

New projects funded under Horizon 2020 Societal Challenge 'Climate action, environment, resource efficiency & raw materials' – 2015 one-stage calls for proposals

Project	Type of action	Duration	EU contribution in EUR	Project coordinator	Short description*
<b>AfriAlliance: Africa-EU Innovation Alliance for Water and Climate</b>	Coordination and support	01/03/2016 - 28/02/2021	3,238,735	STICHTING IHE DELFT - Netherlands	<p>The main objective of AfriAlliance is for African and European stakeholders to work together in the areas of water innovation, research, policy, and capacity development to prepare Africa for future Climate Change challenges. There are many but fragmented initiatives and networks in place, therefore we will not create new but will consolidate existing networks of scientists, decision makers, practitioners, citizens and other key stakeholders into an effective, problem-focused knowledge sharing mechanism via an overall coordination platform: the Africa-EU Innovation Alliance for Water and Climate. We will support them in identifying appropriate social innovation and technological solutions for key water and climate change challenges.</p> <p>We will take Africa-EU cooperation in this field to a practical level by sharing (non)technological innovation for local challenges, thus also identifying and boosting sustainable market and investment opportunities. Demand-driven, problem-focused Action Groups will share knowledge between the identified stakeholders and networks at all scales to effectively identify and address vulnerabilities. We will make extensive use of existing/emerging communication channels and events (EU/African platforms, conferences, social media) to streamline Climate Change issues into water-related networks to raise awareness about their impacts and propose adaptation measures.</p> <p>We will re-enforce and valorise Water and Climate Change research and (social) innovation (R&amp;I) cooperation between Africa and Europe through a mix of forward-looking and bottom-up innovation and road mapping techniques. We will identify demands, opportunities, and constraints at different levels and develop strategic advice (short term demand-driven R&amp;I outlook and long term R&amp;I agenda) for improving Africa-EU collaboration. This will help policy makers to create a consistent approach to bilateral cooperation between Africa and the EU in the field of innovation for water and climate.</p>
<b>Blue Nodules: Breakthrough Solutions for the Sustainable Harvesting and Processing of Deep Sea Polymetallic Nodules</b>	Research and innovation	01/02/2016 - 31/01/2020	7,991,137	IHC MINING BV - Netherlands	<p>A key EU policy aims to reduce the Union dependency on raw materials imports, in particular (candidate) Critical Raw Materials that are vital for the EU innovative technologies. Topic SC5-11c-2015 scope focuses on “developing new highly-automated technological sustainable solutions for deep mining ... in the sea bed combined with in-situ processing of minerals”. An existing but challenging raw material resource concerns polymetallic nodules. These round to elongated concretions of 1–15 cm diameter form on sediment-covered deep-sea plains in all oceans between 4-6000m water depth. The challenge to harvest and transport the nodules to the EU shore is taken on by Blue Nodules.</p> <p>The governing project principle is: industrial viability within the context of a realistic and technical, economic and environmentally balanced business case for the complete Polymetallic Nodules value chain of mining, processing and valorisation. Blue Nodules will develop and test to TRL6 maturity a new highly-automated and technologically sustainable deep sea mining system. Key features are: an annual production capability of 2 million tons nodules in water depths up to 6000m, in-situ processing of the nodules and intrinsic safe</p>

