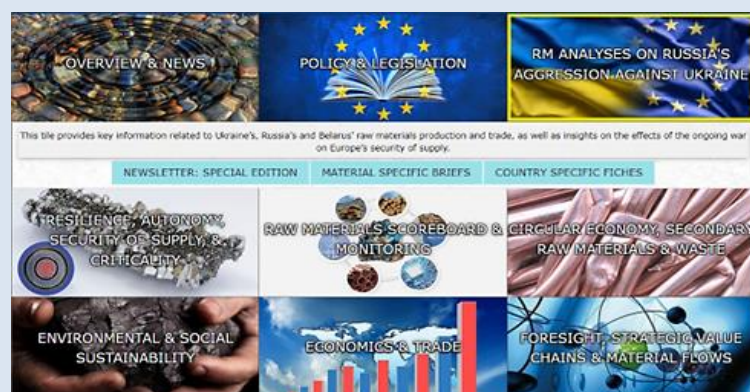




JOINT RESEARCH CENTRE (JRC)
RAW MATERIALS INFORMATION SYSTEM (RMIS)
RMIS Newsletter n.7 (November 2022)

This newsletter is a bi-annual summary of the main developments related to the European Commission's Raw Materials Information System (RMIS). It provides key highlights on raw materials knowledge support to policy.

A new tile focused on RM's analyses in relation to Russia's aggression against Ukraine



In the context of the ongoing aggression of Russia against Ukraine, a **new tile** was included in the RMIS focused on analyses related to raw materials production and trade.

The '[Material specific briefs](#)' page collects briefings focused on raw materials of interest, including short- and medium-term impact assessments, and outlook of supply disruption in EU and globally. So far, 4 briefs are published: potash, titanium, coking coal, and rare gases. Additional material briefs will soon be included.

The tile also includes fiches that present [country's trade analyses of Ukraine, Russia and Belarus](#). Specifically, these fiches provide a data-based overview of the country's trade in non-food raw materials, with an emphasis on its trade relations with the EU.

1. New material briefings on the potential supply disruption of non-food, non-energy raw materials due to Russia's war against Ukraine

The [raw material briefings](#)¹ are a series of overviews about potential supply disruption of non-food, non-energy raw materials in the context of Russia's war against Ukraine.

They give an overview of the material of interest (at global and EU level) with respect to its demand, supply, trade flows and prices.

In addition, the briefs include impact analyses of supply disruptions in EU and at a global level. A summary of the key findings is provided hereafter.



Figure 1. RM briefings cover pages

Potash

- 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

¹ <https://rmis.jrc.ec.europa.eu/?page=material-specific-briefs-2f428d>

could orientate its imports towards Canada in the short term.

Titanium

- The EU does not produce titanium sponge (primary metal feedstock for wrought titanium) and relies fully on imports. Dependence on imports of wrought titanium products is significant. Imports cover at least 60% of EU's consumption of wrought titanium.
- Imports of titanium metal in the EU are mostly in the form of wrought products (85% by value in 2020). The EU is the world's top importer of wrought titanium (mill products & articles).
- 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).
- Russia is a substantial source country of titanium for the aerospace industry globally, making supply chains vulnerable to disruption. Two-thirds of titanium metal in Europe is consumed by the aerospace sector.
- 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 able 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.

Coking coal

- Coking coal is one of the essential raw materials for primary steel production.
- The trade of coking coal is highly concentrated on the export side, with Australia being the dominant global supplier and Russia the world's third largest producer and exporter.
- EU's dependency on coking 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 coking 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: a) additional exports 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; b) 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.

Rare Gases (Krypton, Neon, Xenon)

- Russia and Ukraine are significant sources of rare gases (krypton, neon, xenon). Russia's invasion of Ukraine affects the rare gases supply.
- Industry stockpiles 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.
- As Ukraine is a leading producer of purified neon gas, a critical input for the manufacture of semiconductors, neon's supply disruption poses the greatest challenges. A neon scarcity worldwide could substantially impact industrial supply chains reliant on semiconductors.
- 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.
- 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 air 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.
- Impacts are probable in the broader EU manufacturing sectors by worsening the shortage of imported semiconductors for key industries.

2. Trade in non-food raw materials – country fiches for Ukraine, Russia and Belarus

These fiches present [country's trade analyses of Ukraine, Russia and Belarus](#). Specifically, they provide a data-based overview of the country's trade in non-food raw materials, with an emphasis on its trade relations with the EU. A summary is provided hereafter.

