

WS09_08

Future Technologies for Geothermal Exploration: the Perspective of the Strategic Research and Innovation Agenda of ETIP-DG

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Summary

The presentation will be an occasion to describe what is envisaged by the Strategic Research and Innovation Agenda of the Technology and Innovation Platform on Deep Geothermal, and discuss future perspectives of R&I for geothermal exploration.

Abstract

Research and innovation (R&I) play a fundamental role in unlocking geothermal energy as an affordable, sustainable and secure energy resource in large areas of European countries.

To speed up the development and deployment of low-carbon technologies, including geothermal energy, and to strengthen the cooperation with Stakeholders under the Strategic Energy Technology Plan (SET-Plan), the European Commission has introduced Technology and Innovation Platforms (ETIPs). The ETIP related to deep geothermal system (ETIP on Deep Geothermal, ETIP-DG) is actually drafting strategic documents describing the needs and targets of R&I for the geothermal sector. Following the Vision, which entails using geothermal energy to cover (1) all the demand for domestic heat and (2) much of the demand for electrical power in Europe, the Strategic Research and Innovation Agenda (SRIA) has described the main topics to enable the geothermal technologies to play a more important role in the energy sector.

Geothermal exploration technologies contribute to all phases of a geothermal project and have made advancements in the last years, taking advantage of the progress of single methodologies and the opportunities to develop and test integrated approaches of geosciences. The R&I for predicting and assessing geothermal resources have the overall objective to reduce the costs of exploration technologies and increase probability to successfully characterize the geothermal resources prior to drill and during geothermal development. The knowledge gained over the past 50 years of exploration for hydrocarbon, geothermal and mineral resources, allows a-priori definition of several prospective areas in Europe based on well data, survey information and their geological interpretation. However, a multi-disciplinary approach integrating geosciences disciplines is required for a comprehensive characterisation of such reservoirs and for the assessment of their geothermal potential at different depths. The prediction and assessment of geothermal resources must embrace an integrated, whole-Earth perspective in both theory and practice, recognising that our planet is a truly complex.

The main targets of novel technologies as defined in the SRIA are:

- Improve accuracy and reliability and reduce the cost of survey-based and down-hole exploration technologies
- Improve analytical models and energy production forecast and increase capacity of imaging and characterizing underground geological, physical and chemical properties throughout the life of geothermal projects
- Minimize the uncertainty associated with geothermal energy, by increasing the probability of discovering productive (i.e. fluid-filled) fractures and faults, to be used as drilling targets
- Improved resource and uncertainty reporting protocols, contributing to: transparent and harmonized methods and instruments for technical and financial risk management; increased transparency for stakeholders, better assessment of energy stocks across Europe and direct comparison with other RES projects
- Investigate and characterize unconventional geothermal resources

The presentation will be an occasion to describe what is envisaged by the SRIA of ETIP-DG, and discuss future perspectives of R&I for geothermal exploration.