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					working conditions. Technical WPs are dedicated to subsea harvesting equipment & control technology, in-situ seafloor processing of polymetallic nodules and sea surface, land operations & processes. A dedicated WP focuses on environmental issues and on an Environmental Impact Assessment (EIA). A WP setting requirements and assessing the developed technology controls the entire work plan structure. High credibility is obtained by linking the project work to a nodule field licence owned by a project partner and located in the most promising known nodule deposit: the Clarion Clipperton Zone. The project consortium contains 14 leading industry and research partners from 9 EU member states. The project duration is 42 months, the required funding amounts to 8 Million.
<b>ECOMS2: European Climate Observations, Modelling and Services - 2</b>	Coordination and support	01/12/2015 - 30/11/2020	2,994,372	MET OFFICE – United Kingdom	<p>The ECOMS2 Action will coordinate and support Europe’s knowledge base to enable better management of climate-related risks and opportunities thereby creating greater social and economic value. ECOMS2 has 4 main objectives:</p> <ol style="list-style-type: none"> <li>1. Develop a European framework for Earth-system modelling and climate service activities. The framework will be built around a managed network of European, national and international activities and organisations. Such a network does not yet exist but is becoming increasingly necessary.</li> <li>2. Coordinate and integrate European climate modelling, climate observations and climate service infrastructure initiatives (including JPI-Climate, Climate-KIC, Copernicus C3S) and facilitate dialogue among the relevant stakeholders, including climate science communities, funding bodies, providers and users. This will improve synergies, reduce fragmentation and promote alignment between activities. The user communities will include public sector, businesses, industry and society.</li> <li>3. Establish multi-disciplinary expert groups to assess the state-of-the-art in Earth-system modelling and climate services in Europe; and identify existing gaps, new challenges and emerging needs.</li> <li>4. Enhance communication and dissemination activities with stakeholders, in particular through events to bring the network together and showcase progress; stakeholder-oriented reports on the state-of-the-art in Earth-system modelling and climate services in Europe; operating a website; and undertaking additional stakeholder interactions to increase awareness and maximise project impacts.</li> </ol> <p>This CSA will deliver a range of highly beneficial impacts. Two key impacts are</p> <ol style="list-style-type: none"> <li>(i) to greatly enhance the transfer of information between suppliers and users to improve the resilience of European society to climate change and mitigation of the risk of dangerous climate change; and</li> <li>(ii) to improve coordination to increase efficiency, reduce fragmentation and create synergies with international R&amp;I programmes.</li> </ol>

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<b>EQUINOX: A novel process for manufacturing complex shaped Fe-Al intermetallic parts resistant to extreme environments</b>	Research and innovation	01/02/2016-31/01/2019	4,678,345	NATIONAL TECHNICAL UNIVERSITY OF ATHENS - Greece	<p>After World War II some east European countries were facing severe problems to buy Cr and shortage Ni on the free market to cover their needs for stainless steel production and materials for high temperature using. To overcome this shortage Russia and Czech Republic initiated a strong partnership in the 50s between national research institutions, universities and local industry to develop low cost alternatives for heat resistant cast iron and stainless steel alloys based on intermetallics casted from accessible and cheap Iron, Aluminium and Carbon. These efforts result in the past in the materials such as Thermagal© Tchugal© and Pyroferal©. Pyroferal© offered quite impressive results on high temperature corrosion resistance. It was tested against various severe conditions, such as air atmosphere, vanadium pentoxide, molten glass, carburization, nitration and the atmosphere of the natural gas cracking generators. Though Pyroferal© was manufactured only by casting, welding was the important procedure not only to produce complicated shapes, but also to repair the faults in casts. Unfortunately, the practical use of these materials was limited due to various problems. These problems related to instability and welding could not be overcome by state of the art in material science at that time. In the 60s, access to Chromium was no problem any longer and the dust of history covered the knowhow on (pre-) industrial use of FeAl. But things may change again. Chromium and Nickel are listed in the table of CRMs with a current projected lifetime of 25 - 100 years.</p> <p>EQUINOX tries to blow away the dust of history from this early work on FeAl, aiming to combine latest state of the art in intermetallic metallurgy to overcome the problems that our ancestors were facing when they failed to translate unique corrosion and wear properties of FeAl into a low cost Cr/Ni-free alternative for stainless steel products.</p>
<b>Flintstone2020: Next generation of superhard non-CRM materials and solutions in tooling</b>	Research and innovation	01/02/2016 - 31/01/2020	4,996,180	LUNDS UNIVERSITET - Sweden	<p>Flintstone2020 aims to provide a perspective for the replacement of two important CRMs – tungsten (W) and cobalt (Co) – which are the main constituents for two important classes of hard materials (cemented carbides/WC-Co, and PCD/diamond-Co), by developing innovative alternative solutions for tooling operating under extreme conditions. Fundamental knowledge on mechanical properties and wear of different tools, gained in machining tests and dedicated experiments from WP1 is passed onto the respective WPs. WP2 will experiment on small samples with 3-9 mm Ø for testing the fundamental behaviour of new B-X phases and particularly as a feedback for binder matrix improvement. In WP3 samples (12 mm Ø) will be investigated from individual HPHT runs for characterization and testing to guide high pressure sintering process optimization. The HPHT process and the samples produced are then up scaled to the industrial mass production level in WP4. In WP5, demonstrator cutting tools from full size HPHT synthesis test runs will be prepared via laser cutting and consecutive macro- and micro shaping of tool geometry within WP5. In WP6 aspects of environmental benefits in the total life cycle of the super hard materials will be investigated, including health and safety aspects. WP7 will focus on exploitation and dissemination.</p>

