



Portuguese strategy and its contribution to tackle
EU RAW MATERIALS CHALLENGES

Agenda

1. Main Primary Resources in Portugal
 - Metallic Minerals deposits
 - Non-Metallic Minerals deposits
 - Forest Based Resources
2. Main sources of Secondary Resources in Portugal
3. Raw materials Industrial sector
 - Mining and Processing - Metallic Minerals
 - Mining and Processing – Ornamental Stones
 - Forest Products industry
4. Vision and Contribution of the Portuguese Partnership



Main Primary Resources in Portugal

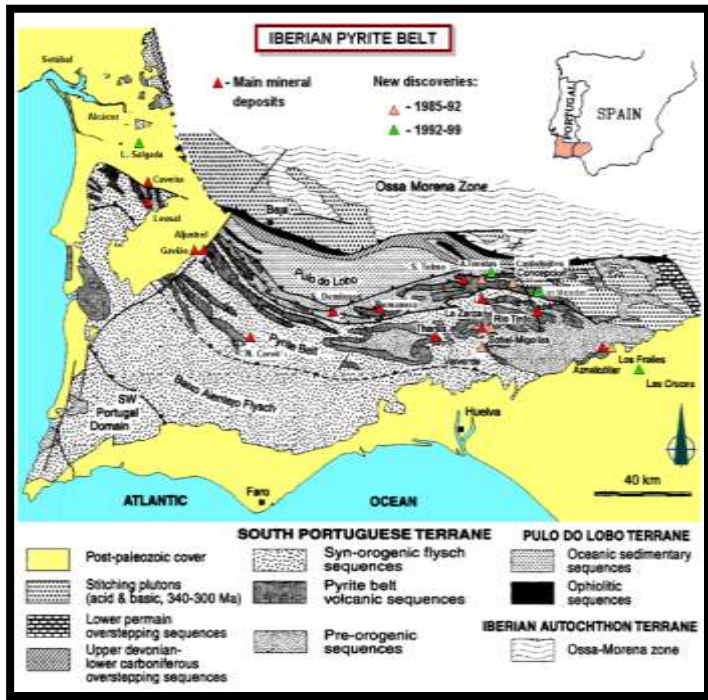
Main primary resources in Portugal

Metallic Minerals deposits

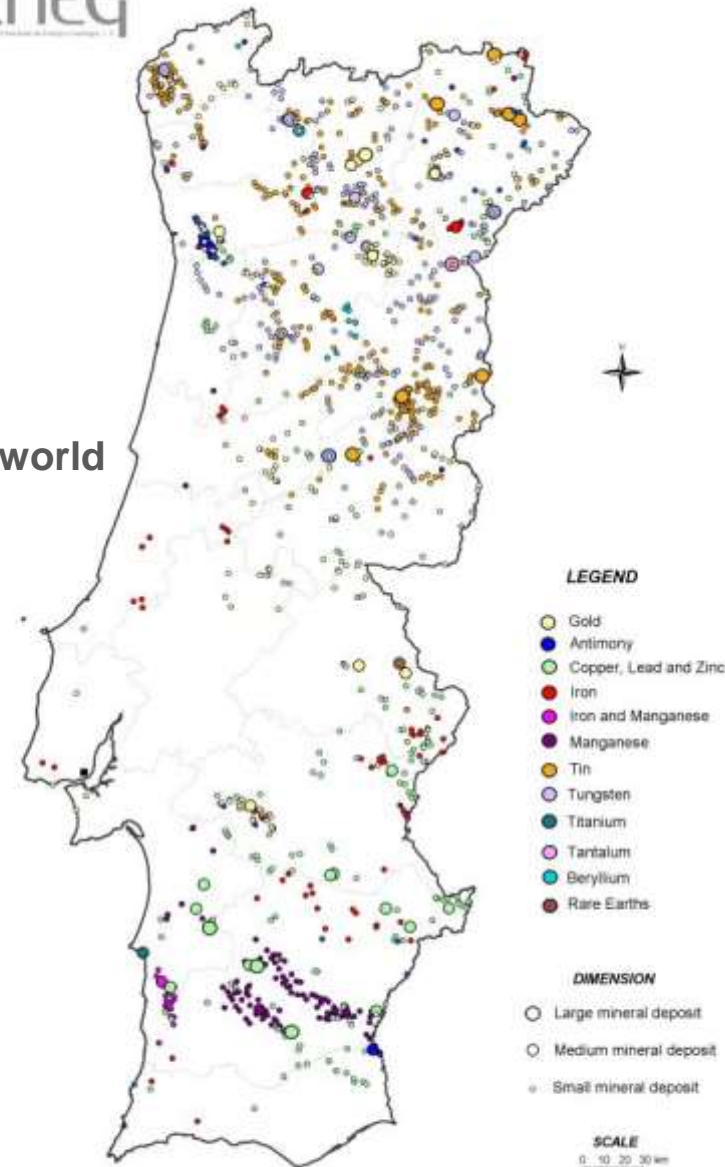
- World class: Cu, Zn, U, Fe, W, Sn.
- Critical Minerals: W, Sb, In, Nb, Ta, Be, Ge.
- Other relevant deposits: Au, Li, Ag, Mn, ...



