

## Objectives

- Determine the sensitivity of monitoring systems to detect shallow CO<sub>2</sub> migration and surface leakage
- Upscale these results to assess monitoring systems and requirements that will ensure safe CO<sub>2</sub> storage
- Test and calibrate migration models in well controlled conditions
- Test new monitoring methods towards the development of improved technology
- Provide guidelines to regulators, operators and technology providers for monitoring systems
- Gain acceptance from the public by showing the performance of monitoring systems

## Background

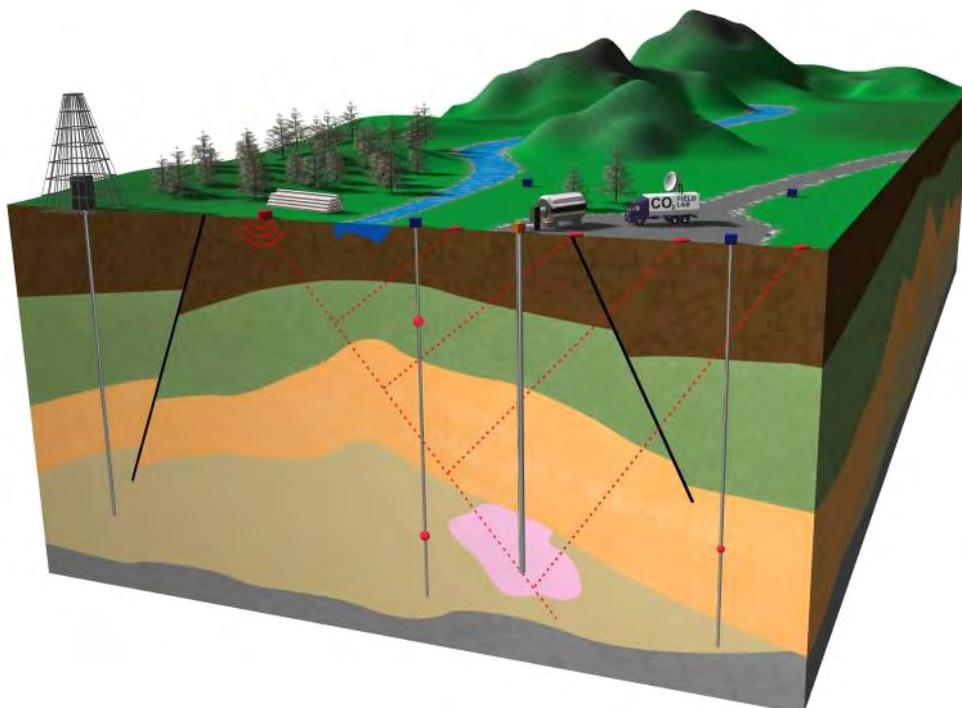
Geological storage of CO<sub>2</sub> is viewed as one of the acceptable options to minimize greenhouse gas emission into the atmosphere, thus to mitigate climate change. Technical feasibility of geological storage of CO<sub>2</sub> is currently being demonstrated. One of the barriers to commercial deployment of Carbon Capture and Storage (CCS) is the lack of protocols for Monitoring, Verifying and Accounting (MVA) the CO<sub>2</sub> stored in the reservoir. Another potential barrier that should not be overlooked is the public acceptance of CO<sub>2</sub> storage. Demonstrating the capability to detect leakage, so that remediation can be effected, will contribute to gain public acceptance.

## State of the art

Protocols to perform detection of CO<sub>2</sub> outside the storage complex and the quantification of CO<sub>2</sub> leaking at the surface are not yet mature. The absence of MVA does not stem from the need for new technologies but rather from the lack of relevant field tests. The required spatial and temporal resolution of present available techniques for detecting CO<sub>2</sub> leakage is not well understood. CO<sub>2</sub> Field Lab provides a unique opportunity to demonstrate the sensitivity of each technique, and to propose a methodology for designing an MVA plan and protocol.

## Methodology

Although a well-chosen and well-designed storage site is not expected to leak, the issue of leakage has to be addressed. Therefore, this project comprises two controlled releases of CO<sub>2</sub> in the shallow and very shallow subsurface in a Norwegian field setting. The CO<sub>2</sub> displacement in the subsurface and at the surface will be monitored with an exhaustive set of techniques deployed by the different partners.



## Phase 1 (Ongoing since Sep. 2009)

- Site characterisation (2009-2010)
  - Geological surveys using ERT, GPR and 2D seismics have been performed at the site
  - A 330-m deep appraisal well has been successfully drilled and logged
- Ongoing activities
  - Hydrodynamic appraisals at several depths
  - Updating geological and flow models using acquired data
- Go/no-go decision at the end of Phase 1 based on suitability of the site and risk analysis

## Phase 2 (Planned start Oct. 2010)

- CO<sub>2</sub> injection & monitoring (2010-2013)
  - Drilling of injection and monitoring wells
  - Shallow CO<sub>2</sub> injection (10-30 m)
  - Main CO<sub>2</sub> injection (100-300 m) - 200 tonnes
  - Monitoring techniques include seismic, electromagnetic, gravimetric, downhole, chemical, geochemical, ecological and atmospheric methods
  - Investigate detectability and sensitivity
  - Ensure safe operations and clean site abandonment
  - Development of a monitoring protocol and certificate

## Eurogia+

- The project has received the internationally recognised EUROGIA+ label (June 2009), that is granted to projects demonstrating technical innovation and showing strong market and exploitation commitment
- This label is a proof of quality to access national funding by individual participating countries' programs

## CLIMIT (Norwegian CCS research funding programme)

"The Field Lab project addresses several important issues that the Norwegian authorities has given priority to within the mandate of the CLIMIT program"

- Active participation in, and funding of the feasibility pre-project
- Currently funding 52% of the total project budget

## DGCIS (French ministry funding)

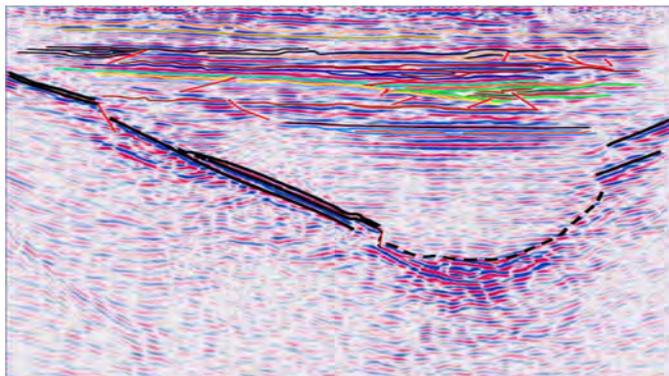
- General Directorate for Competitiveness, Industry and Services
- Currently funding 10% of the total budget

## Funding overview

- The project has a total budget of 11 M€
  - Institutional funding (13%)
  - Industrial funding (25%)
  - National funding (62%)
- 90% funding of Phase 2 is already secured
- The project is open for additional sponsors



Overview of the field laboratory site



Migrated image from the performed 2D seismic survey

## Project partners

Norway:



United Kingdom:



France:



Move Forward with Confidence\*

## Contact

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