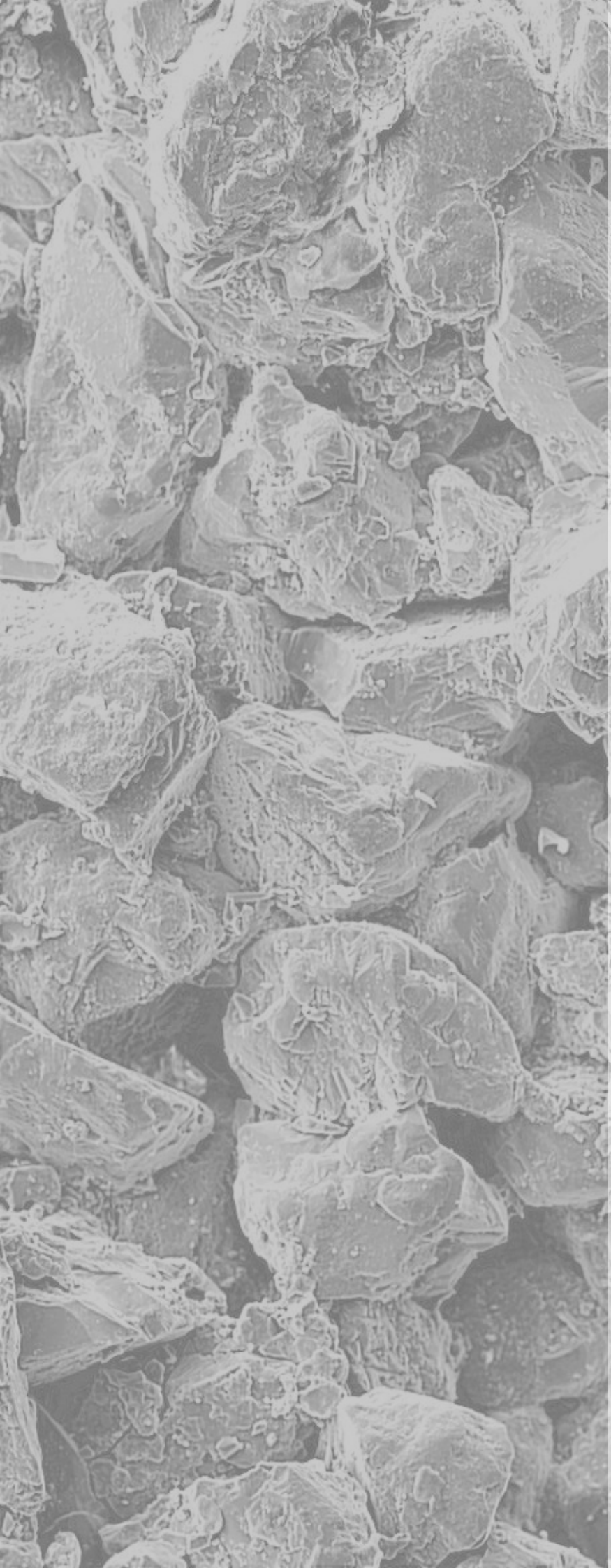


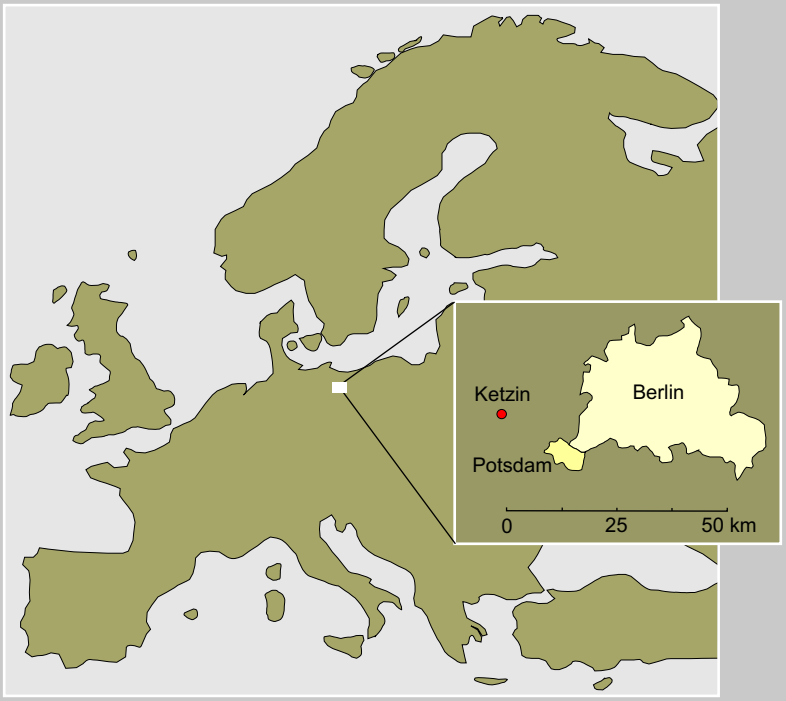
# $CO_2$SINK

