

Press Release



Date: September 29, 2007
Embargo: **Today at 14:00 GMT**

Nature Imitated in Permanent CO₂ Storage Project

Icelandic, American, and French scientists launched today a project aimed at storing CO₂ in Iceland's lavas by injecting the green-house gas into basaltic bedrock where literally turns to stone. Carbon dioxide turning into calcite is a well known natural process in volcanic areas and now the scientists of the University of Iceland, Columbia University and the CNRS in Toulouse are developing methods to imitate and speed up this transformation of the gas that is the prevalent contributor to global warming. The project's implications for the fight against global warming are considerable, since basaltic bedrock susceptible of CO₂ injections are widely found on the planet.

Reykjavik Energy, a global leader in geothermal energy, is the main sponsor of the project. The company's facilities at the Hengill geothermal area, where a 300MW geothermal power plant is under construction, are an ideal site for the multinational scientific project.

Present when contracts on scientific and financial aspects of the project were signed, were Iceland's President, Mr. Olafur Ragnar Grimsson, and Minister for the Environment, Thorunn Sveinbjarnardottir. Appropriately, both officials had just arrived from New York, where they attended the UN Secretary General's summit on climate change.

Injecting CO₂ at carefully selected geological sites with large potential storage capacity can be a long lasting and environmentally benign storage solution. To date CO₂ is stored as gas in association with major gas production facilities such as Sleipner in the North Sea operated by Statoil and In Salah in Algeria operated by Sonatrack, BP and Statoil. The uniqueness of the Icelandic project is that whereas these other projects store CO₂ mainly in a gas form, where it could potentially leak back into the atmosphere, the current project seeks to store CO₂ by creating calcite in the subsurface. Calcite, a major component of limestone, is a common and stable mineral in the Earth is known to persist for tens of millions of years or more.

The research will be a combined program consisting of field scale injection of CO₂ at Hellisheidi, laboratory based experiments, large scale plug-flow experiments, study of natural CO₂ waters as natural analogue and state of the art geochemical modeling.

Why basalt and why Iceland?

Basaltic rocks are one of the most reactive rock types of the Earth's crust. Basaltic rocks contain reactive minerals and glasses with high potential for CO₂ sequestration. Basaltic rocks are common on the Earth's surface, for example the continental flood basalts of Siberia, Deccan plateau of western India, Columbia River basalt in north-western United States, volcanic islands like Hawaii and Iceland and the oceanic ridges. More than 90% of Iceland is made of basalt.

Project consortium

The consortium was launched by Sigurdur Gislason of University of Iceland, Einar Gunnlaugsson of Reykjavik Energy, Eric Oelkers of the CNRS in Toulouse and Wally Broecker of Columbia University in N.Y. with the combined goal of creating solutions for the global CO₂ problem and creating the human capital to address these problems in the future. Reykjavik Energy, one of the world's leading companies in harnessing geothermal energy, will provide the infrastructure of its geothermal fields at Hellisheidi, and create a natural laboratory for the research. The area has been extensively studied.

The research will be lead by an international group of expert scientists including Juerg Matter and Domenik Wolff-Boenisch and consist of a combined program consisting of field scale injection of CO₂ at Hellisheidi, laboratory based experiments, large scale plug-flow experiments, study of natural CO₂ waters as natural analogue and state of the art geochemical modeling. The goal is to generate innovative solutions to safe permanent CO₂ storage that can be used throughout the world.

Natural processes

The process, where CO₂ is released from solidifying magma, reacts with calcium from the basalt and forms calcite, occurs naturally and the mineral is stable for thousands of years in geothermal systems. (Figure 1). Chemical weathering of basalts at the surface of the Earth is another example of carbon fixation in nature. The proposed experiment will aim at accelerating these natural processes.

The project at Hellisheiði

A mixture of water and steam is harnessed from 2000 m deep wells at Hellisheiði geothermal power plant. The steam contains geothermal gases, i.e. CO₂. It is

Natural Processes

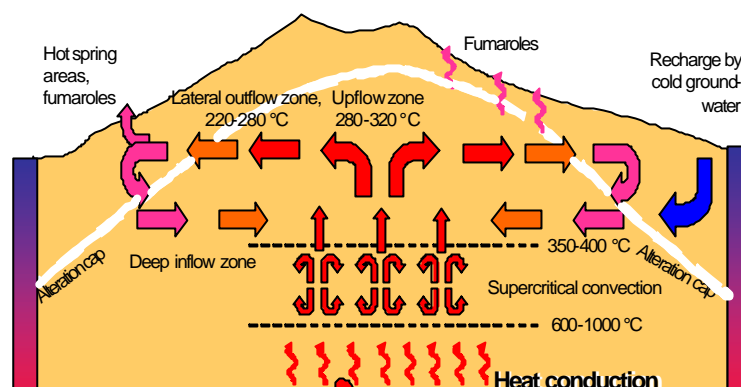


Figure 1 Solidifying magma under geothermal fields release CO₂ to the geothermal system where it partly escapes through fumaroles and other thermal manifestations and also forms the mineral calcite. Calcite is one of the principal minerals in the alteration forming the cap rock sealing of the geothermal systems.

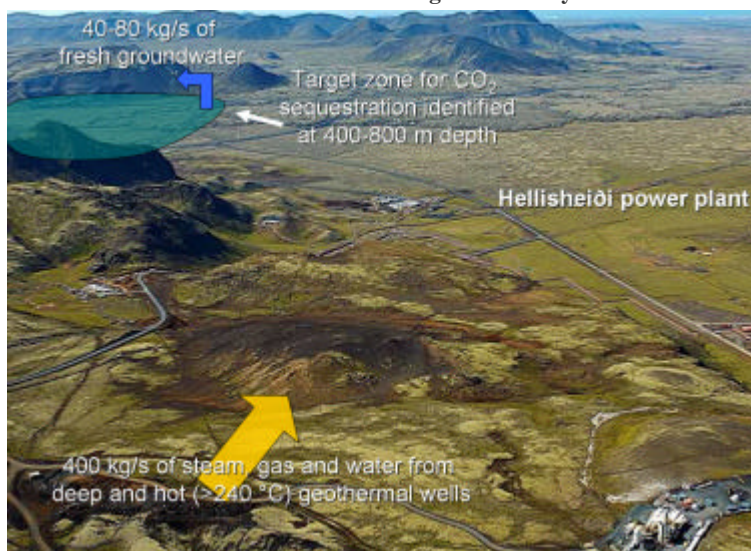


Figure 2 A mixture of water and steam is harnessed from 2000 m deep wells at the Hellisheiði geothermal power plant. The CO₂ from the steam will be dissolved in water at elevated pressure and then inject it through wells down to 400-800 m, just outside the boundary of the geothermal system.

planned to dissolve the CO₂ from the plant in water at elevated pressure and then inject it through wells down to 400-800 m, just outside the boundary of the geothermal system.

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