Raw materials innovation actions: exploration and Earth observation in support of sustainable mining

Actions should develop innovative pilots demonstrating clean and sustainable production or substitution of non-energy non-agricultural raw materials in the EU, finishing at Technology Readiness Levels (TRL) 6-7.

All actions should contribute to achieving the objectives and targets of the EIP on Raw Materials and to building the EU knowledge base of primary and secondary raw materials by feeding into the EC Raw Materials Information System – RMIS[[https://ec.europa.eu/jrc/en/scientific-tool/raw-materials-information-system]].

Actions should also contribute to improving the awareness of relevant external stakeholders and the general public across the EU about the importance of raw materials for society, the challenges related to their supply within the EU and about proposed solutions which could help to improve society's acceptance of and trust in sustainable raw materials production in the EU, duly taking into account the applicable EU environmental legislation.

All actions should facilitate the market uptake of solutions developed through industrially- and user-driven multidisciplinary consortia covering the relevant value chain, and consider standardisation aspects when relevant.

All proposals should justify the relevance of the selected pilot demonstrations in different locations within the EU (and also outside if there is a clear added value for the EU economy, industry and society).

All proposals should include an outline of the initial exploitation and business plans (with indicated CAPEX, OPEX, IRR and NPV[[Capital expenditures (CAPEX), operational expenditure (OPEX), internal rate of return (IRR), and net present value (NPV)]]) with clarified management of intellectual property rights, and commitment to the first exploitation.

In support of the EIP on Raw Materials actions should envisage clustering activities with other relevant selected projects for cross-projects co-operation, consultations and joint activities on cross-cutting issues and share of results as well as participating in joint meetings and communication events. To this end proposals should foresee a dedicated work package and/or task, and earmark the appropriate resources accordingly.

In line with the strategy for EU international cooperation in research and innovation (COM(2012)497), international cooperation is encouraged.

Actions should address only one of the following sub-topics:

a) Integrated exploration solutions (2019): Actions should develop and demonstrate integrated exploration solutions focused on finding new deep land deposits. They could benefit from any of the advanced geological-geochemical-geophysical-remote sensing integrated (and multi-method) approaches, 3D and 4D modelling, automation and robotisation. Solutions should cover and be tested in both green and brown field mining sites.

b) Services and products for the extractive industries life cycle (2019): Actions should develop services and products based on Earth observation data and techniques and GNSS services for the extractive industries life cycle. The services and products should be built upon information and data made available by the Copernicus Programme, and other relevant Earth observation and proximal sensing data. Use of data made available by EGNOS (and in the long term, Galileo) or other relevant Earth GNSS data should be considered where relevant. Services should be developed and tested for any of the different phases of the mining life cycle: exploration, extraction, closure or post closure. Particular attention should be given to services for environmental monitoring (including metals dispersion) and safety and security monitoring associated with open pits (slopes stability/landslides risk), underground mining (e.g. subsidence) and mining waste disposal (e.g. tailings dams and dumps). Services to be developed should include the design and testing of early warning systems and associated monitoring plans to prevent and mitigate risks associated with extraction and mining waste disposal[[SWD(2016) 205 final/2 Action Plan on the Sendai Framework for Disaster Risk Reduction 2015-2030. A disaster risk-informed approach for all EU policies, as well as Directive 2006/21/EC on the management of waste resulting from extractive industries]].

c) Mining pilots (2020): Actions should develop and demonstrate innovative mining systems to avoid exposure of workers in dangerous operations, to increase efficiency, selectivity and profitability of the mining operations, to minimise environmental impacts during the mining life cycle, to improve social acceptance and trust in the innovative solutions, The actions should develop a plan to communicate to policy makers on alignment of public policies with emerging innovative mining systems. Any of the metallic, industrials and/or construction minerals could be targeted. However, the importance of the targeted raw materials for the EU economy has to be duly demonstrated in the proposal.

d) Pilots on substitution of critical and scarce raw materials (2020): Actions should develop and demonstrate innovative and sustainable solutions for the appropriate substitution of critical and/or scarce raw materials use in applications related to any of the high tech sectors, such as the low-carbon renewable energy, electric and electronic, mobility sectors, etc. Actions should build on existing research and aim at scaling-up and market uptake of the most promising solutions.

The Commission considers that proposals requesting a contribution from the EU of between EUR 8 million and EUR 13 million would allow this specific challenge to be addressed appropriately. Nonetheless, this does not preclude submission and selection of proposals requesting other amounts.

Securing the sustainable access to raw materials, including metals, industrial minerals and construction raw materials, and particularly Critical Raw Materials (CRM), is of high importance for the EU economy. Substitution provides an alternative approach to reduce the EU’s consumption of CRMs and decrease the relative dependence upon imports as well as related adverse environmental impact, and therefore ensures the sustainable supply of critical raw materials to the EU.

The challenge for industry is to scale up promising technologies raw materials production or substitution of critical raw materials, and to demonstrate that raw materials can be produced in an innovative and sustainable way in order to ensure that research and innovation end up on the market, to strengthen the competitiveness of the European raw materials industries, to meet the ambitious energy and climate targets for 2030, to minimise environmental impacts and risks and to gain the trust of EU citizens in the raw materials sector.

This specific challenge addresses two major targets of the European Innovation Partnership (EIP) on Raw Materials: the development of ""innovative pilot actions"" [[https://ec.europa.eu/growth/sectors/raw-materials/eip/strategic-implementation-plan_en]]

(subtopic c)) and finding substitutes for at least 3 applications of critical and scarce raw materials (subtopic d)).

The project results are expected to contribute to:

sub-topics a), b)

- pushing the EU to the forefront in the area of sustainable raw materials production technologies and solutions through generated know how (planned patents, publications in high impact journals and joint public-private publications etc.);
- increasing the reserves of various primary raw materials within the EU;
- where relevant, reducing the exploration costs for the industry through new cost-effective exploration technologies, while safeguarding long- and short-term environmental sustainability;
- improving the resolution and interoperability of existing raw materials digital maps;
- in the longer term, improving the competitiveness of and creating added value and new jobs in raw materials producing, equipment manufacturing, information and communication technologies and/or downstream industries;
- additionally, only for b) 'Services and products for the extractive industries life cycle', improved validation of global Copernicus land use and land cover products, enhancing the market uptake of the Copernicus based services and products for mining lifecycle, as well as its synergetic use with GNSS.

sub-topic c)

- achieving the targets of the EIP on Raw Materials, particularly in terms of innovative pilot actions on mining for innovative production of raw materials;
- demonstrate a market potential and the competitive technology advantage that will be gained through the pilot leading to expanding the EU business and to be implemented across the EU after the project is finished;
- push the EU to the forefront in the area of mining technologies and solutions through generated know how (planned patents, publications in high impact journals and joint public-private publications etc.);
- lead to unlocking substantial reserves of new or today unexploited resources within the EU;
- create added value and new jobs in raw materials producing, equipment manufacturing, information and communication technologies and/or downstream industries;
- lead to improving the environmental (including reduction of emissions), health and safety performance of the mining operations.

sub-topic d)

- achieving the targets of the EIP on Raw Materials to find substitutes for at least three applications of critical or scarce raw materials;
- have a market potential and the competitive technology advantage that will be gained through the pilot leading to expanding the EU business and to be implemented across the EU after the project is finished;
- speeding-up industrial exploitation and take up of results of substitution's projects.

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