Coordinating and integRating state-of-the-art Earth Observation Activities in the regions of North Africa, Middle East and Balkans and Developing Links with GEO related intiatives toward GEOSS

GEO-CRADLE pre-Kick-Off Meeting
Friday, 18th of February, 2016

VASSILIKI ANGELATOU

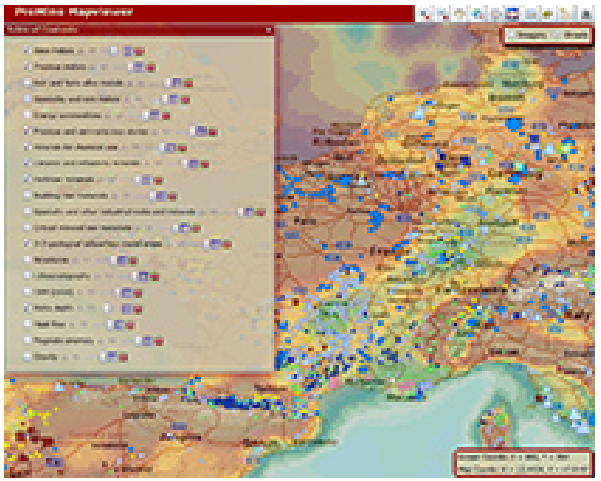
IGME -GR

IONIC Centre, 11 Lysiou Street
Athens, Greece

PROMINE

Nano-particle products from new mineral resources in Europe" 2009-2013

An FP 7/Theme 4 (Nanosciences, Nanotechnologies, Materials and New Production Technologies) Project



- Total budget: 17 M €
- EU contribution: 11 M €
- 27 partners from 11 EU countries
- Coordinated by the Geological Survey of Finland

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Main objectives of the project:

• To develop the first pan-European GIS-based database containing the known and predicted metalliferous and non-metalliferous resources, which together define the strategic reserves (including secondary resources) of the EU.

• To calculate the volumes of potentially strategic metals (e.g. cobalt, niobium, vanadium, antimony, platinum group elements and REE) and minerals that are currently not extracted in Europe.

• To develop five new, high value, mineral-based (nano) products.

• To enlarge the number of profitable potential targets in Europe.

• To establish a new, cross-platform information group between the European Technology Platform on Sustainable Mineral Resources (ETP-SMR) and other platforms.

