From Policy to Implementation

R & I, instrument and opportunity

Lydia González
H2020-SC5
CDTI
Index

• Context
• R&I Posibilities / Programmes
• A couple of examples
• Conclusion
Europe 2020

2030 Framework for CLIMATE and ENERGY policies
- Reducing greenhouse gas emissions by 40%
- Increasing the share of renewable energy to at least 27%
- Increasing energy efficiency by 30%

2050 Low Carbon economy
- By 2050, the EU should cut emissions to 80% below 1990 and 60% by 2040
- The low-carbon transition is feasible & affordable

EU Raw Materials Initiative
Securing sustainable supplies of raw materials

New CIRCULAR ECONOMY package (02/12/2015)
- EU Action Plan (funding, ecodesign, strategy on plastics, reduction of food waste and marine litter, water, etc).
- Legislative proposals on waste (new targets, landfilling reduction, etc).

Conclusions COP21

Sustainable Development Goals (SDGs)

Raw Materials Initiative
Securing sustainable supplies of raw materials

References:
2 http://ec.europa.eu/clima/policies/strategies/2050/index_en.htm
17 Sustainable Development Goals (SDGs)

[Image of the Sustainable Development Goals (SDGs) icons]

1. No Poverty
2. Zero Hunger
3. Good Health and Well-being
4. Quality Education
5. Gender Equality
6. Clean Water
7. Affordable and Clean Energy
8. Decent Work and Economic Growth
9. Industry, Innovation, and Infrastructure
10. Reduced Inequalities
11. Sustainable Cities and Communities
12. Responsible Consumption and Production
13. Climate Action
14. Life Below Water
15. Life on Land
16. Peace, Justice, and Strong Institutions
17. Partnerships for the Goals

[Link to the UN Sustainable Development Goals website]

https://sustainabledevelopment.un.org/?menu=1300

CDTI Centro para el Desarrollo Tecnológico Industrial | E.P.E.
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Raw Materials: R&I in Europe

EIP on Raw Materials

Raw Materials Commitments

HORIZON 2020

ERAMIN ERAMIN-2

National and Regional Programmes

PPP SPIRE Sustainable Process Industry

SusChem European Technology Platform for Sustainable Chemistry

European Technology Platform on Sustainable Mineral Resources

COMINROC

CONFEDEM

Interreg Europe

Life

eurostars™

and...others
ERAMIN-2

- **Research and innovation** programme on **raw materials** to foster **circular economy**

- **ERAMIN-2** cover the **whole value chain**: exploration, extraction, processing/refining, recycling and substitution.

- **Topics** based on the **ERA-MIN Research Agenda** and in line with the integrated strategy proposed in the **EU Raw Materials Initiative (RMI)** and the **Strategic Implementation Plan (SIP) of the EIP-Raw Materials**.

https://www.era-min.eu
EIT – RawMaterials

http://eitrawmaterials.eu/

challenge of raw materials dependence

strategic strength for Europe

- Bridging **business, research and education**
- **Driving and fostering innovation** all along the raw materials value chain
- **Empowering students, entrepreneurs and education partners** driving towards the circular economy
LIFE

LIFE is the EU’s financial instrument supporting environmental, nature conservation and climate action projects throughout the EU.

An example...

**INTERREG**

**Interreg Europe** helps regional and local governments across Europe to develop and deliver better policy.

[https://www.esmimet.eu](https://www.esmimet.eu)

---

**EL PROYECTO**

[https://www.esmimet.eu/](https://www.esmimet.eu/)

---

**Objetivos**

El objetivo del Proyecto es generar una red de conocimiento científico-técnico y de I+D+i en torno al desarrollo de las capacidades de minería metálica de la franja fronteriza entre las 3 regiones participantes... 

[Leer más](#)

**Acciones**

Ejecución de las siguientes acciones encuadradas en el plan de ejecución del proyecto: Preparación del proyecto, Estudio del potencial presente y futuro de la minería metálica... 

[Leer más](#)

**Resultados esperados**

Los resultados previstos del Proyecto son: Identificación del 100% del potencial minero actual y futuro en el territorio considerado, Formación de una red de trabajo... 

