AfricaMaVal

Coordination and Support Action (CSA)

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State of Play (EU activities)

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Summary

This document will present an overview of relevant EU-funded and African projects and evaluate them regarding their potential synergies with and input for AfricaMaVal. Furthermore, the document will identify key challenges and opportunities and pinpoint established partnerships, respective goals/objectives, relevant online platforms, publications (reports and papers), case studies, positive outcomes, and know pitfalls. BRGM, MADI, EGS will be instrumental here to collect information for relevant African activities. This task will be closely co-coordinated with LGI to avoid unnecessary overlap with WP8.

Approval

Date	By
2022-11-24 12:24:04	Mrs. Andre UFER (EIT RM)
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D6.1 - State of Play (EU activities)

WP6 - Task 6.1

30.11.2022

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EIT RawMaterials

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Table of Contents

Abbreviations and Acronyms

Acronym	Description
AEGOS	African-European Georesource Observation System
CRM	Critical Raw Materials
CSA	Coordination and Support Actions
DG INTPA	Directorate General International Partnerships
GSD	Geological Survey Department (of Malawi)
ECRM	Extended Critical Raw Materials
EIP-RM	European Innovation Partnership on Raw Materials
EIT	European Institute for Innovation & Technology
ESG	Environment, Social, Governance
EU	European Union
OAGS	Organisation of African Geological Surveys
RM	Raw Materials
SOSO	Switch on-switch off
UNFC	United Nations Framework Classification
UNRMS	United National Resource Management System
WP	Work Package

Executive Summary

This document will present an overview in the form of a descriptive analysis of relevant EU- and otherwise funded projects in the area of exploration and estimation of geopotential, mining, responsible sourcing, capacity building for national mining authorities including for Geological Surveys and similar topics and describe them regarding their potential synergies with and input for AfricaMaVal. Being the first deliverable under WP 6 (i.e. D 6.1), it is an important step towards building a responsible sourcing strategy together with the respective outputs from WPs 2 and 7 (value chain analysis and investment opportunities). The aim of this task is to map the relevant EU-funded activities and projects with potential synergies for AfricaMaVal as well as African projects.

Keywords

Horizon Europe, Exploration, Geological Surveys, geological potential, resource estimation, mining, ECRM, AfricaMaVal, Sourcing, Strategy

1 Introduction: Purpose and target group

The aim of this task was to map projects that are funded through the EU (mainly under the Horizon Framework among others), and those projects where the AfricaMaVal partners are involved with other sources of funding, for instance through the World Bank and/or industry. The outcome of this exercise is to get an understanding about current ongoing initiatives in the area of exploration, mining, processing and sourcing, but also including recycling that could provide potential synergies towards the creation of a responsible sourcing strategy as envisioned by AfricaMaVal together with identified opportunities from WP 2 (mineral value chains) and WP 7 (investment opportunities).

The key target groups are, first and foremost, the AfricaMaVal project partners to get a better understanding of the scope and diversity of the project ecosystem with potential synergies for future exchange. While the EU, EU-based industry, as well as African partners, are also stakeholders and beneficiaries of this deliverable, they are so only indirectly as the final strategy will need and use a number of additional information, insights and methodologies before it will be user-ready for these partners.

The exercise was led by EIT-RM with key contributions from BRGM, WRFA, EGS, DMT, among others.

2 Methodology and criteria of the database for the State of Play of EU and African projects

In a first instance, a template was created for the collection of relevant information, including the definition of priority criteria such as source of funding, geographical scope, commodities involved and timeline. The template was then distributed among the contributing partners with the request to fill in the relevant information.

To maximize the usability of the dataset created during this exercise, it was decided to focus on projects in the areas of minerals & metals exploration and geopotential examination, mining and beneficiation partnerships, responsible sourcing, recycling and similar. In addition, the projects were also synthesized in terms of content and outputs, providing a short description and keywords that make the table more user-friendly.

2.1 Criteria

In researching relevant projects, the following mapping criteria were used:

- Project type (EU funded, EU co-funded, National funded, World bank, others):
- EU funded (Programme, Horizon topic, Horizon Action Type):
- Project full title
- Project short title
- Project number, especially in case of EU funded projects to connect them with the Cordis System
- Topics
- Keywords
- Geographical scope
- Commodities
- Short description
- Start year
- End year
- Status
- Total budget

- Lead partner
- Project website (if available)
- Relevance: 1-3 for the AfricaMaVal project (1: high relevance, 2: middle relevance, 3: low relevance)
- Synergies (discussed only in the report, not in the database)

3 Findings and outcomes

In the following section, it was distinguished between two sorts of outcomes and findings, namely a quantitative as well as a more qualitative analysis.

3.1 Quantitative review

We start with a quantitative review of the State-of-play database. At the time of writing, the database contained a total of 56 projects. Out of these:

- 27 projects are funded or co-funded by the EU, from the following funding sources:
    - Horizon 2020: 31; Horizon Europe: 3; DG-DEVCO/INTPA: 1; Europe Aid: 1, Framework Programme 7: 2.
    - Horizon Topics: Environment: 2; Societal Challenges: 18; Resilience: 4; Raw materials international co-operation: 1; Raw materials policy support actions for the circular economy: 3; Individual Fellowship: 1; unspecified: 11.
    - Horizon Action Type: CSA: 10; RIA: 10; SA: 12; unspecified: 6.
    - The geographical scope of the projects is mainly restricted to Africa and Europe. However, certain exceptional cases have been accepted, when we thought that the project has specific relevance to the sourcing framework. At the very least, the inclusion of such projects is thought to be useful to have it on the radar, such as the MDNP2 project, which is funded by EuropeAid and has, amongst others, the goals to facilitate the access of the EU companies to the Latin America's mining markets and to facilitate raw materials sourcing for the EU industrial value chains from Latin America.
    - Additionally, bilaterally or industry funded projects were listed in the database
    - World Bank: 4 (Guinea, Cameroon, Congo, Madagascar)

3.2 Qualitative review

The analysed projects were found to cover three main topics: responsible sourcing, networks and recycling, re-use and substitution.

1. **Responsible sourcing, mining and ESG**

- **Responsible sourcing of raw materials** exemplary approaches are tested for instance under the Re:Sourcing project by setting up international platforms that enable more effective stakeholder engagement to address responsible for raw materials highly relevant for Europe's future energy, mobility and infrastructure development. One of the envisioned key outcomes is, besides finding globally agreeable definitions for responsible sourcing to identify enabling factors that will help recently established and upcoming sourcing initiatives to become success stories. The responsibility aspects of sourcing will also be enhanced by the SUMEX project, as it will set-up a sustainability-focused framework for the extractive industry in Europe. This in turn will analyse relevant economic, environmental and social policy frameworks with an emphasis on socioeconomic and environmental impact assessments. We also found the Responsible Mica Initiative (RMI) of potential value in terms of stakeholder engagement for socially risky mining operations like the small-scale based mining of mica in India or Madagascar, although mica itself is not considered to be part of the ECRM. RMI however has also received interest from downstream manufacturers in order to ensure clean and sustainable raw materials value chain.

  Traceability has become an important feature of sustainable mineral value chains, especially for minerals that may have been mined in conflict-affected areas. Tracing methodologies can enable downstream customers to prove the reliability of their sustainability claims and comply with relevant regulations in force (notably the EU Battery regulation, or the German Supply Chain Act). The MaDiTraCe project proposed technical solution is to develop and test independent digital and geo-based CRM traceability approaches and integrate them with a generic certification scheme for CRMs throughout mineral supply chains from the mine to the manufactured and recycled products.

- **Increasing geo-knowledge, and making exploration and/or extraction more efficient** The VECTOR project is an interesting approach in this regard as it aims to integrate a geological prospectivity toolkit with a 'social acceptance' toolkit. Whereas the former will be based on an entirely new workflow using machine learning-based integration of less invasive geological, geochemical and geophysical measurements, the latter will include the core values that the European public invokes when deciding about mineral development. This will result in an enhanced 'Social Licence to Operate' index. This is then integrated in VECTOR's third pillar that contains an interactive platform that will take

into account both the geological exploration potential and socio-economic factors to yield a data-driven, quantitative and integrative assessment of regions suitable for exploration and, eventually, mining.

Promoting the efficiency of the mining processes is at the core of the IMP@CT project (Integrated Modular Plant and Containerised Tools for Selective, Low-impact Mining of Small High-grade Deposits). Among other outputs, it is developing a new switch on-switch off (SOSO) mining paradigm to improve the viability of small complex ore deposits. This approach centres around technological innovations in mining equipment design and mine planning that would reduce the complexity of feasibility studies required, but increase the throughput of extracted material. Also infrastructure, land use, resource consumption and waste are scrutinized as relevant factors.

