



FORAM

TOWARDS A WORLD FORUM
ON RAW MATERIALS

MAPPING RAW MATERIALS INITIATIVES

List of Criteria

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Deliverable D.1.1

List of Criteria for the Mapping

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Introduction

The objective of task 1.1 is to identify and assess the main criteria for the mapping of initiatives, data availability and related stakeholders linked to raw materials and related topics. This deliverable discusses the approach that was used to identify these criteria and it provides the final list of criteria and categories with corresponding descriptions. Task 1.1 will also lay the cornerstone for the project by providing information on definitions. A list with definitions from the various communities related to raw materials such as mining/extraction, processing, product development, design & substitution, up to re-use/recycling related to raw materials, can therefore be found in annex I.

1. Approach

1.1. Draft list with criteria

To identify the criteria to map initiatives, data availability and related stakeholders, the partners did a brainstorm session, carried out online searches and literature review to create a draft list with 39 criteria. The criteria were divided in four themes: general information, membership, focus and governance. General information included criteria such as ‘name’, ‘contact details’, ‘language’ and ‘type of initiative’. Membership included the ‘type of members’, their ‘size and if there was a ‘membership fee’. Focus included what the initiatives are focusing on, such as the ‘type of the raw material’, the ‘criticality’, its ‘activities’ and its ‘step in the value chain’. Finally, governance included the initiatives ‘structure’, ‘financial resources’, ‘areas of impact’ and ‘synergies’.



Figure 1. Four themes of criteria: general information, membership, focus and governance.

1.2. Structured approach to identify initiatives

To have a structured approach in the identification of initiatives, some of the partners also developed a mindmap graph about possible findings or findings of initiatives in project consortia, stakeholder groups, industrial associations etc. This mindmap graph gave support by searching for relevant initiatives and filling in the excel sheet.

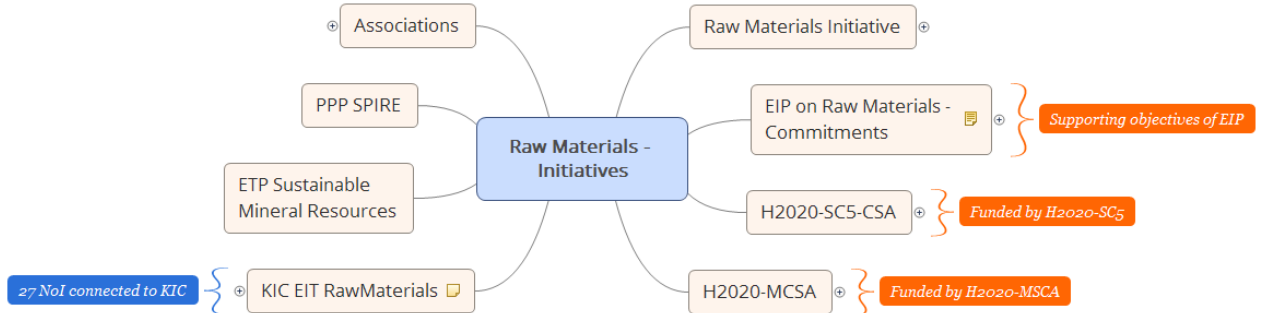


Figure 2. Mindmap graph to support searching initiatives.

1.3. Descriptions and relevance

Not all of the identified criteria were applicable to each initiative and because some are more important than others, for each criterion the relevance was indicated, with 1 for ‘mandatory’, 2 for ‘recommended’ and 3 for ‘optional’. The draft list with criteria was transferred to an Excel file and to clarify the criteria, descriptions were added and, where possible, categories for the criteria were identified. For example, the criterion ‘geographical focus’ includes three categories: global, regional, national. In an additional excel sheet the identified criteria were listed horizontally, in order to map the individual initiatives. As example two initiatives were added, using the draft criteria.

#	Name	Contact Details	Type of Initiative	Language	Existence / Duration
Relevance	1	1	1	1	2
1	Step Initiative	www.step-initiative.eu	Multi-stakeholder Initial	English	2007
2	International Copper Study Group	www.icsg.org/	Forum	English	1992

Figure 3. First five criteria of the draft mapping file with two example initiatives, relevance is indicated.

1.4. Review round 1

The draft list with criteria was reviewed by the partners and feedback was provided on the criteria and categories. The feedback and input was incorporated and the criteria and categories were updated. Some important changes included:

- to have criteria with free text and criteria with fixed categories. For the fixed categories a dropdown list was included in the excel file.

