

# Combining energy production and mineral extraction – the CHPM2030 project

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Geochemistry of Geothermal Fluids

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# 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

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

# 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

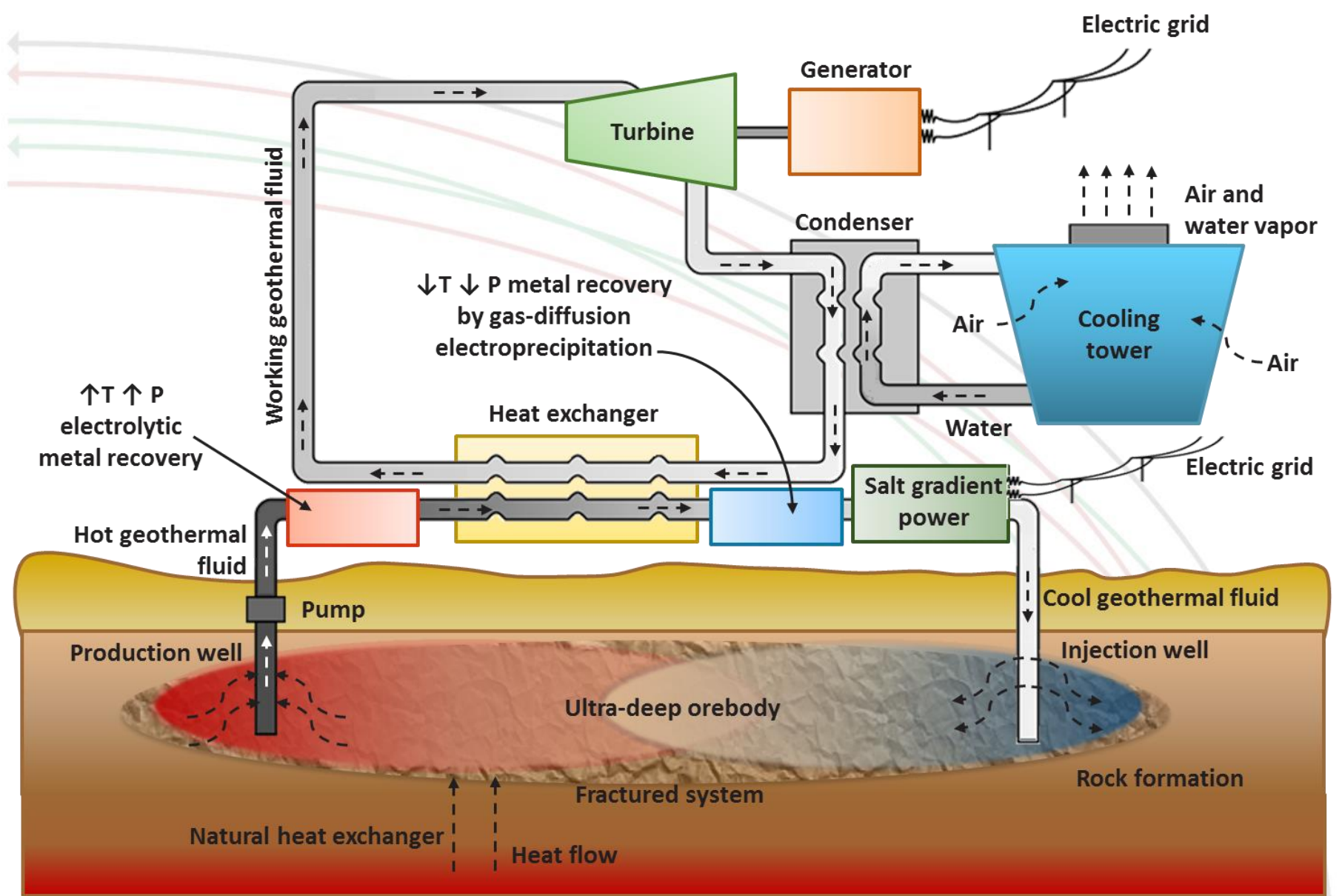
Establishment of EGS ('orebody-EGS')