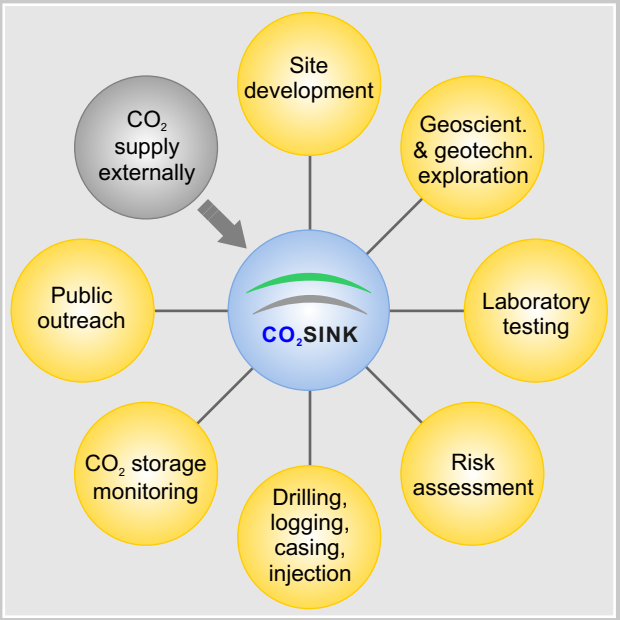
## $CO_2$ Storage by Injection into a Saline Aquifer at Ketzin