- to distinguish between initiatives and individual stakeholders, it was decided to only include initiatives in the mapping file, in which there is a criterion to add the individual stakeholders (members) of the initiative.
- The criteria related to governance were difficult to identify by the partners (from a review of the website). Therefore, it was decided to exclude these from the mapping file, and to analyze these in the phase after the mapping activity. The excluded criteria are the following:
 - Strengths
 - Challenges
 - Contribution to sustainable resources management*
 - Areas of impact
 - Critical environmental impacts*
 - Relevance/innovativeness
 - Areas of improvement
 - Participation
 - Influence
 - Reputation
 - Sustainability
 - Transparency
 - Commitment
 - Resilience
 - Risk management
 - Self-sufficiency

*Under consideration for the list of criteria for the mapping file to be included for task 1.2.

1.5. Test week and review round 2

After the file was updated, adding the indicated information was tested and the partners added 60 initiatives to the file. The mapping activities will continue until the end of month 10 of the project. Following the test phase the partners shared their final comments and feedback on the criteria. Based on the feedback the final changes were made, including:

- Changed criteria: the criterion 'type of initiatives' was changed to 'type of organisational structure'. 'Initiative' is one of the organisational structures, therefore the term organization is used to avoid confusion.

- Added criteria: As one of the important aspects of work package 1 is to map data availability, criteria were added on the availability and name of data platforms/databases and a description of the data. Secondly, to obtain more details about the stakeholders in the initiatives, the stakeholders were split into individual stakeholders and consortium stakeholders.
- Changed categories: some categories were changed and/or added, for example each geographical region was specified.
- Deleted and merged criteria: the membership fee was deleted as this is only relevant for associations, the financial resources remained a separate criterion. And finally, 'objectives' and 'strategies' were merged.

2. Final list with criteria

Following the review rounds and the test week the mapping file was finalized with 23 different criteria. Ten criteria have pre-defined categories, that can be selected using a dropdown list in excel, the other criteria have space for free text. For each criterion a description is added. In the table below is an overview of the list with criteria, categories and their descriptions¹.

Table 1. List with criteria to map initiatives, categories and descriptions.

Criteria	Categories	Description
1. #	Numbering	
2. Name	Free text	The full name of the initiative
3. Acronym	Free text	Acronym if available
4. Contact Details	Free text	Website, phone, email.
5. City	Free text	City where secretariat/ headquarters is, if applicable
6. Country	Free text	Country where secretariat/headquarters is, if applicable
7. Organisational structure (only add those that currently active).	Initiative	Private or publicly funded programmes of activities. An initiative should have specific objectives, timelines, and resources (CWIT D2.4)
	Project	Private or publicly funded projects related to national, European, or international WEEE streams. A project should have a specific deliverable (e.g., report) (CWIT D2.4)

¹ In the categories in the mapping file there are also the options: 'other please specify' and/or 'unknown'.

	Forum	A meeting or medium where ideas and views on a particular issue can be exchanged (Oxford dictionaries)
	Study Group	A group of people joining in the study of a particular topic and usually meeting at scheduled intervals to discuss individual observations, reading, and research (Merriam Webster)
	Partnership	A type of (business)) organisation in which two or more individuals pool money, skills, and other resources, and share profit and loss in accordance with terms of the partnership agreement. (Business dictionary)
	Consortium	A group made up of two or more individuals, companies or governments that work together toward achieving a chosen objective (Investopedia)
	Alliance	A union or association formed for mutual benefit, especially between countries or organisations (Oxford dictionaries)
	Community	A body of persons of common and especially professional interests scattered through a larger society (Merriam Webster)
	Panel	A small group of people chosen to give advice, make a decision, or publicly discuss their opinions as entertainment (Cambridge dictionary) a small group of people brought together to investigate or decide on a particular matter (Oxford dictionaries)
	Platform	An opportunity to voice one's views or initiate action (Oxford dictionaries)
	Working Group	A committee or group appointed to study and report on a particular question and make recommendations based on its findings (Oxford dictionaries).
8. Type of Stakeholders (Members) in the initiative	Policy-makers	A member of a government department, legislature, or other organisation who is responsible for making new rules, laws, etc. (Cambridge dictionary)
	IGO	An entity created by treaty, involving two or more nations (or of other intergovernmental organisations), to work in good faith, on issues of common interest (Harvard law school)
	Geological Survey	A detailed and systematic study of the topography, geology, and mineral resources of an area or country (Oxford dictionaries)
	NGO	A non-governmental organisation (NGO) is a citizen-based association that operates independently of government, usually to deliver resources or serve some social or political purpose (TechTarget)
	Civil society/the Public	Society considered as a community of citizens linked by common interests and collective activity.