Enhance the interconnected fracture systems within the orebody

Leaching metals from the orebody

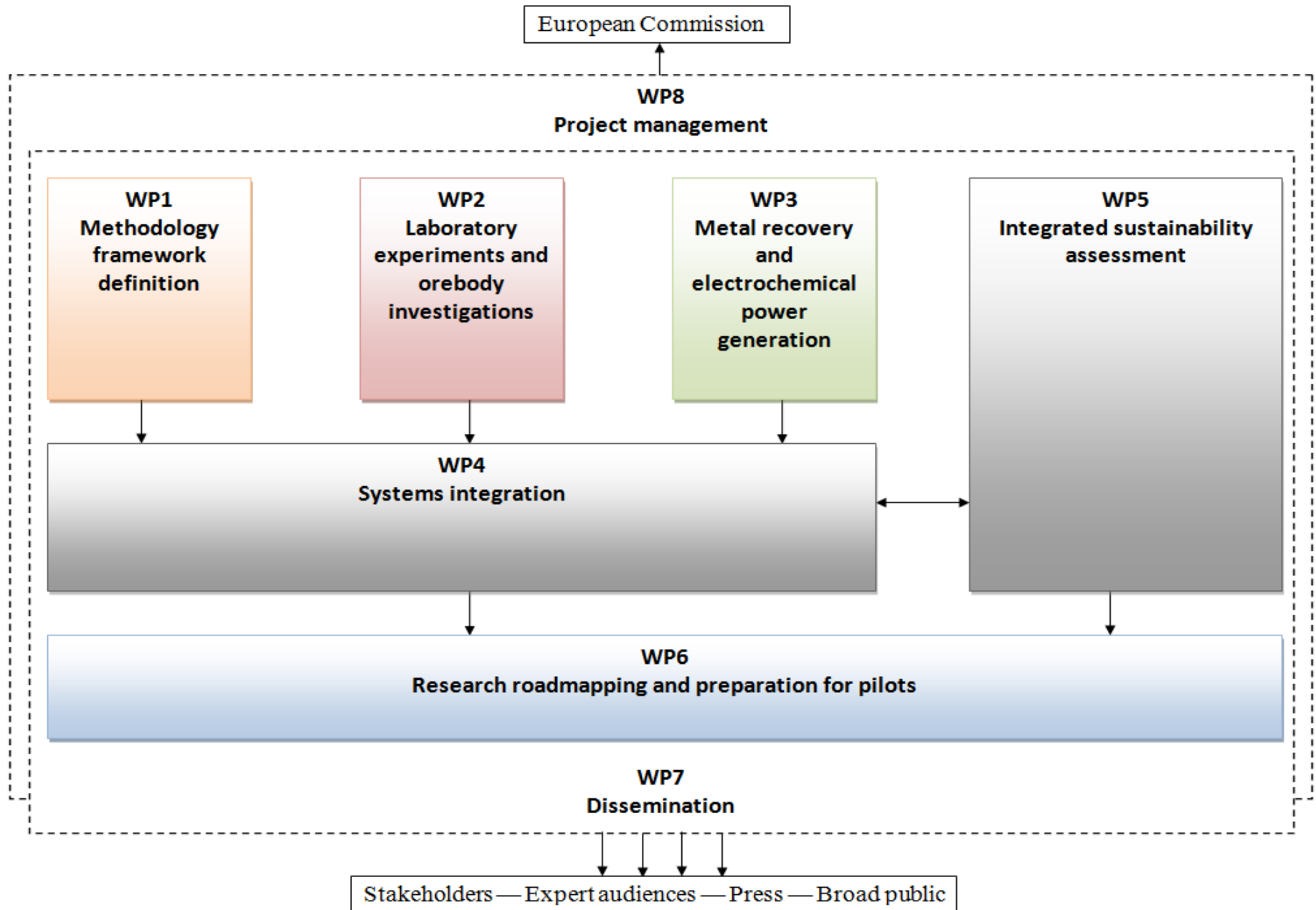
Metal extraction from the geothermal brine

Production of heat and electricity



Schematic overview of the envisioned CHPM Facility

# Work organisation



# 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

CHPM2030



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement/ID 101017724.

