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COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS

on the 2017 list of Critical Raw Materials for the EU

Given the continued strategic importance of raw materials for the EU manufacturing industry[1], the Commission is implementing a wide range of actions under the EU Raw Materials Initiative to help ensure their secure, sustainable and affordable supply. The list of critical raw materials for the EU is a central element of this Initiative.

The Raw Materials Initiative was put forward in 2008 to tackle the challenges related to the access to raw materials. This Communication updates the 2014 list of critical raw materials. The primary purpose of the list is to identify the raw materials with a high supply-risk and a high economic importance to which reliable and unhindered access is a concern for European industry and value chains. Following an objective methodology the list provides a factual tool for trade, innovation and industrial policy measures to strengthen the competitiveness of European industry in line with the renewed industrial strategy for Europe[2], for instance by:

- identifying investment needs which can help alleviate Europe's reliance on imports of raw materials;
- guiding support to innovation on raw materials supply under the EU's Horizon 2020 research and innovation programme;
- drawing attention to the importance of critical raw materials for the transition to a low-carbon, resource-efficient and more circular economy.

The list should help incentivise the European production of critical raw materials through enhancing recycling activities and when necessary to facilitate the launching of new mining activities. It also allows to better understand how the security of supply of raw materials can be achieved through supply diversification, from different geographical sources via extraction, recycling or substitution.

The list is used by the Commission as a supporting element when negotiating trade agreements, challenging trade-distortive measures, developing research and innovation actions and implementing the 2030 Agenda on Sustainable Development and its Sustainable Development Goals. Critical raw materials are a priority area in the EU Circular Economy Action Plan[3] in order to foster their efficient use and recycling. The list may also be relevant for the purpose of the review of foreign direct investments in the EU[4], put forward in parallel with this Communication. It can also be used by Member States, companies and investors on a voluntary basis to inform them about potential raw material supply risks and related opportunities.

This Communication presents an updated list of 27 critical raw materials for the EU as a result of a third assessment. It follows the two subsequent Communications on raw materials, which established a list of 14 critical raw materials in 2011[5] and a revised list of 20 critical

[1] According to the VDI Centre for Resource Efficiency (VDI ZRE), materials are the main cost factor in the manufacturing sector (44%, compared to 18% for labour, 3% for taxes and 2% for energy).
[2] Commission's Communication '*Investing in a smart, innovative and sustainable industry: A renewed EU Industrial Policy Strategy*' (COM(2017) 479)
[3] Commission's Communication '*Closing the loop – An EU action action plan for the Circular Economy*' (COM(2015) 614)
[4] Commission's Proposal for a Regulation of the Parliament and of the Council establishing a framework for screening of foreign direct investments in the European Union (COM(2017) 487)
[5] Commission's Communication *'Tackling the challenges in commodity markets and on raw materials'* (COM(2011)25)

raw materials in 2014[6]. The list of critical raw materials for the EU is subject to regular update at least every three years, in order to reflect production, market and technology developments, and the number of raw materials assessed has increased with each update.

Following the recommendations of the 2014 Report of the Ad hoc Working Group on defining critical raw materials[7], this third assessment of critical raw materials was conducted based on a refined methodology developed by the Commission[8], while ensuring comparability with the previous methodological approaches (2011 and 2014). Economic importance and supply risk remain the two main parameters used to determine the criticality of a raw material. Main improvements in the revised methodology relate to trade (import reliance and export restrictions in calculating supply risk), substitution as a factor correcting both economic importance and supply risk, and detailed allocation of raw materials end-uses based on industrial applications to define economic importance.

Raw materials, even if not classed as critical, are important for the European economy as they are at the beginning of manufacturing value chains. Their availability may quickly change in line with trade flows or trade policy developments underlining the general need of diversification of supply and the increase of recycling rates of all raw materials.