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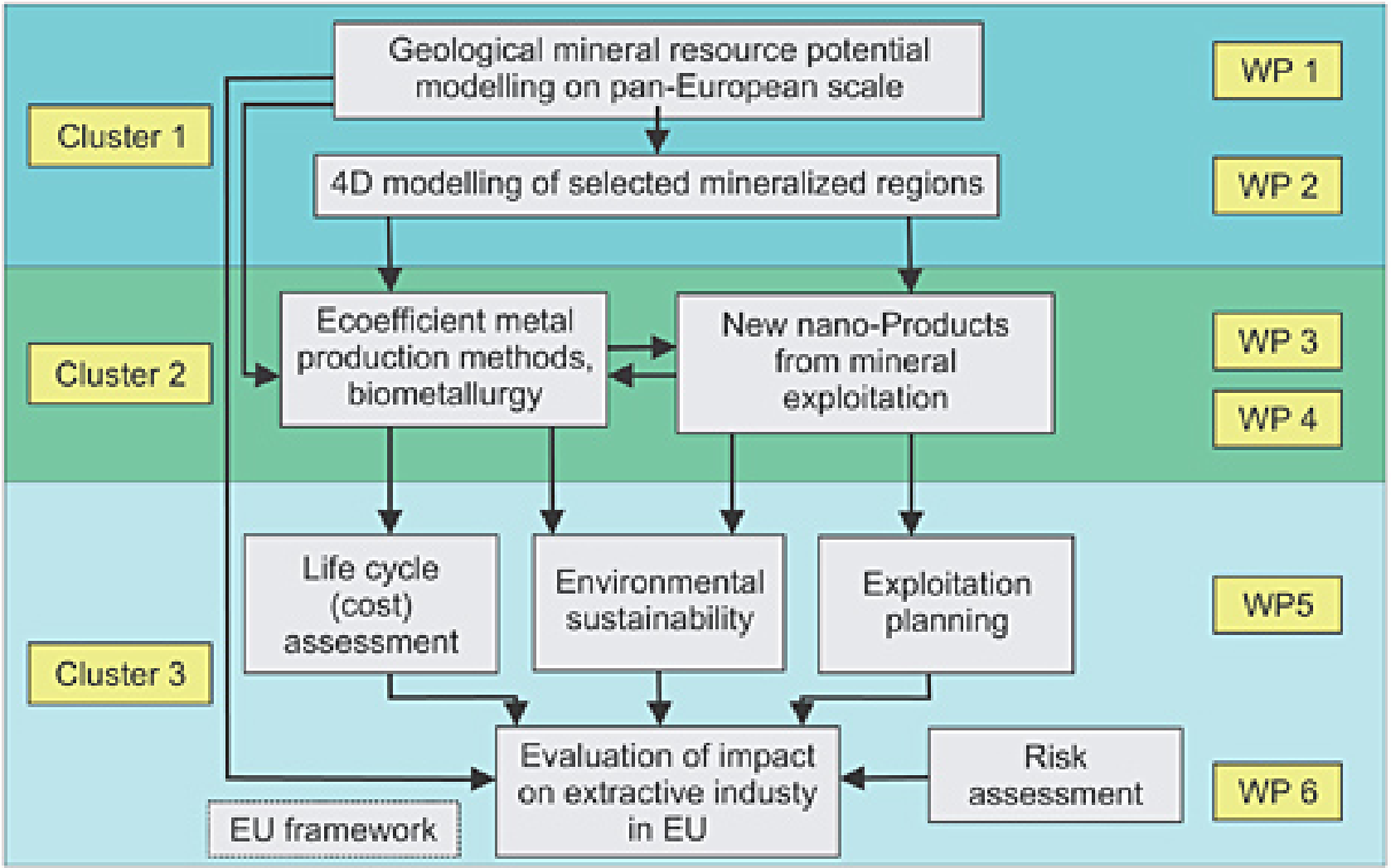
Geological mineral resource potential modelling on pan-European scale
4D modelling of selected mineralized regions
Ecoefficient metal production methods, biometallurgy
New nano-Products from mineral exploitation
Life cycle (cost) assessment
Environmental sustainability
Exploitation planning
Evaluation of impact on extractive industy in EU
Risk assessment
EU framework
Cluster 1
Cluster 2
Cluster 3
WP 1
WP 2
WP 3
WP 4
WP5
WP 6