[Leer más](#)
ES projects funded by CDTI

SOME EXAMPLES:

• **Valoriza Minería SL → “Desarrollo de un Sistema Prototipo Automatizado de Perforación Vertical de Barrenos para su Aplicación en la Industria Minera”**

• **Calaf Trenching SL → “Eco-quarrying by Nextrencher”**

• **Obras Subterráneas SA → “Nuevo Dispositivo para Geolocalización y Mantenimiento en Maquinaria en Túneles y Minería de Interior”**

• **Granygris SL → “Reduex - Nuevo Proceso para la Extracción de Bloques Comerciales en Canteras Reduciendo el Uso de Explosivos”**
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# EIP’s Strategic Implementation Plan

## The EIP’s Strategic Implementation Plan

### Objectives

<table>
<thead>
<tr>
<th>To reduce dependency on imports</th>
<th>To promote the production and exports</th>
<th>To put Europe at the forefront in raw materials sectors</th>
</tr>
</thead>
<tbody>
<tr>
<td>To improve supply conditions from EU</td>
<td>To diversify raw materials sourcing</td>
<td>To make Europe a leader in the raw materials capabilities</td>
</tr>
<tr>
<td></td>
<td>To improve resource efficiency including recycling</td>
<td>To mitigate environmental, social and health impacts</td>
</tr>
</tbody>
</table>

### Targets

<table>
<thead>
<tr>
<th>Pro-active international co-operation strategy of the EU at bilateral and multilateral level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Up to 10 innovative pilot actions</td>
</tr>
<tr>
<td>Framework for enhanced efficiency in material use</td>
</tr>
</tbody>
</table>

### Actions

- 95 concrete actions, organised in 7 Priority Areas

## Systemic change

## Common goals

## Stakeholder participation

Calls for Commitments

Commitments are voluntary joint undertakings that commit to implementing the SIP's actions and targets, delivering tangible results such as innovative actions or pilots, strategic documents or knowledge sharing activities.

• Calls for Commitments.-
  – 1st Call for Commitments (2013) = 76 active
  – 2nd Call for Commitments (2015) = 47 endorsed

• In total, 980 unique partners from more than 50 different countries and have an indicative budget of close to €2 billion.

• ES is the country with the highest number of entities participating in commitments.
  – Commitments coordinated by ES → 17

• Next calls ....in short.
# Calls for Commitments

<table>
<thead>
<tr>
<th>Title</th>
<th>Acronym</th>
<th>Period to implement the commitment</th>
<th>Country</th>
</tr>
</thead>
<tbody>
<tr>
<td>3DS European Mineral Asset Definition and Valuation System</td>
<td>EUROASSET</td>
<td>01/01/2015 to 31/12/2018</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>Africa-EU-Latin America Raw Materials Platform Kandandu</td>
<td>AELPK</td>
<td>01/05/2014 to 31/12/2018</td>
<td>Portugal</td>
</tr>
<tr>
<td>Balancing Regulations, Innovation and Trade in the EU</td>
<td>BRITE</td>
<td>07/02/2014 to 07/02/2019</td>
<td>France</td>
</tr>
<tr>
<td>Before it's yours we mine it</td>
<td>WEMINEIT</td>
<td>01/02/2016 to 31/12/2017</td>
<td>Europe</td>
</tr>
<tr>
<td>Biodiversity IMA tool</td>
<td>BioDIMA</td>
<td>15/03/2016 to 15/03/2020</td>
<td>Europe</td>
</tr>
<tr>
<td>BioMOre: An Alternative Mining Concept - Raw Materials Commitment</td>
<td>BioMOre</td>
<td>01/01/2015 to 31/12/2018</td>
<td>United Kingdom</td>
</tr>
<tr>
<td>BRAVO - Bauxite Residue and Aluminium Valorisation Operations</td>
<td>BRAVO</td>
<td>01/02/2014 to 12/12/2020</td>
<td>Ireland</td>
</tr>
<tr>
<td>Breakthrough Solutions for Seafloor Mineral Extraction and Processing in deep water environment</td>
<td>SeaFlores</td>
<td>20/03/2018</td>
<td>France</td>
</tr>
<tr>
<td>Breakthrough Solutions for the Sustainable Harvesting and Processing of Deep Sea Polymetallic Nodules</td>
<td>Blue Nodules</td>
<td>01/02/2016 to 01/02/2020</td>
<td>Netherlands</td>
</tr>
<tr>
<td>Building a harmonized European database on natural stores for the use of construction and restoration stakeholders.</td>
<td>NATUREEUROSTONES</td>
<td>01/07/2016 to 01/07/2018</td>
<td>Spain</td>
</tr>
</tbody>
</table>