Iberian Pyrite Belt - one of the largest VMS provinces in the world



- New ore bodies recently discovered: Semblana and Monte Branco near Neves-Corvo.
- Several exploration programs are being developed.



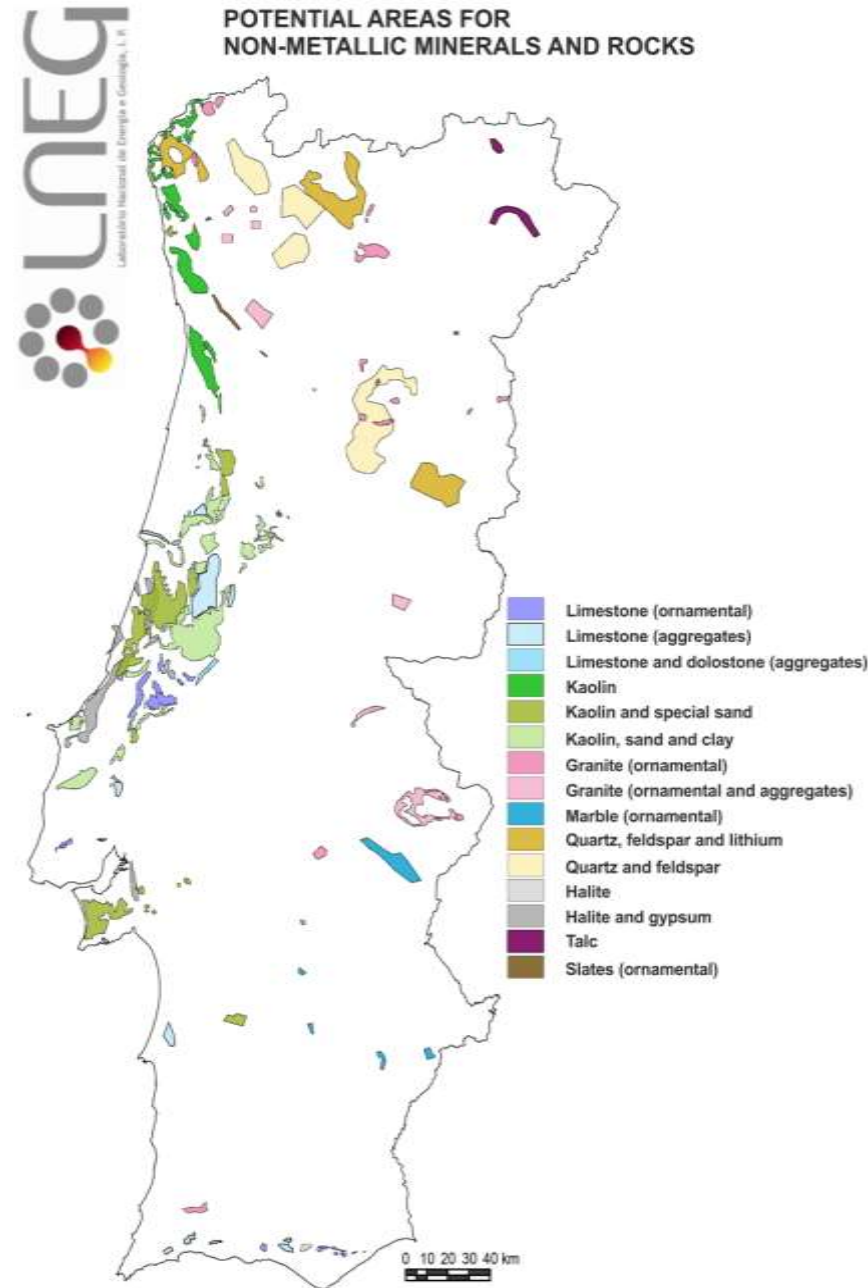
Main primary resources in Portugal

Non-Metallic Minerals deposits

- World class: marbles, limestones.
- Other relevant deposits: kaolin, quartz, feldspar, special clays, special sands, halite, gypsum, talc, granites, slates, aggregates,...