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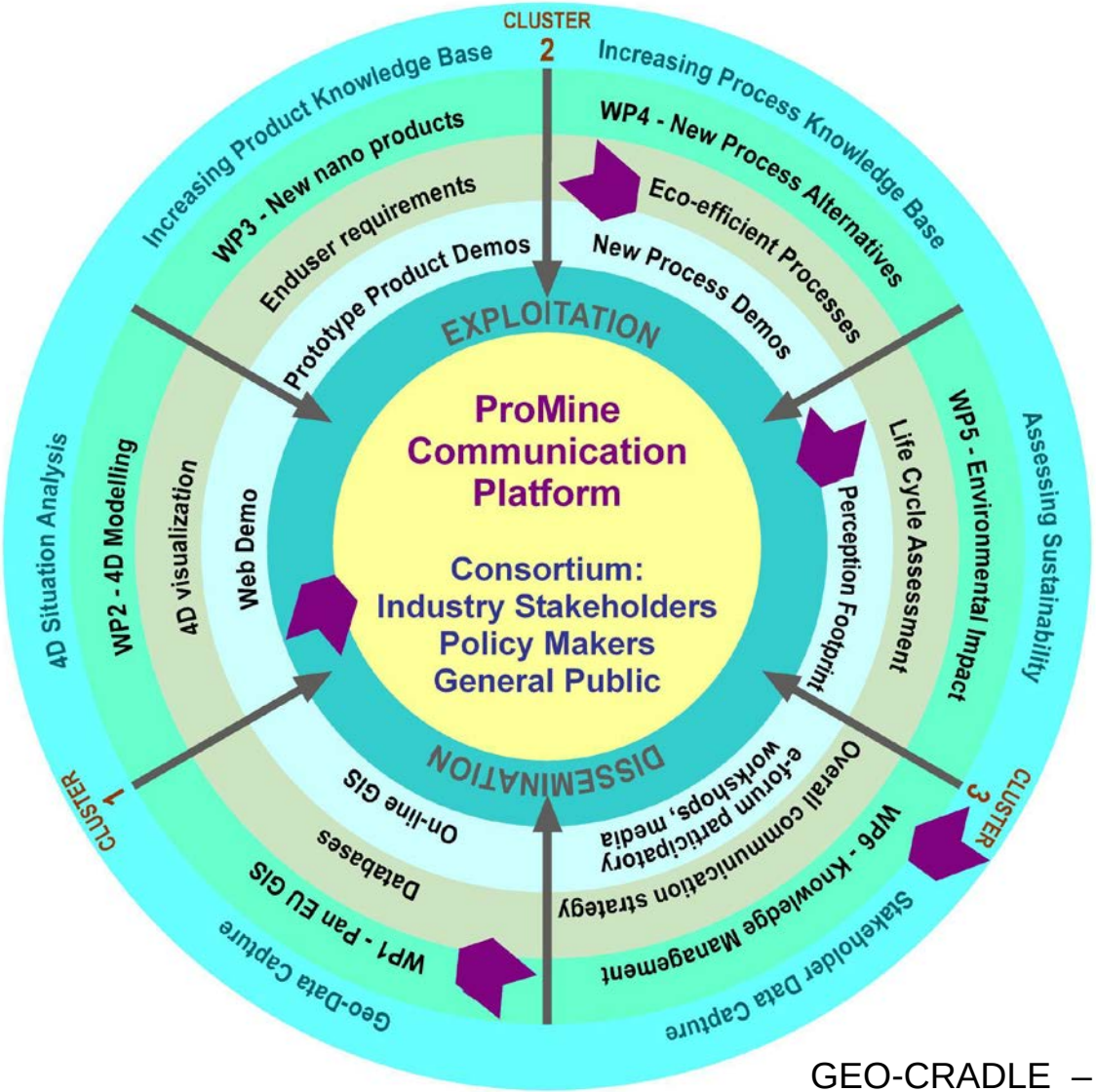
CLUSTER 2
Increasing Product Knowledge Base
Increasing Process Knowledge Base
WP3 - New nano products
WP4 - New Process Alternatives
Enduser requirements
Eco-efficient Processes
Prototype Product Demos
New Process Demos
EXPLOITATION
ProMine Communication Platform
Consortium:
Industry Stakeholders
Policy Makers
General Public
DISSEMINATION
4D Situation Analysis
WP2 - 4D Modelling
4D visualization
Web Demo
Life Cycle Assessment
Perception Footprint
WP5 - Environmental Impact
Assessing Sustainability
CLUSTER 1
Geo-Data Capture
WP1 - Pan EU GIS
Databases
On-line GIS
CLUSTER 3
Stakeholder Data Capture
WP6 - Knowledge Management
Overall communication strategy
e-forum participatory workshops, media

