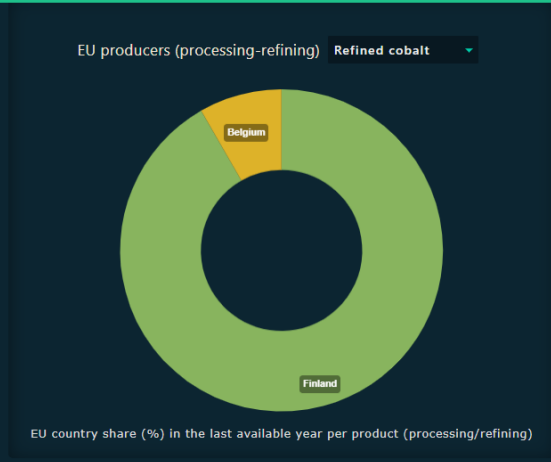
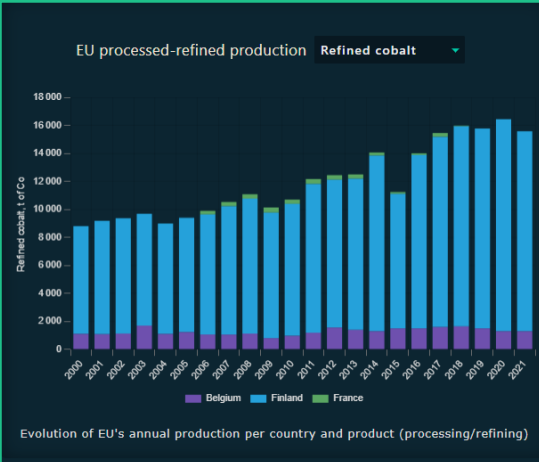
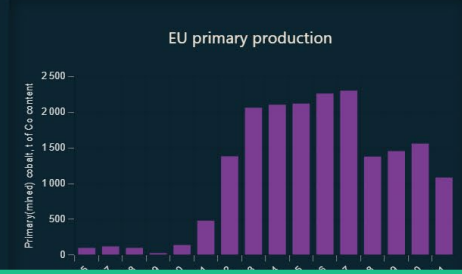
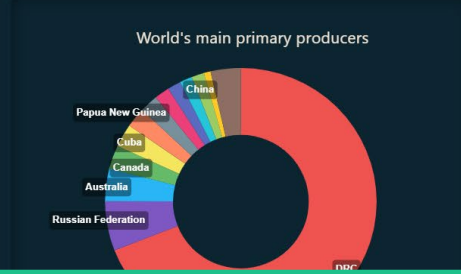
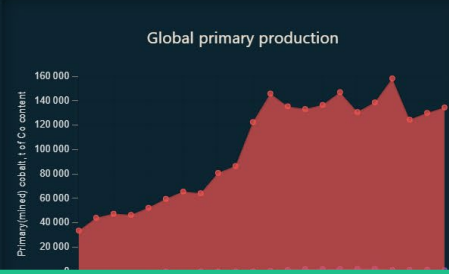