Raw Materials: R&I in Europe

- EIP on Raw Materials
- Raw Materials Commitments
- HORIZON 2020
- ERAMIN ERAMIN-2
- National and Regional Programmes
- PPP SPIRE Sustainable Process Industry
- Interreg Europe
- Life European Union | European Regional Development Fund
- Life European Union | LIFE Programme
- Confindustria
- Eurostars
- ...and others
What is Horizon 2020?

- **Budget**: 74.828 M€
- **Focus on Societal Challenges**
- **Defined topics (“top-down”)**
- **Different Instruments (RIAs, IAs, CSAs, PCPs...)**
- **International Cooperation**
- **Collaborative Projects**
- **Europe 2020**

HORIZON 2020
EU Research and Innovation Framework Programme (2014-2020)

*Some exceptions- MSCAs or SME Instrument*
Raw Materials in H2020

• Aligned with the SIP of the EIP-Raw Materials.

• Non-energy, non-agricultural raw materials.

• Topics on the 3 EIP’s pillars:
  – Technological pillar
  – Non-technological pillar
  – International cooperation

• Topics along the entire value chain of raw materials: Exploration, Extraction, Processing, Recycling and Substitution

• All type of actions: RIA, IAs, CSAs and ERANETs
<table>
<thead>
<tr>
<th>Type of Action</th>
<th>Description</th>
<th>Elegibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>RIA</td>
<td>“......activities aiming to establish new knowledge and/or to explore the feasibility of a new or improved technology, product, process, service or solution. ......they may include basic and applied research, technology development and integration, testing and validation on a small-scale prototype in a laboratory or simulated environment. Projects may contain ..... limited demonstration or pilot activities...”</td>
<td>At least 3 legal entities (independent of each other), from 3 different EU member state or H2020 associated country.</td>
</tr>
<tr>
<td>IA</td>
<td>“......activities directly aiming at producing plans and arrangements or designs for new, altered or improved products, processes or services. For this purpose they may include prototyping, testing, demonstrating, piloting, large-scale product validation and market replication. Projects may include limited research and development activities”</td>
<td>At least 1 legal entity from 1 EU Member State or H2020 associated country.</td>
</tr>
<tr>
<td>CSA</td>
<td>“......accompanying measures such as standardisation, dissemination, awareness-raising and communication, networking, coordination or support services, policy dialogues and........ and may also include complementary activities of strategic planning, networking and coordination between programmes in different countries.</td>
<td>+...otros (ver Annex C y D)</td>
</tr>
<tr>
<td>% Financiación</td>
<td>Actividades</td>
<td>Tipo de Participantes</td>
</tr>
<tr>
<td>----------------</td>
<td>------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>Costes Indirectos (% costes directos, sin subcontratación)</td>
<td>25%</td>
</tr>
<tr>
<td>% Financiación</td>
<td>Research and Innovation Actions (RIAs) + Coordination and Support Actions (CSAs)</td>
<td>Universidades/ Centros Investigación/ Otros «non profit»</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Empresas (grandes)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PYME</td>
</tr>
<tr>
<td></td>
<td>Innovation Actions (IAs)</td>
<td>Universidades/ Centros Investigación/ Otros «non profit»</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Empresas (grandes)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PYME</td>
</tr>
</tbody>
</table>
H2020 budget