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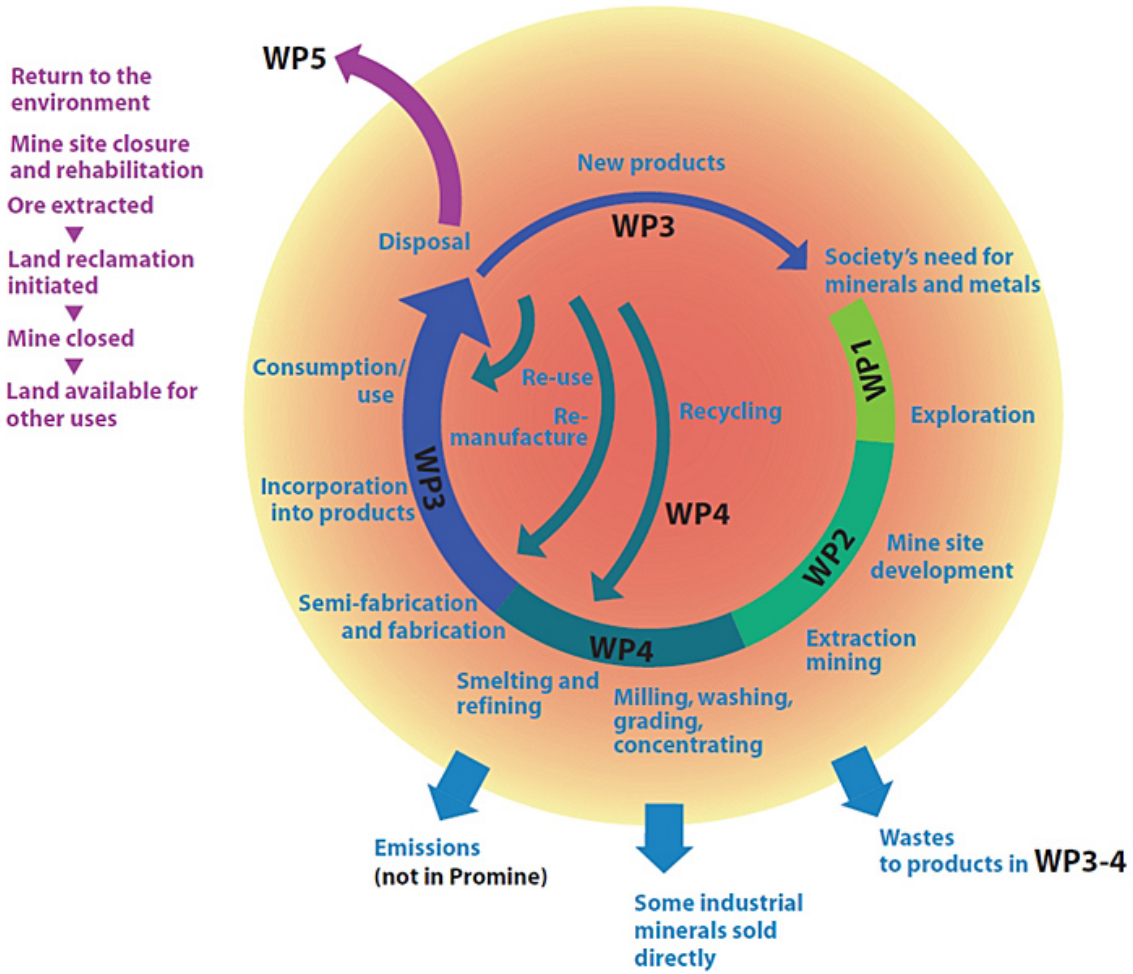
Promine work packages in the Minerals Cycle

Modified from **MMSD** BREAKING NEW GROUND (2002)



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WP1: Geological mineral resource potential modelling across Europe

Objectives

The **development of a Pan-EU GIS data management and visualization system for natural and man-made mineral endowment and the realization of a Pan-EU predictive resource assessment**

Assessment of EU mineral resources (including new strategic and 'green' commodities such as Ga, Ge, In, Li, Nb, Ti, Ta, PGE and REE)

Assessment of secondary (industrial) minerals and resources in combination with metalliferous ores realized in parallel with the previous task)

Assessment of valuable mining and metallurgical residues.

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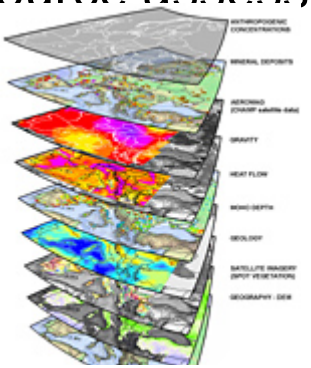
Outputs

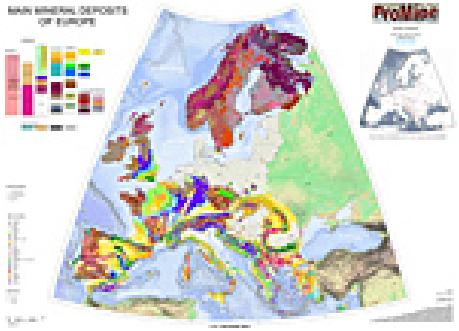
The compilation of the **Pan European Mineral Deposits** has been completed and is available for public access via the ProMine homepage.

The first European Anthropogenic Concentration database has been designed and data compilation is in full swing.