	Industry/ Company	All type of Industry related to Mining/Extraction, Processing, Product Development, Design and substitution, Re-use, Recycling
	University/ Academia/ Research Center	The environment or community concerned with the pursuit of research, education, and scholarship (Oxford dictionaries)
	Governmental organisation/ department	Governmental organisation/department
	Not specified	
9. Number of stakeholders in the initiative	Free text (numbers only)	The number of stakeholders that are part of the initiative.
10. Individual stakeholders (institutions) in the initiative	Free text	The names of stakeholders in the initiative, or a link to the website where they can be found.
11. Consortiums in the initiative	Free text (also possibility to refer to website where they can be found)	The names of consortiums in the initiative
12. Language(s) Working languages of the initiative	English, French, Spanish, German, etc	Working languages of the initiative
13. Year of establishment	before 1990, 1990, 1991, 1992, etc	The year of establishment
14. Short Description	Free text	Brief overview of the aim of the initiative
15. Objectives and strategies	Free text	The objectives of the initiative and how it aims to reach its objectives
16. Type of Raw Material	Free text	Type of Raw Material(s) or category of raw materials such as CRM, that the initiative focusses on
17. Geographical focus	Local	The initiative's target audience and/or members are located in an area in one country

	National	The initiative's target audience and/or members are located in one country
	Regional: Europe	The initiative's target audience and/or members are located in Europe
	Regional: Asia	The initiative's target audience and/or members are located in Asia
	Regional: Africa	The initiative's target audience and/or members are located in Africa
	Regional: North America	The initiative's target audience and/or members are located in North America
	Regional: South America	The initiative's target audience and/or members are located in South America
	Regional: Australia	The initiative's target audience and/or members are located in Australia
	Global	The initiative's target audience and/or members are located in multiple countries in multiple continents
18. Step in the value chain	Mining/Extraction	The process or industry of obtaining coal or other minerals from a mine
	Processing	The series of operations that transforms industrial materials from a raw-material state into finished parts or products
	Manufacturing	Making (something) on a large scale using machinery
	Product Development	Design and substitution
	Recycling / re-use	Converting (waste) into reusable material
	Transport and supply chain	Supply chain and transport related, e.g. due diligence and supply chain transparency for raw materials
19. Activities	Data collection / mapping	Collecting / mapping data related to raw materials
	Development of certification or standards	Development of certification or standard for raw materials
	Research	Research related to raw materials
	Networking and strengthening cooperation	Organisation of (online) meetings, seminars, conferences, working groups, fora to strengthen cooperation between stakeholders.
	Development of tools and technologies	Development of tools and / or technologies that can be used by stakeholders active in the raw material value chain

20. Name of data platform (if applicable)	Free text	Name of database/dataset/platform/mapping activity
21. Description of data (if applicable)	Data on primary raw material extraction/beneficiation	Data collected is related to primary raw material extraction/beneficiation
	Data on secondary raw materials and recycling	Data collected is related to secondary raw materials and recycling
	Data on the use of materials in production and consumption	Data collected is related to the use of materials in production and consumption
22. Data access	Public	Applicable if one of the activities is data collection
	Restricted	Data that is restricted/secured and possibly payment of fee to access the data.
	Not applicable	The initiative does not collect data.
23. Target audience	Policy-makers	a member of a government department, legislature, or other organization who is responsible for making new rules, laws, etc. (Cambridge dictionary)
	IGO	an entity created by treaty, involving two or more nations (or of other intergovernmental organisations), to work in good faith, on issues of common interest (Harvard law school)
	NGO	a non-governmental organisation (NGO) is a citizen-based association that operates independently of government, usually to deliver resources or serve some social or political purpose (TechTarget)
	Industry	All type of Industry related to Mining/Extraction, Processing, Product Development, Design and substitution, Re-use, Recycling
	Academia/Research Center	the environment or community concerned with the pursuit of research, education, and scholarship (Oxford dictionaries)
	Government	Government or government department
24. Source of financial resources (by who the initiative is funded)	Government	The initiative is funded by government resources
	Industry	The initiative is funded by industry resources
	Intergovernmental Organisation (IGO)	The initiative is funded by an IGO

3. Format

The mapping file is currently in Excel format that is placed in the FORAM Intranet and Dropbox folders, that can be accessed by the partners. For the criteria where categories can be chosen, dropdown lists are added to the excel file. In addition to the excel file, an online form will be developed to fill in the information about initiatives following the list with criteria. In this file both the FORAM partners as well as initiatives themselves will be able to provide the needed information. In this way the most up to date information can be collected from the initiative and the FORAM project can engage with the different initiatives.