Ukraine non-food raw materials trade²

Ukraine is an important global producer for a couple of primary raw materials (titanium minerals, kaolin, manganese, iron, uranium and zircon), a net exporter of upstream non-food, non-energy (NFNE) raw materials and a net importer for energy commodities.

In 2020, Ukraine's NFNE raw materials exports were dominated by iron and steel product aggregates, out of which iron and non-alloy steel and iron ore made almost two-thirds of NFNE raw materials exports.

EU was the main destination of Ukraine' exports for all three broad categories of non-food raw materials – Abiotic NFNE, Biotic NFNE and Energy, capturing very high shares of the Top 10 NFNE Ukrainian exports.

The main EU NFNE imports from Ukraine in 2020 were various categories of iron and ore, wood, manganese; fertilisers, industrial minerals -other and titanium. Many of NFNE raw materials, as well as energy raw materials, had also a very high share in extra-EU imports (Table 1).

Table 1. Main materials/product aggregates imported by EU from Ukraine in 2020 (share in extra-EU imports ≥10%)³

Category	Material/Product aggregates	EU imports from UA (mil USD)	Share in extra-EU imports (%)
Abiotic-NFNE	Manganese	314	26%
Abiotic-NFNE	Iron ore	1,307	16%
Abiotic-NFNE	Iron and non-alloy steel	2,066	13%
ENERGY	Wood charcoal	72	26%
ENERGY	Fuel wood	18	19%

³ (*) denotes critical raw material

Russia non-food raw materials trade⁴

Russia is a leading global producer of a variety of non-agricultural raw materials, including 13 critical raw materials.

In 2020, Russian non-food, non-energy NFNE exports were dominated by iron and steel, coking coal, gold, palladium, copper, fertilisers, wood and aluminium. For the EU, Russia is a major trading partner for many of these raw materials.

In terms of extra-EU imports, Russia accounted for 5.4% of biotic and 5% of abiotic NFNE raw materials.

The Top EU NFNE raw material imports from Russia were dominated by various iron and steel categories and included several critical raw materials: coking coal, palladium, titanium, and rhodium, as well as other base metals (aluminium, nickel and copper), diamonds, wood and fertilisers.

Moreover, Russia had a high share in extra-EU imports for a large number of non-food raw materials, including critical raw materials (Table 2).

Table 2. Main materials/product aggregates imported by EU from Russia in 2020 (share in extra-EU imports ≥14%)

Category	Material/Product aggregates	Imports (mil.USD)	Share in extra-EU imports (%)
Abiotic-NFNE	Vanadium*	56	86%
Abiotic-NFNE	Pig iron	346	54%
Abiotic-NFNE	Iron and steel granular/powder	463	53%
Abiotic-NFNE	Nickel	1,706	36%
Abiotic-NFNE	Coking coal*	2,111	35%
Abiotic-NFNE	Fertilisers	1,219	29%
Abiotic-NFNE	Palladium*	1,099	28%
Abiotic-NFNE	Potash	261	21%
Abiotic-NFNE	Iridium	17	21%
Abiotic-NFNE	Iron and non-alloy steel	3,092	20%
Abiotic-NFNE	Titanium*	428	19%
Abiotic-NFNE	Other alloy steel	332	18%
Abiotic-NFNE	Tungsten*	40	17%
Abiotic-NFNE	Diamonds (non-ind.)	1,391	16%
Abiotic-NFNE	Chromium	106	15%
Abiotic-NFNE	REEs*	11	14%
Biotic-NFNE	Wood	1,283	32%
ENERGY	Carbon black	421	67%
ENERGY	Coal	1,294	67%
ENERGY	Coke from coal	99	60%
ENERGY	Wood W&S	271	30%
ENERGY	Oils	50,889	28%
ENERGY	Uranium	349	20%
ENERGY	Petroleum products	403	19%
ENERGY	Gas	11,140	19%

Belarus non-food raw materials trade⁵

The EU was the major destination of Belarus exports of non-food raw materials– Abiotic and Biotic NFNE, as well as Energy commodities.

Russia was the main Belarus' sourcing of non-food raw materials imports. Belarus was highly dependent on Russia for Energy raw materials (over 6 billion USD imports) and Abiotic NFNE (over 2 billion USD imports).