Strengthening knowledge on Africa's geology and creating strong linkages and networks between European and African partners is the objective of a number of research projects. The African-European Georesource Observation System (AEGOS) for instance looks to define i) operational procedures for data management, ii) user-oriented products and services , and iii) establish an African- European partner network. The GEMMAP project in turn holds a specific focus on Malawi by creating maps about geology, mineral resources, tectonic and seismotectonic features and natural hazards. GEMMAP will also include on-the-job training for the Geological Survey Department (GSD) personnel of Malawi with the involvement of students from the Geography and Earth Sciences Department at the Chancellor College – University of Malawi, in Zomba. The Democratic Republic of Congo is a major mining country and partner of the World Bank's PROMINES project. Among other initiatives, the promotion of its mineral development is a key objective, sidelined by training and capacity building measures including a field map training over a 3 weeks period in association with the Marien Ngouabi University.

2. Building Networks

- **Improving Minerals Knowledge and Intelligence** is a crucial objective of the EU's Raw Material Initiative and of the MINERALS4EU project. It is designed to meet the Initiative's recommendations and will develop an EU Mineral intelligence network structure delivering a web portal, a European Minerals Yearbook and foresight studies. The network will provide data, information and knowledge on mineral resources around Europe, based on an accepted business model, making a fundamental contribution to the European Innovation Partnership on Raw Materials (EIP RM). The project will firstly establish the EU minerals intelligence network structure, comprising European minerals data providers and stakeholders, and transform this into a sustainable operational service. It also needs to be highlighted that Minerals4EU is built around an INSPIRE compatible infrastructure,

enabling EU geological surveys and other partners to share mineral information and knowledge, as well as enabling stakeholders to find, view and acquire standardized and harmonized geo-resource and related data.

The PanAfGeo project is a pan-African programme of geoscientific on-the-job training for staff coming from the African Geological Surveys. The project aims to reinforce the cooperation between the European Union and the African Union through their Geological Survey Organisations. It also aims to improve geoscientific knowledge and skills in Africa for a better management and governance of mineral resources, and to better prevent geohazards. This action is co-funded by the European Commission (DG-DEVCO/INTPA) and a Consortium of 12 European Geological Surveys, coordinated by BRGM, and on working in partnership with the African Geological Surveys. Also the Screen projects (Screen 1 and Screen 2) need to be mentioned here, as they aim to develop a CRM-focused network and publish sector-oriented outlook reports analysing the future supply and demand of raw materials.

3. **Recycling, Re-Use and Substitution**

- **EU Horizon 2020 project series (Demeter, Rhinoceros, Nemo, Crocodile, Neohire and Platirus:** While these projects all focus on different aspects in terms of resource reclamation and minerals, they aim for improved recovery rates from either devices that contain the mineral in question or mining residual wastes with the objective of advancing the EU's supply situation, with emphasis largely on REE, cobalt, nickel and lithium. The consortia are mostly made up of industry and research institutes. The benefit is clearly that these projects aim to develop innovative lead technologies that will improve the supply of secondary sources, whereas current recycling and substitution rates are often still at the lower end. Thus potentially increasing substantially the supply of these raw materials. CROCODILE for instance aims for a newly established value chain that will bring together major players who have the potential of supplying 10,000 ton of cobalt annually in the mid-term range from European resources, corresponding to about 65% of the current overall EU industrial demand.

4 Synergies, challenges and opportunities

As was described further above, this state-of-play analysis will be a relevant ingredient towards a strategy for responsible sourcing together with the analysis of works on supply-chain business opportunities and investment opportunities stemming from WPs 2 and 7. As such, while laying important groundwork for the strategy, this deliverable is not to be seen as a stand-alone product but as component of a more complex research effort under AfricaMaVal.

The outcome relevant for further synergies with the AfricaMaVal project is to have an idea about the what type of initiatives are already ongoing around responsible sourcing, including exploration, mining, processing, supply-chain tracking, partnership building, etc. That in turn is crucial to later define a strategy that can make use of these existing initiatives and their outputs, instead of becoming a parallel activity with the associated danger of re-creating work and insights that have already been done. We expect a number of lessons-learned, data, best-practice methods and indeed whole existing partnership platforms can be used to create synergies with AfricaMaVal's responsible sourcing platform.

At the end, it also needs to be highlighted that the State-of-Play analysis should be treated as a 'living document', due to the high number of relevant projects and the relative short time available for analysis. In other words, the number of relevant projects is expected to increase over time, and we also aim to distribute the spreadsheet to additional partners, specifically to EIT's regional offices to continue investigations through their own contacts.