Raw Materials' Profiles

Production module

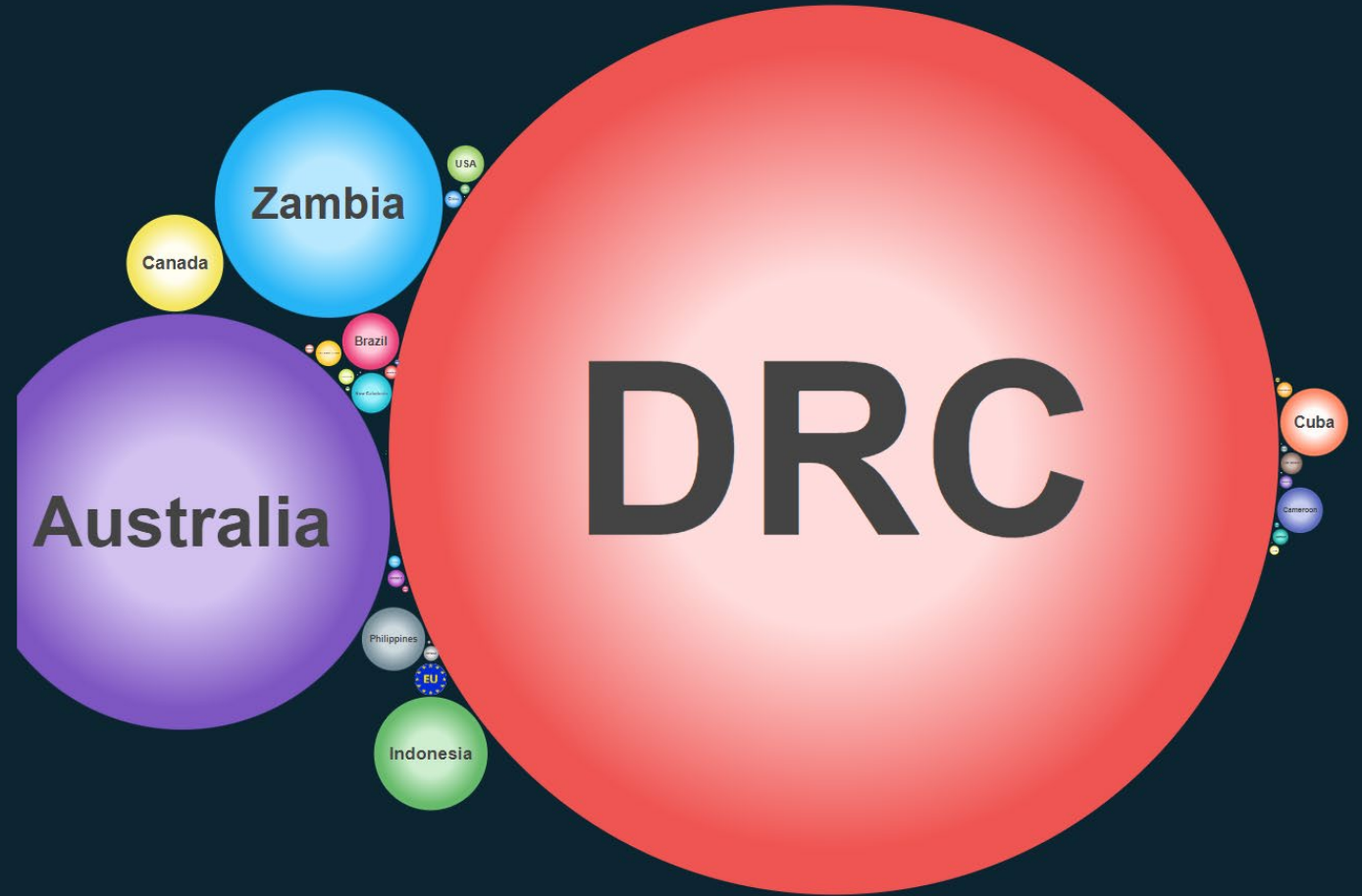
Raw Materials Profiles - Cobalt

PRODUCTION



Resources Reserves

Raw
Materials'
Profiles
Resources &
Reserves
module
(mass)

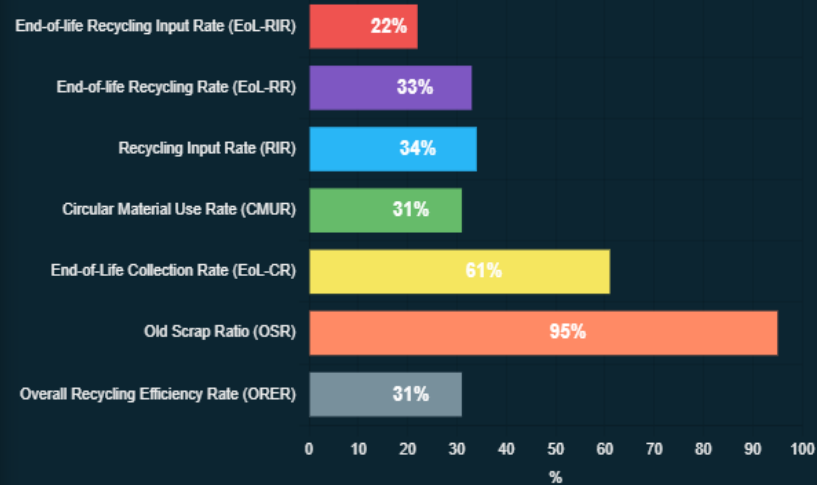


Raw Materials ' Profiles Recycling indicators

RECYCLING INDICATORS

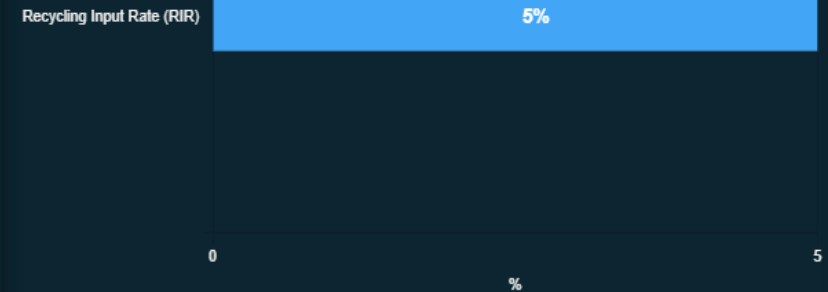
Recycling indicators in the EU

Source: JRC calculation based on MSA(2020), Ref. year: 2016, Coverage ▾



Recycling indicators globally

Source: JRC calculation based on CI(2023), Ref. year: 2022, Coverage: 1 ▾



About the data - Recycling Indicators

[Download](#)

Plans for 2024 and beyond

- **Advanced modelling of stocks and flows of critical raw materials in the battery value chain** (as an enabler of the climate neutral and digital transition)
- Analysis and monitoring of **supply disruption risk**, its impacts, risk mitigation measures and measures for risk preparedness, including for stress-tests and early warning, in support to the Critical Raw Materials Act.
- Analyses on **substitution** of CRMs with advanced materials, supporting the ongoing Advanced Materials Initiative (AMI 2030).
- Clean energy materials and support to the relevant **Taskforce of SETplan** (Strategic Energy Technologies plan) on advanced materials, substitution and recycling.
- Expand coverage of **Country Profiles** to support needs of DG TRADE/INTPA/GROW and selected EU Delegations and strategic partnerships; including for EU Enlargement Countries
- **Refinement of circularity provisions concerning Critical Raw Materials contained in vehicles:** building on a [recent JRC study](#)
- Building on the example of battery modelling: **develop advanced modelling of Critical Raw Materials stocks and flows in other strategic value chains** (e.g. vehicles, electronics) ; **support related sectorial policies.**
- Better coverage of environmental aspects along supply chains (in collaboration with EEA) + Develop the **Environmental Footprint accounting of CRMs**, based on the EU Product Environmental Footprint
- Strengthen 2-way interactions with EU-funded Projects in relation to high-priority topics/dossiers and mutual interests

THE VIEWS EXPRESSED ARE THOSE OF SIMONE
MANFREDI – EC’S JOINT RESEARCH CENTRE (JRC) AND
DO NOT NECESSARILY REFLECT THE VIEWS OF THE
UNITED NATIONS.

Thank you!

Name Surname

Position

UNECE

Date 23 | 04 | 2024, Geneva

Thank you



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