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## 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 electrocrystallization

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)

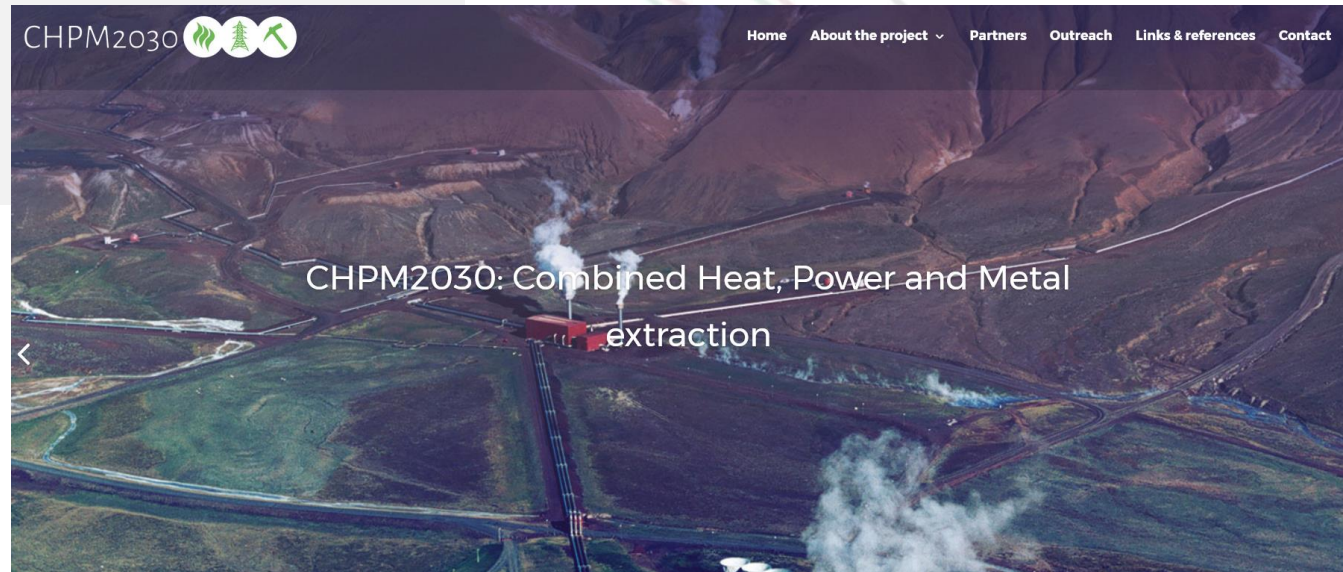
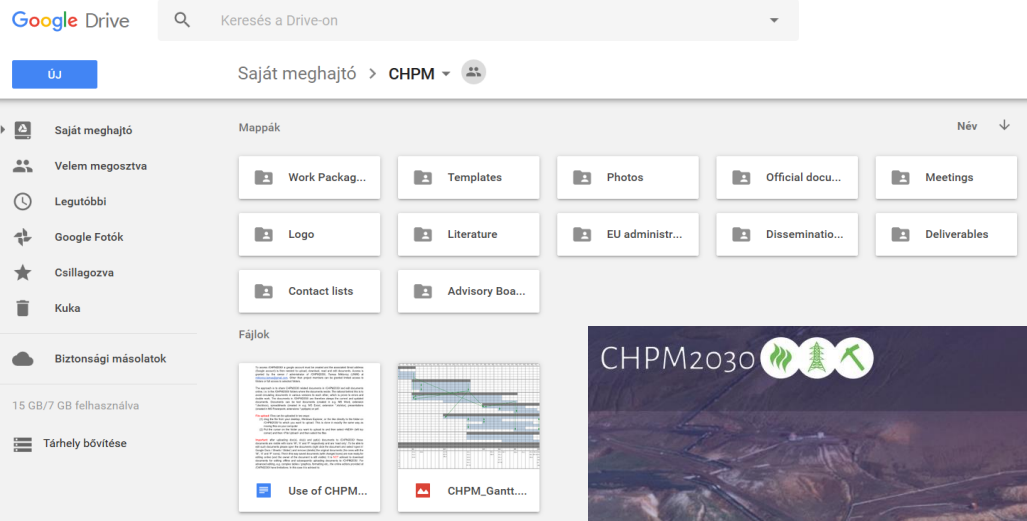
Preparation for pilots (South West England , Iberian Pyrite Belt, Romania, Sweden, European outlook)

Roadmapping (2030, 2050)

# WP7 - Dissemination and stakeholder involvement (EFG)



# WP8 – Project management (UNIM)



More information: <http://www.chpm2030.eu/>





CHPM2030 Kick off meeting, Miskolc Hungary, January 2016

On behalf of the CHPM2030 consortium  
thank you for your attention!