Geo-Energy Test Beds for Low Carbon Energy

Overview

For 2020, the EU has committed to cutting its greenhouse gas emissions to 20% below 1990 levels and further cuts are being decided for 2050. This commitment is one of the headline targets of the Europe 2020 growth strategy and is being implemented through binding legislation.

Power generation will have to take a particularly large part in emissions reductions, mainly by focussing on increasing surface renewables (wind, tidal and solar) but also on carbon capture and storage on fossil fuel power plants, shale gas, nuclear and geothermal power.

All the above technologies have geological issues in common, e.g. containment and deep reservoir issues, and most importantly environmental sustainability: the ways that we put the subsurface to use (for energy and storage for example) must not harm the environment, property or human health.

In a densely populated continent this means that high levels of subsurface management and environmental security assurance are needed to realise energy potential.

Across Europe, experimental test and monitoring facilities and infrastructures (Geo Energy Test Beds, GETB) have been or are being developed to understand the subsurface processes that affect environmental sustainability, including:

- Gas flow
- Fluid containment
- Well and seal leakage
- Hydraulic fracture growth
- Geodynamic strain (well and reservoir damage)
- Subsidence
- Induced seismicity
- Fugitive emissions
- Residual stress

These GETB aim to understand the processes that make subsurface environmental sustainability possible in densely populated countries, and are of great interest to the public and regulators alike. The Geo Energy Test Beds will underpin the design of management systems for the subsurface and underpin and develop regulation.

A key aim, through integrated IT systems and delivery across Geo Energy Test Beds, will be to allow online publication of monitoring data to encourage transparency and to improve public buy-in and trust. In the long term European Geo Energy Test Beds will help to bring about a new energy system in Europe ensuring:
1. Greater energy security and independence, access to low carbon options, and reduced vulnerability to external energy price fluctuations
2. Home-grown European energy solutions

This integrated infrastructure will work alongside other EPOS infrastructures to create an efficient and comprehensive multidisciplinary research platform for the Earth sciences in Europe.

Objectives

- Facilitate the integrated use of data, models and facilities which have so far been operated separately, in different domains of geo-energy, to reach a common understanding of energy processes and resources in the deep underground
- Provide access to observation, modeling and experimental facilities to improve our fundamental understanding of the deep geological environments and processes that regulate the production and storage of hydrocarbons over geologic time
- Integrate data, models and facilities from dedicated GETB with regional geophysical observing systems (seismological and geodetic networks), local observatories (including geomagnetic and volcano Observatories), experimental laboratories and integrated satellite data to get the best out of existing monitoring facilities not necessarily dedicated to energy development
- Promote an integrated approach to planning the next generation of research facilities for geo-energies
- Through integrated IT systems and delivery across Geo Energy Test Beds, allow online publication of monitoring data to encourage transparency and to improve public buy-in and trust
- In the long term, help to bring about a new energy system in Europe ensuring: (1) greater security of energy supply, more independence, access to low carbon options, and reduced vulnerability to external energy price fluctuations; and (2) home-grown European energy contributing to balance of payments, jobs and tax revenues
- Underpin the design of management of sustainable systems for the subsurface and develop regulation for the identification and exploitation of underground geo-energy resources

Our services ready for 2019

Virtual Access to data/products/services

Through data and protocols from present and past GETB experiments.