

Geoscientific recommendations regarding Geothermal Energy to be considered in the Seventh Framework Programme 2007 - 2013

Prepared by the Panel of Experts on Geothermal Energy of the European Federation of Geologists

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April 2006

The European Federation of Geologists (EFG) established panels of experts to provide high quality response to the European Commission and Parliament. Recently, the EFG expert panel on Geothermal Energy was approached to provide additional input to the Seventh Framework Programme, to be able to identify a strategic research agenda for the Geothermal Energy sector.

The official request was studied and discussed within the expert panel. Feedback from the 20 experts involved are presented below. The aim was to provide recommendation headlines, without too much technical detail. More technical background information can be provided on request. We hope the contributions presented will be considered in the final version of the Seventh Framework Programme.

Key issue to keep in mind is that the better we understand the natural mechanisms and the behaviour and properties of the subsurface, the better we can develop our geothermal resources. Significantly improving our understanding of all geological processes will therefore be of great benefit to the European society.

General issues to consider:

- Integration of different disciplines should be a driving force in research. Geothermal geologists are essential for understanding the resource available, they need to work with geothermal engineers for the exploitation of the heat, whilst geothermal economists need to assess the financial aspects of each project. Also possible research exchange and collaboration with the oil industry, including reservoir modelling, reservoir engineering, fluid flow modelling, etc..
- Establish an improved European network of researchers working on the same issues; initiate closer collaboration: develop a Network of Excellence in Geothermal Energy. European Federation of Geologists can assist to build this European research network, using its extensive networks of geoscientists in (and outside) Europe.
- A lot of geothermal energy research has already been done at national geological surveys, at research institutes, at universities, et cetera. The available results and techniques should be inventoried, collected and subsequently harmonised. This should be placed in a GIS database to be made available as an on-going product, able to be updated with new work. Incoming countries, joining the EU should also be able to integrate their data into it. Must be INSPIRE compatible

- The evaluation of resources should be a high priority. They need to be accurately classified with appropriate parameters, definitions, categories etc. This should preferably be harmonious with the current Reserves and Resources definitions being established world wide for natural resources including metalliferous ores, coals, oil & Gas, etc. EFG is a stakeholder in CRIRSCO and can advise on this aspect. EFG is also participant in UN working group on resources and reserves.
- Co-operation and integration with running research projects is recommended (e.g. EGEC projects).
- Raise awareness and educate people. Promote the value and advantage of geothermal energy

We also support the priorities highlighted by the European Geothermal Energy Council EGEC and submitted to FP7, summarised in their newsletter no. 1 Jan-Mar 2006, p4).

European Commission direction

It is understood that the EC intends to concentrate on two areas: a. Renewable electricity, b. Renewable heating & cooling

*** A. RENEWABLE ELECTRICITY.**

Long term research (DG RTD) to focus on electricity production, although this can of course be optimised with heating and cooling use. But the focus would be on advanced methods for power production from various geothermal sources (as long as it does not use conventional technology).

EFG COMMENT:

A1. Deep Systems

The continued support of Enhanced Geothermal System development from great depths of 5km or more, that will lead to more efficient heat exchange and enhanced recovery for hot dry rock systems.

In the light of advances in this field is it time to reassess the hot dry rock potential of regions where initial research was abandoned in the mid-80's. At the moment geothermal electricity generation is not really on the agenda for the UK, Ireland, etc., but perhaps European funding could stimulate this area. There are many crystalline regions, where the local people favour the installation of electric power from geothermal but conventional high enthalpy resources have not yet been identified.

Development of systems utilizing new processes to produce power from low / medium temperatures.

A2. Medium Depth Systems

The emphasis on the development of medium depth systems from 1-4km, where temperatures may vary from 60°C to 150°C.

The concept of underground thermal energy storage (which has obvious synergies with CHP electricity production) should be addressed.

A3. We must not exclude conventional high enthalpy fields where a lot research must be carried out in order to make their use acceptable to the public and to improve more efficient and environmentally friendly exploitation.

A4. Education

We would like to emphasise the continued need to support both specific and general education issues.

There are many locations where it would be desirable to establish Geothermal Education and Training Centres to contribute the spread of geothermal energy use.

A5. Geothermal Licensing

Increased development may produce a situation of there not being enough high-enthalpy heat for closely spaced systems. This is not a problem in most countries at present where projects are rare, but it could become a problem in the future where one system will take a neighbour's heat. Are there any licensing arrangements in Europe? It is probably very important given the increased scale of investment required. Investors will not easily commit funds if security of supply is not assured. The EU should be involved in producing guidelines that could be incorporated into national legislation in the future.

*** B. RENEWABLE HEATING & COOLING.**

The shorter term programme will focus more on the heating and cooling, possibly integrated with other renewables.

EFG COMMENT:

B1. There are varying scenarios for this area, and in many ways this is more important with the potential to supply greater energy in the short to medium term. One example is the need to solve heating and cooling of complexes with a heat demand of 5-20 MWt by a combination of thermal water withdrawal and of heat pumps.

This is probably a greater priority to focus on the direct use of heat etc. rather than on electricity generation,. We should be looking at new exploration models for direct and indirect use geothermal, new materials and process cycles for energy conversion (thermal and electrical) and methodologies to improve the sustainability of the use of existing and new technologies (GSHP and other geothermal).

B2. Cooling

Cooling is very large area to be addressed and needs to be included in all large schemes. We note the current project to cool the London Underground.

B3. Education

We would like to emphasise the continued need to support both specific and general education issues.

There are many locations where it would be desirable to establish Geothermal Education and Training Centres to contribute the spread of geothermal energy use.

B4. Geothermal Licensing

The increased spread of Ground Source Heat Pumps raises the spectre of there not being enough low-enthalpy heat in the near surface for closely spaced systems.

This is not a problem in most countries at present where GSHPs are few and far between, but it could become a problem in the future where shallow emplaced systems will take a neighbour's heat. Are there any licensing arrangements for shallow GSHPs in Europe? The EU should be involved in producing guidelines that could be incorporated into national legislation in the future?

B5. The installation of GSHP requires a lot geological work (hydro geological, soil and rock properties, effects of heating and cooling on soil and water contamination in open systems, etc) and the legislation is not adequate in many countries. The production of guidelines from EU as directives to be incorporated in national legislation is very important.

B6. Technical Aspects

Development of new fluid / systems.

New exploration models for direct and indirect use geothermal.

B7. Transmission.

The District Heating transmission system, can be very expensive. More efficient and cheaper systems will make what energy we develop more attractive. High priority