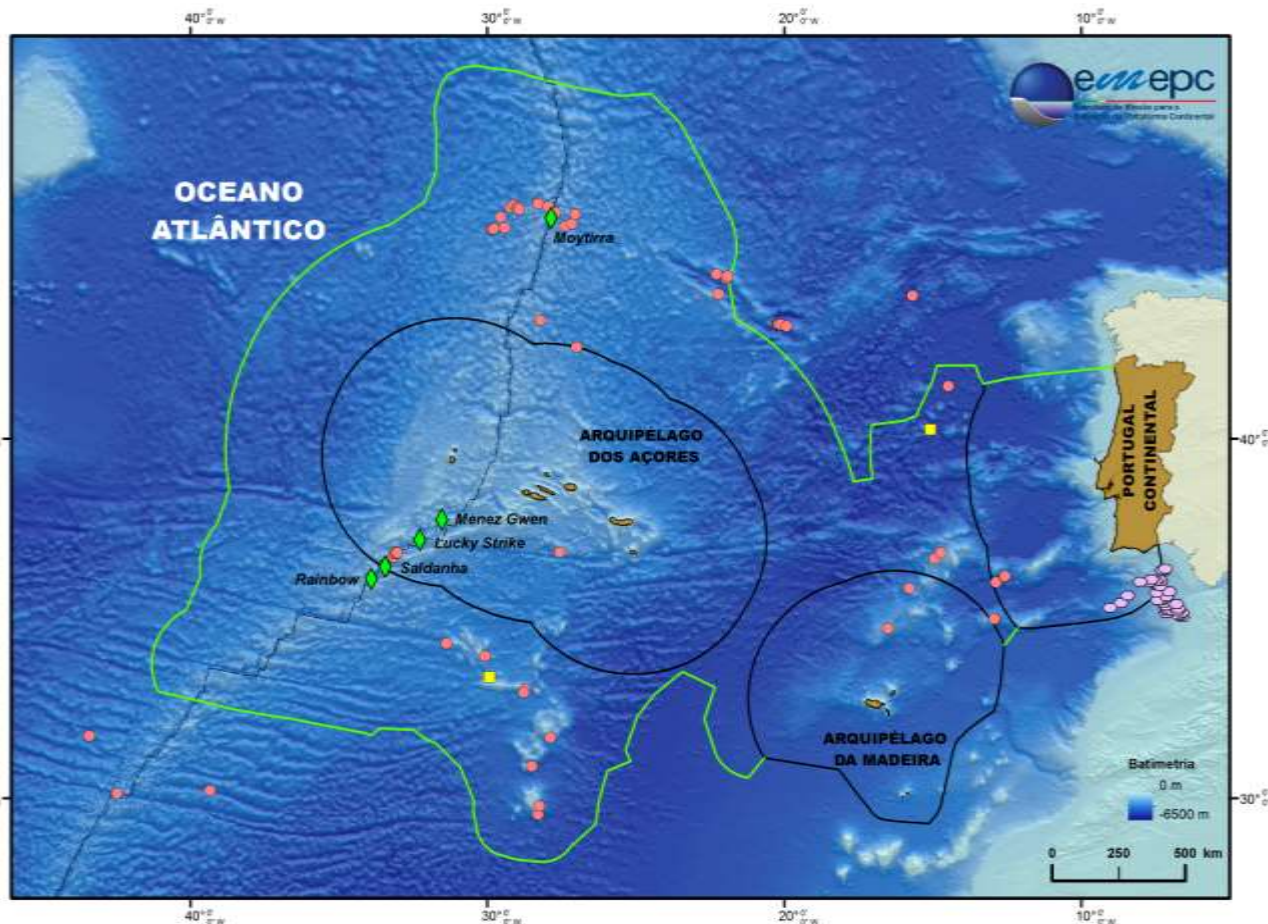
Marbles production region - Alentejo



Deep Seafloor Mineral Resources

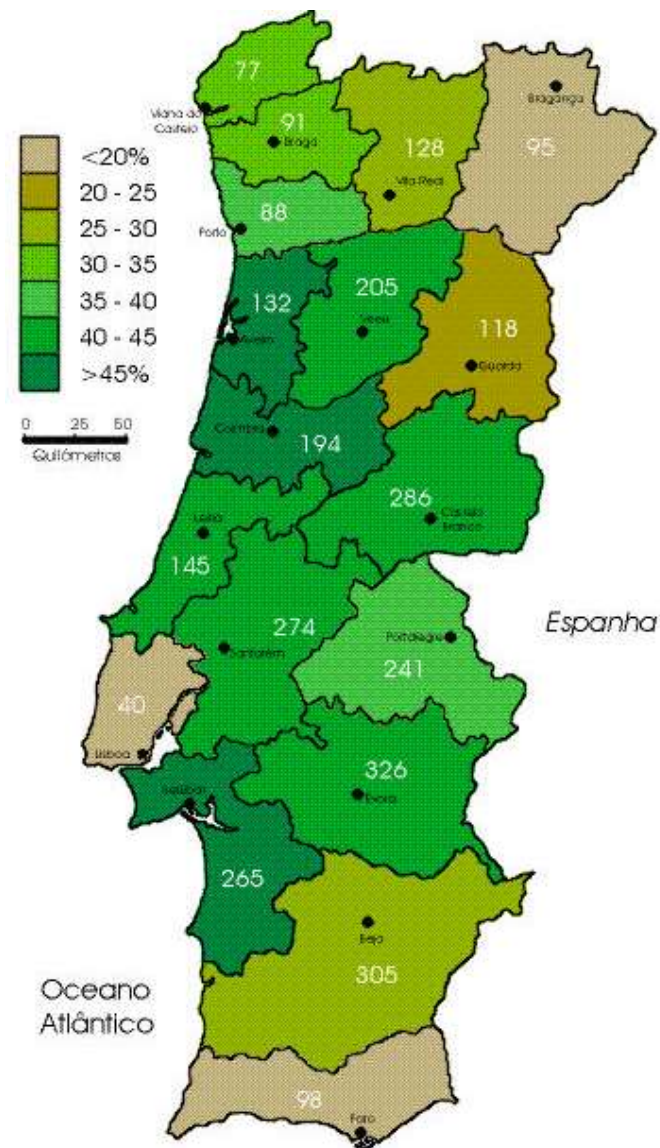
Main deep seafloor mineral resources

- Nearly 4 million km² of largely unexplored seafloor: a huge potential.
- Seafloor and sub-seafloor massive sulphide deposits, on-axis and off-axis of the Mid-Atlantic Ridge (and possibly the Terceira Rift).
- Polymetallic (Mn-Fe-Co) crusts.



