

ICAMCYL

Centro internacional de materiales avanzados y materias primas
International center for advanced materials and raw materials



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*Centro internacional en materiales avanzados y materias
primas de Castilla y León*

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ICAMCyL, a reference competence center in raw materials

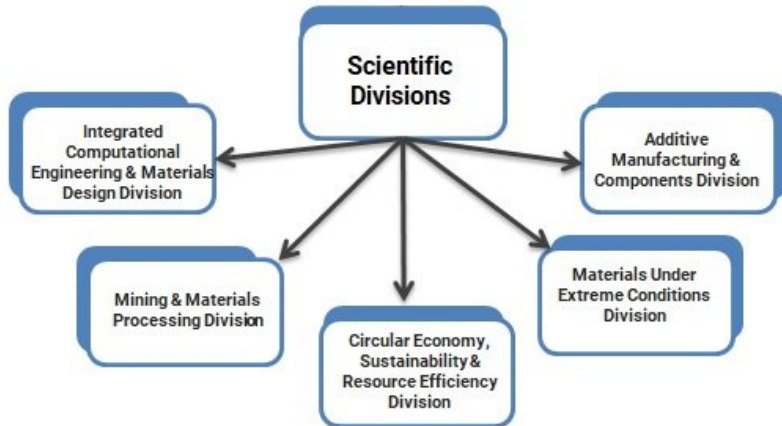


Stakeholders-Patrons

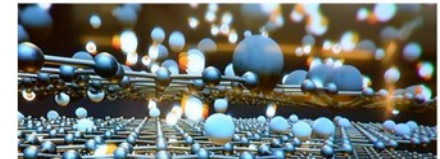
Bench & Ground



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Sustainable mining



Advanced materials



ADVANCED MINING TECHNOLOGIES

- Exploration
- Classification
- Processing



CIRCULAR ECONOMY

- Waste
- Recycling
- Valorisation



SUSTAINABILITY

- New production methods
- Eco-innovation
- Resource efficiency



NANOMATERIALS

- Carbon-based
- MOFs
- Composites
- Alloys



FABRICATION

- Additive manufacturing
- Pilot lines
- Industry



ENERGY & CLIMATE CHANGE

- Batteries /fuel-cells
- CO₂ capture
- Smart cities

ICAMCYL & IBERIAN SUSTAINABLE MINING CLUSTER

ICAMCyL (Internacional Center for Advanced Materials and Raw Materials of Castilla y León)

Non-profit research foundation created by the main industries of Castilla y León region (Spain) in the sectors of automotive, manufacturing, advanced materials, engineering, mining and processing of raw materials.

It constitutes a singular Competence Center with the objective of aligning and working towards regional Smart Specialisation Strategies (RIS3) and international policies

BUILDING A FUTURE IN RAW MATERIALS



XXI CENTURY SUSTAINABLE MINING

SCIENTIFIC INTERESTS



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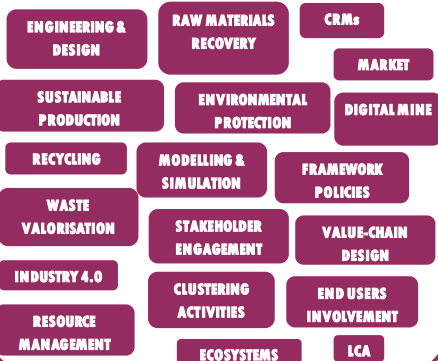
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ENERGY & CLIMATE CHANGE

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EXPERTISE AND CAPACITIES



EUROPEAN PROJECTS



ISMC (Iberian Sustainable Mining Cluster) MISSION & VISION

The Iberian Sustainable Mining Cluster (ISMC) has been created to halt the current decline of the mining sector in Spain, with special attention to the region of Castilla y León and the mining areas of the Province of León, in Northwest Spain. This decline affects the whole value chain as well as social acceptance of mining operations.

ISMC currently includes around 50 companies, research and institutional entities joining efforts to consolidate the strengths of the mining sector and its associated services, promoting sustained economic growth for its members, with special attention to SMEs.