1. #	2. Name	3. Acronym	4. Contact details (Website, Phone, E-mail)	5. City (HQ)	6. Country (HQ)	7. Organisational structure	8. Type of Stakeholders	9. Number of Stakeholders in the	12. Language(s)	13. Year of establishment	14. Short Description
Relev	1	3	1	2	2	1	1	1	1	2	3
1	Solving the e-waste problem Initiative	Step Initiative	www.step-initiative.org	Bonn	Germany	Initiative	Industry, Academia/Research Center, Industry, Governmental organisation/department	110	English	2007	Step's aim is to reduce dangers to humans and the environment which result from e-waste.
2	International Copper Study Group	ICSG	www.icsg.org/	Lisbon	Portugal	Study Group	Industry, Governmental organisation/department	24	English	1932	The International Copper Study Group (ICSG) is an intergovernmental organization.
3	Prospecting Secondary raw materials in the Urban mine and Mining wastes Project	ProSUM	www.prosumproject.eu	Brussels	Belgium	Project	Industry, Academia/Research Center, Governmental	17	English	2015	The ProSUM project will deliver the First Urban Mine Knowledge Data Platform, a centralised database of all available data on urban mines and mining wastes.
4	UNEP International Resource Panel	IRP	http://www.unep.org/iresourcepanel/	Paris	France	Panel	Academia/Research Center	Na	English	2007	The International Resource Panel (IRP) was launched by the United Nations Environment Programme (UNEP).
5	World Resources Forum	WRF	www.wrforum.org	St Gallen	Switzerland	Forum	NGO, Policy-makers, Academia/Research Center, Industry, Governmental organisation/department	Na	English	2012	WRF envisions the world where influential decision-makers, established civil society, academia, industry and government work together to address the world's most pressing environmental and resource issues.
6	World Materials Forum	Na	www.worldmaterialsforum.com	Nancy	France	Forum	Academia/Research Center, Industry, Governmental organisation/department	Na	English	2015	During the 3rd edition, the focus is on all solutions that allow to decouple economic growth and use of materials from environmental impacts.
7	World Materials Research Institute Forum	WRMIRIF	www.wrmirif.org	Gaithersburg	United States	Forum	Academia/Research Center	50	English	2005	International organization for materials science based on a global network of researchers and industry professionals.
8	Intergovernmental Forum on Mining Minerals, metals and sustainable development	IGF	http://igfmining.org/	Ottawa	Canada	Forum	Governmental organisation/department, Industry, Civil society/the Public, Initiatives	55	English	2002	The Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF) is a member-driven organization that provides national governments with a platform for dialogue and cooperation.
9	Global Reporting Initiative	GRI	www.globalreporting.org	Amsterdam	Netherlands	Initiative	Industry, Governmental organisation/department, Academia/Research Center, Industry	90 countries	English	1997	GRI is an international independent organization that helps businesses, governments and other organizations to measure, manage and report their economic, environmental and social performance.
10	Extractive Industries Transparency Initiative	EITI	eiti.org	Oslo	Norway	Initiative	Industry, Governmental organisation/department, Academia/Research Center, Industry	52 countries	English	2016	The Extractive Industries Transparency Initiative (EITI) is a global standard to ensure that governments and companies in the extractive sector are open and accountable to each other and to citizens.
11	Knowledge Innovation Community (KIC) on Raw Materials (EIT RM)	KIC EIT RM	https://eit.europa.eu/eit-community/eit-rw-materials	Berlin	Germany	Community	Academia/Research Center, Industry	100+	English	2015	EIT RawMaterials, initiated by the EIT (European Institute of Innovation and Technology) and funded by the European Union, is a community of experts and innovators in the raw materials sector.
12	G7-Alliance on Resource Efficiency		http://www.iges.org/files/research/scp/PDF/20160222/session_6_Synthesislaus.pdf	Na	Na	Forum, Platform	Governmental organisation/department	7 countries	English	2015	G7 Alliance of Resource Efficiency (G7 ARE) is a forum to share knowledge and create information networks on a voluntary basis.