# $CO_2$ Storage by Injection into a Saline Aquifer at Ketzin

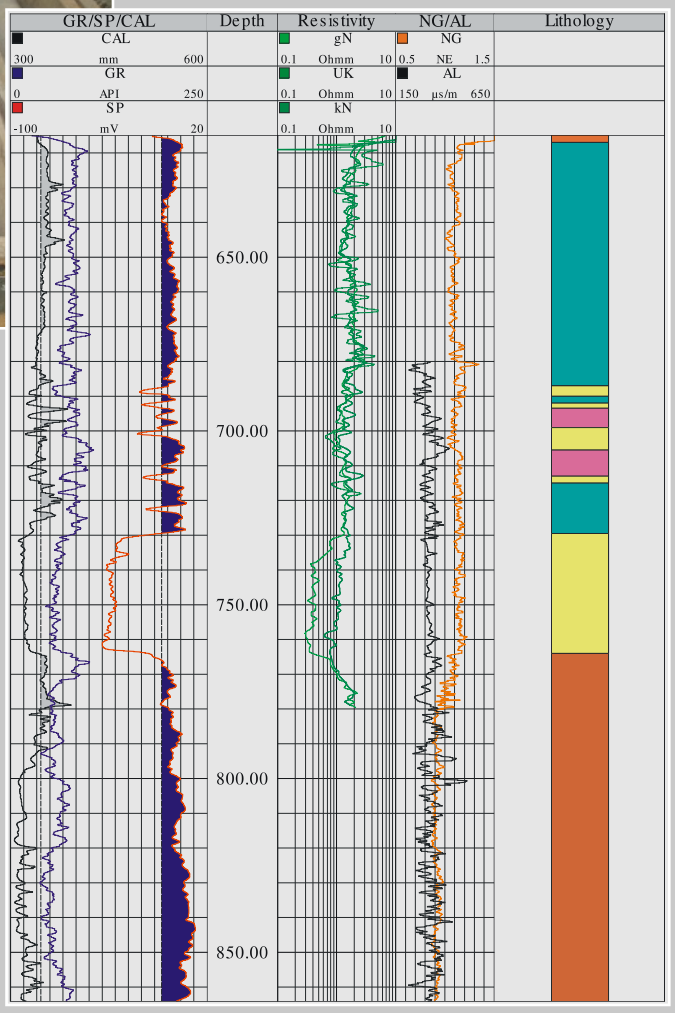
## The $CO_2$SINK Integrated Project

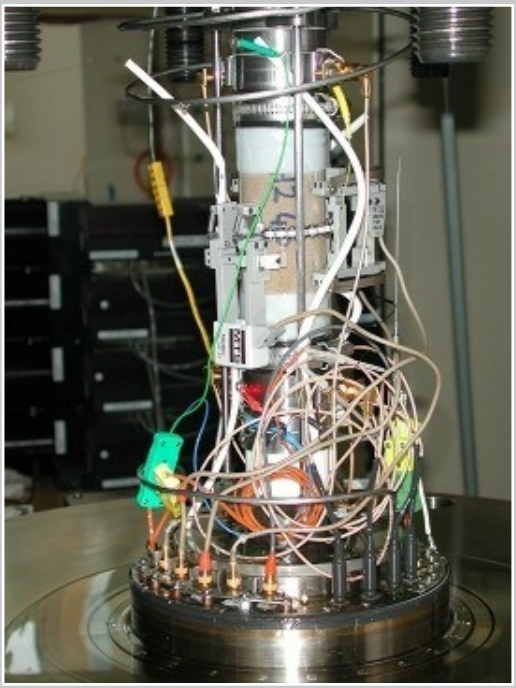
The $CO_2$SINK project aims at in-situ testing of geological storage of $CO_2$. It will advance the understanding of the science and the practical processes involved in underground storage of $CO_2$ into a saline aquifer as a means of reducing greenhouse gas emissions. The site selected is located in Germany, close to Berlin, next to the city of Ketzin. It includes industrial land and some infra-structure, which also makes it suitable as a testing ground for small scale demonstration of $CO_2$ capture processes.



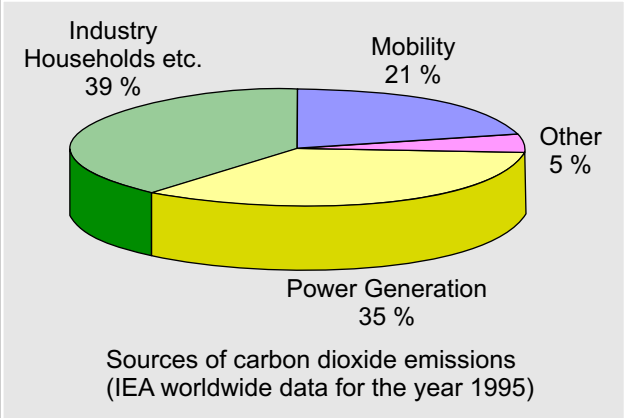

The work program involves intensive monitoring of the fate of the injected $CO_2$ by using a broad range of geophysical and geochemical techniques, as well as the development and benchmarking of numerical models and risk assessment strategies. The test site, being close to a metropolitan area, provides a unique opportunity to develop a European showcase for onshore $CO_2$ storage. It will accelerate the public acceptance of geological storage of $CO_2$ as a greenhouse gas mitigation option for the benefit of Europe.