OBJECTIVES

- ☐ Boost the mining sector and related services
- ☐ Promote growth and competitiveness
- ☐ Foster cooperation across industries
- ☐ Attract business and commercial opportunities
- ☐ Promote technological innovation and sustainability



EXPERTISE OFFER

- ☐ ISMC covers the whole mining value chain
- ☐ Wide coverage of raw materials & CRMs
- ☐ Pilots and new lines of research
- ☐ Stakeholders participation
- ☐ Clustering and matchmaking activities



ISMC & THE MINING VALUE CHAIN

ISMC has members across the whole mining value chain, from mineral extraction, exploration and production to business development, recycling and other services.



RAW MATERIALS & THE CIRCULAR ECONOMY

ISMC members cover a wide range of raw materials, including some essential critical raw materials (CRMs) used in high added-value, innovative products.1

EU LIST OF CRITICAL RAW MATERIALS (2017)			
Antimony	Gallium	Magnesium	Scandium
Baryte	Germanium	Natural graphite	Silicon metal
Bismuth	Hafnium	Natural rubber	Tantalum
Borate	Helium	Niobium	Tungsten
Cobalt	HREEs	PGMs	Vanadium
Fluorspar	Indium	Phosphate rock	
	LREEs	Phosphorus	

The development of a sustainable, low environmental impact mining will only occur through the improvement and integration of new methods, techniques and processes that allow the use and valorisation of raw materials and their by-products, always according to the principles of sustainability and circular economy.



Regional Specialisation Strategy (RIS3) of Castilla y León

UPDATE
FOR THE PERIOD
2018-2020

REGIONAL RESEARCH
AND INNOVATION
STRATEGY FOR SMART
SPECIALISATION (RIS3)
OF CASTILLA Y LEÓN
2014-2020

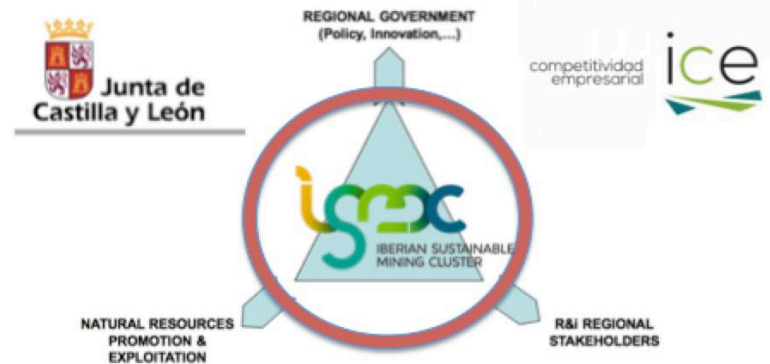
EXECUTIVE SUMMARY

RIS³ CASTILLA Y LEÓN
2014-2020

Castilla y León eco-system: Innovation Triangle

Solid triangle of actors

Clear and solid commitment of the regional Government to promote 'competence centers', clusters and to create an innovation ecosystem



TP 4. Natural Heritage, Cultural Heritage and the Spanish Language, and endogenous resources as basis of the sustainability of the territory.

Mineral raw materials

Development of mining and metallurgical techniques to increase the efficiency of processes
Use and promotion of waste
Development of competitive products from indigenous mineral raw materials (natural stone and others)