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5 Annex

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ID	Project Type	Programme	Horizon Topic	Horizon Action type	Project full title	Project short title	topic	Keywords	geographic scope	commodities	short description	start year	end year	status	total budget	budget currency	lead partner	contact owner	project website	relevance
1	EU funded	Horizon 2020	Resilience	CSA	Global Stakeholder Platform for Responsible Sourcing	Re:Sourcing	responsible sourcing	Minning and mineral processing CSR Environment Sustainability Supply chain management	Worldwide	various (RE, MS & EEE sectors)	The proposed project will set up an international platform on responsible sourcing (RS) that: 1. facilitates the development of a globally accepted definition of RS, 2. develops ideas for incentives facilitating responsible business conduct in the EU, supporting RS initiatives, 3. enables exchange of stakeholders for information exchange and promotion, 4. fosters the emergence of RS in international political fora, and 5. supports the European Innovation Partnership on Raw Materials. To achieve the above mentioned objectives, the platform will connect experts and stakeholders by means of a physical element ("Platform Spaces") and digital element ("Digital Ground"): The Platform Spaces will allow practitioners (i) to gain a hands-on and peer-to-peer learning experience in workshops and site visits to exchange and learn from enabling factors, instruments and tools facilitating RS initiatives and business conduct for practitioners, and (ii) to engage with stakeholders at international conferences to further the concept of RS on the global political agenda. The Digital Ground will (i) enable, through innovative digital tools such as digital conference spaces and webinars, more easily connect international players and engage them in networking, promotion and information exchange activities, and (ii) synthesise and make easily accessible ideas that incentivise RS initiatives and responsible business conduct. The proposed project will feature important Flagship Cases of mature and well-established RS initiatives for raw materials highly relevant for Europe's future energy, mobility and infrastructure development. By engaging international experts and stakeholders via the digital and physical platform element, the project team will be able to engage these initiatives into mutual learning processes on success elements and challenges encountered, and to identify enabling factors that will help recently established and upcoming RS initiatives to become success stories.	2019	2023	ongoing	2,999,928	Euro	Wirtschafts Universtät Wien	EIT RM		1
2	EU funded	Horizon Europe	Resilience	RIA	Vectors to Accessible Critical Raw Material Resources in Sedimentary Basins	Vector	Creation of geospatial vectors for exploration and ESG	Mining and mineral processing Exploration Geological potential	EU	various : Cu, Ag, Re, Mo, Zn, Pb, Cu, Ni CRM: Li, *Sb, Bi, Co, Ga, Ge, In, PGE, baryte, borate*	The EU imports 80% of its industrial raw materials making European supply chains highly vulnerable to disruption and threatening the EU?s ability to manufacture raw material-intensive technologies, such as electric cars, wind turbines, and ICT hardware, that are essential to the green and digital transformations. Europe possesses significant mineral potential but development is limited by the lack of sustainable, low-impact exploration methods and by social opposition to mineral projects. With VECTOR we will generate new knowledge to overcome these technical and social barriers, unlocking Europe?s raw material potential and improving the resilience of EU raw materials supply chains. VECTOR?s overall objective is to deliver evidence-based and accessible knowledge that integrates the scientific and social pathways to successful mineral exploration and mining. The first pillar of our approach is a geological prospectivity toolkit based on an entirely new workflow using machine learning-based integration of less invasive geological, geochemical and geophysical measurements. The workflow will be validated in three European sedimentary basins and will be transferable worldwide. The second pillar is a social acceptance toolkit that identifies, for the first time, the core values that the European public invokes when deciding about mineral development. This will result in an enhanced Social Licence to Operate index and a new body of knowledge that reflects diverse values-based perspectives. The third pillar is an integrated toolkit consisting of a unique, distributed, multimodal, self-learning, and interactive platform that will consider both geological exploration potential and socio-economic factors to yield a data-driven, quantitative and integrative assessment of regions suitable for exploration and, eventually, mining. The results will be freely available via an engaging, web-based interface designed to support evidence-based decision making and the UNFC and UNRMS.	2022	2025	ongoing	7,474,006	Euro	HZDR	EIT RM	https://www.gfz-potsdam.de/en/press/news/details/effizientere-rohstoff-exploration-in-europa	2
3	EU funded	Horizon Europe	Resilience	RIA	Material and digital traceability for the certification of critical raw materials	MaDiTraCe	Mining and mineral processing	Mining and mineral processing Traceability Supply chain management	EU	CRM	MaDiTraCe's main goal is to enlarge and integrate the portfolio of technological solutions reinforcing the reliability of critical raw material (CRM) tracking and the transparency of complex supply chains. The project aims to develop and test independent digital and geo-based approaches for CRM traceability and to integrate them with a generic certification scheme for CRMs throughout mineral supply chains from the mine to the manufactured and recycled products. The project intends to increase the TRL of experimental or largely untested methods in both domains, digital and material sciences. A special attention will be payed to the complexity of mineral supply chains with points of material aggregation and of transformation (processing, refining…) including circular economy (recycling). This methodology will enable downstream industrials to prove the reliability of their sustainability claims, complying with regulation in force (notably EU Battery regulation, German Supply Chain Act) and anticipating implementation of regulation to come (EU Directive on Corporate Sustainability Due Diligence). MaDiTraCe's fundament is a strong stakeholder process (WP1) with upstream and downstream industrials from mining to manufacturing industry and large networks involved via the consortia (EIT-RM) and clusters (ISMC) participating in the project. Continuous interaction with this industrial and policy-oriented stakeholder community on the traceability technology (WP2 and WP3) and the certification schemes (WP4) developed in the project will ensure to stay in line with industrial needs and expectations with respect to regulatory compliance. It will also facilitate implementation and exploitation (WP5) of the project outcomes.	2022	2025	ongoing	11,024,757	Euro	BRGM	EIT RM		1
4	EU funded	FP 7	Environment	SA	African-European Georesources Observation System	AEGOS	sustainable use of georesources shared, distributed, Internet-linked georesources observation system	Geological potential Africa Institutional cooperation	Africa		Africa, the largest single component of the African Caribbean Pacific (ACP) Group of States, despite its huge potential for development through both human and georesources, suffers in many places from poverty and underdevelopment. The sustainable use of its resources is a key issue, not only for development of the African countries, but also for the world's future. Over the coming decades, these issues are likely to play an ever-increasing role due to the world's growing population, rapid urban development and the rising demand for better infrastructure and services. The sustainable use of georesources requires a knowledge based on data, information and expertise. Thus, the availability, traceability, accessibility and processing using GIS technologies of heterogeneous data from multiple sources is essential. Such processing requires a qualified and experienced personnel and the definition of strategies for capacity building and training. In view of this situation, a recognised need has emerged for a shared, distributed, Internet-linked georesources observation system, based on open standards and interoperability developments, as a contribution to the sustainable development of African countries. The Support Action is the preparatory phase needed to design the African-European Georesource Observation System (AEGOS) capable of hosting and providing access to Africa's geological resources, including groundwater, energy, raw materials and mineral resources. Its objectives are to define: i) operational procedures for data management (Spatial Data Infrastructure, metadata and data specification), ii) user-oriented products and services including the preparation of innovative spin off projects based on AEGOS and an evaluation of the input of Interoperability and interdisciplinary in support of GEOSS iii) the African- European partner network, iv) a geoscience contribution to GEOSS, in the context of INSPIRE	2008	2011	finished	2,422,557	Euro	BRGM	BRGM	African-European Georesources Observation System | AEGOS Project | Fact Sheet | FP7 | CORDIS | European Commission (europa.eu)	1
5	EU funded	Horizon 2020	Individual Fellowships	none	Selective Recoveryof Critical Raw Materials by Using Metal-Organic Framework Based Adsorbents	RUMBA	improve the efficiency of conventional hydrometallurgical methods by using solid adsorbents based on metal-organic frameworks	Recycling	Europe	CRM	Selective recovery of Critical Raw Materials (CRMs) from underexploited mining side streams can contribute to reducing the European dependence on imports of these refractory metals. RUMBA: "Selective Recovery of CRMs (Nb, Ta, W) by Using MOFs Based Adsorbents" aims to improve the efficiency of conventional hydrometallurgical methods. These methods require the digestion of ores under strong acid or alkaline conditions and the recovery of CRM via liquid-liquid extraction. RUMBA innovative approach is based on the use of solid adsorbents known as Metal-Organic Frameworks (MOFs). MOFs are crystalline materials with porous and flexible frameworks. Their properties (porosity, flexibility, adsorption capacity, chemical and thermal stability) make them capable of extremely fast sorption with unprecedentedly high selectivity toward targeted ionic species. Despite their suitability for heavy metals capture, MOFs have never been used for recovering CRMs. RUMBA involves the first study of the interactions CRM-MOF to guide the design of frameworks with high affinity/selectivity toward target CRMs. Extraction experiments will be performed in samples from real mining streams. Additionally, the CRM-MOF systems will be studied for possible added-value applications of environmental relevance. The feasibility for succeeding in the scientific and training objectives pursued in RUMBA is supported by the strong expertise of the host institution (ICAMCyL) in advanced mining technologies and the solid background of the researcher in synthesis and characterization of MOFs. RUMBA offers the researcher the opportunity of resuming her research career through the exploration of a completely different application for materials she is familiar with. She will gain scientific skills in mineral processing, CRMs regulation, and catalysis. Furthermore, her profile will grow in IPR management and patent exploitation thanks to the supervisor expertise in mining industrial innovation.	2022	2025	ongoing	259,398	Euro	Fundacion ICAMCYL	none		Not really for AfricaMaVal
6	EU funded	Horizon 2020	Societal Challenges	RIA	Integrated Modular Plant and Containerised Tools for Selective, Low-impact Mining of Small High-grade Deposits	IMPaCT		Mining and mineral processing Innovation	Europe	various	The IMP@CT project proposes a solution that develops a new switch on-switch off (SOSO) mining paradigm to improve the viability of small complex ore deposits. Our whole systems approach centres around technological innovations in mining equipment design and mine planning that would reduce the feasibility studies required, throughput of extracted material, infrastructure, land use, resource consumption and waste. Successful business models for SOSO mining require that mining and processing technologies can be adapted to multiple deposits and commodities. Risks that are associated with the approach concern geological uncertainty, metallurgical variability and social acceptance. Our overall objectives were to demonstrate that the concept of SOSO mining is viable using case studies in the West Balkans, and to understand the wider settings in which it can work in Europe. The entire mining system produced lead concentrate in Bosnia and Herzegovina, at the Olovo mine site and then antimony concentrate from an ore deposit in Serbia, in a way that is conductive to low carbon production, environmental management and low impact on society	2016	2020	finished	6,991,820	Euro	The University of Exeter	none	Novel modular mining equipment supports sustainable and cost-effective mining in Europe | IMPaCT Project | Results in brief | H2020 | CORDIS | European Commission (europa.eu)	2