Forest Based Resources

- Portuguese forest covers 35.4% of the national territory (2010)
- Pulp and paper sector activity contribute strongly to the growth of the Portuguese economy – 3% of Gross Added Value (2011) and 1 % of national GDP and 5,6% of total exports
- Pulp production in 2012 – 2,5 million tons
- Portugal is the world biggest cork producer



Áreas florestadas de cada distrito, em milhares de hectares, inscritas no mapa

Legend: degree of afforestation



Main Secondary Resources in Portugal

Main secondary sources of materials in Portugal

- Mining and metallurgical residues.
- End-of-life (metal-containing) products.
- Metal-rich sludges/fines from distinct industrial activities.
- Inorganic non-metallic wastes:
 - › sludge and fines from cutting/sawing/polishing of natural stones;
 - › sludge generated in potable water filtration/cleaning operations;
 - › glass cullet;
 - › municipal solid wastes incineration (MSWI) and biomass combustion ashes;
 - › construction and demolition wastes (CDW).
- Pulp and paper industry and paper products
 - Inorganics (sludges, dresh and dregs ...)
 - Biomass residues
 - Secondary fibres (320 thousand ton for recycled paper)



Raw Materials Industrial Sector

Mining industry in Portugal

Government initiatives to encourage mining activity

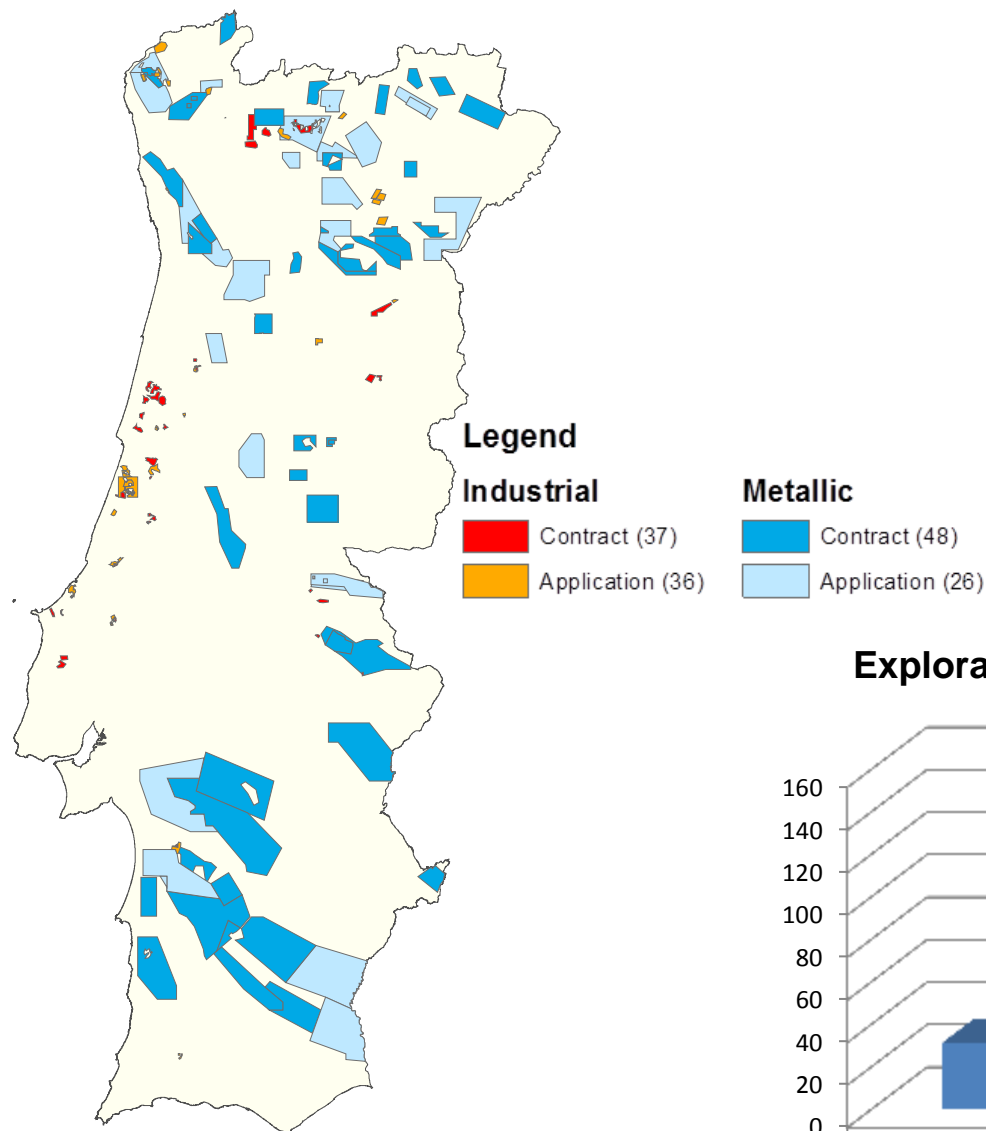
- Approval of a National Strategy for Geological Resources – Mineral Resources (Aug. 2012, Ministry of Economy and Employment)
- Recent launch of a Portuguese Partnership for Mineral Resources (Dec.2012) with the aim to join
 - mining industry,
 - specialized services and consulting companies,
 - academia,
 - mining associations
 - public entities

