Combining energy production and mineral extraction – the CHPM2030 project

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Geochemistry of Geothermal Fluids
Miskolc, 26-27 October 2017
Project data

Call: H2020-LCE-2014-2015 two-stage, Research and Innovation action

Topic: Developing the next generation technologies of renewable electricity and heating/cooling

Project title: Combined Heat, Power and Metal extraction from ultra-deep ore bodies

Project ID: 654100

Implementation: 01.01.2016-30.06.2019

Budget: 4.2 million EUR

TRL: 4-5
# The consortium

<table>
<thead>
<tr>
<th>Participant organisation name</th>
<th>Country</th>
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<tr>
<td>University of (UNIM), coordinator</td>
<td>Hungary</td>
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<td>University of Szeged (USZ)</td>
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<td>European Federation of Geologists (EFG)</td>
<td>France</td>
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<td>Iceland Geosurvey (ISOR)</td>
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<td>British Geological Survey (BGS)</td>
<td>UK</td>
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<td>Laboratório Nacional de Energia e Geologia (LNEG)</td>
<td>Portugal</td>
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<td>Vlaamse Instelling voor Technologisch Onderzoek (VITO)</td>
<td>Belgium</td>
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<td>La Palma Research S.L. (LPRC)</td>
<td>Spain</td>
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<td>Agency for International Minerals Policy (MinPol)</td>
<td>Austria</td>
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<td>Geological Survey of Romania (IGR)</td>
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<td>Katholieke Universiteit Leuven (KLeuv)</td>
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<td>Geological Survey of Sweden (SGU)</td>
<td>Sweden</td>
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Challenge

EU needs clean energy - EGS operating costs are high
EU needs critical raw materials – limited mining

Developing a new technology for combining geothermal energy production and metal mining

Create a proof of concept of the technical and economic feasibility at a laboratory scale
Concept
Identifying ultra deep metalliferous formations
Establishment of EGS (‘orebody-EGS’)
Enhance the interconnected fracture systems within the orebody
Leaching metals from the orebody
Metal extraction from the geothermal brine
Production of heat and electricity
Schematic overview of the envisioned CHPM Facility
WP1 - Methodology framework definition (UNIM)

EGS-relevant review of metallogenesis and ore deposit formation
Collection and evaluation of unprocessed data
Understanding the geochemical, petrographic and structural characteristics of orebodies from an EGS perspective
Providing a conceptual framework for orebody-EGS
Reports related to WP1

EGS-relevant review of metallogenesis
CHPM2030 Deliverable D1.1
Version: December 2016

Report on data availability
CHPM2030 Deliverable D1.2
Version: December 2016

EGS-relevant review of orebody structures
CHPM2030 Deliverable D1.3
Version: December 2016

Conceptual framework for orebody-EGS
CHPM2030 Deliverable D1.4
Version: December 2016
WP2 - Laboratory experiments and orebody investigations (BGS)

Laboratory experiments and simulations for orebody characteristics

Metal content mobilisation using ’mild leaching’ (additional heat: pyrite oxidation exothermic)

Metal content mobilisation with carbon nanoparticles
WP3 - Metal recovery and electrochemical power generation (VITO)

Recovery of the metal content by high-temperature, high-pressure geothermal fluid electrolysis

Recovery of the metal content of geothermal fluids by gas-diffusion electroprecipitation and electocry stallization

Salinity gradient power from pre-treated geothermal fluids – reverse electrodialysis
WP4 – Systems integration (ISOR)

Conceptual framework for CHPM power plant
Process optimisation and simulations
CHPM schematics and blueprints
WP5 - Integrated sustainability assessment (USZ)

Integrated sustainability assessment framework
Baseline economics for energy and mineral raw materials
Decision support for economic feasibility assessment
Social impact assessment and policy considerations
Environmental impact assessment
Ethics assessment
WP6 - Roadmapping and preparation for pilots (LPRC)

Horizon Scanning & Visions (EU2050 Energy Roadmap, Geothermal Technology Roadmap)

Preparation for pilots (South West England, Iberian Pyrite Belt, Romania, Sweden, European outlook)

Roadmapping (2030, 2050)
WP7 - Dissemination and stakeholder involvement (EFG)
WP8 – Project management (UNIM)

More information: http://www.chpm2030.eu/
On behalf of the CHPM2030 consortium thank you for your attention!