

## **'Significant barriers' to geothermal power must be overcome**

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In an environment of high and unstable energy prices, geothermal power offers a cost-effective, renewable and alternative energy option with multiple advantages. As it relies on harvesting the continuous heat flux coming from Earth, – which represents twenty five billion times the world annual energy consumption – it is an almost unlimited source of energy. It is also the only source of renewable energy capable of driving consistent and reliable electricity generation 24h a day, 365 days a year. It is flexible and can provide base load electricity, thus complementing various other renewables while providing broad market opportunities. It could displace oil, gas and electricity, thus reducing our external energy dependency and increasing security of supply. Last but not least, the integrated generation of heating and power has been shown to have a significant positive effect on job creation.

The development of advanced technologies such as 'Enhanced geothermal systems' has enabled to reach an electricity production of more than 10,000 GWh/y in all Europe. Geothermal power accounted for 4.4 % of total renewable energy consumption in the EU in 2010. According to the European Commission, geothermal power and heat could avoid up to 40 Megatons a year CO<sub>2</sub> in 2020 and 50 Megatons a year CO<sub>2</sub> in 2030. However, while the resources of geothermal energy are infinite, the key challenge today is to tap them with state of the art technology, under realistic economic conditions, while relaying societal and environmental concerns. Given the right policy environment, geothermal technology would be able to contribute significantly to our energy and environmental objectives (20% for renewable energy's share of energy consumption in the EU by 2020 and the promotion and use of renewable energy), but there are significant barriers to overcome.

The disposal of waste water containing small quantities of chemicals (boron and arsenic) and gases (hydrogen sulphide and carbon dioxide), although minor when compared to that of other industrial pollutants, represents a first challenge. Various methods are used to tackle this issue, such as the total reinjection of separated water, or mineral extraction. Under the 7th Framework Programme, funding has also been devoted to research aiming at understanding and mitigating the induced seismicity associated with some geothermal field development. The Horizon 2020 Framework Programme for Research and Development includes significant allocations for support to the on-going research activities on geothermal technologies in order to address these environmental concerns.

However, the main obstacle to the development of the geothermal sector in Europe remains the high cost of drilling, which represents two thirds of the costs of a geothermal plant. Competition with the oil and gas industry for drilling subcontractors has an undesirable impact on exploration costs, which increase with the price of oil and gas. Furthermore, the geothermal industry faces the high risk of heat and electricity production not reaching the proposed objectives, given that 30 to 40% of

wells fail to reach their output target. Advances in this area are urgently needed so as to enable market actors to drive down these costs through improved research, industrialisation of the supply chain and more efficient policies and support schemes.

13 Member States presently offer geothermal electricity feed-in tariffs, ranging from 25 to 300 €/MWh. This is where a functioning ETS scheme is fundamental to ensure fair competition and pricing. Furthermore, complex administrative procedures for geothermal exploitation are creating significant delays for obtaining the necessary permits and licences, thus generating uncertainty for investors. Energy regulators and competition authorities, at EU and national level, need to act decisively to ensure that all companies are treated equally ensuring a level playing field. Uniformity across Member States is a prerequisite for the completion of an 'open, integrated and flexible market' whose dynamics will drive investments rather than subsidies. This requires a real integration of Europe's energy networks and systems, and the further opening of energy markets to ensure the transition to a low carbon economy. The architecture for the internal energy market is however laid out in the Third Energy package and in complementary legislation, although the main obstacle continues to be the lack of implementation.

Renewables are expected to be at the of the energy mix in Europe by 2050; geothermal power could theoretically supply 15% of European global energy by then. This potential can only be fulfilled through a committed, integrated and stable European renewable energy policy fostering private investments and fairer competition upon which this shift depends.

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