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MORE INFORMATION

CHPM2030.EU

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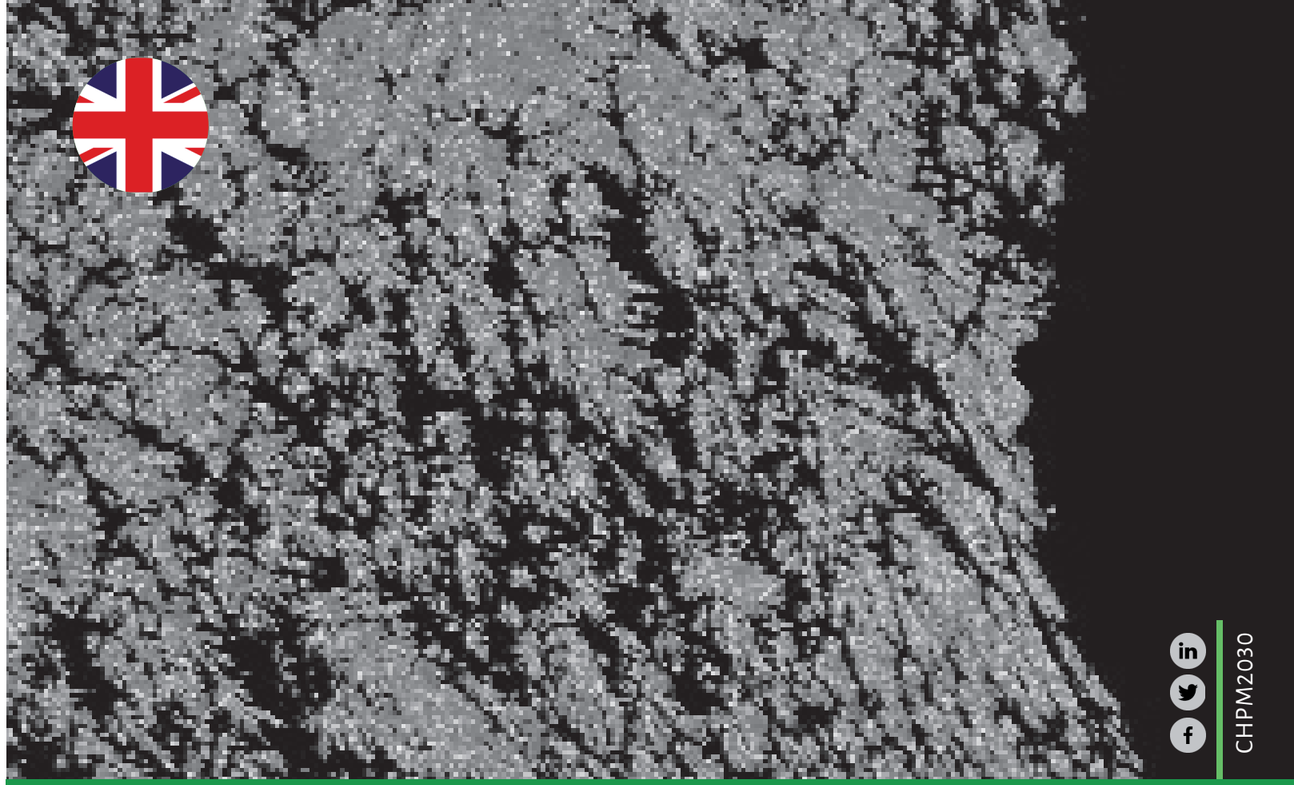
Project duration: 1 January 2016 – 30 June 2019

Cover photo: Courtesy Vigdís Harðardóttir, Iceland Geological Survey



CHPM2030

CHPM2030

Combined Heat, Power and Metal Extraction

CHALLENGE

The European Union has committed to reduce greenhouse gas emissions and contribute to a comprehensive transition towards a low carbon economy. Deep geothermal energy is a key technology towards this goal, producing both heat and electricity and being available almost anywhere. The main challenge we face is to reduce the capital and operation costs of Enhanced Geothermal Systems (EGS).

Europe faces another major challenge: securing the supply of critical raw materials, in particular metals, for European industry. This is made worse by the decreasing number of operational mines within Europe. Thus, our dependency on importing metals is growing every year, despite significant efforts in the development of recycling technologies and in material science. However, significant metal deposits (ore bodies) do exist well below the depths of conventional mining. Temperatures at such depths are high, and there is evidence of metal-rich waters within existing geothermal power plants.

SOLUTION

The CHPM2030 project is defining a technology pathway that could substantially decrease Europe's dependency on both the import of critical metallic minerals and of energy. The project aims at new concepts coupling the production of geothermal energy and metals and thus improving the economic viability of EGS projects. This will require novel methods to identify and manipulate suitable metal bearing formations using a combination of geo-engineering and advanced electrochemical methods. The CHPM2030 project aims to create a proof of concept of the technical and economic feasibility of this at a laboratory scale.

Although there are many research needs to make such facility a reality by 2030, **the present project**, running until mid 2019, **focuses on laboratory investigations for the technology of *in-situ* leaching, electrochemical metal extraction, harvesting electrochemical energy, systems integration for a new type of facility,** and includes the development of concepts for a new type of plant, economic feasibility modelling and environmental viability simulations for the proposed technology scenarios.

EXPECTED RESULTS

Using state of the art geothermal energy developments, the most recent geo-scientific data on mineral deposit structures, extensive laboratory experiments and simulations, and supported by new predictive models of ore genesis, the project will develop:

- A proof of concept for the technological and economic feasibility of mobilisation of metals from ultra-deep mineral deposits combining geo-engineering techniques, in order to enhance the natural interconnected fracture systems within the orebody;
- Innovative pathways for leaching strategic metals from geological formations, and corresponding electrochemical methods for metal removal and recovery on the surface;
- Metallic-mineral formation specific solutions for the co-generation of electricity using salt-gradient power reverse electrodialysis;
- A new conceptual framework that increases the total number of economically viable geothermal resources in Europe;
- Economic feasibility assessment models to be applied for such new facilities;
- An integrated feasibility assessment framework for evaluating the economic, environmental and social impacts of the proposed new technology;
- Combined metallogenic models and geothermal datasets, in order to develop a database of suitable areas as case-studies in Europe where such developments could be feasible;
- A roadmap in support of the pilot implementation of such system by the year 2030, the full-scale commercial implementation before 2050.

DOWNLOAD

Underpinning the future direction of CHPM2030 four recent important reports have been produced by the project working groups.

These provide reviews covering:

- metallogenesis in Europe in likely regions where EGS might be possible;
- what useful pre-existing data are available;
- the orebody characteristics relevant to EGS;
- and the conceptual framework for an operational orebody-EGS.

These studies are available for download at http://www.chpm2030.eu/outreach.