to increase the competitiveness and innovation within the sector, boosting the knowledge transfer and fostering research **activities**.

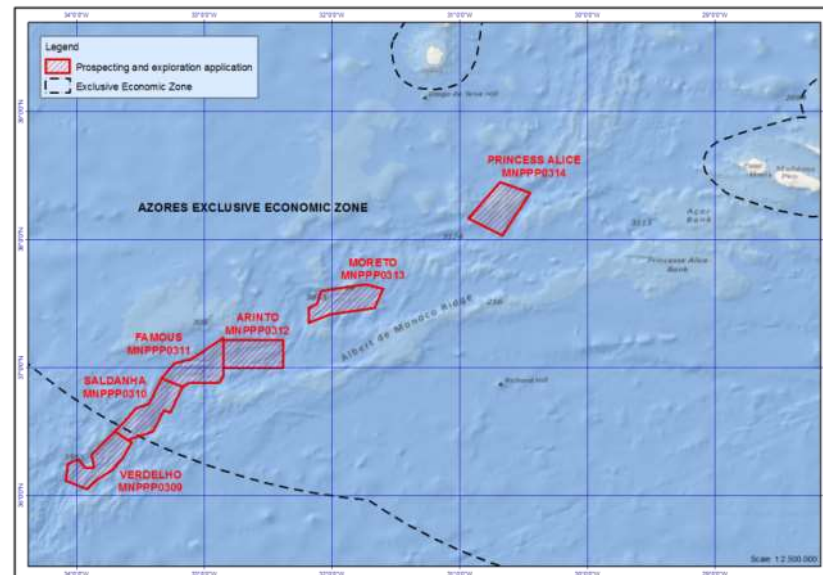
Mining industry in Portugal

Exploration Contracts and Applications

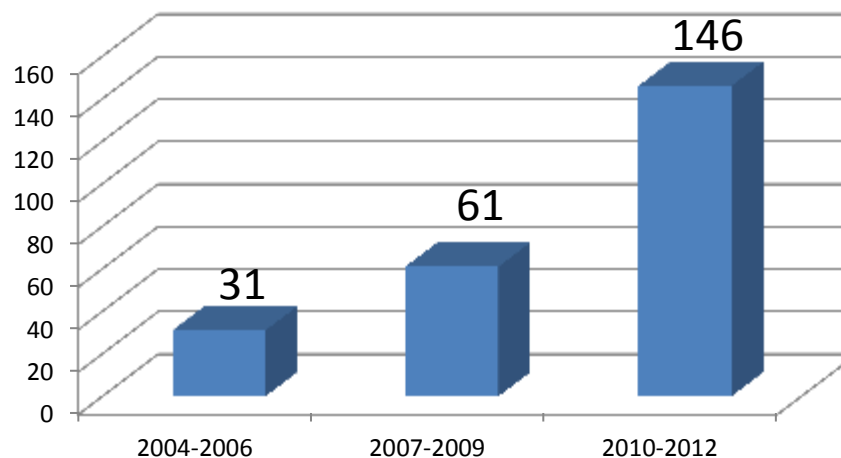
Metallic and Industrial Minerals



Exploration Applications – Deep sea



Exploration permits evolution 2004-2012



Existing mines

Two of the biggest mines in Europe are located in Portugal:

