Raw Materials under Horizon 2020
Societal Challenge 5
Work Programme 2018

Giornata Nazionale di Lancio dei Bandi 2018-20 in Horizon 2020
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Unit C2 - «Resource Efficiency and Raw Materials»
EU Raw Materials Strategy and Juncker priorities

Commission priorities 2015-19

1. Jobs, Growth and Investment
   - *circular economy and green growth*

2. Digital Single Market

3. Energy Union
   - *transition to a low-carbon economy*
   (renewables, electricity market, transport...)

4. Internal Market
   - *unlock the full potential of the single market*
   - *a renewed EU Industrial Policy Strategy*

6. Trade policy to harness globalisation
   - *economic diplomacy*
   - *raw materials chapters in FTAs*

9. A stronger global actor
   - *international cooperation and development*
EU “Raw Materials Initiative” = EU raw materials policy

- **Aim:** securing sustainable supplies of raw materials
- **Launched in 2008, consolidated in 2011**
- **Non-energy, non-agricultural raw materials**
- **Connecting EU external and internal policies**
- **Integrated strategy (3 pillars)**
- **Introduced a list of Critical Raw Materials (CRM) in 2011 and updated list in 2014 and 2017**
- **Policy strongly supported by EIP on Raw Materials**
**EU Critical Raw Materials assessment 2017**

- **78 raw materials** evaluated with **fact sheets available**, **revised methodology** published – CRM website

<table>
<thead>
<tr>
<th>2017 CRMs (27)</th>
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<tbody>
<tr>
<td>Antimony</td>
<td>Fluorspar</td>
<td>*LREEs</td>
<td>Phosphorus</td>
<td></td>
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<tr>
<td>Baryte</td>
<td>Gallium</td>
<td>Magnesium</td>
<td>Scandium</td>
<td></td>
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<tr>
<td>Beryllium</td>
<td>Germanium</td>
<td>Natural graphite</td>
<td>Silicon metal</td>
<td></td>
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<tr>
<td><strong>Bismuth</strong></td>
<td>Hafnium</td>
<td>Natural Rubber</td>
<td>Tantalum</td>
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<tr>
<td>Borate</td>
<td><strong>Helium</strong></td>
<td>Niobium</td>
<td>Tungsten</td>
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<tr>
<td>Cobalt</td>
<td>*HREEs</td>
<td>*PGMs</td>
<td>Vanadium</td>
<td></td>
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<tr>
<td>Coking coal</td>
<td>Indium</td>
<td>Phosphate rock</td>
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*HREEs=heavy rare earth elements, LREEs=light rare earth elements, PGMs=platinum group metals*
Biggest suppliers of CRM to the EU

CRM ≡ Economic importance + Supply risk

Study on the review of the list of critical raw materials 2017
EIP Objectives

Overall objective:
Contribute to the 2020 objectives of the EU Industrial Policy (to increase the share of industry in GDP to 20%), the Innovation Union and the Resource Efficiency 'flagships'

Specific objectives:
Reduce import dependency
Improve supply conditions from European and other sources
Push Europe to the forefront in raw materials sectors
Provide alternatives in supply
Mitigate negative environmental and social impacts
EIP targets 2020

- **Up to 10 innovative pilot actions** e.g. demonstration pilot plants for exploration, mining, processing, collecting and recycling
- **Substitutes for at least 3 applications** of critical raw materials
- **Regulatory framework for primary raw materials**
- **Regulatory framework for secondary raw materials**
- **Raw materials knowledge base** with raw materials flows and trends
- **Raw materials network** of Research, Education and Training Centres
- **Pro-active international cooperation strategy** of EU at bilateral and multilateral level
I. Technology Pillar
   o I.A Raw materials research and innovation coordination
   o I.B Technologies for primary and secondary raw materials' production
   o I.C Substitution of raw materials

II. Non-Technology Policy Pillar
   o II.A Improving Europe's raw materials framework conditions
   o II.B Improving Europe's waste management framework conditions and excellence
   o II.C Knowledge, skills and raw materials flows

III. International Cooperation Pillar
   o III.1 Technology
   o III.2 Global Raw Materials Governance and Dialogues
   o III.3 Health, Safety and Environment
   o III.4 Skills, Education and Knowledge
   o III.5 Investment activities
The EIP plays a central role in the EU's raw materials policy framework

- It reinforces the **Raw Materials Initiative** by:
  - translating the strategic policy framework into **concrete actions**
  - mobilising the **stakeholder community** to implement them