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<b>GEO-CRADLE: Coordinating and integrating state-of-the-art Earth Observation Activities in the regions of North Africa, Middle East, and Balkans and Developing Links with GEO related initiatives towards GEOSS</b>	Coordination and support	01/02/2016 - 31/07/2018	2,910,800	NATIONAL OBSERVATORY OF ATHENS - Greece	<p>GEO-CRADLE brings together key players representing the whole (Balkans, N. Africa and M. East) region and the complete EO value chain with the overarching objective of establishing a multi-regional coordination network that will</p> <ul style="list-style-type: none"> <li>(i) support the effective integration of existing EO capacities (space/air-borne/in-situ monitoring networks, modelling and data exploitation skills, and past project experience),</li> <li>(ii) provide the interface for the engagement of the complete ecosystem of EO stakeholders (scientists, service/data providers, end-users, governmental orgs, and decision makers),</li> <li>(iii) promote the concrete uptake of EO services and data in response to regional needs, relevant to the thematic priorities of the Call (adaptation to climate change, improved food security, access to raw materials and energy), and</li> <li>(iv) contribute to the improved implementation of and participation in GEO, GEOSS, and Copernicus in the region.</li> </ul> <p>In this context, GEO-CRADLE lays out an action plan that starts by inventorying the regional EO capacities and user needs, which in turn leads to a gap analysis, the definition of region specific (G)EO Maturity Indicators and common priority needs. Through showcasing pilots, it demonstrates how the priorities can be tackled by the GEOCRADLE Network, and provides the roadmap for the future implementation of GEOSS and Copernicus in the region, building on the GEO-CRADLE Regional Data Hub, which abides by the GEOSS Data Sharing Principles. To maximise the impact of GEO-CRADLE activities, well-defined Communication, Dissemination and Stakeholder Engagement strategies are proposed. Key Performance Indicators (KPIs) will be used for the quantified assessment of the impact, identifying potential enabling or constraining factors, while pursuing realistic but also ambitious exploitation scenarios.</p> <p>For efficient project coordination, the project management is assisted by a regional coordination structure, and active liaison with EC, GEO and UN initiatives.</p>