GR/SP/CAL
Depth
Resistivity
NG/AL
Lithology
CAL
300 mm 600
GR
0 API 250
SP
-100 mV 20
gN
0.1 Ohmm 10
UK
0.1 Ohmm 10
kN
0.1 Ohmm 10
NG
0.5 NE 1.5
AL
150 µs/m 650
650.00
700.00
750.00
800.00
850.00



## Capture and storage of $CO_2$

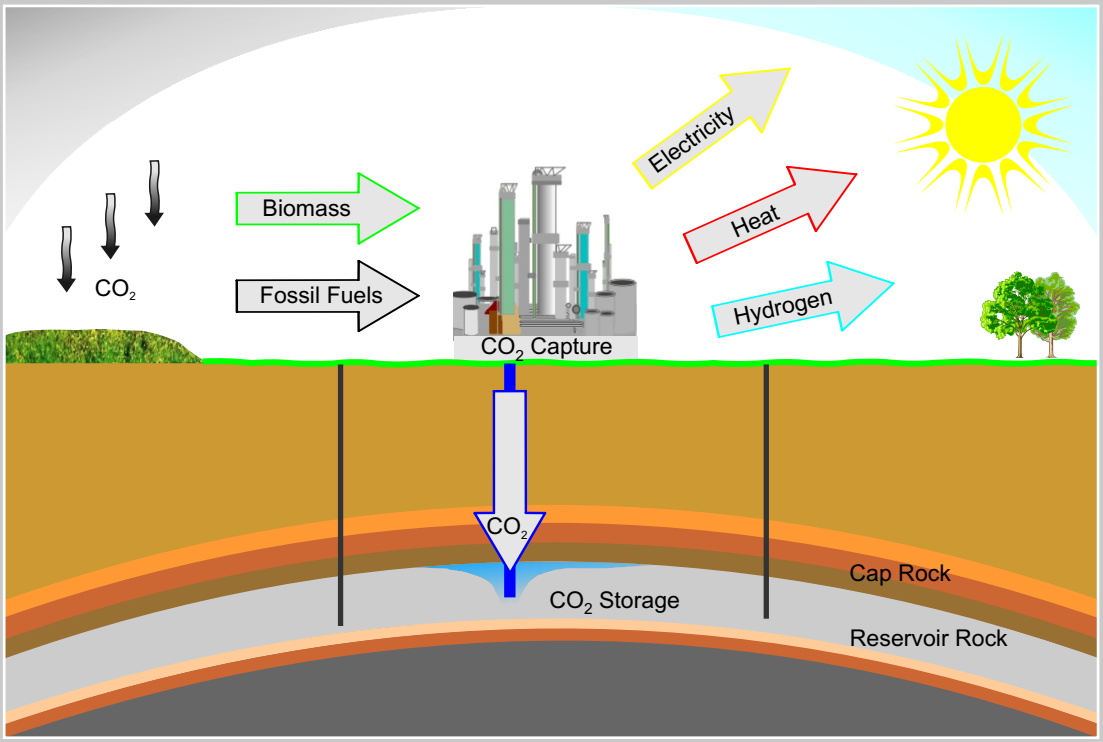
Approximately one third of all $CO_2$ emissions due to human activity come from fossil fuels used for generating electricity. A variety of other industrial processes also emit large amounts of $CO_2$, for example oil refineries, cement works, and iron and steel production. These emissions could be reduced substantially, without major changes to the basic process, by capturing and storing the $CO_2$. There are many ways in which $CO_2$ emissions can be reduced, for example by an increase of the efficiency of power generation or by the use of renewable energy. However, most scenarios suggest that these steps alone will not achieve the required reductions in $CO_2$ emissions in time. The capture and geological storage of $CO_2$ from fossil fuel combustion could play an important part in solving this problem.