ID	Project Type	Programme	Horizon Topic	Horizon Action type	Project full title	Project short title	topic	Keywords	geographic scope	commodities	short description	start year	end year	status	total budget	budget currency	lead partner	contact owner	project website	relevance
7	EU funded	FP 7			Minerals Intelligence Network for Europe	MINERALS 4 EU	minerals intelligence network	Mining and mineral processing Geological potential Mineral intelligence	Europe	primary minerals	The Minerals4EU project is designed to meet the recommendations of the Raw Materials Initiative and will develop an EU Mineral intelligence network structure delivering a web portal, a European Minerals Yearbook and foresight studies. The network will provide data, information and knowledge on mineral resources around Europe, based on an accepted business model, making a fundamental contribution to the European Innovation Partnership on Raw Materials (EIP RM), seen by the Competitiveness Council as key for the successful implementation of the major EU2020 policies. The Minerals4EU project will firstly establish the EU minerals intelligence network structure, comprising European minerals data providers and stakeholders, and transform this into a sustainable operational service. Minerals4EU will therefore contribute to and support decision making on the policy and adaptation strategies of the Commission, as well as supporting the security of EU resource and raw materials supply, by developing a network structure with mineral information data and products, based on authoritative of information sources. The Minerals4EU project is built around an INSPIRE compatible infrastructure that enables EU geological surveys and other partners to share mineral information and knowledge, and stakeholders to find, view and acquire standardized and harmonized georesource and related data. The target of the Minerals4EU project is to integrate the best available mineral expertise and information based on the knowledge base of member geological surveys and other relevant stakeholders, in support of public policy-making, industry, society, communication and education purposes at European and international levels. The Minerals4EU consortium possesses the skills and resources to make this the leading European mineral information network structure that will provide tools and expertise to enhance resource efficiency, minerals supply security and support sustainable mineral development for Europe.	2013	2015	finished	2,784,588	Euro	Geological Survey of Finland (GTK)	BRGM, EGS, BGR, EITRM	Home (minerals4eu.eu)	1
8	other source	other source			Malawi Geological Mapping and Mineral Assessment Project	GEMMAP	Geological mapping, mineral resources potential assessment, tectonic and sismotectonic features and natural hazards assessment. Artisanal and small scale mining assistance	Geological potential, mapping	Malawi	primary minerals	The Geological Mapping and Mineral Assessment Project (GEMMAP) has been funded by the French Government through a Debt Reduction and Development Contract (C2D). The main objective of GEMMAP was to contribute to the economic development of Malawi in helping to diversify the mineral resources sector and by advancing geological knowledge and capacity building. GEMMAP has supported this national development strategy through its three main objectives: -Establish a fundamental knowledge base for future mineral resources management of Malawi by providing a set of modern multi-scale geological and thematic (structural, mineral resources and geohazards) maps of the whole country at various scales; -Develop strategies in order to cultivate responsible Artisanal and Small-Scale Mining (ASSM) practices; -Implement a capacity-building program for sustainable human resources development in the Earth Sciences in Malawi.	2016	2021	finished	10,213,000	Euro	BRGM	BRGM		2
9	other source				Republic of Congo : support to the National programme of geological mapping			Geological potential Capacity building	Congo-Brazzaville.	primary minerals	This exercise has been commissioned by Total. Facilitating the mineral development of the country. There are two task: 1- "Geological mapping" which aims at the completion of 7 geological maps at the 1:1000,000-scale, and their explanatory notes. 2- "Training and capacity building" which corresponds to the organisation of a field map training over a 3 weeks period in association with the Marien Ngouabi University.	2012	2015	finished	3,960,000	Euro	BRGM	BRGM		02-Jan
10	EU funded	DG-DEVCO/INTPA			Pan-African support to the EuroGeoSurveys-Organisation of African Geological Surveys (EGS-OAGS) Partnership	PanAfGeo and PanAfGeo 2		Geological potential Institutional cooperation	Africa	Various	PanAfGeo is a pan-African programme of geoscientific on-the-job training for staff coming from the African Geological Surveys. The project aims to reinforce the cooperation between the European Union and the African Union through their Geological Survey Organisations. It also aims to improve geoscientific knowledge and skills in Africa for a better management and governance of mineral resources, and to better prevent geohazards. This action is co-funded by the European Commission (DG-DEVCO/INTPA) and a Consortium of 12 European Geological Surveys, coordinated by BRGM, and on working in partnership with the African Geological Surveys. Finally, PanAfGeo contributes to reinforce the Organisation of African Geological Surveys (OAGS) in order to better address the African continent needs.	2016	2024	on-going	10,348,953 (PanafGeo 1 only)	Euro	BRGM	BRGM	https://panafgeo.eurogeosurveys.org/	2
11	other source				Democratic Republic of Congo : support to the design of the organization chart of the National Geological Service (NGS) and its Provincial Antennas in		Organization of the National Geological Service of the Democrtaic Republic of Congo	Geological potential	Democratic Republic of Congo	Various	As part of the project of good governance in the mining sector as a growth factor (PROMINES), the objective of this project was to design, in the DRC, the organization chart of the National Geological Service and its Provincial Antennas, built from the pre-existing geoscientific agencies of the public service sector. It was then followed by a larger programmme of Geological Mapping and mineral resource potential assessment (2017-2018)	2014	2015	finsihed	300,000	Euro	BRGM	BRGM		3
12	other source				Géological and Mineral Resources mapping at 1 : 1,000,000 scale of Madagascar			Geological potential	Madagascar	primary minerals	Synthesis, harmonization, integration of the available geological and mining information in order to elaborate update 1 : 1,000,000-scale products with an added value for the development of the mining sector and to promote mining investments.	2007	2012 (after interruption in 2009)	finished	1,025,000	Euro	BRGM	BRGM		2
13	World Bank				Cameroon : Realization of a geological and geochemical mapping program and the	PRECASEM	Realization of a geological and geochemical mapping program and the establishment of a Geological	Geological potential	Cameroon	various	Realization of a geological and geochemical mapping program and the establishment of a Geological and Mining Information System	2016	2018	finsihed	6,806,000	Euro	BRGM	BRGM		2
14	World Bank				PROMINES - VOLET A4	PROMINES	Realization of a campaign of regional geological field studies including geochemical and gîtological studies and the estimation of potential	Geological potential	Democratic Republic of Congo	various including CRM (cobalt)	Realization of a campaign of regional geological field studies including geochemical and gîtological studies and the estimation of potential mineral resources in 3 target zones (hereafter ZC): Katanga Sakania, South Katanga and West Equateur, centered on mineral targets (ZRG - Geological Research Zones) and totaling approximately 6 square degrees (DC)	2017	2018	finished	7,161,004	Euro	BRGM, IGS, GEOCOFF	BRGM		2
15	Other sources	other source			Conceptual Study of the Gantour Phosphate Basin		The main objective of the study is definition of the best possible mining strategy for the open pit phosphate mines Gantour (Benguerir North, South and Mzinda) with the focus on the cost-saving technologies. Evaluation of different equipment constellation in different mining technologies.	Mining and mineral processing	Morocco, El Gantour	Phosphate	"In order to fulfill the purpose of the project, the scope of services was split up into several sections below: - Identification of the various possible mining methods for the mines and subsequent selection of the best possible method; - Definition of the nominal production capacity of the mines; - Determination of the technologies to be used in terms of extraction equipment, de-stoning and screening installations as well as phosphate handling; - Definition of the organizational structure, optimal material means and mine personnel for the operation and maintenance of the mines; - Evaluation of the investment and operating budgets for each mine; - Elaboration of the profitability analysis for each mine for an operating period of 30 years; - Elaboration of technical descriptions for equipment tender documents mining, facilities and infrastructure."	2016	2020	finished	928000	EUR	DMT	DMT		2
16	Other sources	other source			Desk Top Assessment of OKD Coal Mines and Preparation Plants in Czech Republic		DMT acted as Independent Engineer for a Fatal Flaw Analysis at OKD coal mines and preparation plants in Czech Republic. The second part of the project (due diligence) succeeded in 2017.	Mining and mineral processing	Czechia	Coal	DMT provided a project evaluation report ("Fatal Flow Analysis") on: - Geology incl. Resources/Reserves Estimation, - Mining machinery incl. longwall and roadheading equipment, - Environmental hazards and mines closure cost estimation, - Coal preparation plants, - Coal Production Costs (OPEX).	2016	2016	finished	29000	EUR	DMT	DMT		3
17	Other sources	other source			Prefeasibility Study on the Multi-Mineral Project Ahmetli, Turkey		DMT was consulted by Topkapi Mineral A.S to supervise the resource definition programme for the Ahmetli heavy and rare earth-bearing mineral project on a multi-mineral deposit and to prepare a prefeasibility study on this project.	Exploration Geological potential	Türkiye, Ahmetli	REE	"DMT provided the following types of services: - Detailed metallurgical test-work and processing method. - Resource estimate. - Mining method and mining plan. - Conceptual flow sheet. - Production schedule. - Marketing analyses. - Capital cost estimate. - Operating costs estimate. - Environmental impact and management. - Hydro-geological study. - Permitting and royalties. - Economic evaluation and conversion of resources (after up-date) into reserves."	2012	2013	finished	186082	EUR	DMT	DMT		3
18	EU funded	EU funded			CERA 4in1 - Certification system	CERA 4in1	CERA 4in1 - Certification of Raw Materials is a certification scheme concept that covers the mineral upstream value chain by different standards	Traceability Supply chain management	Worldwide	various	The CERA 4in1 project started in April 2017 and has been supported by EIT RawMaterials until 2021 Results: 1. certification concept to cover the complete value chain of mineral raw materials has been drafted 2. standardised certification scheme for raw materials that ensures environmental, social and economic responsibility of mineral raw material mining and processing has been developed	2017		ongoing	3000000	EUR	DMT	DMT	https://www.cera4in1.org/	2
19	Other sources	other source			Project Management Consultant for Gara Djebilet Iron Ore Deposit		DMT supported the client in the role of the Project Management Consultant for executing a Prefeasibility Study as well as a Feasibility Study for determining the technical, economical and environmental viability of exploitation of the complex politic type iron ore deposit		Algerien, Tindouf	Iron ore	"The role of the Project Management Consultant (PMC) involved the following tasks: Identification of gaps in the documentation within exploration, infrastructure, processing. Elaboration of Terms of Reference for the Prefeasibility (PFS) and the Feasibility Study (FS). Support the client in selection of the consultant for conducting the PFS and FS. Monitoring, controlling and analysis of the PFS and the FS and presentation of results to public authorities. Planning, supervision and evaluation of additional exploration and laboratory testing, generation of a 3D geological model and JORC compliant assessment of resources. Elaboration of a flow sheet for processing and pelletizing of the iron ore."	2015		ongoing	2025000	EUR	DMT	DMT		3