Figure 4. Mapping file in Excel. Criteria 1-14 with twelve example initiatives (information retrieved from initiative's website).

4. Next tasks

In task 1.2 a proper set of indicators for each criterion will be identified to prioritize initiatives. The indicators will be related to the categories, in task 1.2 will be identified which categories within the criteria will have priority for FORAM. Relevant criteria include for example the geographical coverage and the number of stakeholders involved. This will, together with the list of criteria and mapping file, serve as basis for the framework used for the assessment and mapping of initiatives and data collections (task 1.3).



Annex I Definitions related to raw materials

A Metal (metallic) ore	A type of rock (mineral raw material) from which metal can be extracted at a profit. ²
Beneficiation	Beneficiation is a process of mechanically separating the grains of ore minerals from the gangue minerals, to produce a concentrate (enriched portion) containing most of the ore minerals and a tailing (discard) containing the bulk of the gangue minerals. ³
Biomass	Biomass is organic, non-fossil material of biological origin that can be used as biogenic feedstock in food supply, and other products. Classification of biomass: Crops, Crop Residues, Wood, Animals. ⁴
Brownfield Exploration	In brownfield exploration, geologists look for deposits near or adjacent to an already operating mine. As geologists are able to use existing data, the risk in brownfield exploration is considerably lower than in greenfield exploration. ⁵
Commodity	A raw material or primary agricultural product that can be bought and sold, such as copper or coffee. ⁶
Fossil energy materials/carriers (refer to energy resources)	Fossil fuel is a generic term for non-renewable carbon-based energy sources such as solid fuels, natural gas and oil that have their origins in plants and animals that lived millions of years ago on earth and underwent

² European Commission Infrastructure for Spatial Information in Europe (2013). Data Specification on Mineral Resources – Technical Guidelines. Retrieved from <http://inspire.ec.europa.eu/file/1527/download?token=dQ1GJw-j>

³ King Abdulaziz University. Retrieved from:

[http://www.kau.edu.sa/Files/0052737/Subjects/\(8\)%20Ore%20processing%20\(beneficiation\).pdf](http://www.kau.edu.sa/Files/0052737/Subjects/(8)%20Ore%20processing%20(beneficiation).pdf)

⁴ European Commission Eurostat (2016). Biomass. Retrieved from: <http://ec.europa.eu/eurostat/web/environmental-data-centre-on-natural-resources/natural-resources/raw-materials/biomass>

⁵ UndervaluedEquity. Mineral Exploration Companies - Greenfield Exploration vs. Brownfield Exploration. Retrieved from <http://www.undervaluedequity.com/Mineral-Exploration-Companies-Greenfield-Exploration-vs.-Brownfield-Exploration.html>

⁶ Oxford Dictionaries. Retrieved from <https://en.oxforddictionaries.com/definition/commodity>

transformation through chemical and physical processes. Coal, Natural Gas and Oil. In EU fossils one half (49.8%) of total net electricity generated.⁷

Geologic Materials

The rocks and sediments that make up the land where we live. The characteristics of geologic materials reflect the processes that form them and the environments in which they form.⁸

Greenfield Exploration

Greenfield exploration relies on the predictive power of ore genesis models to find mineral deposits in previously unexplored areas or in areas where they are not already known to exist.⁹

Industrial minerals and rocks

- Raw materials that are used in industry in variously prepared forms as minerals (e.g., talc, asbestos, diamond) or rocks (diatomite, bentonite, ochre);
- Raw materials that serve as a source of non-metallic elements (fluorite for fluorine, apatite for phosphorus) or their simple compounds (e.g., borates for H_3BO_3 or B_2O_3);
- Raw materials of non-metallic habit that are source of metals, and also of their compounds employed in other than metallurgical industries (e.g., beryl as a source of BeO , magnesite of MgO , bauxite or Al-rich laterite as a source of Al_2O_3 ; all these three oxides are refractory materials);
- Building materials (rocks for aggregate, together with gravel and sand for concrete, decorative stone and roofing slate, limestone for cement and lime, brickloam).¹⁰