Castilla y León: a reference in endogenous resources

Castilla y León and the mining industry in short



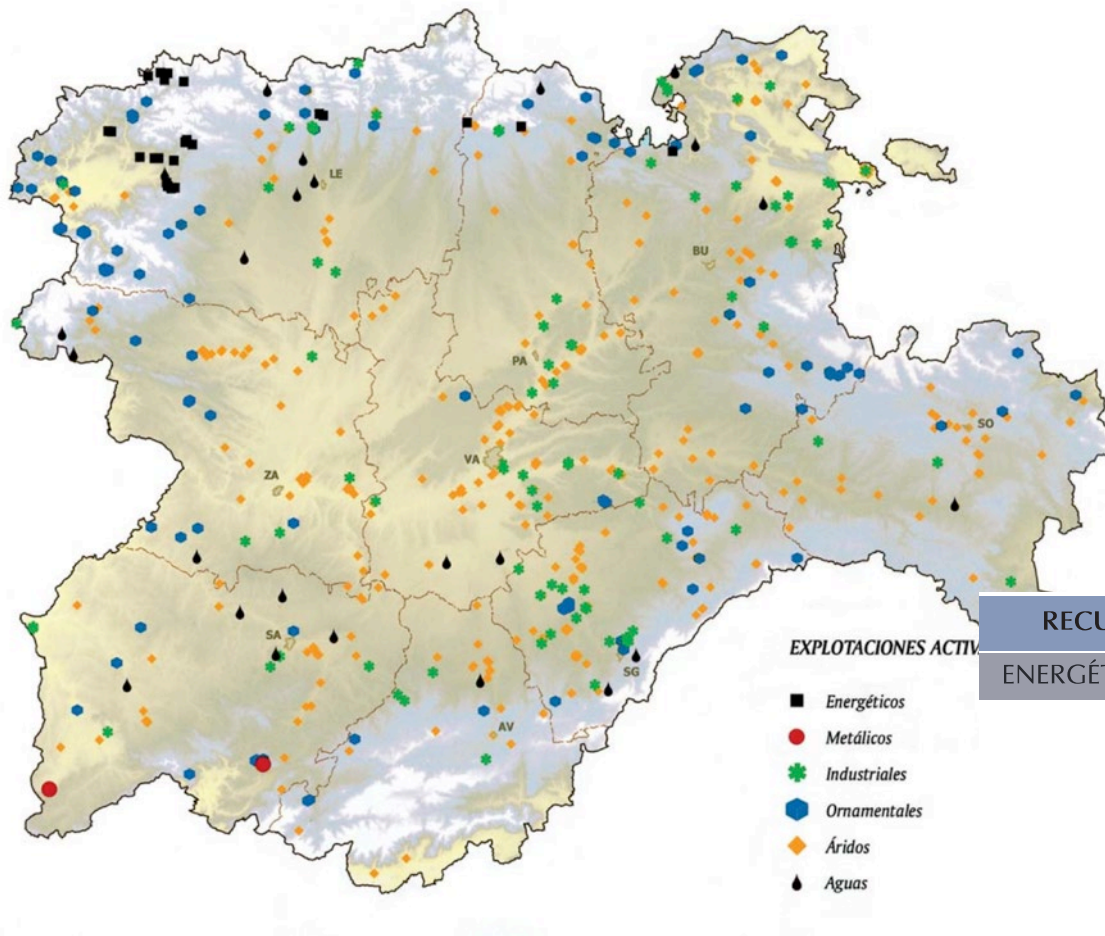
2,519,87 inhabitants (2013)

Regional territorial area: 94,224 km²

9 provinces

2,249 city and town councils (30% Spain)

**510 mines in operation
> 9.000 jobs**



EXPLORACIONES ACTIVAS

- Energeticos
- Metálicos
- ★ Industriales
- ⬡ Ornamentales
- ◆ Áridos
- ⬮ Aguas

RECURSOS

PROD. (Mt)

VALOR (M)