ID	Project Type	Programme	Horizon Topic	Horizon Action type	Project full title	Project short title	topic	Keywords	geographic scope	commodities	short description	start year	end year	status	total budget	budget currency	lead partner	contact owner	project website	relevance
20	Other sources	other source			Expert Opinion on Value of Gold Options		A German public prosecutor's office requested DMT to issue an expert opinion on the selling price of gold delivery rights sold in 2014 and 2015.		Mali	Gold	-Review of relevant documents and reports (economic and feasibility studies, IPO documentation, capital increase documentation and gold option and sales agreements); -Collection of data with regards to the historic conditions prevailing on the capital and commodity markets, historical trade multipliers, historical merger & acquisition multipliers, economic and operational state of operating company, other factors in Mali during the sales period; -Comparison of data sets; -Reporting of expert opinion.	2019	2020	finished	275000	EUR	DMT	DMT		3
21	EU funded	Horizon 2020	Raw materials policy support actions for the circular economy	CSA	Voluntary Certification Scheme for recycling of CRMs form WEEE	CEWASTE	Improving the framework conditions for access to secondary raw materials by developing a certification scheme for recovery of CRMs from key types of waste	Certification Recycling	European/Worldwide	CRMs	The project has developed, tested and validated a set of normative requirements (technical, sustainability, traceability and managerial requirements) and the related certification scheme for the collection, transport and treatment facilities of key types of waste containing significant amounts of valuable materials and CRMs, such as WEEE and batteries.	2018	2021	finished	training		WRFA	WRFA	https://cewaste.eu/	1
22	EU funded	Horizon 2020	Raw materials international co-operation	CSA	Towards a World Forum on Raw Materials	FORAM	Enahancing international cooperation on raw materials	Supply security International cooperation	Worldwide	raw materials	The FORMA project developed and set up a broad stakeholder network to assess and advance the idea of a World Forum on Raw Materials. As such the proejct developed a methodological approach to map existing initiatives to understand the existing landscape of stakeholders, their interest and agenda. Furthermore, the proejct engaged with these stakeholders in a participatory and structured multidisciplinary dialogue and developed recommendations and a strategic position with purpose and vision for a potential World Forum on Raw Materials.	2016	2018	finished	1136812		WRFA	WRFA	http://www.foramproject.net/	1
23	National funded	Other source			Sustainable Recycling Industries	SRI	Build capacity on sustainable recycling practices in developing countries	Recycling	Worldwide	secondary raw materials	Sustainable Recycling Industries (SRI) is an international programme aimed at fostering the sustainable integration and participation of small and medium enterprises from developing and transition countries in the global recycling of secondary resources. More specifically the projects aims to improve local capacity for sustainable recycling together with private and public institutions, as well as the informal sector in Colombia, Egypt, Ghana, Peru and South Africa.	2015	2023	ongoing			WRFA	WRFA	https://www.sustainable-recycling.org/	2
24	EU funded	Horizon 2020	SOCIETAL CHALLENGES - Climate action, Environment, Resource Efficiency and Raw Materials	CSA	Solutions for CRitical Raw materials - a European Expert Network 2	SCRREEN2	Raw materials policy support actions for the circular economy - Expert network on Critical Raw Materials	International cooperation Recycling	Europe		Raw materials are crucial to Europe's economy and key to maintaining and improving our quality of life. But securing reliable access to certain raw materials is a growing concern. This is why the European Commission created a list of Critical Raw Materials (CRMs). The list includes rare earth elements cobalt and niobium. Europe's CRM strategy was strengthened through an expert network built by the EU-funded SCRREEN project, which ended in 2020. Its successor, SCRREEN2, was launched to develop the SCRREEN expert network to cover all raw materials. Specifically, SCRREEN2 will develop the network and publish sector-oriented outlook reports analysing the future supply and demand of raw materials. The project will support the Commission in policymaking related to CRMs.	2020	2023	ongoing	2,999,875	Euro	COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES	EuroGeoSurveys - EGS		2
25	EU funded	EuropeAid/140-307	none	none	EU Americas Partnership on Raw Materials (Latin America)	MDNP2	none	Geological potential Institutional cooperation	EU & Latin America	Mineral Raw Materials including copper, lithium ...	This project aims to: (i) promote the values of sustainable and responsible mining; (ii) promote EU innovation, equipment and services for the extractive sector; (iii) facilitate the access of the EU companies to the Latin America's mining markets; (iv) facilitate raw materials sourcing for the EU industrial value chains from Latin America.	2020	2023	ongoing	2,200,000	Euro	Projekt-Consult GmbH	EuroGeoSurveys - EGS	https://www.mineralplatform.eu/	2
26	EU co-funded	Horizon Europe	2.5-Climate, Energy and Mobility	CSA	A Geological Service for Europe	GSEU	Support to the activities of the European Geological Services	Geological potential Institutional cooperation	Europe		Existing geological surveys, the national custodians of geological information, have amassed huge legacies of data and information that are difficult to merge. This project will continue the harmonisation and standardisation effort initiated in earlier projects. We aim to create joint services that can support acceleration of the energy and climate transitions, as well as a larger critical mass of intra-European cooperation through convergence of our research agendas, as key steps to increase the amount and quality of results we are aiming for. A common thread in this project is innovation in ways in which subsurface information is conceptualised, organised, visualised, delivered and translated to the needs of a wide range of audiences, and the methodologies to achieve this.	2022	2027	ongoing	23,168,128,25	Euro	EuroGeoSurveys - EGS	EuroGeoSurveys - EGS		2
27	EU funded	Horizon 2020	SOCIETAL CHALLENGES - Climate action, Environment, Resource Efficiency and Raw Materials	CSA	INTERNATIONAL NETWORK OF RAW MATERIALS TRAINING CENTRES	INTERMIN	Raw materials international co-operation	Institutional cooperation	Worldwide	All	INTERMIN will create a self-sustainable long-term lasting international network of training centres for professionals. This project involves educational and research institutions in the EU and the leading counterparts in third countries, based on specific country expertise in the primary and secondary raw materials sectors. The network will map skills and knowledge in the EU and the third countries, identify key knowledge gaps and emerging needs, develop roadmap for improving skills and knowledge, as well as establish common training programmes in the raw materials sectors. In line with the EU's strategy for international co-operation in research and innovation (COM(2012)497), the consortium will seek international collaboration, fostering and exploring synergies with the relevant EU Member States initiatives	2018	2021	finished	1,266, 021,25	Euro	AGENCIA ESTATAL CONSEJO SUPERIOR DE INVESTIGACIONES CIENTIFICAS	EuroGeoSurveys - EGS		2