- It has been instrumental in helping **securing R&I funding**: EUR 600 million under Horizon 2020 – Societal Challenge 5
Horizon 2020
Context and overview
Topics relevant to raw materials

Excellent science
(€24 billion)

Industrial leadership
(€17 billion)

Societal challenges
(€31 billion)

SC5. Climate action, environment, resource efficiency and raw materials

SC5 - Raw materials
(~€600 million for 7 years)

Circular Economy
SC2 - Bioeconomy
SC3 - Energy

+ ERA-MIN 2
+ EIT Raw Materials

NMPB - Materials
SPIRE PPP
EEB PPP

SME Instrument
FTI-pilot
Call "Greening the economy in line with the Sustainable Development Goals (SDGs)" - Structure

- Connecting economic and environmental gains - the circular economy
- Raw materials
- Water for our environment, economy and society
- Innovating cities for sustainability and resilience
- Protecting and leveraging the value of our natural and cultural assets: Earth observation; nature-based solutions, disaster risk reduction and natural capital accounting; heritage alive
Raw materials in SC5 2018 topics

Call "Greening the economy in line with the Sustainable Development Goals (SDGs)"


- Near 240 million available under SC5 (plus FTI, SME Inst).
- Actions covering the entire EU raw materials value chain, following the logic of SIP and supporting the **targets and objectives of the EIP on Raw Materials**.
- 64% of the budget to Innovation Actions + 28% to RIAs
- Specific attention to CRMs, Circular economy, Production.
- Involving all relevant actors at EU level as well as strategic international partners (international cooperation is encouraged).
- Clustering with other relevant projects is encouraged.
- Pursuing collaboration and synergies with other parts of H2020.
- "Bridge" to Post-2020 "FP9".
Raw materials in SC5 2018 topics

Call "Greening the economy in line with the Sustainable Development Goals (SDGs)"

Raw materials: Objectives

• deliver **pilot actions** demonstrating sustainable production of primary and secondary raw materials, particularly CRM or other scarce high-tech metals

• deliver **breakthrough research concepts**, as basis of tomorrow's innovations

• contribute to building **EU knowledge base** of primary and secondary raw materials for solid decision making; further development of EC Raw Materials Information System – **RMIS**

• respond to the **Circular Economy Action Plan** and objectives of Strategic Implementation Plan of the **EIP on Raw Materials**

• improve **framework conditions** for sustainable development of and investment in innovative solutions for raw materials in the EU

• In the long term, positive impact on: downstream industries' access to raw materials; **employment in and competitiveness** of EU raw materials and related manufacturing industries, including SMEs; **environmental and social performance** of the sector; improved public **awareness**, acceptance and trust; EU endeavours to **implement the SDGs**, notably SDG 12
Raw materials in SC5 2018 topics

SC5-Call "Greening the economy in line with the Sustainable Development Goals (SDGs)"

Raw materials, WP 2018:

- **CE-SC5-06-2018**: New technologies for the enhanced recovery of by-products (RIA)
- **CE-SC5-07-2018-2019-2020**: Raw materials innovation for the circular economy: sustainable processing, reuse, recycling and recovery schemes (IA)
  a) Sustainable processing and refining of primary and/or secondary raw materials
  b) Recycling of raw materials from end-of-life products
  c) Recycling of raw materials from buildings
  d) Advanced sorting systems for high-performance recycling of complex end-of-life products
- **CE-SC5-08-2018-2019-2020**: Raw materials policy support actions for the circular economy (CSA)
  a) Voluntary scheme for certification of treatment facilities for key types of wastes
  b) Resource efficiency in wood processing, recovery and recycling
- **SC5-09-2018-2019**: New solutions for the sustainable production of raw materials (RIA)
  a) Breakthrough concepts and solutions for sustainable exploration, mining and/or processing

- **Budget**
  €60 million

- **Deadlines** (Open 7 November 2017)
  27 Febr 2018 (CSA and First stage of RIA, IA)
  4 Sep 2018 (Second stage of RIA, IA)
General annex G of the Work programme 2016-2017,

Where a topic description refers to a TRL, the following definitions apply:

- **TRL 1** – basic principles observed
- **TRL 2** – technology concept formulated
- **TRL 3** – experimental proof of concept
- **TRL 4** – technology validated in lab
- **TRL 5** – technology validated in relevant environment (industrial environment in the case of key enabling technologies)
- **TRL 6** – technology demonstrated in relevant environment (industrial environment in the case of key enabling technologies)
- **TRL 7** – system prototype demonstration in operational environment
- **TRL 8** – system complete and qualified
- **TRL 9** – actual system proven in operational environment (competitive manufacturing in the case of key enabling technologies; or in space)
CE-SC5-06-2018: New technologies for the enhanced recovery of by-products (RIA)

Scope. Actions should:

• develop sustainable systemic solutions through industrially- and user-driven multidisciplinary consortia covering the relevant value chain.