<table>
<thead>
<tr>
<th>Prioridad «Ciencia excelente»</th>
<th>24,232</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. El Consejo Europeo de Investigación (CEI)</td>
<td>13,095</td>
</tr>
<tr>
<td>2. Las Tecnologías Futuras y Emergentes (FET)</td>
<td>2,585</td>
</tr>
<tr>
<td>3. Las acciones Marie Skłodowska-Curie</td>
<td>6,162</td>
</tr>
<tr>
<td>4. Las infraestructuras de investigación</td>
<td>2,390</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prioridad «Liderazgo industrial»</th>
<th>16,466</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Liderazgo en tecnologías industriales y de capacitación:</td>
<td></td>
</tr>
<tr>
<td>1.1 Tecnologías de la información y la comunicación (TIC)</td>
<td>7,423</td>
</tr>
<tr>
<td>1.2 Nanotecnologías, 1.3 Materiales avanzados y 1.5 Fabricación y transformación avanzadas</td>
<td>3,741</td>
</tr>
<tr>
<td>1.4 Biotecnología</td>
<td>501</td>
</tr>
<tr>
<td>1.6 Espacio</td>
<td>1,403</td>
</tr>
<tr>
<td>2. Acceso a la financiación de riesgo</td>
<td>2,842</td>
</tr>
<tr>
<td>3. Innovación en las PYME</td>
<td>589</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prioridad «Retos de la sociedad»</th>
<th>28,630</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Salud, cambio demográfico y bienestar</td>
<td>7,257</td>
</tr>
<tr>
<td>2. Seguridad alimentaria, agricultura y silvicultura sostenibles, investigación marina, marítima y de aguas interiores y Bioeconomía</td>
<td>3,708</td>
</tr>
<tr>
<td>3. Energía segura, limpia y eficiente</td>
<td>5,688</td>
</tr>
<tr>
<td>4. Transporte inteligente, ecológico e integrado</td>
<td>6,149</td>
</tr>
<tr>
<td>5. Acción por el clima, medio ambiente, eficiencia de los recursos y materias primas</td>
<td>2,956</td>
</tr>
<tr>
<td>6. Europa en un mundo cambiante – Sociedades inclusivas, innovadoras y reflexivas</td>
<td>1,258</td>
</tr>
<tr>
<td>7. Sociedades seguras – Proteger la libertad y la seguridad de Europa y de sus ciudadanos</td>
<td>1,613</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Difundir la excelencia y ampliar la participación</th>
<th>816</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ciencia con y para la sociedad</td>
<td>445</td>
</tr>
<tr>
<td>Acciones directas no nucleares del Centro Común de Investigación (JRC)</td>
<td>1,856</td>
</tr>
<tr>
<td>Instituto Europeo de Innovación y Tecnología (EIT)</td>
<td>2,383</td>
</tr>
</tbody>
</table>
- 48 projects on SC5 – Raw Materials
- More under SC5 – Waste, NMBP, SC2, and other areas
INTRODUCTION

- Ultimately, the actions are expected to contribute to the implementing the Sustainable Development Goals (SDGs), notably SDG 12 'Ensure sustainable consumption and production patterns'.
- The main focus is on securing the supply of minerals and metals through sustainable innovative production technologies for primary and secondary raw materials.
- Large innovative pilot actions at higher TRL levels (6-8) will be launched to demonstrate viability of cost-effective, environmentally sound and safe production of primary and secondary raw materials and to unlock a substantial volume of various raw materials within the EU.
- Co-ordination and support actions will target different parts of the raw materials value chain including the framework conditions for sustainable primary and secondary raw materials production that would provide a stable and competitive supply from the EU sources; better co-ordination of the Member States' research and innovation programmes and funded activities; as well as international co-operation with countries producing and using raw materials.

Some details in the topics

- define Social Licence to Operate (SLO) guidelines and develop a toolbox improving communication and transparency during the permitting and licensing procedures and in the production cycle by mobilising all the concerned EU's stakeholders which can be affected by a mining project;
- assess health, safety and environmental risks and their management for all proposed actions to avoid environmental damage and maintain overall environmental stability;
- improving the environmental performance of the operations, including a reduction in waste and emissions generation and a better recovery of resources from generated waste;
- improving the awareness, acceptance and trust of society in a sustainable raw materials production in the EU;
Raw Materials: SC5 – H2020

“Topics” (Research and Innovation Actions and Innovation Actions)

**SC5-11-2014/2015. New solutions for sustainable production** of primary raw materials (Research and Innovation Actions)

a) New exploration technologies and geomodels
b) Mining of small deposits and alternative mining
c) Deep mining on continent and in sea-bed
d) Flexible processing technologies
e) New metallurgical systems

**SC5-13-2016/2017: New solutions for sustainable production** of raw materials (Research and Innovation Actions)

a) Sustainable selective low impact mining
b) New technologies for the enhanced recovery of by-products
c) New sensitive exploration techniques