- Neves-Corvo Cu/Zn mine is active since 1989 and has an average annual production of 300,000 tons of Cu concentrate and 100,000 tons of Zn concentrate.
- Panasqueira W deposit is active since 1896 and has an average annual production of 1.300 tons of W₀₃.



Mining and Processing – Ornamental Stones



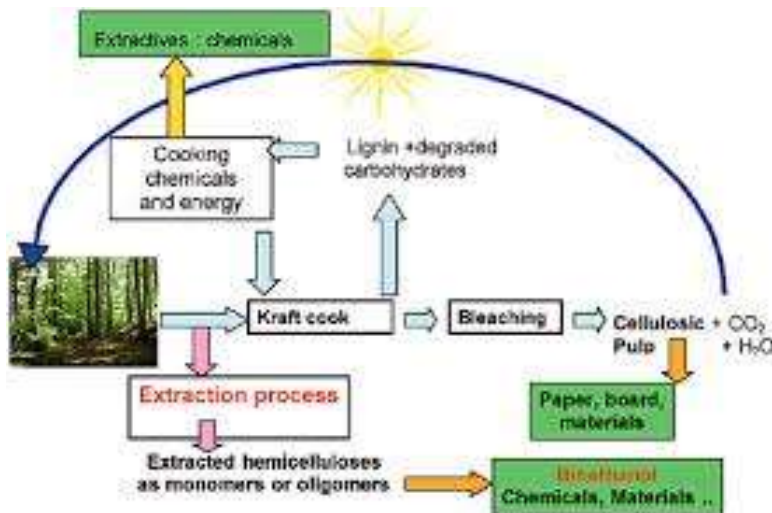
- 2.500 Companies – 17.000 jobs.
- 2nd Exporting Country per capita.
- 7th Exporting Country.
- 45% Exports outside Europe.
- Exporting to 116 Countries: €325.000.000 in 2012.

The Forest Products Industry – Pulp and Paper



Pulp and paper industries turning into integrated biorefineries

- Combined production of materials, energy and chemicals from biomass
- Up-grading of mineral by-products as secondary raw materials
- New renewable chemical intermediates for polymers and materials (rubber-like materials?)
- New uses of virgin and recycled cellulosic fibres (composites ...)





Vision and Contribution of the
Portuguese Partnership

Structure of the Portuguese Partnership

Research and Technology / Higher Education

Universidade de Aveiro (UA) – **National consortium leader**

Universidade de Lisboa (UL)

Universidade do Porto (UP)

Instituto Superior Técnico (UTL/IST)

Laboratório Nacional de Energia e Geologia (LNEG)

Business

Bosh Thermotechnology

Colt Resources Inc.

EDM – Empresa de Desenvolvimento Mineiro, S.A.

Grupo Portucel Soporcel

Sojitz Beralt Tin & Wolfram (Portugal), S.A.

Somincor – Sociedade Mineira de Neves-Corvo, S.A.

Visa Consultores

Weatherford

Weber Saint-Gobain

Industrial Mining Associations

ANIET – Associação Nacional da Indústria Extractiva e Transformadora (149 Cos.)

ASSIMAGRA – Recursos Minerais (260 Cos.)