• contribute to achieving the objectives of the EIP on Raw Materials

• contribute to building the EU knowledge base of primary and secondary raw materials by feeding into the EC Raw Materials Information System – RMIS.

• 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.

• include a task to cluster with other projects financed under this topic and – if possible – with other relevant projects in the field funded by Horizon 2020, in support of the EIP on Raw Materials.

• International cooperation is encouraged.
CE-SC5-06-2018: New technologies for the enhanced recovery of by-products (RIA)

Scope. Actions should:

• **evaluate the potential by-products** existing in primary or secondary raw materials

• **develop energy-, material- and cost-efficient new sustainable mineral processing and/or metallurgical technologies and processes** to increase the **selectivity and the recovery rates** of valuable by-products, particularly critical raw materials.

• The **importance** of the targeted sources of by-products for the EU economy should be duly demonstrated in the proposal.

• Recycling of end-of-life products is excluded from this topic.

• **Expected TRL:** 3-5

• **Indicative size of proposals:** 3-7 M €

Scope. Actions should:

• contribute to achieving the targets of the EIP on Raw Materials,
• contribute to building the EU knowledge base of primary and secondary raw materials by feeding into the EC Raw Materials Information System – RMIS.
• 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
• facilitate the market uptake of solutions developed through industrially- and user-driven multidisciplinary consortia covering the relevant value chain and should consider standardisation aspects when relevant.
• justify the relevance of 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).
• include an outline of the initial exploitation and business plans (with indicated CAPEX, OPEX, IRR and NPV) with clarified management of intellectual property rights, and commitment to the first exploitation.
• include a task to cluster with other projects financed under this topic and – where possible – with other relevant projects in the field funded by Horizon 2020, in support of the EIP on Raw Materials.
• International cooperation is encouraged.
• Expected TRL: 6-7
• Indicative size of proposals: 8-13 M €

a) Sustainable processing and refining of primary and/or secondary raw materials (2018, 2019)

- demonstrate new or improved systems integrating relevant processing and refining technologies for better recovery of minerals and metals at increased efficiency in terms of better yield and process selectivity as well as better utilisation of resources (hence reducing wastes). This would include processing of and recovery from low grade and/or complex ores and/or from industrial or mining wastes, and/or the reduction of the content of toxic elements or compounds in the resulting materials.

- The importance of the targeted raw materials and their sources for the EU should be demonstrated in the proposal. The solution proposed should be flexible enough to adapt to different or variable ore/secondary raw material grades and should be supported by efficient and robust process control. Where relevant, any solution proposed for the reduction of the content of toxic elements or compounds in the resulting materials should also include the appropriate management of the hazardous substances removed.

- Recycling of end-of-life products is excluded from this option

- Expected TRL: 6-7
- Indicative size of proposals: 8-13 M €

- develop and demonstrate novel and environmentally sound solutions for a higher recycling and recovery of secondary raw materials from end-of-life products such as WEEE, batteries, wood-based panels, multi-material paper packaging, end-of-life tyres, etc.

- These products can contain a multitude of minerals, metals, wood and wood-fibre, rubber, etc. (including critical raw materials and other technology metals).

- Expected TRL: 6-7

- Indicative size of proposals: 8-13 M €

c) Recycling of raw materials from buildings (2018, 2019)

- develop and demonstrate **novel solutions for a high-value recovery of raw materials from buildings**.

- Actions should also **benchmark against a series of comparative case studies** of construction and demolition waste (C&DW) management in deconstruction of buildings of representative size categories in countries with different types of end-of-life building stocks, **showcasing the appropriate use** of the following:
  - the EU C&DW Management Protocol,
  - pre-demolition audit,
  - smart demolition practices,
  - using appropriate technical equipment, and sorting/processing and quality management of waste fractions such as metals, aggregates, concrete, bricks, plasterboard, glass, polymers and plastics and wood

- Expected TRL: 6-7
- Indicative size of proposals: 8-13 M €


- develop and demonstrate innovative dismantling and sorting systems enabling functional recycling of critical raw materials, or other types of highly efficient recovery of metals, minerals or construction materials, from complex end-of-life products and scrap thereof.

