

Background data for Critical Raw Materials (CRM)

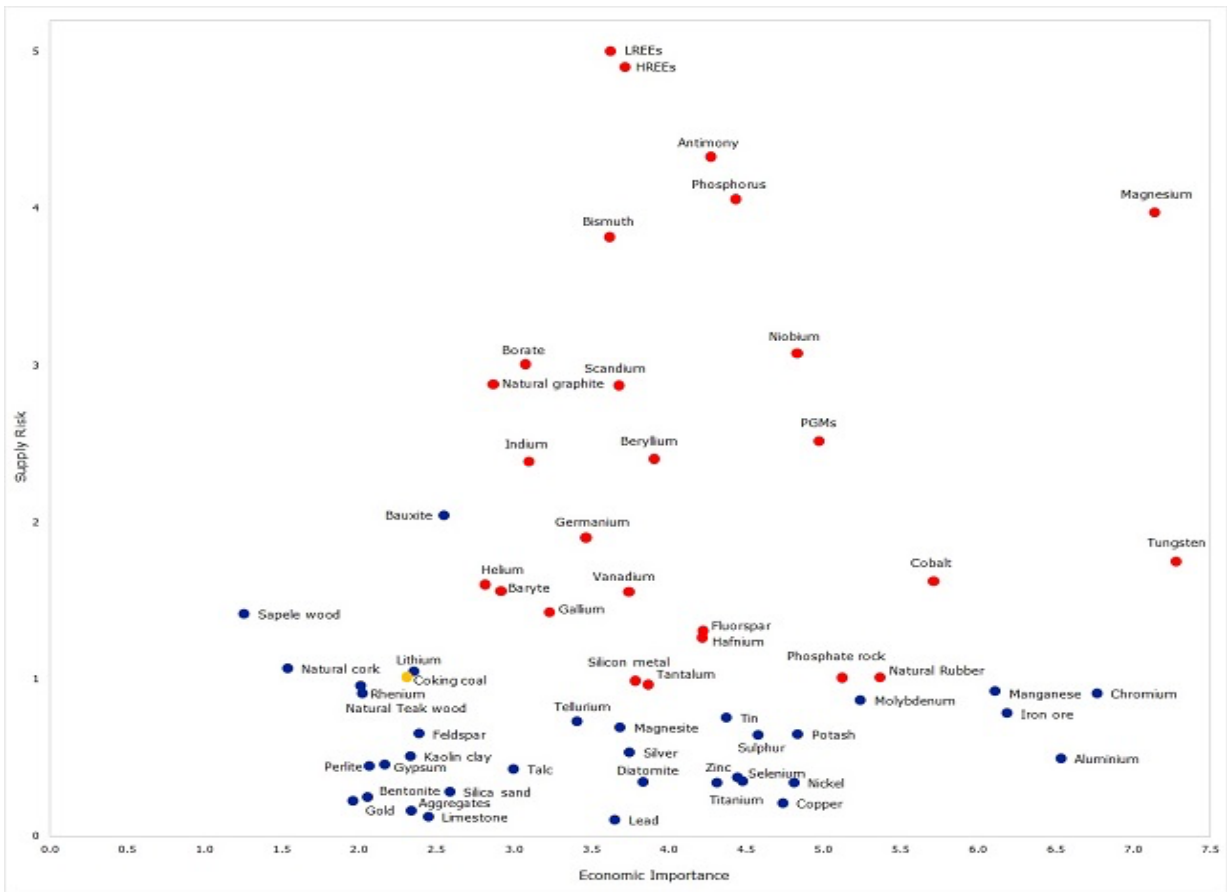
In this folder, you can find information on metals and minerals that are considered as critical raw materials in the European Union. They have to be imported from suppliers around the world, are scarce and important for a number of important sectors. Recirculation of CRM is an important contribution to mitigate criticality.

The graph shows assessment results for raw materials; red dots stand for materials that are critical because of an identified supply risk or economic importance.

The List includes in alphabetical order all CRM listed by the European Union in 2017 with information on supplying countries, economic importance and End-of-life recycling input rate

A glossary to understand the terminology is added; more information can be found via https://ec.europa.eu/growth/sectors/raw-materials/specific-interest/critical_en and <https://publications.jrc.ec.europa.eu/repository/bitstream/JRC106997/kjna28654enn.pdf>

To use this information: check bills of materials to understand which components of existing products contain CRM. Prioritise recirculation efforts for those components. For CRMs that have a (high) recycling input rate, recirculation pathways are most likely established and should be used. Higher recovery rates as can be established via reuse should be preferred.