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<b>HiTech AlkCarb: New geomodels to explore deeper for High-Technology critical raw materials in Alkaline rocks and Carbonatites</b>	Research and innovation	01/02/2016 - 31/01/2020	5,395,296	THE UNIVERSITY OF EXETER – United Kingdom	Five of the 20 raw materials identified by the European Commission as critical are commonly found in association with alkaline rocks and carbonatites (heavy and light rare earth elements, niobium, fluorspar, and phosphate). Other elements increasingly important for 'hi-tech' applications, and found in these rocks include hafnium (Hf), tantalum (Ta), scandium (Sc) and zirconium (Zr). In fact, there is a greater chance of a carbonatite complex having resources economic to mine than any other rock type (about 20 active mines in ca. 500 known carbonatite complexes). Less than 3% of critical raw materials supply is indigenous to the EU. However, deposits are known and exploration is ongoing in parts of northern Europe. In central and southern Europe the presence of abundant alkaline volcanic rocks indicates the likelihood that deposits exist within about a km of the surface. This project will make a step-change in exploration models for alkaline and carbonatite provinces, using mineralogy, petrology, and geochemistry, and state-of-the-art interpretation of high resolution geophysics and downhole measurement tools, to make robust predictions about mineral prospectivity at depth. This will be achieved through studies at seven key natural laboratories, combined with Expert Council workshops. The results will be incorporated into new geomodels on multiple scales. In contrast to known deposits, Europe is well endowed with expertise. The project brings together industry partners involved in exploration, geophysics and environmental assessment with two geological surveys, a major museum and five universities. The results will make Europe the world leader in this specialist area. They will give the four SME industry partners world-leading expertise to develop and expand their businesses, transferring their business expertise from Africa to Europe. The project will help give European 'hi-tech' industry the confidence to innovate in manufacturing using critical raw materials.

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<b>IMPACTPapeRec: IMPACT - Introduction and Improvement of Separate Paper Collection to avoid landfilling and incineration</b>	Coordination and support	01/02/2016 - 31/01/2018	1,486,782	INSTITUTO TECNOLÓGICO DEL EMBALAJE, TRANSPORTE Y LOGÍSTICA - Spain	<p>The European paper industry is at the core of the bioeconomy, using wood, a renewable material, and Paper for Recycling (PfR) as its main raw materials for producing paper products. This industry is a strategic sector in the EU economy, actively contributing to the re-industrialisation of Europe. Currently, the production of paper and board in the EU is 91 tonnes per year, while PfR represents 63%. The contribution of PfR has increased over the last few years (from 25 t to 40 t). This increase in the availability of PfR has not taken place in all EU states, and this is especially true in Eastern European countries. Besides, although high collection rates are achieved, the quality of this material does not always meet the requirements of paper recycling. Both facts make difficult to keep up with the increases in PfR collection rates observed over the last few years if specific actions are not taken.</p> <p>IMPACTPapeRec aims to put Europe at the forefront of PfR collection, ensuring raw material procurement from mainly European sources through an innovative approach based on the participation of the whole paper value chain including citizens and municipalities, which is also open to other sectors. Main objective is to provide an innovative and common knowledge platform, which will enable present and future cooperation. Analysis on best practices in PfR collection and assessment procedures are delivered, considering specific local conditions. They will encourage reliable decisions and make solutions available to decision-makers ensuring the procurement and supply of PfR in Europe through the improvement of municipal paper collection. Medium-long results are: increases in PfR collection (up to 75%); 1.57 Mt/year and raw material savings of €385 million. This proposal has positive support from the EU of the commitment approved within the EIP on raw materials.</p>