Sources of carbon dioxide emissions
(IEA worldwide data for the year 1995)

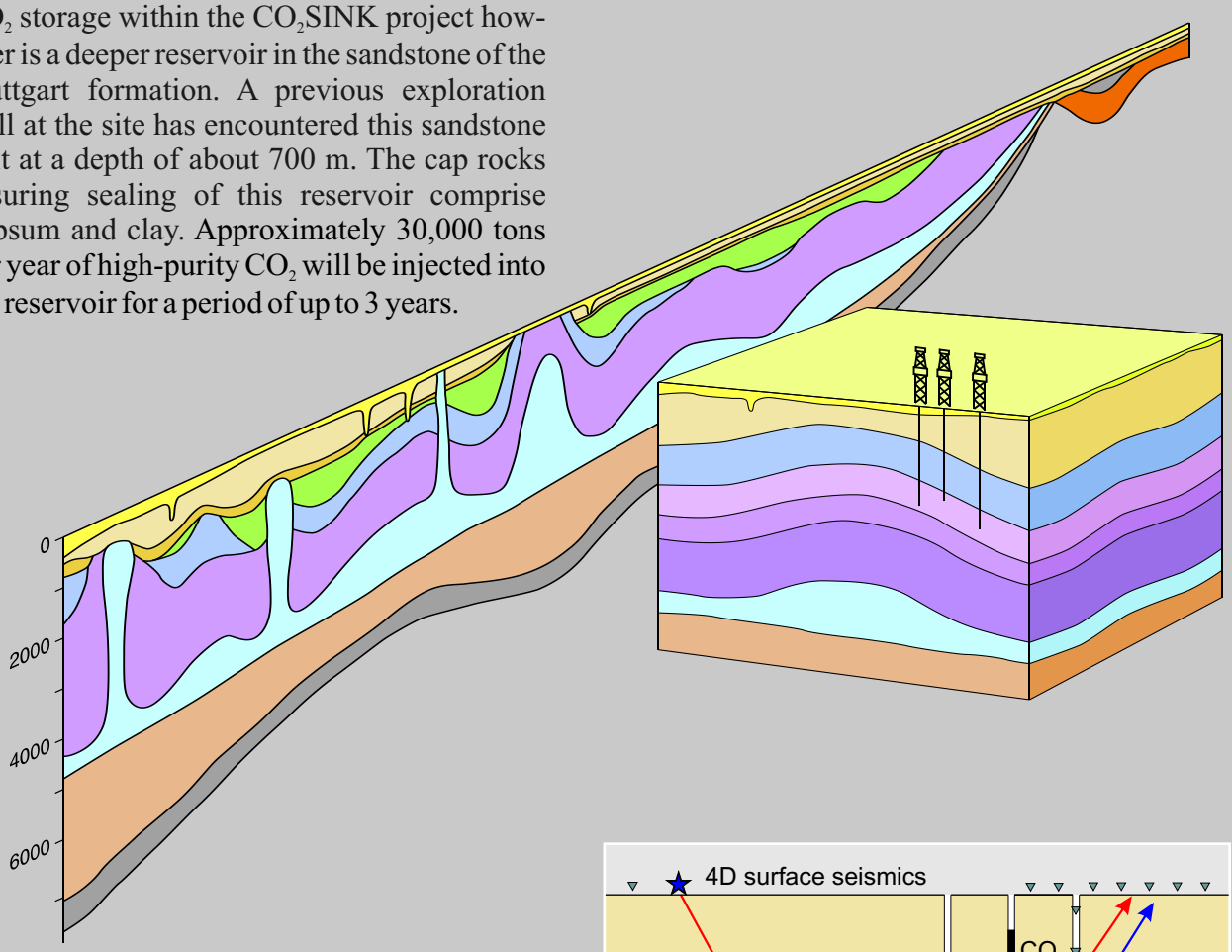
## Status of $CO_2$ storage

Having captured the $CO_2$ it would need to be stored securely in the underground for a long time horizon. Major geological formations, suitable for storage, have been identified deep under the earth's surface. These are depleted oil and gas reservoirs, coal beds and saline aquifers. The potential global capacity for underground storage is large and estimated to correspond to hundreds of years of man-made $CO_2$ emissions. The fact that $CO_2$ occurs naturally in the earth and has been stored over geological time scales improves the credibility of deep underground storage. Underground injection of $CO_2$ into oil fields has already been used for decades by industry to enhance recovery. The main priority for $CO_2$ storage is to establish its acceptability as safe and reliable in the long-term. Ensuring evidence that any losses of $CO_2$ will be insignificant is a major issue.