Raw materials	Main global producers (average 2010-2014)	Main importers to the EU (average 2010-2014)	Sources of EU supply (average 2010-2014)	Import reliance rate	Substitution indexes: Economic importance, substitution rate	End-of-life recycling input rate
Antimony	China (87%) Vietnam (11%)	China (90%) Vietnam (4%)	China (90%) Vietnam (4%)	100%	0.91 / 0.93	28%
Baryte	China (44%) India (18%) Morocco (10%)	China (53%) Morocco (37%) Turkey (7%)	China (34%) Morocco (30%) Germany (8%) Turkey (6%) United Kingdom (5%) Other EU (4%)	80%	0.93 / 0.94	1%
Beryllium	United States (90%) China (8%)	n/a	n/a	n/a	0.99 / 0.99	0%
Bismuth	China (82%), Mexico (11%) Japan (7%)	China (84%)	China (84%)	100%	0.96 / 0.94	1%
Borate	Turkey (38%) United States (23%) Argentina (12%)	Turkey (98%)	Turkey (98%)	100%	1.0 / 1.0	0%
Cobalt	Democratic Republic of Congo (64%) China (5%) Canada (5%)	Russia (91%) Democratic Republic of Congo (7%)	Finland (66%) Russia (31%)	32%	1.0 / 1.0	0%
Coking coal	China (54%) Australia (15%) United States (7%) Russia (7%)	United States (39%) Australia (36%) Russia (9%) Canada (8%)	United States (38%) Australia (34%) Russia (9%) Canada (7%) Poland (1%) Germany (1%) Czech Republic (1%) United Kingdom (1%)	63%	0.92 / 0.92	0%
Fluorspar	China (64%) Mexico (16%) Mongolia (5%)	Mexico (38%) China (17%) South Africa (15%) Namibia (12%) Kenya (9%)	Mexico (27%) Spain (13%) China (12%) South Africa (11%) Namibia (9%) Kenya (7%) Germany (5%) Bulgaria (4%) United Kingdom (4%) Other EU (1%)	70%	0.98 / 0.97	1%
Gallium	China (85%) Germany (7%) Kazakhstan (5%)	China (53%) United States (11%) Ukraine (9%) South Korea (8%)	China (36%) Germany (27%) United States (8%) Ukraine (6%) South Korea (5%) Hungary (5%)	34%	0.95 / 0.96	0%
Germanium	China (67%) Finland (11%) Canada (9%) United States (9%)	China (60%) Russia (17%) United States (16%)	China (43%) Finland (28%) Russia (12%) United States (12%)	64%	1.0 / 1.0	2%
Hafnium	France (43%) United States (41%) Ukraine (8%) Russia (8%)	Canada (67%) China (33%)	France (71%) Canada (19%) China (10%)	9%	0.93 / 0.97	1%
Helium	United States (73%) Qatar (12%) Algeria (10%)	United States (53%) Algeria (29%) Qatar (8%) Russia (8%)	United States (51%) Algeria (29%) Qatar (8%) Russia (7%) Poland (3%)	96%	0.94 / 0.96	1%
Indium	China (57%) South Korea (15%) Japan (10%)	China (41%) Kazakhstan (19%) South Korea (11%) Hong Kong (8%)	China (28%) Belgium (19%) Kazakhstan (13%) France (11%) South Korea (8%) Hong Kong (6%)	0%	0.94 / 0.97	0%
Magnesium	China (87%) United States (5%)	China (94%)	China (94%)	100%	0.91 / 0.91	9%
Natural graphite	China (69%) India (12%) Brazil (8%)	China (63%) Brazil (13%) Norway (7%)	China (63%) Brazil (13%) Norway (7%) EU (< 1%)	99%	0.95 / 0.97	3%
Natural rubber	Thailand (32%) Indonesia (26%) Vietnam (8%) India (8%)	Indonesia (32%) Malaysia (20%) Thailand (17%) Ivory Coast (12%)	Indonesia (32%) Malaysia (20%) Thailand (17%) Ivory Coast (12%)	100%	0.92 / 0.92	1%
Niobium	Brazil (90%) Canada (10%)	Brazil (71%) Canada (13%)	Brazil (71%) Canada (13%)	100%	0.91 / 0.94	0.3%