EMPLEO

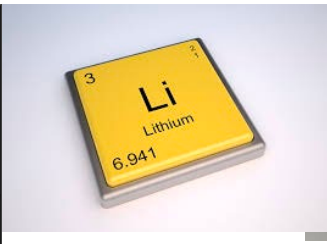
ENERGÉTICOS

Currently -> Towards strategic mining

83 Coal deposits and tailings -> under identification for REE, graphyte and other strategic minerals

10 Fe / 8 W / 6 Hg / 5 Cu

Others: Pb, Zn, Co, Si, Graphite and Lithium



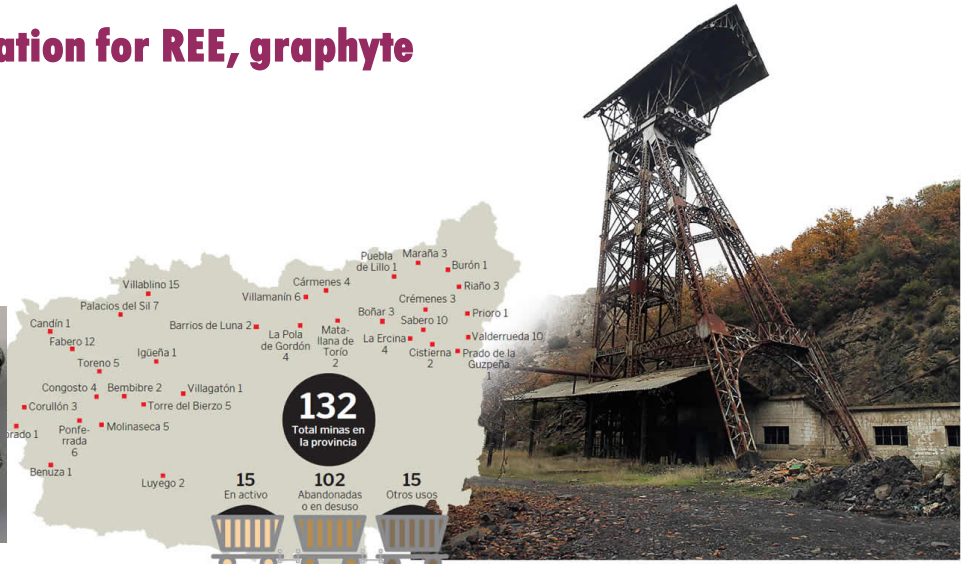
MINAS ABANDONADAS O EN DESUSO

León = biggest coal and anthracite reserve in Spain (1.341 million Tn)

Slate: Spain 1st worldwide market, with León covering 33% of national production

Castilla y Leon has 10% reserves of W of the World !

Biggest Uranium EU reserves in Salamanca (Cyl)



MINAS EN ACTIVO

Boñar	Arenero/Mina de Silíce	Silíce
Barrios de Luna, Los	Mina Satélites de Miñera	Mercurio
Cistierna	Cantera de la Jagariz	Caliza
Ercina, La	Arenero de La Ercina	Arenisca
Cantera de Barrillos	Lavadero de carbón/Lavadero de Esteban Corral	Carbón
Fabero	Poblado de Diego Pérez	Carbón
Ponferrada	Mina de carbón de Jarrinas/Antracitas de Lillo	Carbón
Prado de la Guzpeña	Mina de wolframio de Espinosa de Compludo	Wolframio
Sabero	Fábrica de cok de Prado	Carbón
Pozo Herrera I	Pozo Herrera I	Carbón
Cantera de caliza de La Herrera	Cantera de caliza de La Herrera	Carbón
Torre del Bierzo	Lavadero de Viloria	Carbón
Villablino	Hulleras de Riocuro o Hijos de Baldomero García	Carbón
Conjunto de la minería del carbón en la Cuenca de Villablino	Conjunto de la minería del carbón en la Cuenca de Villablino	Carbón
MINAS CON OTROS USOS		
Boñar	Fábrica de Talcos/Mina La Respina	Talco
Fabero	Pozo Julia	Carbón
Pozo Viejo	Lavadero de carbón de Antracitas de Fabero: Pozo Viejo	Carbón
Cable aéreo de AFSA	Polvorin Antracitas de Fabero/Polvorin de La Reguera	Carbón
Molinaseca	Conjunto de la minería del carbón Cuenca de Fabero	Carbón
Coto Wagner Paradosolana	Coto Wagner Paradosolana	Hierro
Coto Wagner Onamio	Coto Wagner Onamio	Hierro
Ponferrada	Mina de plomo de Valdefrancos	Plomo
Sabero	Ferriera de San Blas	Hierro
Cable vaivén de escombros del Pozo Herrera I	Cable vaivén de escombros del Pozo Herrera I	Carbón
Plano inclinado de La Herrera/Mina de La Herrera I	Plano inclinado de La Herrera/Mina de La Herrera I	Plomo
Conjunto de la minería del carbón Cuenca de Sabero	Conjunto de la minería del carbón Cuenca de Sabero	Carbón