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<b>INTMET: Integrated innovative metallurgical system to benefit efficiently polymetallic, complex and low grade ores and concentrates</b>	Research and innovation	01/02/2016 - 31/01/2019	7,834,976	COBRE LAS CRUCES SA - Spain	The INTMET approach represents a unique technological breakthrough to overcome the limitations related to difficult low grade and complex ores to achieve high efficient recovery of valuable metals (Cu, Zn, Pb, Ag) and CRM (Co, In, Sb). Main objective of INTMET is applying on-site mine-to-metal hydroprocessing of the produced concentrates enhancing substantially raw materials efficiency thanks to increase Cu+Zn+Pb recovery over 60% vs. existing selective flotation. 3 innovative hydrometallurgical processes (atmospheric, pressure and bioleaching), and novel more effective metals extraction techniques (e.g. Cu/Zn-SX-EW, chloride media, MSA, etc) will be developed and tested at relevant environment aiming to maximise metal recovery yield and minimising energy consumption and environmental footprint. Additionally secondary materials like tailings and metallurgical wastes will be tested as well for metals recovery and sulphur valorisation. The technical, environmental and economic feasibility of the entire approaches will be evaluated to ensure a real business solution of the integrated INTMET process. INTMET will be economically viable thanks to diversification of products (Cu, Zn, Pb), high-profitable solution (producing commodities not concentrates), with lower operation and environmental costs (on-site hydroprocessing will avoid transport to smelters) and allowing mine-life extension developing a new business-model concept based on high efficient recovery of complex ores that will ensure EU mining industry competitiveness and employment. INTMET is fully aligned with EIP-RM validated in the PolymetOre Commitment where most of INTMET partners take part on and the market up-take solutions are guaranteed by an exploitation from industrially-driven consortia composed by 4 Mines, 2 SMEs (AGQ –waste & water tech provider; MINPOL -policy & exploitation expert), 2 tech providers (OUTOTEC and TR) and 5 complementary RTD's with expertise in leaching and recovery metals processing.
<b>METGROW PLUS: Metal Recovery from Low Grade Ores and Wastes Plus</b>	Research and innovation	01/02/2016 - 31/01/2020	7,911,462	Teknologian tutkimuskeskus VTT Oy - Finland	METGROW+ will address and solve bottlenecks in the European raw materials supply by developing innovative metallurgical technologies for unlocking the use of potential domestic raw materials. The METGROW+ consortium has received an EIP RM Commitment status. The consortium is supported by internationally respected research institutes and universities. Many of the partners (9) are members of EIT KIC Raw Materials consortium as well. The value chain and business models for metal recovery from low grade ores and wastes are carefully looked after. Within this project, both primary and secondary materials are studied as potential metal resources. Economically important nickel-cobalt deposits and low grade polymetallic wastes, iron containing sludges (goethite, jarosite etc.) which are currently not yet being exploited due to technical bottlenecks, are in focus. Concurrently, METGROW+ targets innovative hydrometallurgical processes to extract important metals including Ni, Cu, Zn, Co, In, Ga, Ge from low grade ores in a cost-effective way. In addition a toolbox for metallurgical system is created in the project using new methods and combinations. The unused potential of metal containing fine grained industrial residues are evaluated, while

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					hybrid and flexible hydrometallurgical processes and treatment methods of fines are developed for both materials. Training and education of new professionals are facilitated within the METGROW+ project. The knowledge of raw materials and sustainable technologies will attract new talents in the field who can flexibly change fields from treatment of secondary to primary resources, which also smoothens the economic ups and downs in the primary sector.
<b>MICA: Mineral Intelligence Capacity Analysis</b>	Coordination and support	01/12/2015 - 31/01/2018	1,998,955	Geological Survey of Denmark and Greenland - Denmark	Primary and secondary raw materials are fundamental to Europe's economy and growth. They represent the most important link in the value chain of industrial goods production, which plays a prominent role as a source of prosperity in Europe. However, as stated in the call, there exists to-date no raw materials knowledge infrastructure at EU level. The Mineral Intelligence Capacity Analysis (MICA) project contributes to on-going efforts towards the establishment of such an infrastructure by projects such as ProMine, EURare, Minventory, EuroGeoSource, Minerals4EU, ProSum, I2Mine, INTRAW, MINATURA2020 and others. The main objectives of MICA are: - Identification and definition of stakeholder groups and their raw material intelligence (RMI) requirements,- Consolidation of relevant data on primary and secondary raw materials,- Determination of appropriate methods and tools to satisfy stakeholder RMI requirements,- Investigation of (RMI-) options for European mineral policy development,- Development of the EU-Raw Materials Intelligence Capacity Platform (EU-RMICP) integrating information on data and methods/tools with user interface capable of answering stakeholder questions,- Linking the derived intelligence to the European Union Raw Materials Knowledge Base developed by the Minerals4EU project. The MICA project 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. Furthermore, the MICA project integrates a group of 15 European geological surveys that contribute to the work program as third parties. They have specific roles in the fulfilment of tasks and will provide feedback to the project from the diverse range of backgrounds that characterizes the European geoscience community.