**SC5-14-2016/2017: Raw materials Innovation actions [pilots demonstrating clean and sustainable production]** (Innovation Actions)

a) Intelligent mining on land
b) Processing of lower grade and/or complex primary and/or secondary raw materials in the most sustainable ways
c) Sustainable metallurgical processes
Raw Materials: SC5 – H2020

“Topics” (Research and Innovation Actions and Innovation Actions)

CE-SC5-06-2018: New technologies for the enhanced recovery of by-products (Research and Innovation Actions)


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

SC5-09-2018-2019: New solutions for the sustainable production of raw materials (Research and Innovation Actions)

a) Breakthrough concepts and solutions for sustainable exploration, mining and/or processing (2018)
b) Digital mine (2019)
c) Recovery of metals and minerals from sea resources (2019)
Raw Materials: SC5 – H2020

“Topics” (Coordination and Support Actions)

a) Mineral deposits of public importance
b) -
c) Innovation friendly minerals policy framework
d) f) .......

c) Optimising collection of raw materials data in Member States
d) Linking land use planning policies to national mineral policies
e) EU network of mining and metallurgy regions

SC5-15-2016/2017: Raw materials policy support actions
a) - b) f)
c) Optimising collection of raw materials data in Member States
d) Linking land use planning policies to national mineral policies
e) EU network of mining and metallurgy regions

SC5-16-2016/2017: Raw materials international cooperation
a) Demand-supply forecast and raw materials flows at global level
b) Advancing the idea of a World Forum on Raw Materials
c) International network of raw materials training centres

CE-SC5-08-2018-2019-2020: Raw materials policy support actions for the circular economy
a) - b)
c) Responsible sourcing of raw materials in global value chains (2019)

• Budget (2014 – 2017) ~ 280 M€

• Type of actions:
  - RIA s, Research and Innovation Actions
  - IAs, Innovation Actions (“pilots”)
  - CSAs, Coordination and Support Actions
  - ERA-NET Cofund (ERAMIN-2)

• Results:
  - 48 projects funded
  - More than 480 entities participating
  - Grants > 270 M€

Analysis by country

Grants (%) by type of entity

- Private For Profit
- University
- Public Research Organization
- Association
- Public Body
- Research Association
- Innovation and Technology Centre

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H2020 projects (some of them)

BIOMOre: Research on future mining
Funded by the EU's Horizon 2020 research and innovation program

- BIOMOre: A project for winning deep ores
  Different supply/demand forecasts estimate a lack of raw materials leading to higher costs or even no more availability in the future at all.

- Progress needs input
  The EU consumes 20 to 35% of the most important base metals worldwide while importing more than 80% of its commodities representing more than 23 billion euros per year.

- Imagefilm
  The film contains valuable information on the subject of raw materials, mining and of course the BIOMOre project including easy to understand animations of the planned process itself and potential future implementation as well as a statement of the European Commission. The film also shows the objectives of the project and all the partners. It ultimately shows ways and
H2020 projects (some of them)

http://minatura2020.eu/
H2020 projects (some of them)

http://www.solsa-mining.eu/
H2020 projects (some of them)
Raw Materials: SC5 – H2020

And for 2019 and 2020???????

   a) Sustainable processing and refining of primary and/or secondary raw materials (2019, 2020)
   b) - c) – d)

CE-SC5-08-2018-2019-2020: Raw materials policy support actions for the circular economy (Coordination and Support Actions)
   a) - b)
   c) Responsible sourcing of raw materials in global value chains (2019)

SC5-09-2018-2019: New solutions for the sustainable production of raw materials (Research and Innovation Actions)
   b) Digital mine (2019)
   c) Recovery of metals and minerals from sea resources (2019)

Raw Materials: SC5 – H2020

And for 2019 and 2020?