Phosphate rock	China (44%) Morocco (13%) United States (13%)	Morocco (31%) Russia (18%) Syria (12%) Algeria (12%)	Morocco (28%) Russia (16%) Syria (11%) Algeria (10%) EU – Finland (12%)	88%	1.0 / 1.0	17%
Phosphorus	China (58%) Vietnam (19%) Kazakhstan (13%) United States (11%)	Kazakhstan (77%) China (14%) Vietnam (8%)	Kazakhstan (77%) China (14%) Vietnam (8%)	100%	0.91 / 0.91	0%
Scandium	China (66%) Russia (26%) Ukraine (7%)	Russia (67%) Kazakhstan (33%)	Russia (67%) Kazakhstan (33%)	100%	0.91 / 0.95	0%
Silicon metal	China (61%) Brazil (9%) Norway (7%) United States (6%) France (5%)	Norway (35%) Brazil (18%) China (18%)	Norway (23%) France (19%) Brazil (12%) China (12%) Spain (9%) Germany (5%)	64%	0.99 / 0.99	0%
Tantalum	Rwanda (31%) Democratic Republic of Congo (19%) Brazil (14%)	Nigeria (81%) Rwanda (14%) China (5%)	Nigeria (81%) Rwanda (14%) China (5%)	100%	0.94 / 0.95	1%
Tungsten	China (84%) Russia (4%)	Russia (84%) Bolivia (5%) Vietnam (5%)	Russia (50%) Portugal (17%) Spain (15%) Austria (8%)	44%	0.94 / 0.97	42%
Vanadium	China (53%) South Africa (25%) Russia (20%)	Russia (71%) China (13%) South Africa (13%)	Russia (60%) China (11%) South Africa (10%) Belgium (9%) United Kingdom (3%) Netherlands (2%) Germany (2%) Other EU (0.5%)	84%	0.91 / 0.94	44%
Platinum Group Metals	South Africa (83%) - iridium, platinum, rhodium, ruthenium Russia (46%) - palladium	Switzerland (34%) South Africa (31%) United States (21%) Russia (8%)	Switzerland (34%) South Africa (31%) United States (21%) Russia (8%)	99.6%	0.93 / 0.98	14%
Heavy Rare Earth Elements	China (95%)	China (40%) USA (34%) Russia (25%)	China (40%) USA (34%) Russia (25%)	100%	0.96 / 0.89	8%
Light Rare Earth Elements	China (95%)	China (40%) USA (34%) Russia (25%)	China (40%) USA (34%) Russia (25%)	100%	0.90 / 0.93	3%

Source: COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS, COM (2017) 490 final

<https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52017DC0490&from=EN#footnote15>

Indicator	Definition	Background
Supply risk (SR)	The risk of inadequate supply of a raw material to meet industry demand is assessed using the indicator "supply risk (SR)". The SR indicator in the EU criticality assessment (EC 2011, 2014) is based on the concentration of primary supply from countries and their governance. Secondary production of raw materials (recycling) and Substitution are considered to reduce SR.	Raw materials that are sourced from few countries outside of the EU potentially have a higher supply risk. That applies especially for countries for which Institutional and Legal Settings, Reporting and Safeguards are not fully established. Countries with failing resource governance are Democratic Republic of Congo, Afghanistan, and Zimbabwe. Countries with satisfactory resource governance are Australia, Chile, and Peru. Not all countries were considered. Secondary supply from recycling decreases supply risks.
Economic importance (EI)	EI was evaluated by accounting for the fraction of each material associated with megasectors at EU level and their gross value added (GVA). The Economic Importance (EI) is an indicator of importance of the raw materials for the EU economy. It uses existing data and does not contain predictions or extrapolations.	Megasectors are: electrical equipment and domestic appliances. Including batteries, motors and distribution equipment; road transport such as vehicles including motorcycles and bicycles; manufacture of ships and aircrafts; Manufacture of furniture, sports equipment, toys, cutlery. Repair and maintenance is also included for the aforementioned sectors.
Substitution index	the availability of substitutes is considered as a reducing element in both the economic importance (SIEI) and the supply risk (SISR) dimensions. The assessment only takes into account the proven substitutes that are readily available today and able to reduce the consequences of a disruption and/or influence the risk of a disruption.	Substitution is assessed according to cost and performance of alternative raw materials for a specific application.
End-of-life recycling input rate	Input of secondary material to the EU from old scrap to the total input of material (primary and secondary)'. In the EC criticality assessments (EC 2011, 2014), recycling rates and EOL-RIR refer only to functional recycling. Functional recycling is 'the portion of EOL recycling in which the material in a discarded product is separated and sorted to obtain recyclates'. Recyclates obtained by functional recycling are used for the same functions and applications as when obtained from primary sources. As opposed to recyclates generated from non-functional recycling which substitute other raw materials, and therefore do not contribute directly to the total supply of the initial raw material.	EOL-RIR is useful as an indicator to evaluate the state of the art for recirculation of materials.