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<b>MIN-GUIDE: Minerals Policy Guidance for Europe</b>	Coordination and support	01/02/2016 - 31/01/2019	1,999,625	WIRTSCHAFTSU NIVERSITAT WIEN - Austria	<p>MIN-GUIDE is 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 are</p> <ol style="list-style-type: none"> <li>(1) providing guidance for EU and MS minerals policy,</li> <li>(2) facilitating minerals policy decision making through knowledge co-production for transferability of best practice minerals policy, and</li> <li>(3) fostering community and network building for the co-management of an innovation catalysing minerals policy framework.</li> </ol> <p>This will be achieved through a systematic profiling and policy benchmarking of relevant policy and legislation in Europe, which includes the identification of innovation friendly best practices through quantitative indicators and a qualitative analysis country-specific framework conditions, as well as through the compilation of minerals statistics and reporting systems. These insights will form the basis for developing an interactive, tailor-made online 'Minerals Policy Guide'. Another key feature of the MIN-GUIDE project will be knowledge co-production for minerals policy decision makers through Policy Laboratories exploring these best practice examples along the whole mineral production value chain (exploration and extraction, processing, recycling and mine closure).</p> <p>Furthermore, MINGUIDE will facilitate the building of a sustainable minerals policy stakeholder network through this knowledge coproduction and utilization in Policy Laboratories as well as through three major Conferences. These conferences will explore the minerals governance framework, work on recommendations for promoting innovation along the whole minerals production value chain, and put it into the wider context of the circular economy.</p> <p>The MIN-GUIDE project and in particular the dissemination of the 'Minerals Policy Guide' to specific target audiences will have the expected impact of guiding EU MS and EU level minerals policy-making towards a more coherent, transparent and innovation-catalysing framework.</p>
<b>MSP-REFRAM: Multi-Stakeholder Platform for a Secure Supply of Refractory Metals in Europe</b>	Coordination and support	01/12/2015 - 30/06/2017	1,499,760	COMMISSARIAT A L'ENERGIE ATOMIQUE ET AUX ENERGIES ALTERNATIVES - France	<p>Refractory metals (tungsten, tantalum, rhenium, molybdenum and niobium) are highly strategic metals today mainly imported from a few countries. The European primary production remains below a few percentages. However, resources exist in Europe, as primary resources but mainly as secondary resources (industrial waste, urban mines).</p> <p>Valorising these resources requires coordination and networking between researchers, entrepreneurs and public authorities to harmonise technologies, processes and services, develop standards, create new potential for export of eco-innovative solutions and for seizing new markets. MSP-REFRAM will address these challenges by creating of a common multi-stakeholder platform that will draw the current refractory metals value chains and identify its innovation potential in order to support the implementation of the EIP on Raw Materials.</p> <p>Coming from industry, research, public sectors and civil society, both Consortium Members and External Experts have joined forces with expertise covering the whole value chain</p>