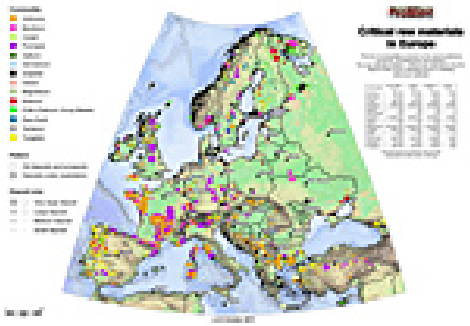
Moreover, a major highlight of WP1 is the **first ever delivery of the occurrences of** C**ritical Raw Minerals in Europe**, at the request of the Commission, thus demonstrating the usefulness of a European wide mineral resource assessment.



Pan-EU GIS: a homogeneous multi-layer information system covering the whole of Europe



Main mineral deposits of Europe



Critical Raw Minerals

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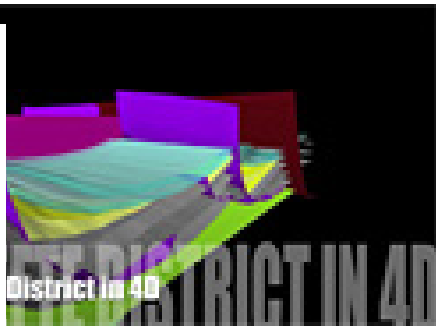
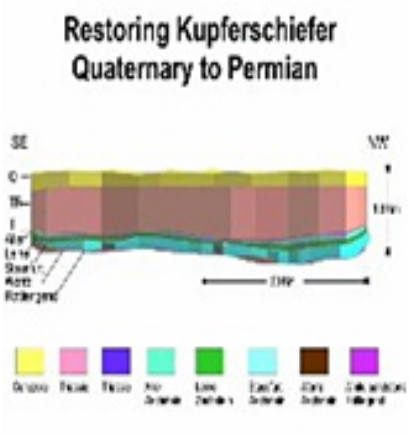
WP2: 4D modelling of mineralised belts



Objective :

Tto develop **robust 4D geomodels visualized in user-friendly software** which can be used for resource estimation as well as to assess the likely environmental and societal impacts of mineral extraction throughout the entire life cycle from discovery to closure, as well as financial and legislative limitations, to avoidconflicts in land use.



Four major active mining belts in Europe have been selected for the demonstration of concepts:

- Fennoscandian Shield (Skellefte-Pyhäsalmi)
- Forsudetic belt (Kupfershiefer area) of Poland-Germany
- Iberia, both Portugal and Spain
- Hellenic belt of northern Greece

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Outputs

The **first 4D geo-model** was compiled for the Skellefte district, Sweden and the **first 4D restoration tests** have been carried out in the Forsudetic Basin, Poland and Germany.

This success paves the way towards **new mining exploration as 3D methods allow investigation down to several 1000 m depths**. Indeed, the first results in detecting new ore bodies in the vicinity of mines of partners are emerging.

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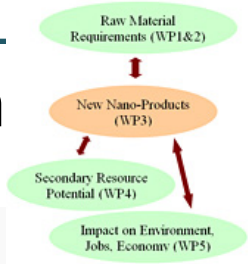
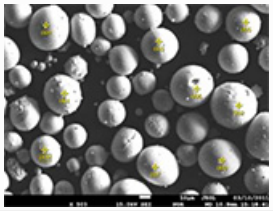
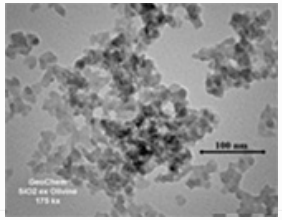


WP3: New nano-products from mineral exploitation

Product	Application area
Spherical rhenium / Rhenium alloys	Aerospace, TGV trains, turbine blades and engines 
Metal fibres	High performance abrasive products for automotive, wood, construction, metal and high tech industry, conductive metal (Cu, Ag, Au) fibres, mats: carbide fibres
Nano silica	Construction materials, catalysts
Nano-coatings	New paper making chemical for coatings for ink jet Paper industry 
Schwertmannite	Pigments, ceramics water treatment