## The Ketzin Storage Site

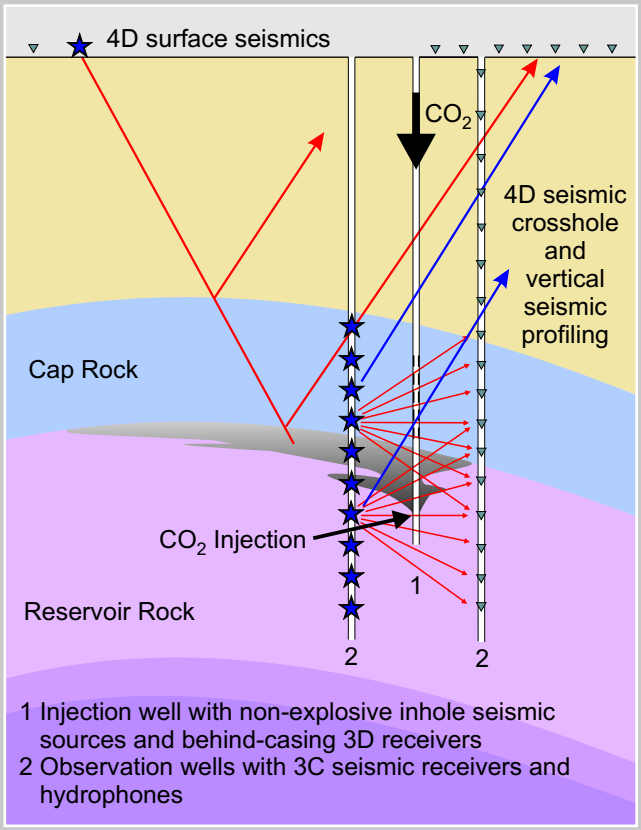
In northern Germany, salt structures have formed in the overburden anticlinal structures that could act as natural traps for oil or gas. The Ketzin anticline is such a geological structure. Here in the past natural gas was stored at depths between 250 and 400 meters. The target for the $CO_2$ storage within the $CO_2$SINK project however is a deeper reservoir in the sandstone of the Stuttgart formation. A previous exploration well at the site has encountered this sandstone unit at a depth of about 700 m. The cap rocks ensuring sealing of this reservoir comprise gypsum and clay. Approximately 30,000 tons per year of high-purity $CO_2$ will be injected into the reservoir for a period of up to 3 years.




## $CO_2$ Storage Monitoring and Verification

To characterise the underground and understand the processes which will occur during $CO_2$ storage an array of activities is planned to develop strategies to investigate and assess potential risks. Detailed analysis of samples of rocks, fluids and microorganisms collected from the underground, measurements and experiments in boreholes, geophysical surveys at the surface, innovative monitoring instruments at the surface and down-hole as well as numerical predictive models all help to prepare for the injection of $CO_2$ underground, follow its fate over long periods of time and evaluate reservoir stability and integrity.

The project is supported by a consortium consisting of 14 companies and research institutions.



**GeoForschungsZentrum Potsdam**

**G.E.O.S. Freiberg Ingenieurgesellschaft**

**Geological Survey of Denmark and Greenland**

**Mineral and Energy Economy Research Institute**

**Det Norske Veritas**

**Statoil**

**Shell International Exploration and Production**

**University of Stuttgart**

**Vibrometric Finland**

**University of Kent**

**Uppsala University**

**RWE Power AG**

**International Energy Agency - Greenhouse Gas R&D Programme**

**Vattenfall Europe Mining and Generation**

**Verbundnetz Gas AG**

For further information
visit the $CO_2$SINK website at
http://www.co2sink.org
or contact the Project Office at GFZ Potsdam,
e-mail: co2sink@gfz-potsdam.de.