28	EU funded	Horizon 2020	Societal Challenges		ENRICH in Africa - A Multi-sided Platform Business Model for supporting the EU-African Innovation Community	ENRICH in Africa	Cooperation for innovation; providing services to start-ups	Innovation International cooperation	Africa		The focus of the activities will be the set-up of a network of incubators and accelerators to deliver services to European and African innovators. Key elements of the concept are the focus on capacity building and learning for incubators and accelerators for them be able to offer high-quality services to innovators. The EiA multi-sided platform, with a clever digital backbone, will be the central point for all EiA activities, offering different services for a wide range of stakeholders in the EU-Africa innovation ecosystem.	2021	2023	ongoing	3 586 505	Euro	Steinbeis 2i		ENRICH in Africa Project Page (enrich-in-africa-project.eu)	2
29	EU funded	Horizon 2020	SOCIETAL CHALLENGES - Climate action, Environment, Resource Efficiency and Raw Materials	CSA	Mining and Metallurgy Regions of EU	MIREU	Improving cooperation and networking on raw materials in Europe	International cooperation Supply security	Europe	All	The project MIREU aims to establish a network of mining and metallurgy regions across Europe with a view to ensure the sustained and sustainable supply of mineral raw materials to the EU. The network will help the regions to share knowledge and experiences when facing the challenge to establish and maintain an extractive industry. MIREU will facilitate an exchange between all interested stakeholders in the regions, namely regulatory authorities, political and administrative bodies, development agencies, mining companies, non-government organisations, as well as the general public. The project will develop a shared knowledge base, taking into account the region-specific geographic and economic features, cultural, societal and language diversity, and their historical developments.	2017	2021	finished	2 999 725	Euro	GTK (Geological Survey of Finland)	WRFA	https://mireu.eu/	2
30	EU funded	Horizon 2020	H2020-EU.3.5. - SOCIETAL CHALLENGES - Climate action, Environment, Resource Efficiency and Raw Materials	CSA	SUstainable Management in EXtractive industries	SUMEX	Sustainable mining	Mining and mineral processing	Europe	All	The EU-funded SUMEX project will develop a sustainability framework for the extractive industry in Europe. The framework will apply across the extractive value chain to analyse the mineral as well as relevant economic, environmental and social policy frameworks of the EU and its Member States, as well as selected regions. The focus will be on socioeconomic and environmental impact assessments, land use planning, health and safety, reporting official statistics, and permitting processes and policy integration.	2020	2023	Ongoing	1 999 551,25	Euro	MONTANUNIVERSITAET LEOBEN	WRFA	https://www.sumexproject.eu/	2
31	EU funded	Horizon 2021	H2020-EU.3.5. - SOCIETAL CHALLENGES - Climate action, Environment, Resource Efficiency and Raw Materials	CSA	Minerals Policy Guidance for Europe	MINGUIDE	Mineral policy	Supply security	Europe	All	MIN-GUIDE was a project addressing the need for a secure and sustainable supply of minerals in Europe by developing a 'Minerals Policy Guide'. The key objectives of the project were (1) providing guidance for EU and MS minerals policy, (2) facilitating minerals policy decision making through knowledge co-production for transferability of best practice minerals policy, and (3) fostering community and network building for the co-management of an innovation catalysing minerals policy framework.	2016	2019	finished	1 999 625	Euro	WIRTSCHAFTSUNIVERSITAT WIEN	WRFA	https://cordis.europa.eu/project/id/689527/de	2
32	EU funded	Horizon 2022	HORIZON-CL4-2021-RESILIENCE-01-03 - Identifying future availability of secondary raw materials (RIA)	RIA	The Future Availability of Secondary Raw Materials	FutuRaM	Secondary raw materials	Supply security Recycling	Europe	CRMs	The Future Availability of Secondary Raw Materials (FutuRaM) project seeks to (1) develop knowledge on the availability and recoverability of secondary raw materials (SRMs) within the European Union (EU), with a special focus on critical raw materials (CRMs), to enable fact-based decision making for their exploitation in the EU and third countries, and (2) disseminate this information via a systematic and transparent Secondary Raw Materials Knowledge Base (SRM-KB). The FutuRaM project will establish a methodology, reporting structure, and guidance to improve the raw materials knowledge base up to 2050, and facilitate the exploitation of SRMs with a particular focus on CRMs. The project will integrate SRM and CRM data to model their current stocks and flows, and consider economic, technological, geopolitical, regulatory, social and environmental factors to further develop, demonstrate and align SRM recovery projects with the United Nations Framework Classification for Resources (UNFC).	2022	2026	Ongoing	11 675 968,75	Euro	WEEE Forum	WRFA	https://weee-forum.org/projects-campaigns/futuram/	1
33	EU funded	Horizon 2023	SC5-13f-2015 - Strategic international dialogues and cooperation with raw materials producing countries and industry	CSA	Strategic Dialogue on Sustainable Raw Materials for Europe	STRADE	policy for the long-term and sustainability of the European raw materials supply chains	Supply chain management International cooperation	Worldwide	All	STRADE addressed the long-term security and sustainability of the European raw material supply from European and non-European countries. It will develop dialogue-based, innovative policy recommendations for a European strategy on future raw-material supplies. STRADE concentrated on the industry perspective. Based on an analysis of the European mineral raw-material mining sector's competitiveness, the objective is to provide a strategy on how the EU can work to promote mining investment into and within the EU. Areas in which there is a need to revisit and improve present policies and conditions to advance European competitiveness for inward investments were identified.	2015	2018	finished	1 977 508,75	Euro	Oeko Institute	.	https://www.stradeproject.eu/home	2
34	Other sources				Extrative Commodity Trading		ESG due diligence in extractive commodity trading companies	CSR Environment Sustainability Supply chain management	Worldwide	All	This is a small project (initiated by the Responsible Mining Foundation) to support industry-wide implementation of existing guidance on responsible sourcing and public reporting. This project will produce a report that presents the findings of a pilot study on ESG due diligence and transparency policies and practices among a sample of companies in the extractive commodity trading sector. The assessment, based on public domain data, covers four key issues in extractive supply chains: Human Rights, Corporate Governance, Financial Flows and the Environment. The project will update the 2021 report.	2022	2023	Ongoing			Responsible Mining Foundation	WRFA (is a partner in developing this report)	https://www.responsibleminingfoundation.org/extractivecommoditytrading/	2
35	Other sources				Responsible Mica Initiative	RMI	Fair and responsible mica supply chains	Minning and mineral processing CSR Environment Sustainability Supply chain management	India	Mica	The Responsible Mica Initiative (RMI) is a global coalition for action – putting policy into practice – comprised of multiple organizations committed to establishing a fair, responsible and sustainable mica supply chain in the states of Jharkhand and Bihar in India that will eliminate unacceptable working conditions and eradicate child labor by 2030.	2017	Ongoing	Ongoing					https://responsible-mica-initiative.com/	3