[6] Commission's Communication *'On the review of the list of CRM for the EU and the implementation of the Raw Materials Initiative'* (COM(2014)297)

[7] *Report on Critical Raw Materials for the EU*, Report of the Ad hoc Working Group on defining critical raw materials, May 2014

[8] See: *Methodology for establishing the EU List of Critical Raw Materials*, 2017, ISBN 978-92-79-68051-9

Annex 1

List of critical raw materials for the EU

The 27 raw materials listed below are critical for the EU because risks of supply shortage and their impacts on the economy are higher than those of most of the other raw materials. The table indicates the existence of domestic production of certain critical raw materials in the EU, notably hafnium. However, China is the most influential country in terms of global supply of majority of critical raw materials, such as rare earth elements, magnesium, tungsten, antimony, gallium and germanium among others. Several other countries have dominant supplies of specific raw materials, such as Brazil (niobium) or USA (beryllium and helium). Supply of platinum group metals is concentrated in Russia (palladium) and South Africa (iridium, platinum, rhodium and ruthenium). The risks associated with the concentration of production are in many cases compounded by low substitution and low recycling rates.

The 2017 criticality assessment was carried out for 78 raw materials. The extended scope includes nine new materials as compared to 2014 assessment[9].

The nine new critical raw materials for the EU, as compared to 2014 list, are highlighted in dark grey in the table below. The three raw materials (chromium, coking coal and magnesite)[10] are not deemed critical based on the 2017 assessment. While heavy rare earths[11], light rare earths[12] and platinum group metals[13] were assessed individually, they remain as groups in the criticality list (arithmetic average shown in the table) in order to ensure comparability with the previous assessment.

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 EI/SR**	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[14]	0.99 / 0.99	0%

[9] Abiotic: Aggregates, Bismuth, Helium, Lead, Phosphorus, Sulphur; Biotic: Natural cork, Natural teak wood, Sapele wood.

[10] However, coking coal, which was on the 2014 list of critical raw materials for the EU, is considered a borderline case. Although it narrowly misses the economic importance threshold, for the sake of caution, coking coal is kept on the list of critical raw materials for the EU and thus included in the table. However, it will be phased out from the next list should it fail to meet the criteria in full.

[11] Dysprosium, Erbium, Europium, Gadolinium, Holmium, Lutetium, Terbium, Thulium, Ytterbium, Yttrium

[12] Lanthanum, Cerium, Praseodymium, Neodymium, Samarium

[13] Palladium, Platinum, Rhodium, Ruthenium, Iridium

[14] The EU import reliance cannot be calculated for the beryllium, as there is no production and trade for beryllium ores and concentrates in the EU.

Bismuth	China (82%), Mexico (11%) Japan (7%)	China (84%)	China (84%)	100%	0.96 / 0.94	1%
Borate	Turkey (38%) Unites 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[15]	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%

[15] Gallium is a by-product; the best available data refer to production capacity, not to production as such.

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[16]	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[17]	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%

Notes:

(*) The 'Import reliance rate' takes into account global supply and actual EU sourcing in the calculation of Supply Risk, and it is calculated as follows: EU net imports / (EU net imports + EU domestic production).

(**) The ‘Substitution index’ is a measure of the difficulty in substituting the material, scored and weighted across all applications, calculated separately for both Economic Importance and Supply Risk parameters. Values are between 0 and 1, with 1 being the least substitutable.

The economic importance is corrected by the Substitution Index (SI_{EI}) related to technical and cost performance of the substitutes for individual applications of each material. The supply

[16] Tantalum is covered by the Conflict Minerals Regulation (Regulation (EU) 2017/821) establishing a Union system for supply chain due diligence to curtail opportunities for armed groups and security forces to trade in tin, tantalum and tungsten, and their ores, and gold.

[17] Tungsten is covered by the Conflict Minerals Regulation (Regulation (EU) 2017/821) establishing a Union system for supply chain due diligence to curtail opportunities for armed groups and security forces to trade in tin, tantalum and tungsten, and their ores, and gold.

risk is corrected by the Substitution Index (SI_{SR}) related to global production, criticality and co-/by-production of the substitutes for individual applications of each material.

(***) The ‘End-of-life recycling input rate’ measures the ratio of recycling from old scrap to EU demand of a given raw material, the latter equal to primary and secondary material supply inputs to the EU.

Source: compiled on the basis of the Final Report of the 'Study on the review of the list of Critical Raw Materials' 2017.