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					<p>including mining, processing, recycling, application. The outputs of MSP-REFRAM will help Europe improve the supply value chain of refractory metals in the coming years, optimising the use of external resources as energy and water and at the same time reducing the amount and the toxicity of waste.</p> <p>MSP-REFRAM will share its conclusions widely and efficiently, in a long lasting way thanks to the support of the PROMETIA association. To ensure the systemic change, the outcomes of the project will be made available to the stakeholders and to the public through different tools and reports. In the medium term, MSP-REFRAM will contribute to better-informed decision-making at EU and national level as well as industry by proposing innovative value chains that will boost the refractory metals sector. In the longer term, this should improve the availability of these refractory metals, while creating greater added value to the economy and more jobs.</p>
<b>ROBUST: Robotic subsea exploration technologies</b>	Research and innovation	01/12/2015 - 31/01/2020	5,986,722	TWI LIMITED – United Kingdom	<p>There is a need to develop an autonomous, reliable, cost effective technology to map vast terrains, in terms of mineral and raw material contents which will aid in reducing the cost of mineral exploration, currently performed by ROVs and dedicated SSVs and crew. Furthermore there is a need to identify, in an efficient and non-intrusive manner (minimum impact to the environment), the most rich mineral sites. This technology will aid the seabed mining industry, reduce the cost of exploration and especially the detailed identification of the raw materials contained in a mining sites and enable targeted mining only of the richest resources existing.</p> <p>The ROBUST proposal aims to tackle the aforementioned issue by developing sea bed in situ material identification through the fusion of two technologies, namely laser-based in-situ element-analysing capability merged with underwater AUV (Autonomous Underwater Vehicle) technologies for sea bed 3D mapping. This will enable resource identification done by robotic control enabled by the synergy between AUV hovering and manipulator capabilities. The underwater robotic laser process is the Laser Induced Breakdown Spectroscopy (LIBS), used for identification of materials on the sea bed.</p> <p>The AUV Robotic vehicle will dive, identify the resources that are targeted for LIBS scanning through 3D real time mapping of the terrain (hydro-acoustically, laser scanners, photogrammetry) and position the LIBS in the required locations of mineral deposits on the ocean floor to autonomously perform qualitative and quantitative analyses.</p>
<b>SOLSA: Sonic Drilling coupled with Automated Mineralogy and chemistry On-Line-On-Mine-Real-</b>	Research and innovation	01/02/2016 - 31/01/2020	9,775,488	ERAMET - France	<p>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. SOLSA responds perfectly to the need for ""New sustainable exploration technologies and geo-models"" of SC5-11d-2015. The objective is to "develop new or improved highly efficient and cost-effective, sustainable exploration technologies". It includes</p> <p>(1) integrated drilling optimized to operate in the difficult lateritic environment with the</p>

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<b>Time</b>					<p>challenge of a mixture of hard and soft rocks, extensible also to other ore types, (2) fully automated scanner and phase identification software, usable as well in other sectors.</p> <p>SOLSA combines for the first time the non-destructive sensors X-ray fluorescence, X-ray diffraction, vibrational spectroscopies and 3D imaging along the drill core. For that purpose, SOLSA will develop innovative, user-friendly and intelligent software, at the TRL 4-6 levels. To minimize the risk and capitalize on the newest technologies, the subsystems for the hardware, will be selected on the market of miniaturized sensors.</p> <p>To align SOLSA to the industrial needs and to guarantee market uptake at the end of the project, the SOLSA multidisciplinary consortium includes an end-user (ERAMET) with mining and commercial activities in laterite ores, the case study selected for the project. Industrially driven, the consortium is composed of LE, SMEs and academic experts (ERAMET (PI), F; SSD, NL; BRGM, F; INEL, F; Univ. Vilnius, Lt; CNRS-CRISMAT, F; Univ. Trento, I; Univ. Verona, I; TU Delft, NL) covering exploration, database management, instrumentation and software development, drilling rigs, analytical prototypes and marketing strategies. SOLSA is expected to revolutionize exploration and push Europe in front, by reducing the exploration time at ≈ 50%, the analysis time from 3 - 6 months to real-time and thus the environmental footprint.</p>
<b>STRADE: Strategic Dialogue on Sustainable Raw Materials for Europe</b>	Coordination and support	01/12/2015 - 30/11/2018	1,977,508	OEKO-INSTITUT E.V. - INSTITUT FUER ANGEWANDTE OEKOLOGIE - Germany	<p>STRADE addresses 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 will initially concentrate 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.</p> <p>Areas in which there is a need to revisit and improve present policies and conditions to advance European competitiveness for inward investments will be identified. STRADE also addresses equipment and service suppliers, exploration companies and investors. EU-level dialogues should be initiated with mineral-producing countries to support European businesses in these sectors within non-EU countries. These activities will also serve as a gateway to future cooperation between the EU and other raw material-producing countries and will often address environmental challenges in the mining sector.</p> <p>Subsequently, STRADE will focus on government level and the EU's relation to mineral-producing countries. Based on the mapping of present EU and member-state engagements as well as those engagements of non-EU countries, it will provide analyses on how the EU can renew its engagement with mineral-producing countries aiming at a larger EU strategy to ensure fair and unrestricted access to mineral raw materials worldwide.</p> <p>A specific objective towards the goals of environmental and social sustainability is the development of new concepts for Europe's role in international action towards sustainable mining and processing. Stakeholder workshops on possible contributions of EU /member</p>