Mining in CyL (I)

MINERAL RESOURCES IN THE REGION

Clay	Glauberite	79 Au Gold	26 Fe Iron	K-Feldspar	Magnesite	Silica	Talc	30 Sn Tin	74 W Tungsten	92 U Uranium	30 Zn Zinc	29 Cu Copper	82 Pb Lead
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Los Santos mine (W)

Open-pit deposit located approximately 50 kms from Salamanca. It produces 700-1,000 tWO3 per year.



Barruecopardo mine (W)

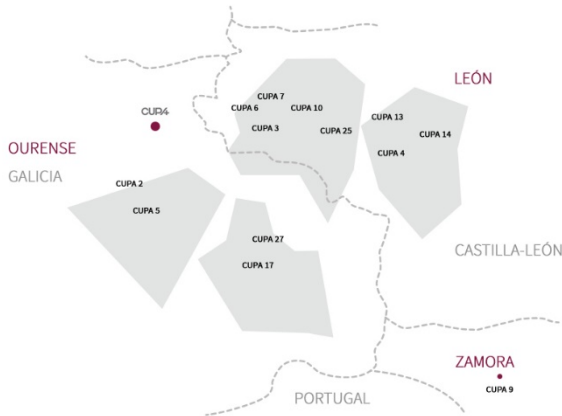
Open-pit tungsten mine, represents one of the largest tungsten reserves in Spain. In operation since the beginning of 2019 and is expected a production of 2,600 tWO3 per year. The mine is located 94 km from Salamanca.



Mining in CyL (II)

CUPA PIZARRAS
The world leader in natural slate

World leader in the production and distribution of roofing slate



Borobia mine (Magnetite)

In operation since 2015, located in the eastern border of Soria province. Produces around 73,000 t/year (12% of the national production).



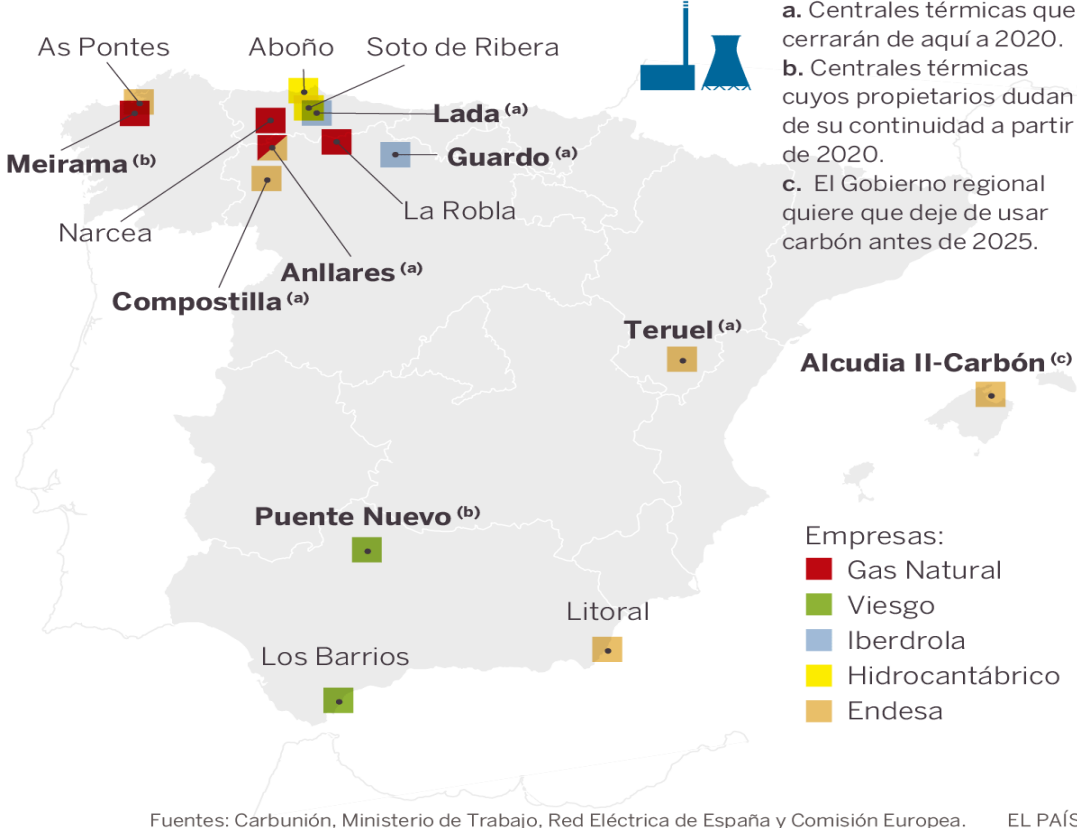
Belorado mine (Glauberite)