Manufacturing

Manufacturing is the value added to production of merchandise for use or sale using labour and machines, tools, chemical and biological processing, or formulation. The term may refer to a range of human activity, from handcraft

⁷ European Commission. <http://ec.europa.eu/eurostat/web/environmental-data-centre-on-natural-resources/natural-resources/energy-resources/fossil-fuels>

⁸ Geologic Materials. Retrieved from https://geomaps.wr.usgs.gov/sfgeo/geologic/stories/geologic_materials.html

⁹ UndervaluedEquity. Mineral Exploration Companies - Greenfield Exploration vs. Brownfield Exploration. Retrieved from <http://www.undervaluedequity.com/Mineral-Exploration-Companies-Greenfield-Exploration-vs.-Brownfield-Exploration.html>

¹⁰ Kuzvart, M. Industrial minerals and rocks in the 21st Century. Retrieved from http://www.ehu.eus/sem/seminario_pdf/SEMINARIO_SEM_2_287.pdf.



to high tech, but is most commonly applied to industrial production, in which raw materials are transformed into finished goods on a large scale.¹¹

Metal Ores

Metal ores are mineral aggregates containing metals. Most metal ores are polymetallic, i.e. the metal ore contains more than one metal. The different metals are separated during the production process. Metal ores are divided into ferrous (containing iron) and non-ferrous ores.¹²

Mine

An excavation for the extraction of mineral deposits, including underground workings and open-pit workings (also called open-sky mines) for the extraction of metallic commodities, as well as open workings for the extraction of industrial minerals, (which are commonly referred to as quarries).¹³

Mineral exploration

Mineral exploration is the process of finding ore or mineral deposits in commercially viable concentrations.¹⁴

Mineral reserve

That portion of an identified resource from which a usable mineral or energy commodity can be economically and legally extracted at the time of determination.¹⁵

Mineral resource

a naturally occurring concentration/accumulation of organic or inorganic material of intrinsic economic interest in or on the Earth's crust such as energy fuels, metal ores, industrial minerals and construction minerals, but excluding water, in such form and quality that there are reasonable prospects for eventual economic extraction.¹⁶

¹¹ Business Dictionary (2016). Manufacturing. Retrieved from <http://www.businessdictionary.com/definition/manufacturing.html>

¹² <http://ec.europa.eu/eurostat/web/environmental-data-centre-on-natural-resources/natural-resources/raw-materials/metal-ores>

¹³ European Commission Infrastructure for Spatial Information in Europe (2013). Data Specification on Mineral Resources – Technical Guidelines. Retrieved from <http://inspire.ec.europa.eu/file/1527/download?token=dQ1GJw-j>

¹⁴ Quara (2017). Mining Industry: What is mineral exploration and how is it beneficial? Retrieved from <https://www.quora.com/Mining-Industry-What-is-mineral-exploration-and-how-is-it-beneficial>

¹⁵ USGS. Mineral reserves, resources, resource potential and certainty. Retrieved from <http://www.nwrc.usgs.gov/techrpt/sta13.pdf>

¹⁶ European Commission Infrastructure for Spatial Information in Europe (2013). Data Specification on Mineral Resources – Technical Guidelines. Retrieved from <http://inspire.ec.europa.eu/file/1527/download?token=dQ1GJw-j>



Mineral resource anomalies

locations where background concentrations of potentially valuable elements in soils, stream sediments or rocks onshore or offshore exceed the normal background values expected given the local geological context. Such maps are widely used in mineral exploration. Attributes are location, chemical elements, nature of the sampled element (s), analytical value(s).¹⁷

Mineral Resources (non-metallic)

A raw material qualifying as a 'mineral resource' is a concentration or occurrence of material of economic interest in or on the earth's crust in such form, quality and quantity that there are reasonable prospects for eventual economic extraction. Minerals are essential raw materials for modern society, contributing significantly to its social and technological progress. They are used for the production of infrastructure such as roads, homes, schools and hospitals, and in many industrial and consumer products such as cars, computers, medicines, and household appliances.¹⁸

Mining activity

The process of extracting metallic or non-metallic mineral deposits from the Earth.¹⁹

Mining/Extraction

the process or industry of obtaining minerals from a mine.²⁰

Ore (sensu lato):

