

Metal recovery and geothermal energy production in a single interlinked process – the CHPM2030 project

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EuroWorkshop: Geothermal – The Energy of the Future

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CHPM2030





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 laboratory scale



Concept

Identifying ultra deep metalliferous formations

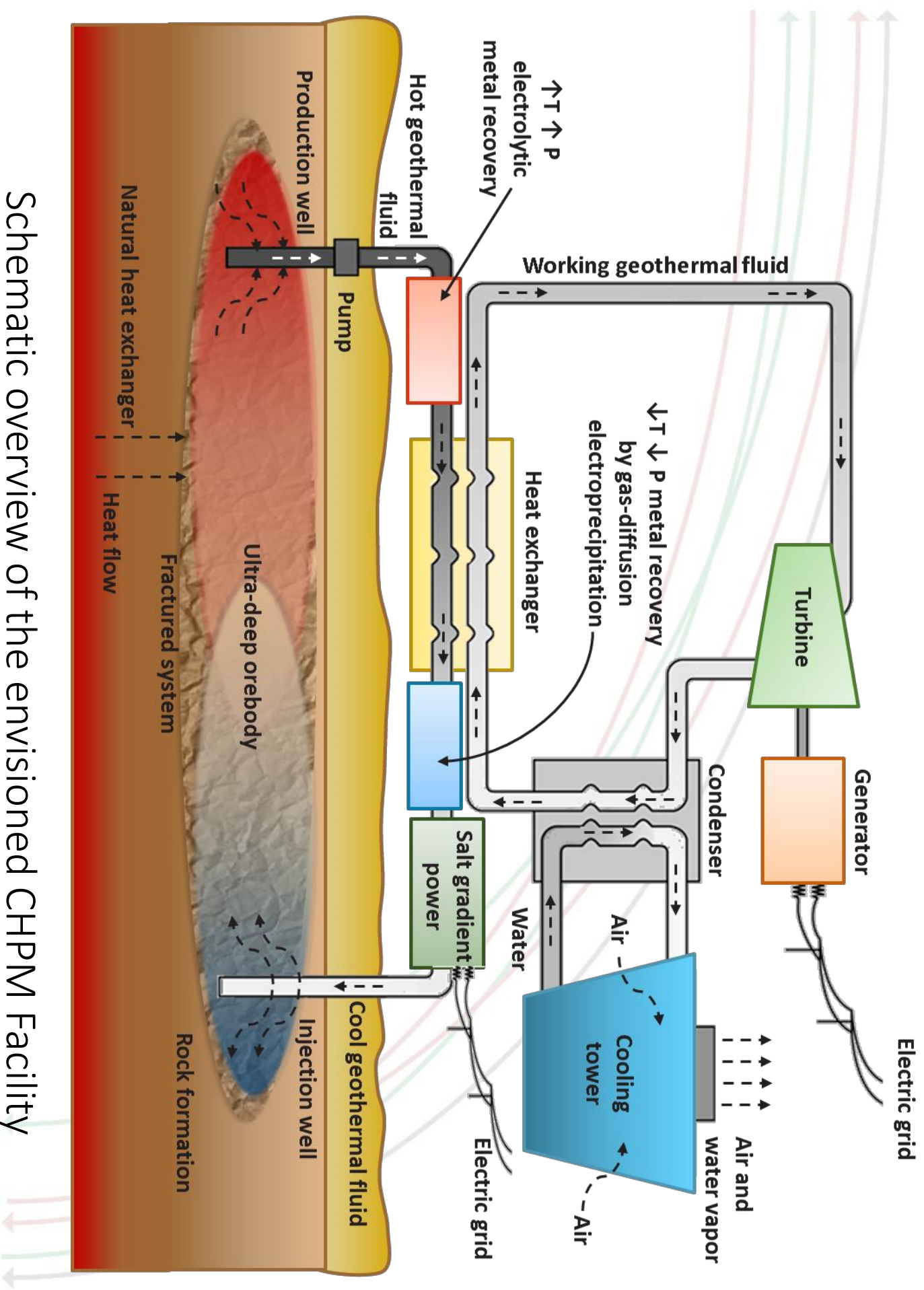
Establishment of EGS

Enhance the interconnected fracture systems within the orebody

Leaching metals from the orebody

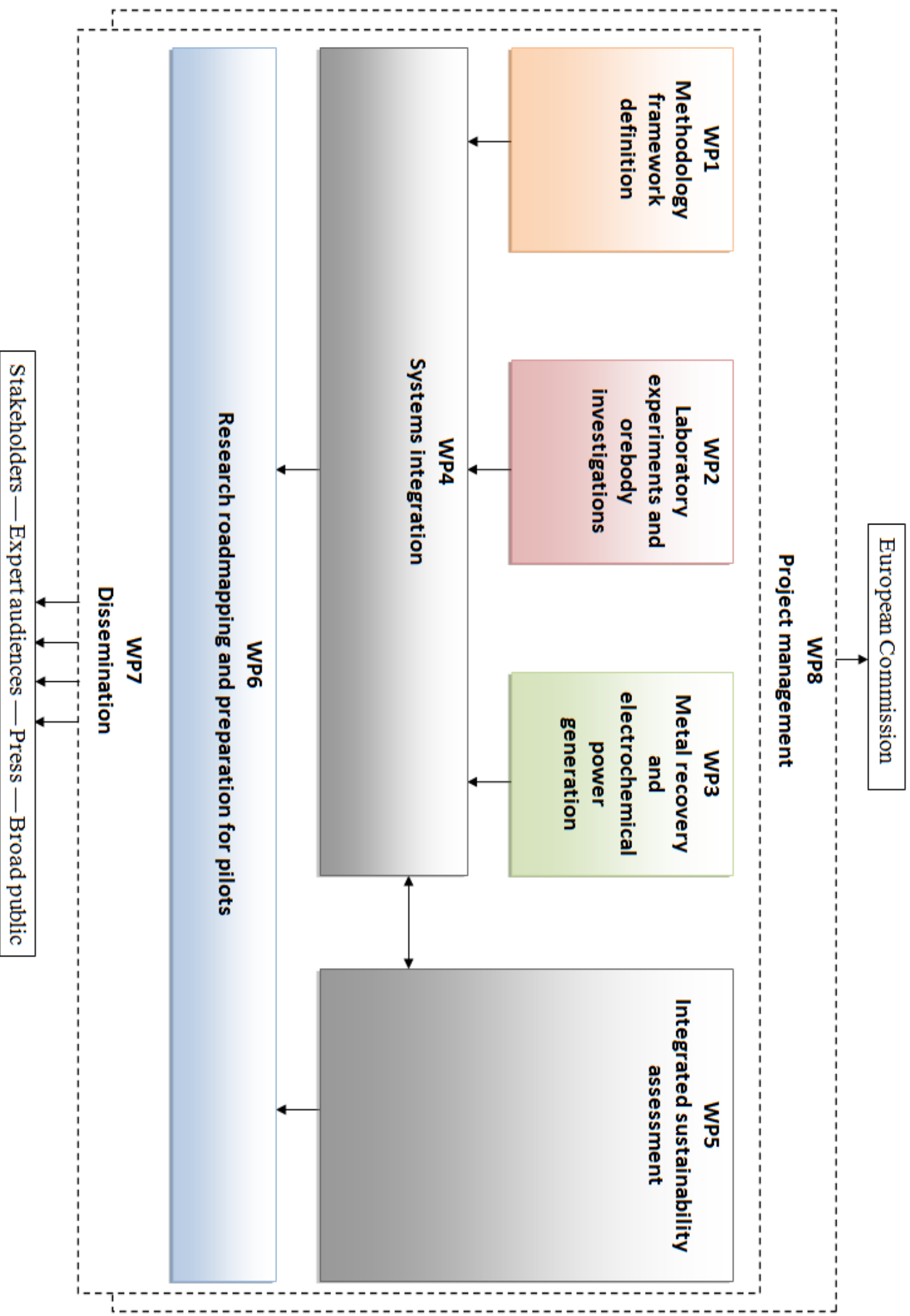
Metal extraction from the geothermal brine