The Top 10 EU NFNE imports from Belarus for Abiotic & Biotic broad categories was dominated by wood, iron and non-alloy steel, potash and fertilisers. Belarus has a low share in extra-EU imports overall, yet it is an important sourcing country for EU for three materials (Table 3).

Table 3. Main materials imported by EU from Belarus in 2020 ((share in extra-EU imports ≥15%)

Category	Material/Product aggregates	EU imports from Belarus (mil USD)	Share in extra-EU imports (%)
Abiotic-NFNE	Potash	196	16%
Biotic-NFNE	Wood	568	14%
ENERGY	Fuel wood	17	18%

Belarus is the third producer of potash at global level. Nevertheless, only 8.5% of potash exports were reaching the EU, the latter ranking the fourth among the destination countries of Belarus potash exports.

3. Raw Materials in Vehicles: a new app!

The new “Raw Materials in Vehicles”⁶ app is now available in the RMIS “Foresight, strategic value chains and material flows” section.

Building on the analysis published in Huisman et al. (2017)⁷ and Lovik et al. (2021)⁸, the app provides information on: the stocks and flows of vehicles placed on the EU market as well as flow of collected and recycled End-of-Life Vehicles (ELV); the related stocks and flows of Critical Raw Materials (CRM) and other relevant metals embedded in vehicles; the methodological aspects and key references.

An interactive data viewer allows the user to visualize and extract information on stocks and flows of vehicles, key vehicles' components and materials per vehicles' type (e.g. electric, plug-in hybrid, diesel, petrol) between 2006 and 2023.

In the interactive charts, various options and combinations can be selected to visualize the trends of sales, stocks and waste generated in time. For example, quantities of targeted materials contained in several types of vehicles put on the market can be visualized (see Figure 2).

The underlying dataset also allows to create customised charts for quantities of CRMs contained in selected vehicles' components reaching their end of life in the EU.

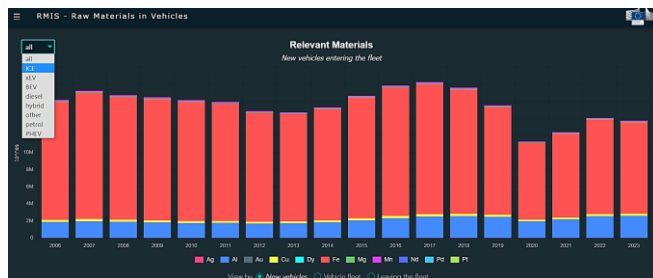


Figure 2. Example of data visualization in the RM in vehicles' app

This application updates and expands the original vehicle dataset developed by the Horizon 2020 project ProSUM (2015-2017) and visible in the Urban Mine Platform (UMP)⁹. To have a full overview of (critical) raw materials used in (e-)vehicles, this dataset needs to be looked at in conjunction with the “RMIS Raw Materials in batteries”¹⁰ dataset (e-mobility application).

This dataset substantiates discussions on the importance of CRMs and other metals for the vehicle value chain and contributes to improving the availability of data on secondary raw materials through the RMIS, as indicated in the 2015 Circular Economy Action Plan¹¹.

⁴ https://rmis.jrc.ec.europa.eu/uploads/Russia_trade_fiche_JRC.D3_FINAL.pdf
⁵ https://rmis.jrc.ec.europa.eu/uploads/Belarus_trade_fiche_JRC.D3_FINAL.pdf
⁶ <https://rmis.jrc.ec.europa.eu/apps/veh/#/pl/intro>
⁷ <https://www.prosumproject.eu/sites/default/files/170601%20ProSUM%20Deliverable%203.3%20Final.pdf>

⁸ <https://publications.jrc.ec.europa.eu/repository/handle/JRC126564>
⁹ <http://www.urbanmineplatform.eu/homepage>
¹⁰ <https://rmis.jrc.ec.europa.eu/apps/bvc/>
¹¹ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52015DC0614>