Deposit located in the eastern boundary of Burgos province. CRIMIDESA and Minera Santa Marta producing together around 940,000 t/year (76% of the national production).

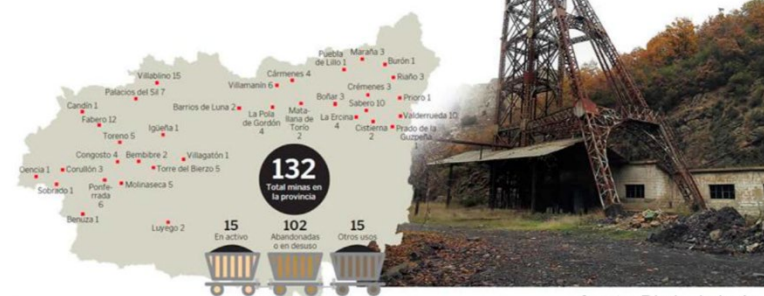
Other minerals:

K-Feldspar: extracted from eolic sands in two open pits in Segovia and (with Li) in two quarries in Salamanca. The whole production is around 426,000 t/year (67% of the national total).

Absorbent clays (bentonite, attapulgite), **silica** (ferroalloys and glass, among other uses) and **wollastonite** (glass) are produced in several open pits.



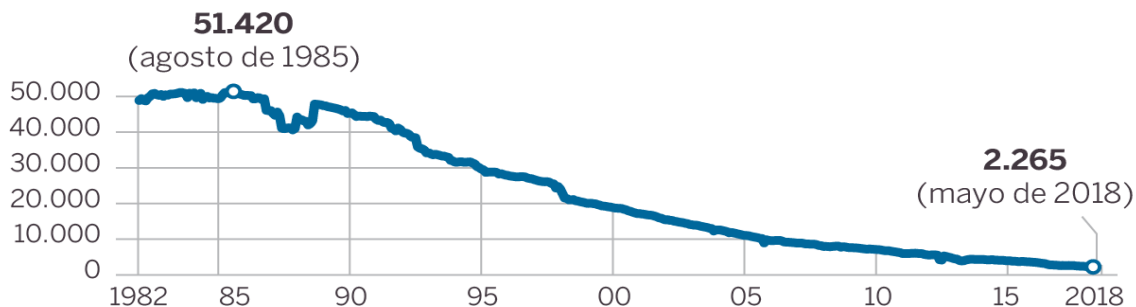
5 Powerplants closed abruptly from 2019 up to 2021



FROM LIGHT TO DARKNESS IN LESS THAN 50 YEARS

EMPLEO

Trabajadores en el Régimen Especial la Minería del Carbón



Fuentes: Carbunión, Ministerio de Trabajo, Red Eléctrica de España y Comisión Europea. EL PAÍS



TECHNOLOGICAL SOLUTIONS, CLUSTERS AND
INNOVATION HUBS AS A MECHANISM TO SOLVE
DEPOPULATION AND BOOST REINDUSTRIALIZATION.

