CO$_2$ Field Lab Project

Presentation to CSLF, October 2010
Background

- **From demonstration projects to sequestration deployment:** Storage considered as an acceptable option for mitigation of climate change. By 2012, 3 projects for storage in saline aquifers > 5MT CO$_2$/Y, 4 projects > 0.5 MT CO$_2$/Y

- **Regulatory framework:**
  EU legislation passed December 2008, to be derived state by state
  Monitoring, Reporting and Accounting protocols are under development.

  - However, the **issue of leakage** must be well addressed:
    - **Safety:** Minimize the Health, Safety & Environmental risk
    - Mitigation and early remediation
    - Public acceptance: credibility of geological storage challenged
    - Accounting: if leakage occurs, emission credits must be surrendered and the site stabilized (EU)

**Crucially needed:** validated monitoring system for leakage

**Currently:** no means to assess such technologies.
CO₂FieldLab in one slide

CO₂ injected in permeable rocks in a well-controlled and well-characterised geological environment. Shallow and very shallow subsurface in a Norwegian field.

The underground CO₂ distribution will resemble leakages and will be monitored with an exhaustive set of techniques deployed by the project partners.
Assurance Monitoring

Four monitoring activities targeted at controlling containment

1- Control of barriers' integrity
2- Leakage detection
3- Impact detection and evaluation
4- Leakage quantification
Objectives

- CO₂ injection in permeable reservoir
  - Shallow (10-30 m)
  - Deep (200 – 300 m, ca. 200 tons in 2-4 weeks)
- Determine sensitivity of monitoring systems to detect subsurface migration & surface leakage
- Upscale results to assess monitoring systems and requirements ensuring safe CO₂ storage
- Test and calibrate migration models in well controlled conditions
- Inform the public about the safety of CO₂ storage by showing the performance of monitoring systems
- Develop monitoring protocol / certification scheme
The project is unique

- Controlled leakage experiment
- Main focus on detection limits:
  - For each monitoring technology, what is the detection limit (threshold)
- Combination/integration of monitoring tools and technologies
- Test of existing and novel technologies
- Focus on repeatability and permanent networks
- A better option than natural analogues
  - We have a controlled source of CO₂ and a well known geological environment
Project history

- Project approved by EUROGIA+ board (June 2009)
- Project approved by French Ministry (July 2009)
- Project approved by CLIMIT board (September 2009)
  - Phase 1 (appraisal, Sep. ‘09 – Sep. ‘10) approved
  - Phase 2 (CO₂ injection, Oct. ‘10 – Oct. ‘13) approved, in case 9% missing funding is found
- Project start 1 September 2009
- Go/no-go decision at the end of Phase 1
Drilling – June 10
Appraisal phase: Baseline monitoring
Mean CO₂ concentrations (soil gas)

- Original site: 0.13 %
- Alternative 1: 0.06 %
- Alternative 2: 0.38 %
- Seismic line E-W: 0.16 %
- Seismic line N-S: 0.20 %
External Communications

- **Exposure in media**
  - Newspaper articles
  - Norwegian national TV:
  - Oil & energy minister’s site visit

- **Personal contact**
  - Public hearings (SINTEF, UiO)
  - Direct mail about first survey

- **Future exposure**
  - Press book (BV)
  - Scientific publications
  - Press releases
Timeline – phase 2 + 3

Milestones – phase 2

- July 2011: shallow injection completed
- Spring 2012: deep injection initiated
- Spring 2013: coupled modeling reported, protocol
- September 2013: final report

Milestones - phase 3 (parallel to Phase 2)

- December 2011: 1st abandonment plan
- September 2013: Site abandoned; project closure
Financial support:

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