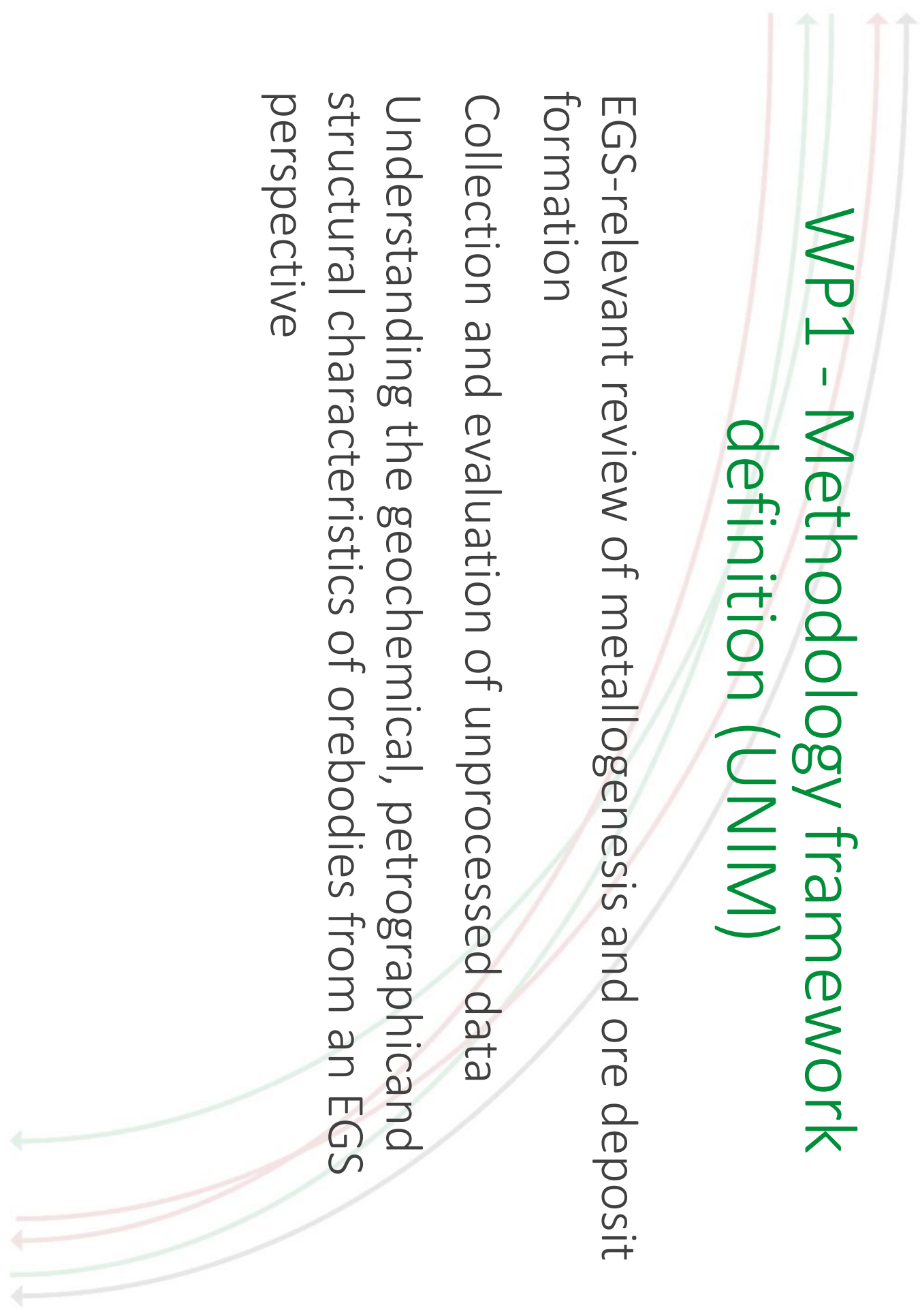
Production of heat and electricity



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

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**

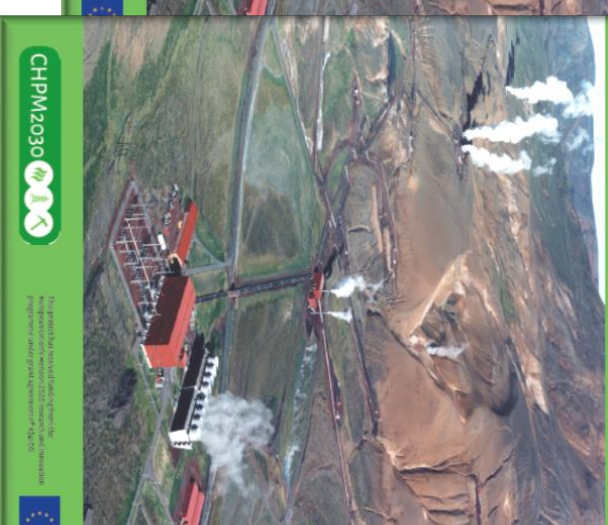
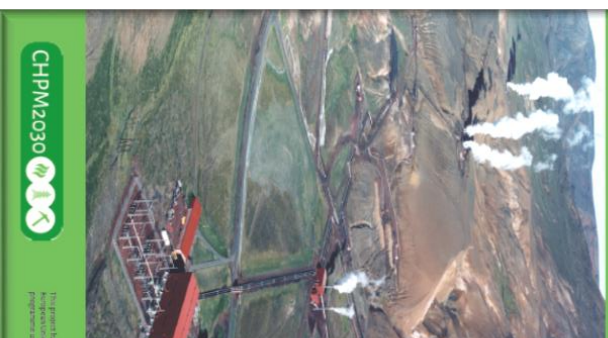
CHPM2030 Deliverable D1.3