SC5-10-2019-2020: Raw materials innovation actions: **exploration and Earth observation in support of sustainable mining** (Innovation Actions)

a) Integrated exploration solutions (2019)
b) Services and products for the extractive industries life cycle (2019)

CE-SC5-07-2020: Raw Materials Innovation for the Circular Economy


SC5-10-2020: Raw materials Innovation actions: **Mining pilots**; Pilots on substitution of Critical Raw Materials

SC5-24-2020: Sustainable management in extractive industries

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• Context
• R&I Possibilities / Programmes
• A couple of examples
• Conclusion
Conclusion

• R&I, instrument + opportunity
• Aligned with EU Raw Materials policies and initiatives
• Focus on technological aspects but also on sustainability, environment, health, security and social acceptance, and ....business/exploitation.
• Different options/programmes/initiatives to different needs

Don’t miss the opportunities !!!!!!
Index

• Context
• R&I Possibilities / Programmes
• A couple of examples
• Conclusion

• Information
Information

Some events:
• 8-9/11/2017 (Brussels), [InfoDay SC5-Calls 2018](#) (Presentations and video-record are available)
• 6-10/11/2017 (Brussels), [Raw Materials Week](#)
• Additional events:
  – [EC- R&I-Environment](#)
  – [esHorizonte2020](#)

More information:
• [EIP de Materias Primas](#) → SIP
• [Commitments EIP-Raw Materials](#)
• [Horizon 2020](#)
• [esHorizonte2020](#)
• [EC- R&I-Environment](#)
• [CORDIS - EU research projects](#)
• [LIFE](#)
On this site you can find and secure funding for projects under the following EU programmes:

- **2014-2020** Horizon 2020 - research and innovation framework programme
- **2007-2013** 7th research framework programme (FP7) and Competitiveness & Innovation Programme (CIP)

**Non-registered users**
- search for funding
- read the H2020 Online Manual & download the legal documents
- check if an organisation is already registered
- contact our support services or check our FAQs

**Registered users**
- submit your proposal
- sign the grant
- manage your project throughout its lifecycle
- register as expert advising the Commission

Visit [this website](http://ec.europa.eu/research/participants/portal/desktop/en/home.html) for more information.
Of interest.....

SAVE-THE-DATE: Raw Materials Week 2018

http://ec.europa.eu/growth/content/raw-materials-week-2018_es
What’s been funded?

Research & Innovation Projects - CALLS 2014, 2015, 2016 and first part 2017
Climate action, environment, resource efficiency and raw materials
(H2020 projects)

 Investing in European success. -
Environmental research and innovation
(FP7 projects)

Otros proyectos aprobados:

• CORDIS - EU research projects
• LIFE
• Projects from JPIs’ and ERANETs’
What’s been funded?

LOW-CARBON RESEARCH AND INNOVATION
Building a low-carbon, climate-resilient future

CIRCULAR ECONOMY RESEARCH AND INNOVATION
Connecting economic & environmental gains
DISCLAIMER

The contents of this presentation are for informal guidance and discussion purposes only.

In no circumstance the content of these slides can substitute the information provided in the official call documents and guidelines.
Thank you all

Lydia González
Representante Reto Social 5 – H2020 “Sherpa” EIP-Materias Primas

Dir. Programas Europeos, Espacio y Retornos Tecnológicos
CDTI
Mail.- lydia.gonzalez@cdti.es
Tel.- +34 91 581 5562/5500
@EsHorizonte2020, @CDTIoficial

CDTI Centro para el Desarrollo Tecnológico Industrial | E.P.E.
+ info sobre programas y ayudas para la internacionalización de la I+D+i española


@EsHorizonte2020 - @CDTloficial
Anexo.-  
SC5 -H2020, Raw Materials: 
Projects funded 2014 - 2017