4. RMIS news & outlooks

- The 2022 edition of the yearly [EU Raw Materials Week](#) is taking place in Brussels, from November 14th to 18th.
- Continuing a well-established tradition, as part of the RM Week, the JRC is organising a “knowledge base” session titled “Knowledge needs: future supply/demand foresight”. Featuring keynote speeches from Joaquim Nunes de Almeida (Director - Mobility & Energy Intensive Industries, DG GROW, EC) and Alessandra Zampieri, (Director - Sustainable Resources, DG JRC, EC) the event will present the latest findings related to foresight analyses on supply/demands of metals and minerals. With respect to this theme, the latest RMIS developments/products will be presented too. The session will be held on November 17th, afternoon session.
- [Responsible sourcing page](#) of the RMIS has been revamped. Thanks to the collaboration between the RMIS and the H2020 funded project [RE-SOURCING](#), it now includes information on Responsible sourcing in the Renewable Energy sector, with insights on the challenges and good practices cases, and an evidenced-based roadmap by 2050. Studies on the Mobility, and Electrical and Electronic Equipment (EEE) sectors will be added next.
- SUMEX (a Horizon 2020 funded project cooperating with the RMIS) is proposing a Massive Open Online Course on *Sustainable Management in the Extractive Industry*. The course will address five key-challenges that industry and policy face in this transition: impact assessment, land use planning, health&safety, permitting, and reporting. Find out more following this link: <https://www.futurelearn.com/courses/transitioning-towards-sustainable-management-of-mineral-resource-extraction>.
- Two additional material-specific briefs on Platinum and Palladium are about to be published in the framework of the analysis regarding the EU security of supply consequent to the Russian war against Ukraine.

This is the newsletter of the Raw Materials Information System (RMIS) of the European Commission. It is hosted by the Land Resources Unit of the Sustainable Resources Directorate (JRC-D) of the Joint Research Centre (JRC) in Ispra, Italy. This newsletter is circulated to a broad selection of scientists and stakeholders. Please click [here](#) should you wish to be removed from the newsletter mailing list. The JRC manages e-mail addresses as personal data.

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For more information, check out the [News page in the RMIS](#).

HaDEA corner

The 2022 RMIS workshop

Continuing the well-established dialogue between the RMIS and the European funded projects on raw materials (such as [Horizon 2020/Europe](#), and [EIT Raw Materials projects](#)), on October 14th the 2022 JRC/ HaDEA Technical Workshop “Channeling knowledge from European projects into the Raw Materials Information System (RMIS)” was held online.

The RMIS workshop’s main objective is to develop further the EC’s Raw Materials Information System (RMIS) and to strengthen the underlying European Raw Materials Knowledge Base (EURMKB), through the efficient knowledge transfers from EU projects into the RMIS

The 2022 edition focused on aspects related in particular to the EU security of supply for critical/strategic raw materials and on the evaluation of environmental and social aspects (e.g., sustainability certification schemes and life-cycle impacts along specific value chains). It also focused on knowledge that could help strengthen a more circular management of (raw) material resources. These are key domains of today’s raw materials policy and can certainly represent areas for further exchanges between the JRC RMIS team and selected project consortia.

The workshop was opened by the key speakers: Constantin Ciupagea (HoU, Land Resources, JRC), Victoria Petrova (HoU, Industry, HaDEA), Ignacio Calleja (EIT Raw Materials), Peder Jensen (European Environment Agency-EEA), and Philip NUSS (DE-UBA & ETC/EEA).

The [agenda](#) included two sessions focused on projects:

- Towards more circular and sustainable RM value chains, with the participation of the projects: ORIENTING (Horizon), CSyARES (EIT RM), PHOTORAMA (Horizon), CEWASTE (Horizon), CERA 4 in 1;
- Improving efficient mining and recovery of critical/strategic materials towards greater EU security of supply, with the participation of: BrinerIS (EIT RM), TARANTULA (Horizon), FutuRaM (Horizon), SCANDERE (ERA-MIN3), ERA MIN 3 (Horizon).

The Tarantula project

In this context, we would like to highlight some excellent results of Tarantula (Recovery of Tungsten, Niobium and Tantalum occurring as by-products in mining and processing waste streams).

TARANTULA’s overarching objective is to develop a toolkit of novel, efficient and flexible metallurgical technologies with high selectivity and recovery rates with respect to Tungsten (W), Niobium (Nb) and Tantalum (Ta).

The project promotes:

- sustainable annual supply of secondary W at an amount equivalent to 50% of current EU W primary production,
- exploitation of Ta content equivalent to at least 120% of EU annual demand
- exploitation of Nb content equivalent to at least 5% of EU annual demand.

To learn more about the Tarantula’s outcomes, please visit: <https://h2020-tarantula.eu>.