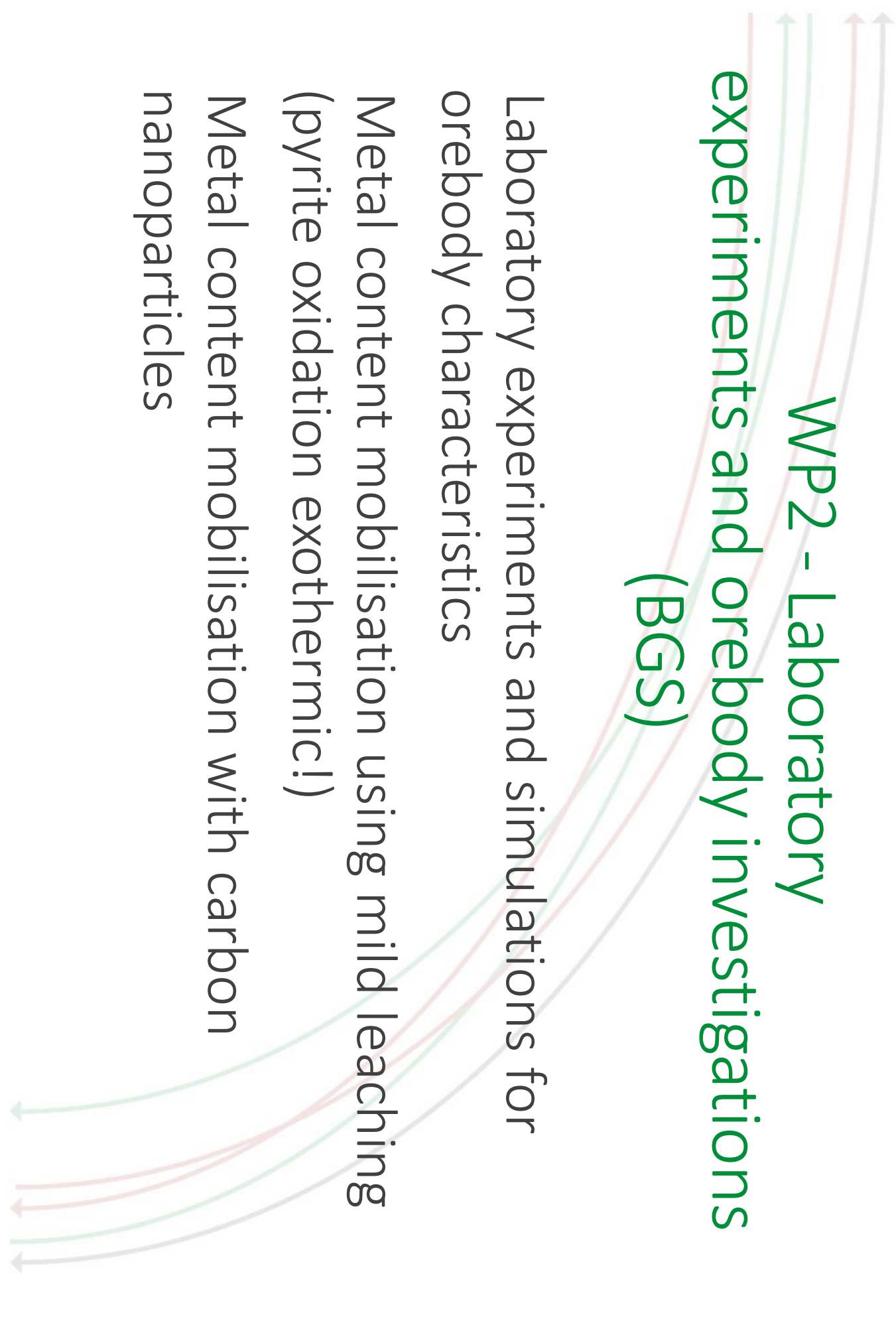
Version: December 2016

**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
(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 (EFFG)

Project website

Project image and stylebook

Communication and dissemination plan

Project brochures

Press-releases and media kits related to

CHPM2030 initiatives and outcomes

Fact-sheets on the CHPM technology

WP8 – Project management (UNIM)

- Coordination and supervision of project activities
- Administrative project management
- Administrative project reporting
- Organisation of project meetings
- Risk management and conflict resolution
- Technology exploitation, innovation management and IPR



CHPM2030 Kick off meeting, Miskolc Hungary, January 2016

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