Any naturally occurring (raw) material from which a mineral or aggregate can be extracted at a profit. Although more than 4,400 mineral species are known, only about 100 are considered ore minerals. The term 'ore' originally applied only to metallic minerals but now includes such non-metallic substances as sulphur, calcium fluoride (fluorite), and barium sulfate (barite). Ore is always mixed with unwanted rocks and minerals, known collectively as gangue. The ore and the gangue are mined together and then separated. The desired element (often a metal which is usually contained in chemical combination

¹⁷ European Commission Infrastructure for Spatial Information in Europe (2013). Data Specification on Mineral Resources – Technical Guidelines. Retrieved from <http://inspire.ec.europa.eu/file/1527/download?token=dQ1GJw-j>

¹⁸ <http://ec.europa.eu/eurostat/web/environmental-data-centre-on-natural-resources/natural-resources/raw-materials/mineral-resources-non-metallic>

¹⁹ European Commission Infrastructure for Spatial Information in Europe (2013). Data Specification on Mineral Resources – Technical Guidelines. Retrieved from <http://inspire.ec.europa.eu/file/1527/download?token=dQ1GJw-j>

²⁰ Oxford dictionaries (2017). Mining. Retrieved from <https://en.oxforddictionaries.com/definition/mining>



with some other element in addition to various impurities) is then extracted from the ore. It may be still further refined (purified) or alloyed with other metals.²¹

Primary raw materials

Primary raw materials are the product of the primary production sectors, which encompass the extraction of natural resources from the environment and their transformation through processing or refining. The obtained raw materials are primary commodities, the base materials for further manufacturing and consumption processes.²²

Processing

The series of operations that transforms industrial materials from a raw-material state into finished parts or products.²³

Product Development (Design and substitution)

The creation of products with new or different characteristics that offer new or additional benefits to the customer. Product development may involve modification of an existing product or its presentation, or formulation of an entirely new product that satisfies a newly defined customer want or market niche.²⁴

Raw Materials

Raw materials are basic substances or mixtures of substances in an untreated state except for extraction and primary processing. They can be subdivided into primary and secondary raw materials.²⁵

Recycling / re-use

Converting (waste) into reusable material²⁶ or energy.

²¹ European Commission Infrastructure for Spatial Information in Europe (2013). Data Specification on Mineral Resources – Technical Guidelines. Retrieved from <http://inspire.ec.europa.eu/file/1527/download?token=dQ1GJw-j>

²² European Commission Eurostat (2017). Raw Materials. Retrieved from <http://ec.europa.eu/eurostat/web/environmental-data-centre-on-natural-resources/natural-resources/raw-materials>

²³ Encyclopedia Britannica (2017). Materials processing. Retrieved from <https://www.britannica.com/technology/materials-processing>

²⁴ Business Dictionary (2017). Product development. Retrieved from <http://www.businessdictionary.com/definition/product-development.html>

²⁵ European Commission Eurostat (2017). Raw Materials. Retrieved from <http://ec.europa.eu/eurostat/web/environmental-data-centre-on-natural-resources/natural-resources/raw-materials>

²⁶ Oxford Dictionaries (2017). Recycle. Retrieved from <https://en.oxforddictionaries.com/definition/recycle>



Rock	Material of the Earth’s crust, composed of one or more minerals strongly bonded together that are so little altered by weathering that the fabric and the majority of the parent minerals are still present. ²⁷
Secondary Raw Materials	Waste materials that have been identified for their potential for recycling or reprocessing to generate raw materials (potentially displacing the use of primary materials), for example: mining wastes, manufacturing and processing waste, including scrap, and contents of landfill. ²⁸
Soil	A naturally occurring mass of discrete particles or grains, at most lightly bonded together, occurring as a product of rock weathering either <i>in situ</i> or transported, with or without admixtures of organic constituents, in formations with no or only slight lithification. ²⁹
Substitution	the direct replacement of a material for another in a given application or process or to substitute that material for an entirely new technology. ³⁰

²⁷ Hunt, R.E. (2007). Characteristics of geological materials and formations. Boca Raton, Florida: CRC Press.

²⁸ European Commission Eurostat (2017). Raw Materials. Retrieved from <http://ec.europa.eu/eurostat/web/environmental-data-centre-on-natural-resources/natural-resources/raw-materials>

²⁹ Hunt, R.E. (2007). Characteristics of geological materials and formations. Boca Raton, Florida: CRC Press.

³⁰ Critical Raw Materials (2017). What exactly is substitution. Retrieved from <http://www.criticalrawmaterials.eu/blog/what-is-substitution/>