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					states to an international resource governance alliance and internationally accepted sustainability evaluation and certification schemes will be conducted.
<b>UNEXMIN: Autonomous Underwater Explorer for Flooded Mines</b>	Research and innovation	01/02/2016 - 31/10/2019	4,862,865	MISKOLCI EGYETEM - Hungary	<p>This project will develop a novel robotic system for the autonomous exploration and mapping of Europe's flooded mines. The Robotic Explorer (UX-1) will use non-invasive methods for autonomous 3D mine mapping for gathering valuable geological and mineralogical information. This will open new exploration scenarios so that strategic decisions on the re-opening of Europe's abandoned mines could be supported by actualised data that cannot be obtained by any other ways.</p> <p>The Multi-robot Platform will represent a new technology line that is made possible by recent developments in autonomy research that allows the development of a completely new class of mine explorer service robots, capable of operating without remote control. Such robots do not exist nowadays; UX-1 will be the first of its kind.</p> <p>Research challenges are related to miniaturisation and adaptation of deep sea robotic technology to this new application environment and to the interpretation of geoscientific data. Work will start with component validation and simulations to understand the behaviour of technology components and instruments to the application environment. This will then be followed by the construction of the first Prototype. Post processing and data analysis tools will be developed in parallel, and pre-operational trials are launched in real life conditions. In the final stage of the project extensive pilots will take place during which UX-1 will be iteratively improved after each trial session, which will be increasingly demanding.</p> <p>The final, most ambitious demonstration will take place in the UK with the resurveying of the entire Ecton mine (UK) that nobody has seen for over 150 years. This final pilot will demonstrate the Platform's scalability from small missions to the largest ones by increasing the number of deployed autonomous drones, and supporting multi-robot cooperation in confined 3D spaces with real-time sensor and data fusion for reliable navigation and communications.</p>
<b>VERAM: Vision and Roadmap for European Raw Materials</b>	Coordination and support	01/12/2015 - 31/05/2018	1,431,498	European Technology Platform on Sustainable Mineral Resources - Belgium	<p>VERAM aims to provide an umbrella and coordination function for the raw materials related research and innovation activities across the relevant ETPs and their national technology platforms (while maintaining the flexibility and individual visions of each ETP network) as well as related other stakeholders across the raw materials value chain in order to increase synergies and facilitate uptake of research results and innovation across the sectors and their value chains.</p> <p>The project will encourage capacity building as well as transfer of knowledge and innovation capability. It will coordinate the network of people involved in the different Horizon 2020 and other projects and initiatives and will provide a platform for identifying gaps and complementarities and bridge these. We will also advise the European Commission and national governments of future research needs and tools to stimulate innovation and assist in overcoming the fragmentation in the implementation of the EIP on RM SIP. We will look for</p>

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					<p>mutually beneficial information exchange, encourage cross-fertilization between actions undertaken by different raw material industries and will speed-up exploitation of breakthrough innovations. The final result of the activities will be a common long-term 2050 vision and roadmap for the relevant raw materials, including metals, industrial minerals and aggregates and wood.</p> <p>The following main deliverables are foreseen as major project results:</p> <ul style="list-style-type: none"> <li>• Deliver a mapping of on-going initiatives in the field of raw materials at the EU and Member States level as well as regional and local levels, both from the R&amp;I and policy side. The mapping will also consider other international initiatives.</li> <li>• Propose a 2050 roadmap/research agenda for raw materials in coordination and cooperation with all stakeholders across the value chain, based on a comprehensive gap analysis while paying close attention to the specificities of critical industrial sectors as well as possible synergies.</li> </ul>

\* As submitted by the beneficiaries