- The advanced sorting systems should achieve very high throughput rates in order to allow their economically viable operation on the European market.

- Expected TRL: 6-7

- Indicative size of proposals: 8-13 M €
CE-SC5-08-2018-2019-2020: Raw materials policy support actions for the circular economy (CSA)

a) Voluntary scheme for certification of treatment facilities for key types of wastes (2018)

- develop and launch a voluntary scheme for certification – including verification – of treatment facilities for key types of waste/recyclates containing significant amounts of critical raw materials (e.g. electronic waste and/or waste batteries).

- integrate measurable and verifiable minimum quality standards and a verification procedure based on traceability through the supply chain from collection to end-processing.

- Participation of relevant stakeholders – including waste holders, dealers, brokers and operators of treatment facilities – from the conception phase of the scheme.

- Full compliance with applicable WTO rules and with the rules and principles of the Basel Convention should be ensured, and existing certification schemes for waste.

- contribute to building the EU knowledge base – RMIS.

- include a task to cluster with other relevant projects in the field funded by Horizon 2020, in support of the EIP on Raw Materials

- International cooperation is encouraged.

- Indicative size of proposals: up to 2 M €
CE-SC5-08-2018-2019-2020: Raw materials policy support actions for the circular economy (CSA)

b) Resource efficiency in wood processing, recovery and recycling (2018)

- **identify, assess and document existing practices** in a representative set of EU Member States/Associated Countries and possibly third countries,

- create a **network** to widely disseminate and transfer good practices covering both issues: resource-efficient wood processing and wood waste recycling (…).

- involve **relevant stakeholders** across value chains

- assess **trade-offs between wood waste use** for material and energy (based on life cycle analysis and all sustainability pillars) (…)

- include the participation of industrial **SMEs**, as far as possible.

- contribute to building the EU **knowledge base** – RMIS.

- include a task to **cluster** with other relevant projects in the field funded by Horizon 2020, in support of the EIP on Raw Materials

- Indicative size of proposals: up to 3 M €

Scope. Actions should:

• develop sustainable and resource-efficient solutions through industrially- and user-driven multidisciplinary consortia covering the relevant value chain.

• contribute to achieving the objectives of the EIP on Raw Materials

• contribute to building the EU knowledge base of primary and secondary raw materials by feeding into the EC Raw Materials Information System – RMIS.

• 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.

• include a task to cluster with other projects financed under this topic and – if possible – with other relevant projects in the field funded by Horizon 2020, in support of the EIP on Raw Materials.

• International cooperation is encouraged.

• Expected TRL: 3-5

• Indicative size of proposals: 3 - 7 M €

a) Breakthrough concepts and solutions for sustainable exploration, mining and/or processing (2018)

Scope. Actions should:

• develop **ground-breaking concepts and solutions for exploration, mining and/or raw materials processing** to secure the sustainable access to abiotic raw materials for the EU in the long term and to gain the trust of society in clean and safe production of raw materials.

• Recycling of end-of-life products is excluded from this topic.

• Solutions for marine mineral resources are also excluded from this sub-topic

• Expected TRL: 3-5

• Indicative size of proposals: 3 - 7 M €
SME instrument & Fast-Track-to-Innovation

- The respective calls for the **EIC-SME instrument** call (H2020-EIC-SMEInst-2018-2020) and **EIC-Fast-Track-to-Innovation** (H2020-EIC-FTI-2018-2020) are found under the Horizon 2020 Work Programme Part – Towards the next EU Framework Programme for Research and Innovation: **European Innovation Council (EIC) Pilot** (part 17 of this work programme).

**Contribution from Raw Materials (2018):**

- 1.5 M to FTI
- 5.8 M to SME Instr.
Useful links on Raw Materials

Horizon 2020 - Raw materials webpage:

H2020 Participant portal
  - Deadline Raw materials topics: 27 Feb 2018 (CSA, and First stage of RIA, IA).
  - Don't wait until last minute!!!

National NCP SC5 support and events:
http://ec.europa.eu/research/participants/portal/desktop/en/support/national_contact_points.html

Horizon 2020 – EXPERTS:

H2020 Project abstracts and description of consortia:

EU raw materials:

EIP on Raw materials:

EIT Raw materials:
www.eitrawmaterials.eu
¡Thanks for your attention!
Grazie!

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