ID	Project Type	Programme	Horizon Topic	Horizon Action type	Project full title	Project short title	topic	Keywords	geographic scope	commodities	short description	start year	end year	status	total budget	budget currency	lead partner	contact owner	project website	relevance
36	EU funded	Horizon 2020	Research & Innovation	RIA	Compact System for the Efficient Recovery of Cobalt with intergrated leading technologies	Crocodile	Recycling and secondary raw materials	Recycling Supply security Innovation	Europe	Cobalt	The project will showcase innovative metallurgical systems based on advanced pyro-, hydro-, bio-, iono- and electrometallurgy technologies for the recovery of cobalt and the production of cobalt metal and upstream products from a wide variety of secondary and primary European resources. Additionally, CROCODILE will produce a first of a kind economically and environmentally viable mobile commercial metallurgical system based on advanced hydrometallurgical and electrochemical technologies able to produce cobalt metal from black mass containing cobalt from different sources of waste streams such as spent batteries and catalysts. The new established value chain in this project will bring together for the first time major players who have the potential of supplying 10,000 ton of cobalt annually in the mid-term range from European resources, corresponding to about 65% of the current overall EU industrial demand.	2018	2022	Ongoing	14 623 772	Euro	FUNDACION TECNALIA RESEARCH & INNOVATION		https://h2020-crocodile.eu/	1
37	EU funded	Horizon 2020	Research & Innovation	RIA	Platinum group metals Recovery Using Secondary raw materials	Platirus	Recycling of PGM from key sources such as used car catalysts	Recycling Supply security Innovation	Europe	PGM	The projects aims to decrease the growing supply gap faced by the EU for PGM. The gap is due to lower production of secondary resources (read catalysts) and ongoing political instability of supplier countries. As consequence, the project promotes the development of novel or improved secondary materials to PGM recovery supply chains from autocatalysts, mining and electronic wastes. Successful market introduction of the PLATIRUS technology is likely to generate a significant impact on PGM availability for strategically important industrial sectors in Europe such as automotive and electronics, by filling the supply gap up to a potential 30% compared to the current situation.	2016	2021	finished	6 994 210	Euro	Tecnalia		https://www.platirus.eu/	1
38	EU funded	Horizon 2020	Research & Innovation	RIA	NEOdymium-Iron-Boron base materials, fabrication techniques and recycling solutions to Highly REduce the consumption of Rare Earths in Permanent Magnets for Wind Energy Application	Neohire	Substitution of REE requirements in wind turbine generation and decrease of import dependency through waste recycling	Recycling Supply security Innovation	Worldwide	REE, Co	NEOHIRE main objective is to reduce the use of rare earth elements (REE), and Co and Ga (CRM), in the permanent magnets used in wind turbine generators (WTG). This objective is mainly achieved through the development of: a) new concept of bonded NdFeB magnet able to substitute the present state-of-the-art sintered magnets for WT, and b) new recycling techniques for these CRM from the future and current permanent magnets (PM) wastes. In this way, the EU external demand of REE and CRM for PM in WTG will be reduced in a 50% (thanks to a strong reduction of the REE (Dy and Nd) and CRM (Co and Ga) needed to manufacture NEOHIRE PM for WT and to a high supply-chain based on reuse).	2017	2020	Finished	4 532 638,75	Euro	CEIT		https://neohire.eu/	2
39	EU-funded	Horizon 2020	Research & Innovation	RIA	Near zero waste recycling from sulphidic mining waste for critical metal, mineral and construction raw material production	Nemo	Recycling and reuse of sulphidic mining waste as a source for copper, lead, zinc and nickel;	Recycling Supply security Innovation	Europe	Co, Pb, Zn, Ni	NEMO aims at further treatment of tailing facilities to recover valuable metals and minerals, while concentrating hazardous elements and using the residual matrix in cement and construction materials.	2018	2022	Finished	14 144 709	Euro	VTT		https://h2020-nemo.eu/	2
40	EU-funded	Horizon 2020	Research & Innovation	RIA	European Training Network for the Design and Recycling of Rare-Earth Permanent Magnet Motors and Generators in Hybrid and Full Electric Vehicles	Demeter	Recycling of REE containing devices	Recycling Supply security Innovation	Europe	Li, Co, Graphite	The project aims to reduce the supply risks for REE, inclduing for the downstream industries by increasing the recycling rates from devices that contain REE. It does so through increasing reuse, direct recycling and indirect recycling. Its four objectives are to i) Develop innovative, eco-efficient direct and indirect recycling routes of NdFeB and SmCo magnets motors and generators from End-of-Life (H)EVs and Advanced ICEVs; ii) Develop innovative processing techniques for production of high performance NdFeB and SmCo magnets; iii) Design electric motors and generators for the next generation of (H)EVs and Advanced ICEVs to enable easy future reuse of NdFeB and SmCo magnets; iv) Develop a complete, "(urban) mine-to-machine", lifecycle assessment (LCA) and lifecycle costing (LCC) methodology for REE permanent magnets to ensure the most environmentally-friendly and economical routes are applied for recycling.	2015	2019	finished	3 802 512,24	Euro	KU-Leuven		https://etn-demeter.eu/	2
41	EU-funded	Horizon	Research & Innovation	RIA	Batteries reuse and direct production of high performances cathodic and anodic materials and other raw materials from batteries recycling using low cost and environmentally friendly technologies.	Rhinoceros	Recycling of EV batteries including anodes and cathode components	Recycling Supply security Innovation	Europe	Li, Co, Graphite	develop and improve economically and environmentally viable routes for re-using and recycling end-of-life electric vehicles and stationary energy storage lithium-ion batteries. In the framework of the project, the consortium these innovative recycling solutions will be tested and demonstrated in an industrially relevant environment. The project has great potential to decrease Europe's dependency on critical raw material imports (Li, Co, graphite) by demonstrating a recycling route from local EU resources.	2022	2025	Ongoing	8.943.025,75	Euro	Tecnalia		Not yet set up	
42	EU-funded	Horizon 2020	Research & Innovation	RIA	Integrated Innovative Pilo	Rawmina	Recyling CRMs from mine wastes	Recycling Supply security Innovation	Europe	Ge, Sb, W, Co, Fe, Au and Ag	RAWMINA aims to develop and to demonstrate the RAWMINA pilot system: an industrially scalable and flexible innovati	2021	2024	Ongoing	10857402	Euro	Leitat		www.rawmina.eu	3
43	Other	FFEM, AFD			Building a pioneering treatment system for electrical and electronic waste in Africa	WEEECAM	Recycling WEEE	Recycling Supply security Institutional cooperation	Africa	Au, Ag, Cu, CRM	The WEEECAM project legitimises and reinforces the legal arrangements put in place by the Cameroon government and assists in meeting the requirements of the international legal instruments which the country has ratified. Having tested the creation and re-sale of carbon credits linked to managing WEEE, this initiative is based on a pioneering economic model which can be tailored to ensure viability as a business stream, even without subsidies. This is key to determining its reproducibility in other African countries and more widely in other developing nations. Such an innovative organisational model, associated with an R&D component to transfer current recycling technologies is further enhanced through partnership building and advocacy development. This package is an example of a rationale that allies environment and economics.	2017	2022	Ongoing	600000	Euro			https://www.ffem.fr/en/carte-des-projets/weeecam-building-pioneering-treatment-system-electrical-and-electronic-waste	2
44	EU-funded	Horizon 2020			Integrated Mineral Technologies for More Sustainable Raw Material Supply	ITERAMS	Water recycling in mining activities. Minimization of environmental impact	Mineral processing Environment	Worldwide		The project aims to isolate the mineral processing plant of a mine and its water use completely from adjacent water systems. This will result in more efficient water recycling. Another target is the development and small-scale application of technologies for exploiting the valuable contents of the solid tailings. Furthermore, ITERAMS aims at improving the properties of the material that will be finally deposited to storage. Both implementations are expected to bring cost savings as well as added income streams to mine sites, improve the environmental footprint of a mine and enhance its positive reception in the public. These aspects will be verified with the help of a comprehensive life cycle sustainability assessment.									
45	EU-funded	Horizon 2020	Societal challenges	SA	Sonic Drilling coupled with Automated Mineralogy and chemistry On-Line-On-Mine-Real-Time	SOLSA	Improved drill-core analyses techniques, to be done on-site	Exploration Geological potential	Worldwide		SOLSA is the first automated expert system for on-site cores analysis. With access to data on-line, great savings are expected on the number of drill holes, the accuracy of geo-models and economic evaluation of ore reserves. It includes (1) integrated drilling optimized to operate in the difficult lateritic environment with the challenge of a mixture of hard and soft rocks, extensible also to other ore types, (2) fully automated scanner and phase identification analyser and software, usable as well in other sectors.	2016	2020	Finished	9 775 488,25	Euro	BRGM Eramet		https://www.solsa-mining.eu/	2
46	EU-funded	Horiton 2020			Efficient mineral processing and Hydrometallurgical Recovery of by product Metals from low-grade metal contalning secondary raw materials	Chromic	Improving availability of minerals, specifically of Chromium, Molybdaen, Niobium and Vanadium through recovery from industrial wastes	Recycling Environment	Worldwide		Aims to develop new processes to recover chromium, vanadium, molybdenum and niobium from industrial waste, through smart combinations and new technological innovations. This will help reduce the CO2 emissions of metal production and reduce the environmental impact of its wastes. CHROMIC will contribute to sustainable materials management by recovering resources from waste and avoiding primary extraction. The result will be a a "circular economy", which turns what is now waste into products with a high market value CHROMIC is an inclusive project, that will seek citizens and communities contribution in designing its technologies	2016	2020	Finished	4 869 687,50	Euro	Vito		http://www.chromic.eu/	2
47	EU-funded	Horizon 2020	Research & Innovation	RIA	Ionometallurgy of primary sources for an enhanced raw materials recovery	ION4Raw	New mineral processing technology to recover by-products from primary sources by means of innovative Deep Eutectic Solvent (DES) ionic liquids and advanced electrochemical methods	Recycling Mining and mineral processing	Europe	Tellurium, selenium, rhenium, molybdenum, bismuth, germanium, indium, cobalt, platinum, antimony, copper, silver, gold	Project aims to convert new and currently unexploited resources into reserves. It proposes an energy-, material- and cost-efficient new mineral processing technology that will help in the recovery of by-products from primary sources (such as germanium or indium) and major metals, such as copper, silver and gold.Targeted metals to be recovered as by-products are within Cu-Ag-Au group: tellurium (Te), selenium (Se), rhenium (R e), and molybdenum (Mo), as well as Critical Raw Materials as bismuth (Bi), germanium (Ge), indium (In), cobalt (Co), platinum (Pt) and antimony (Sb). Accompanying major product metals, e.g. copper (Cu), silver (Ag) and gold (Au), may also be recovered by this process.	2019	2023	Ongoing	5 684 450	Euro	Idener		https://ion4raw.eu/	2
48	EU-funded	Horizon 2020	Societal Challenges	SA	New Mining Concept for Extracting Metals from Deep Ore Deposits using Biotechnology	BioMOre	Mining of small and complex deposits and alternative mining	Mining and mineral processing	Europe	Not restricted	The concept is to use hydrofracturing for stimulation and bioleaching for winning of ores. The final process will consist of a so-called doublet, which is two deviated and parallel wells. Phase 1 will be research on the intended bioleaching process whereas phase 2 will aim at a pilot installation to demonstrate the applicability of the process in large scale including hydro-fracturing and access of the deposit from surface. The main objective of the BioMOre first phase is to design and build an underground test facility for testing the concept of combined hydro-fracturing and bioleaching. The intention is to test the bioleaching process in high detail in an in-situ environment at the same time avoiding time consuming and risky permission procedures.	2015	2018	Finished	8 564 961	Euro	KGHM POLSKA MIEDZ			2
49	EU-funded	Horizon 2020	Societal Changes	SA	Prospecting Secondary raw materials in the Urban mine and Mining waste	ProSUM	Using urban mines and mining waste as deposits for raw materials	Mining and mineral processing Recycling Mineral intelligence Institutional cooperation	Europe	ECRM	The ProSUM project will establish a European network of expertise on secondary sources of critical raw materials (CRMs), vital to today's high-tech society. Data on primary and secondary raw materials are available in Europe, but scattered amongst a variety of institutions including government agencies, universities, NGOs and industry. By establishing a EU Information Network (EUIN), the project will coordinate efforts to collect secondary CRM data and collate maps of stocks and flows for materials and products of the "urban mine". The scope is the particularly relevant sources for secondary CRMs: Electrical and electronic equipment, vehicles, batteries and mining tailings.	2015	2017	Finished	3 704 327	Euro	AISBL		https://www.prosumproject.eu/	1