Government Entities

Direcção-Geral de Energia e Geologia (DGEG)

Estrutura de Missão para a Extensão da Plataforma Continental (EMEPC)

Instituto Português do Mar e da Atmosfera (IPMA)

Portuguese Partnership's contribution to European RM Strategy

Education

- Graduation and post-graduation programmes covering the entire raw materials value chain (from Earth Sciences to Materials Science and Engineering).
- MSc and PhD programmes in industrial context.
- Erasmus Mundus MSc and PhD programmes.
- One of the highest European students ratio in Science and Engineering courses (22.3% against 14.1% in EU27).

Entrepreneurship

- Curricular entrepreneurship education and tech-based business-oriented programmes.
- Regional and national network of business incubators.
- Science and innovation parks.
- National network of business angels and a public venture capital company (Portugal Ventures).

Technology Transfer

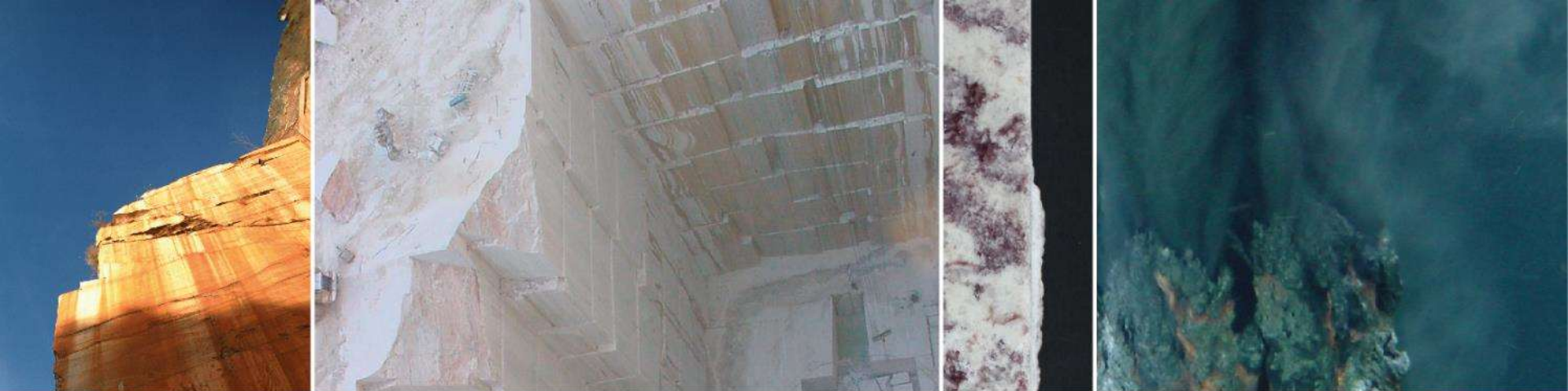
- Experience in IP management and commercialization (UTEN - University Technology Enterprise Network).
- University-Entreprise Liaison Offices and TTOs in each university.

Portuguese Partnership's contribution to European RM Strategy

- A truly comprehensive and highly qualified Portuguese network, **aligned with the national and European policies**, covering the **whole value chain** within the rationale of the knowledge triangle.
- A country with **abundant primary resources, relevant mining industry** and a long experience and tradition in **exploration and mining activities** and **forest industry**
- Occurrence of important **deep sea mineral resources** on an **extensive continental shelf** and research and technological experience and skills on the deep sea environment.
- Excellent cooperation network within the **Portuguese Speaking Countries Community (CPLP)** and **Latin-America**.
- **Know-how, expertise, knowledge, technological capacities and commitment to fulfil the previously identified challenges.**

Opportunities for European Cooperation

- Promote **innovation and technical training** along the **entire value chain of raw materials** involving stakeholders for relevant upstream and downstream sectors.
- Contribute to the **reduction of import dependency** and to the **promotion of production and exports** by improving supply conditions from EU and providing **resource efficiency**, including **recycling**, and alternatives to supply through **substitution**.
- Forthcoming opportunities: **Horizon 2020**, new **KICs** promoted by the European Institute of Innovation and Technology (EIT), **Call for Commitments** promoted by the EIP on Raw Materials



Thank you for your attention! cneto@ua.pt



grupo Portucel Soporcel