<table>
<thead>
<tr>
<th>Topic</th>
<th>Type of Action</th>
<th>Acronym</th>
<th>Title</th>
<th>EU contribut. (M€)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC5-11a-2014</td>
<td>RIA</td>
<td>VAMOS</td>
<td>¡Viable and Alternative Mine Operating System!</td>
<td>9,2</td>
</tr>
<tr>
<td>SC5-11a-2014</td>
<td>RIA</td>
<td>Real-Time-Mining</td>
<td>Real-time optimization of extraction and the logistic process in highly complex geological and selective mining settings</td>
<td>5,6</td>
</tr>
<tr>
<td>SC5-11a-2014</td>
<td>RIA</td>
<td>BioMOre</td>
<td>New Mining Concept for Extracting Metals from Deep Ore Deposits using Biotechnology</td>
<td>8,6</td>
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<tr>
<td>SC5-11b-2014</td>
<td>RIA</td>
<td>FAME</td>
<td>Flexible and Mobile Economic Processing Technologies</td>
<td>7,5</td>
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<tr>
<td>SC5-11b-2014</td>
<td>RIA</td>
<td>OptimOre</td>
<td>Holistic Innovative Solutions for an Efficient Recycling and Recovery of Valuable Raw Materials from Complex Construction and Demolition Waste</td>
<td>5,1</td>
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<tr>
<td>SC5-11c-2015</td>
<td>RIA</td>
<td>Blue Nodules</td>
<td>Breakthrough Solutions for the Sustainable Harvesting and Processing of Deep Sea Polymetallic Nodules</td>
<td>8,0</td>
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<tr>
<td>SC5-11d-2015</td>
<td>RIA</td>
<td>SOLSA</td>
<td>Sonic Drilling coupled with Automated Mineralogy and chemistry On-Line-On-Mine-Real-Time</td>
<td>9,8</td>
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<tr>
<td>SC5-11d-2015</td>
<td>RIA</td>
<td>ROBUST</td>
<td>Robotic subsea exploration technologies</td>
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<tr>
<td>SC5-11d-2015</td>
<td>RIA</td>
<td>HiTech AlkCarb</td>
<td>New geomodels to explore deeper for High-Technology critical raw materials in Alkaline rocks and Carbonatites</td>
<td>5,4</td>
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<tr>
<td>SC5-11e-2015</td>
<td>RIA</td>
<td>METGROW PLUS</td>
<td>Metal Recovery from Low Grade Ores and Wastes Plus</td>
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<tr>
<td>SC5-11e-2015</td>
<td>RIA</td>
<td>INTMET</td>
<td>Integrated innovative metallurgical system to benefit efficiently polymetallic, complex and low grade ores and concentrates</td>
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<tr>
<td>SC5-12a-2014</td>
<td>RIA</td>
<td>INREP</td>
<td>Towards Indium free TCOs</td>
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<tr>
<td>SC5-12a-2014</td>
<td>RIA</td>
<td>INFINITY</td>
<td>Indium-Free Transparent Conductive Oxides for Glass and Plastic Substrates</td>
<td>4,0</td>
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<tr>
<td>SC5-12b-2015</td>
<td>RIA</td>
<td>Flintstone2020</td>
<td>Next generation of superhard non-CRM materials and solutions in tooling</td>
<td>5,0</td>
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<tr>
<td>SC5-12b-2015</td>
<td>RIA</td>
<td>EQUINOX</td>
<td>A novel process for manufacturing complex shaped Fe-Al intermetallic parts resistant to extreme environments</td>
<td>4,7</td>
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## Research and Innovation Actions (RIAs)

<table>
<thead>
<tr>
<th>Topic</th>
<th>Type of Action</th>
<th>Acronym</th>
<th>Acronym</th>
<th>Title</th>
<th>EU contrib. (M€)</th>
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<tr>
<td>SC5-13-2016</td>
<td>RIA</td>
<td>SCALE</td>
<td>SCALE</td>
<td>Production of Scandium compounds and Scandium Aluminum alloys from European metallurgical by-products</td>
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<tr>
<td>SC5-13-2016</td>
<td>RIA</td>
<td>SLIM</td>
<td>SLIM</td>
<td>Sustainable Low Impact Mining solution for exploitation of small mineral deposits based on advanced rock blasting and environmental technologies</td>
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<tr>
<td>SC5-13-2016</td>
<td>RIA</td>
<td>CHROMIC</td>
<td>CHROMIC</td>
<td>effiCient mineral processing and Hydrometallurgical RecOvery of by-product Metals from low-grade metal containing seCondary raw materials</td>
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<td>SC5-13-2016</td>
<td>RIA</td>
<td>IMPaCT</td>
<td>IMPaCT</td>
<td>Integrated Modular Plant and Containerised Tools for Selective, Low-impact Mining of Small High-grade Deposits</td>
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<td>SC5-13-2016</td>
<td>RIA</td>
<td>PLATIRUS</td>
<td>PLATIRUS</td>
<td>PLATInum group metals Recovery Using Secondary raw materials</td>
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<td>SC5-13-2017</td>
<td>RIA</td>
<td>INFACT</td>
<td>INFACT</td>
<td>Innovative, Non-invasive and Fully Acceptable Exploration Technologies</td>
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<td>SC5-13-2017</td>
<td>RIA</td>
<td>Smart Exploration</td>
<td>Smart Exploration</td>
<td>Sustainable mineral resources by utilizing new Exploration technologies</td>
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<tr>
<td>SC5-13-2017</td>
<td>RIA</td>
<td>NEXT</td>
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<td>New exploration technologies</td>
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<td>SC5-13-2017</td>
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<td>PACIFIC</td>
<td>PACIFIC</td>
<td>Passive seismic techniques for environmentally friendly and cost efficient mineral exploration</td>
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# Innovation Actions (IAs)