ID	Project Type	Programme	Horizon Topic	Horizon Action type	Project full title	Project short title	topic	Keywords	geographic scope	commodities	short description	start year	end year	status	total budget	budget currency	lead partner	contact owner	project website	relevance
50	EU-funded	Horitzon 2020			Development of a sustainable exploitation scheme for Europe's Rare Earth ore deposits	EURARE	New environmentally friendly approaches in minerals processing	Mining and mineral processing Environment Supply chain management Institutional cooperation	Europe	REE	The main goal of the EURARE project was to set the basis for the development of a European Rare Earth Element (REE) industry. Establishment of an REE value chain in Europe would safeguard the uninterrupted supply of REE raw materials and products crucial for sectors of the EU economy (including automotive, electronics, machinery and chemicals) in a sustainable, economically viable and environmentally friendly way. It had 4 key objectives: The mapping, characterization and technological and economic evaluation of the REE resources in Europe The development, optimization and demonstration of innovative technologies for the efficient exploitation of European REE resources with minimal impact on the environment. This will be done in compliance with the EU environmental legislation and in a manner acceptable to European citizens The establishment of the critical mass of scientists and engineers to support the REE exploitation, processing and manufacturing industry The development of an Integrated Knowledge Management System (IKMS) for EU REE resources, which will provide information on REE and build up the knowledge to be developed within the frame of the project.	2014	2018	Finished	447,547	Euro			http://www.eurare.org/	1
51	EU-funded	Horizon 2020			Holistic Innovative Solutions for an Efficient Recycling and Recovery of Valuable Raw Materials from Complex Construction and Demolition Waste	HISER	Recycling and recovery of raw materials from secondary sources	Mining and mineral processing Environment Recycling	Europe	Not restricted	EU28 currently generates 461 milion tons per year of Construction and Demolition Waste (C&DW;), excluding excavated material, and the generation rates are expected to reach 516 Mt in 2020 and around 570 Mt between 2025 and 2030. C&DW; is ever more complex and there is a need for shifting from traditional recycling approaches to novel recycling and recovery solutions. This will guarantee a higher efficiency in the recovery of mineral, metallic and organic resources contained in this priority waste steam. Therefore, the HISER project proposes integral solutions throughout the whole building value chain.	2015	2018	Finished	306,025	Euro	Tecnalia		https://www.hiserproject.eu/	3
52	EU-funded	Horizon 2020	Societal Changes	SA	Sustainable Low Impact Mining solution for exploitation of small mineral deposits based on advanced rock blasting and environmental technologies	SLIM	New solutions for sustainable production of raw materials	Mining and mineral processing Environment	Worldwide	Not restricted	The main economic, technological and environmental challenges of small mining include reducing high investment costs, reducing generation of waste and large tailings, identifying and addressing environmental impacts, and improving flexibility, automation and safety of operations. SLIM aims to develop a cost-effective and sustainable selective low impact mining solution based on non-linear rock mass fragmentation by blasting models, airborne particulate matter, vibration affections and nitrate leaching mitigation actions for exploitation of small mineral deposits	2016	2020	Finished	6 979 200	Euro	UNIVERSIDAD POLITECNICA DE MADRID			
53	EU-funded	Horizon 2020	Societal Changes	SA	Mineral Intelligence Capacity Analysis	MICA	Raw materials intelligence capacity	Mineral intelligence Institutional cooperation	Europe	Not restricted	The MICA project contributes to on-going efforts towards the establishment of a stakeholder tailored product, namely the "European Union Raw Materials Intelligence Capacity Platform" (EU-RMICP). To do so, the project team will conduct a careful analysis of stakeholder needs and undertake a review of existing data, methods and tools that provide intelligence on raw materials. brings together a multidisciplinary team of experts from natural and technical sciences, social sciences including political sciences, and information science and technology to ensure that Raw Material Intelligence is collected, collated, stored and made accessible in the most useful way corresponding to stakeholder needs.	2015	2018	Finished	2 005 205	Euro	Geological Survey of Denmark (GEUS)		https://www.mica-project.eu/	2
54	EU-funded	Horizon 2020	Societal Changes	SA	Optimising quality of information in RAw MAterials data collection across Europe	ORAMA	Raw materials policy support actions	Mineral intelligence Institutional cooperation	Europe	Not restricted	The project focuses on optimising data collection for primary and secondary raw materials in Member States. It supports the further development of the system containing this information. The Joint Research Centre (JRC), the European Commission´s science and knowledge service, is responsible for the Raw Materials Information System (RMIS), which is planned to fulfil the mentioned criteria in the future. ORAMA will identify the best practices in collecting information on raw materials (WP1 & WP2). Data providers are targeted for training to secure wider uses of these practices. The objective is to create a system to transfer information stored at national level to the EU common information system. This public service will show which metallic raw materials are produced in different parts of the EU, in which quantities and how much is imported to the EU.	2015	2019	Finished	1 731 230	Euro	Geological Survey of Finland (GTK)		https://orama-h2020.eu/	2
55	EU-funded	Horizon 2020	Societal Changes	SA	Multi-Stakeholder Platform for a Secure Supply of Refractory Metals in Europe	MSP-REFRAM	Raw materials policy support action	Mineral intelligence Institutional cooperation Mining and mineral processing	Europe	Renium, tungsten, other refractory minerals	A secure access to refractory metals is highly strategic for Europe. Although primary refractory metal resources are limited in Europe, they can be found in secondary resources (industrial waste and urban mines) and are already being recycled from super alloys to some extent. The supplyvalue chain in the coming years could be improved if industry develops a better use of these secondary resources, optimises the use of external resources such as energy and water and at the same time reduces the amount and the toxicity of the waste.MSP-REFRAM aimed to establish a durable multi-stakeholder network to carry out a comprehensive study of the entire value chain of key refractory metals including mining, processing, recycling and final applications (and potential substitution opportunities), and taking account of crosscutting aspects: policy/society, technology and market.	2015	2017	Finished		Euro	COMMISSARIAT A L ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES		https://prometia.eu/msp-reframe/	3
56	EU-funded	Horizon 2020	Societal Changes	SA	Mineral resources in sustainable land-use planning	Minland	Social license to operate Land use	Mining and mineral processing CSR Sustainability Institutional cooperation	Europe	Not restricted	The MINLAND project has been designed to meet challenges concerning competing land-use planning related to different land-use interests. Competition about use of land is fierce within Europe. There is a large need for access to land for exploration and extraction of mineral raw materials, including critical raw materials. MINLAND aims to secure access to land, with actual or potentially valuable resources, for exploration and extraction of minerals, in an integrated and optimised process, within the EU. The main goal for the MINLAND project is to ensure access to areas with actual or potentially valuable resources for mineral exploration and exploitation activities within the EU. Exploration and exploitation are required in order to secure European access to necessary raw materials, including critical raw materials (CRM).	2017	2019	Finished	1 498 691	Euro	Swedisch Geological Survey		https://www.minland.eu/project/	1
57	EU-funded				Exploration Information System	EIS	Mineral information	Exploration Geological potential Mineral intelligence	Worldwide	Not restricted	Main aim of this project is to implement an exploration information system (EIS) for MPM, which includes tools for data preprocessing, integration and visualization in GIS. The fundamental basis of EIS (Mahyar et el. 2019) is the mineral system library defining the critical parameters associated with each mineral system type. The data preprocessing tools will enable transformation of measured geoscientific quantities to grids of values representing proxies to the critical parameters. Several data integration tools will be implemented for combining the information from the various proxies into a prospectivity map. There should be a variety of data integration methods for different types of input data (supervised and unsupervised methods). There will also be a set of model validation tools.					Euro	Geological Survey of Finnland; BRGM		https://eis-he.eu/	1