Key existing elements:

- Framework for an innovation ecosystem
- Endogenous richness
- Human capital of value
- Collection of SMEs with skills from a former industrial scenario

CREATION OF A CLUSTER

USE INNOVATION ECOSYSTEM (i.e competence centers as ICAMCYL)

GIVE THE CLUSTER LOCAL, NATIONAL and INTERNATIONAL DIMENSION

USING INNOVATION ECOSYSTEMS - THE BENEFITS OF THIS SCENARIO

INNOVATION ECOSYSTEMS: Strong innovation ecosystems are needed to profile the region as a hotspot for innovation, **to attract industrial investment** and to develop the regional economy.

Interregional collaboration and the regional ecosystems will foster European-wide innovations and establish (inter)regional innovation ecosystems. Further, it provides risk sharing by bringing together all stakeholders along the value chain from academia & industry.

Innovations enabled by interregional collaboration and the regional ecosystems will result in reduced costs for technology and hence increased development, and deployment.

Revitalizing the region: recovering coal mining places by the creation of 'innovation poles'



Smart and Green Mining Regions of EU

Connect EU regions through their raw materials and minerals production, metallurgy and common S3 objectives

9 Partners | 1 Advisory Partner |
9 Countries | 8 Policy Instruments



Mining and Metallurgy Regions of EU



12/2017 – 11/2020

www.mireu.eu

Establish a network of mining and metallurgy regions across Europe

30 Partners | 17 Regions | 15 Countries



Joint
Research
Centre



“Advanced Materials for Batteries”

<http://s3platform.jrc.ec.europa.eu/batteries>



ICAMCYL Pilot leader “Sustainable Raw Materials Extraction & Processing” (Pilot 2)

“Mining Industry”

<http://s3platform.jrc.ec.europa.eu/mining-industry>



Towards a common strategy for securing reliable access to and supply of (critical) raw materials in the European Union area



***BUILDING THE FUTURE OF THE MINING TERRITORIES
AND ASSEMBLING THE SPANISH MINING INDUSTRY***

IBERIAN SUSTAINABLE MINING CLUSTER

Iberian Sustainable Mining Cluster (ISMC)

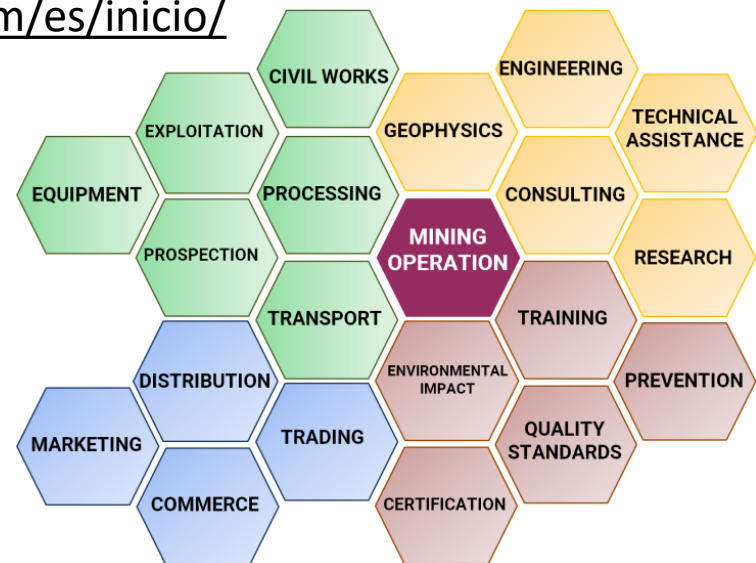
<http://www.ismc-iberiamine.com/es/inicio/>

Raw Materials and Circular Economy



ISMC brings together +50 leading companies in the extraction of mining resources and raw materials, engineering, training, transportation, associated services and commercialisation. In addition, it covers a wide range of raw materials and critical raw materials.