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<td>SC5-14-2016</td>
<td>IA</td>
<td>SIMS</td>
<td>Sustainable Intelligent Mining Systems</td>
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<td>SC5-14-2016</td>
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<td>X-MINE</td>
<td>Real-Time Mineral X-Ray Analysis for Efficient and Sustainable Mining</td>
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<td>SC5-14-2017</td>
<td>IA</td>
<td>CROCODILE</td>
<td>first of a kind commercial Compact system for the efficient Recovery Of CObalt Designed with novel Integrated LEading technologies</td>
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<td>SC5-14-2017</td>
<td>IA</td>
<td>RemovAL</td>
<td>Removing the waste streams from the primary Aluminium production and other metal sectors in Europe</td>
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<tr>
<td>SC5-14-2017</td>
<td>IA</td>
<td>NEMO</td>
<td>Near-zero-waste recycling of low-grade sulphidic mining waste for critical-metal, mineral and construction raw-material production in a circular economy</td>
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<td>SC5-14-2017</td>
<td>IA</td>
<td>SecREEts</td>
<td>Secure European Critical Rare Earth Elements</td>
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## ERANET Cofund

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<tr>
<td>SC5-17-2016</td>
<td>ERA-NET-Cofund</td>
<td>ERA-MIN 2</td>
<td>Implement a European-wide coordination of research and innovation programs on raw materials to strengthen the industry competitiveness and the shift to a circular economy</td>
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# Coordination and Support Actions (CSAs)

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<tr>
<th>Topic</th>
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<tr>
<td>SC5-13a-2014</td>
<td>CSA</td>
<td>MINATURA 2020</td>
<td>Developing a concept for a European minerals deposit framework</td>
<td>2,1</td>
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<tr>
<td>SC5-13b-2014</td>
<td>CSA</td>
<td>INTRAW</td>
<td>International cooperation on Raw materials</td>
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<tr>
<td>SC5-13c-2015</td>
<td>CSA</td>
<td>MIN-GUIDE</td>
<td>Minerals Policy Guidance for Europe</td>
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<td>SC5-13d-2015</td>
<td>CSA</td>
<td>VERAM</td>
<td>Vision and Roadmap for European Raw Materials</td>
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<td>SC5-13e-2015</td>
<td>CSA</td>
<td>MICA</td>
<td>Mineral Intelligence Capacity Analysis</td>
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<td>SC5-13f-2015</td>
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<td>STRADE</td>
<td>Strategic Dialogue on Sustainable Raw Materials for Europe</td>
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<td>SC5-15-2016</td>
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<td>SCRREEN</td>
<td>Solutions for CRitical Raw materials - a European Expert Network</td>
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<td>SC5-15-2017</td>
<td>CSA</td>
<td>ORAMA</td>
<td>Optimising quality of information in RAw MAterials data collection across Europe</td>
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<td>SC5-15-2017</td>
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<td>MIREU</td>
<td>Mining and Metallurgy Regions of EU</td>
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<td>COLLECTORS</td>
<td>waste COLLECTiOn systems assessed and good pRacticeS identified</td>
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<td>SC5-15-2017</td>
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<td>ROSEWOOD</td>
<td>European Network of Regions On Sustainable WOOD mobilisation</td>
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<td>SC5-16-2016</td>
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<td>FORAM</td>
<td>Towards a World Forum on Raw Materials (FORAM)</td>
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<td>MinFuture</td>
<td>Global material flows and demand-supply forecasting for mineral strategies</td>
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<td>SC5-16-2017</td>
<td>CSA</td>
<td>intermin</td>
<td>INTERNATIONAL NETWORK OF RAW MATERIALS TRAINING CENTRES</td>
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