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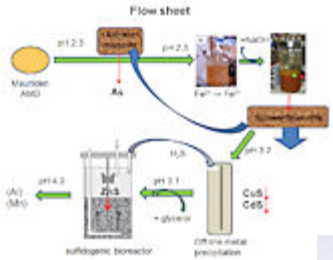
WP4: Eco-efficient metal production methods and utilization of secondary materials

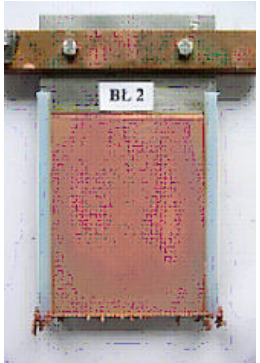
Objective :

To give proof of concept of (bio)hydrometallurgy technologies on European resources, eventual ly by integrating new internal processing routes in current flowsheets for the**optimization of the recovery of metals**, and by developing **innovative routes for treatment of wastes/secondary resources** (tailings, contaminated process water).



Output

- **New Bioreactor for Bioleaching application**
- **Metal recovery from Mine waters**
- **Transformation of slags into new resources**
- **Improved (bio)processing methods for complex ore**



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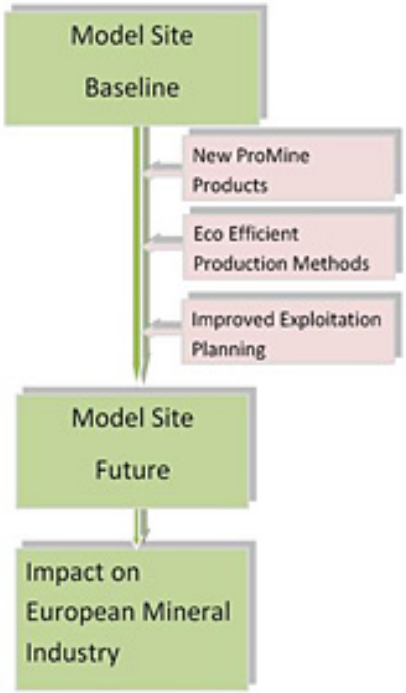
WP5: Assessment of sustainability and environmental impact



Objective

The objective in WP5 was to assess the effect of the new products and eco-efficient metal production methods developed within the project on the sustainability of Europe's mineral industry, comprising the environmental, economic and social dimensions.

Outputs

After reviewing several sets of sustainability performance indicators, a subset of 15 indicators from the G3 sustainability reporting guidance of the Global Reporting Initiative (GRI, see globalreporting.org) was selected and used to document the **Baseline Sustainability Situation at the Model Sites**.

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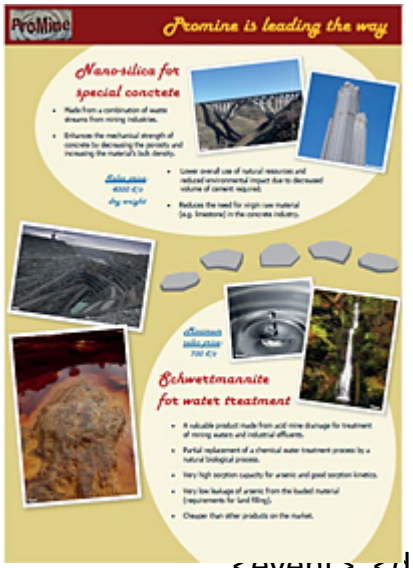
WP6: Knowledge management and Exploitation

Objective

The objective of WP6 was to ensure the efficient and effective flow of information, both within the project, and with outside parties. The added value component would be to maximize the creative capacity of all data and knowledge generated by the project. This in turn will feed into the overall goal of improving industrial links and revitalizing the industry.

Outputs

The description of the current sustainability situation has been harnessed to produce a folder with **ProMine Factsheets** on each of the Model Sites for circulation within and outside ProMine. In parallel, a first series of stakeholder workshops, designed as **ProMine Information Days**, have been organized



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ProMine wins best European project award

The ProMine project was awarded first prize in the European finalised projects category, at the Industrial Technologies 2014 conference held in April in Athens.
The project won first prize in the European finalised projects category.

Over 1000 European projects on industrial technologies, launched under the 7the FPRD (Framework Programme for Research and Development) and the previous programmes, had entered the competition.

The project won first prize for its scientific and commercial results.

THANK YOU FOR YOUR ATTENTION !