CORE CAPACITIES



MEMBERS



ISMC covers strategically the full value chain of sustainable mining



85% SMEs
> 65
partners

> 1300 jobs

Turn over
≈ 480 M euros
That will double in
2020 to 1.000M

Exploration

Excavation

Mineral
Processing

Tailings
Management

Mine Closure/
Rehabilitation

**Social
Responsibility**



Working & housing
conditions



Community
development



Post-closure
programs

Dust

Environment



Land use &
biodiversity



Biodegradability



Water & air
emissions



Acid rock
drainage



Waste volume



Water
depletion



Energy
consumption



Rehabilitation

Economy



Permissions



Depleting high
quality ores



IMPROVING COMPETITIVENESS TOWARDS A NEW SUSTAINABLE MINING ACROSS THE WHOLE VALUE CHAIN



MISSION & VISION

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Iberian Sustainable Mining Cluster (ISMC)

Operative Objectives

Dynamisation, promotion and improvement of R&D competitiveness in mining

Promotion & business development

Strategic plan implementation & cluster development

Communication & society

Sustainable development, circular economy & 21st century mining

Incorporation of industry 4.0 into the sector & mine digitalization



STRATEGIC LINES

AXE 1
AXE 2
AXE 3

PROMOTION & IMPROVEMENT OF COMPETITIVENESS

BUSINESS DEVELOPMENT

CLUSTER DEVELOPMENT

AXE 4
AXE 5
AXE 6

COMMUNICATION & SOCIETY

SUSTAINABLE MINING & CIRCULAR ECONOMY

MODERNISATION OF THE MINING INDUSTRY



WORKING GROUPS

- WG1:** International projects, technological projects and grants
- WG2:** Business opportunities for the cluster and its members
- WG3:** Technology surveillance
- WG4:** Training, health and safety in the workplace
- WG5:** Communication and marketing
- WG6:** Legislation, European regulations and certifications

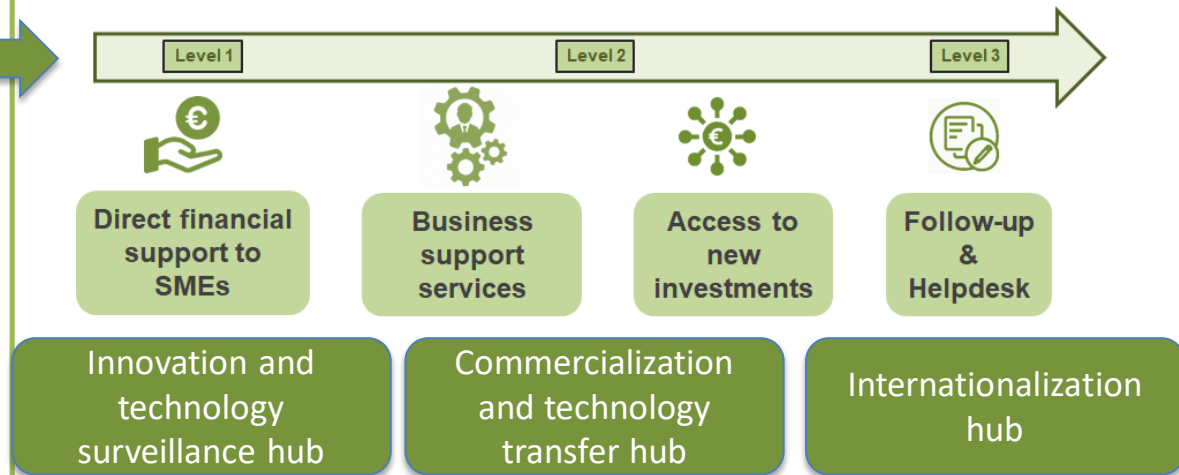
Our methodology and strategy to promote innovation, business support and cross-sectoral collaboration between SMEs in ISMC cluster

The ISMC cluster is launching yearly competitive proposals funded by our regional government (Junta de Castilla y León) under

DIRECT FUNDING or BUSINESS SUPPORT SERVICES

within three axis and hubs:

- *Improving internationalization of SMEs*
- *Technological innovation for improvement of productivity and competitiveness*
- *Cooperative support, business development and awareness of the importance of mining industry in society*







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Thank you for your attention



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