



**The answer to  
carbon storage  
is here**

## Introduction to the Geological Storage of Carbon Dioxide

### Aims

Governments around the world believe that geological storage of carbon dioxide captured at industrial sources will make a significant contribution to reducing atmospheric CO<sub>2</sub> emissions. As the leading UK subsurface consultancy on the geological storage of CO<sub>2</sub>, Senergy have in-depth knowledge of the selection, design and operation of geological storage sites.

The course provides an introduction to the principles and practicalities of CO<sub>2</sub> storage in subsurface geological formations. There is no assumption of previous knowledge in any technical discipline.

### Benefits

Understand the issues from site selection to project delivery surrounding geological storage projects. This will cover oil fields (including CO<sub>2</sub> enhanced oil recovery), depleted gas fields and saline aquifers with an emphasis on risks, uncertainties and the UK context, including the current legislative and policy status.

Get to know and understand the nature and basic physical principles of geological CO<sub>2</sub> storage, the data requirements for site evaluation and both the capabilities and limitations of the data.

Gain an appreciation of the options, possibilities, merits and prognosis for introducing carbon storage in the UK to allow the continued use of fossil fuels for power generation in the medium term.

### Who Should Attend?

The course is designed for environmental and energy industry executives, managers, financiers, technical staff, government advisors, civil servants, politicians, journalists and any who wish to know more about the subject of carbon storage and its relevance to the UK and EU in achieving CO<sub>2</sub> emissions reduction targets.

**Duration** – 1 Day

### Course Instructors

Dr Andy Beckly is principal geologist with 22 years oil industry experience - spanning frontier exploration to field development. As the lead Senergy geologist engaged in the evaluation of the Miller Field for CO<sub>2</sub> storage and other possible sites, Andy has first hand experience of the issues around CO<sub>2</sub> storage site selection.

David Hughes is a 2008-2009 'Distinguished Lecturer' for the Society of Petroleum Engineers on carbon storage and its significance to the oil industry. He is an oil reservoir engineer with 29 years' experience, and is Senergy's Technical Head, Carbon Storage.

Dr Mark Raistrick is a geologist and an internationally recognised expert in geological CO<sub>2</sub> storage monitoring. Mark has first hand experience of collecting, and interpreting monitoring data at a number of CO<sub>2</sub> storage projects. Mark has advised UK and global clients on CO<sub>2</sub> storage. His publications have been featured in the leading technical and environmental science journals.

(The course will be delivered by at least two of the Senergy Carbon Storage Team).

## Course Description

### Introduction

- Global warming and the greenhouse effect
- CO2 emissions growth predictions
- Strategies for CO2 reduction (Princeton Wedges)
- UK CO2 emissions and reduction targets and the role of geological storage
- Basic options for carbon capture and transport possibilities
- UK CCS competition and EU initiatives

### Physics and Chemistry of CO2

- High density supercritical fluid CO2
- CO2 miscibility/solubility in hydrocarbons
- CO2 solubility in formation water
- Dissociation and formation of carbonate ions
- Mineral dissolution, alteration, precipitation

### Geology and Risk

- The nature of the geological storage 'tank'
- Differences between depleted oil and gas fields and deep saline aquifers
- Data requirements for storage site evaluation
- What to look for in storage capacity estimates
- Impact on existing or future possible uses for the subsurface

### Traps and Trapping Mechanisms

- Residual saturation and structural traps
- Solution and mineral trapping

- Dynamics and trapping mechanisms in saline aquifer storage
- Constraints on, and estimation of the rates and volumes of CO2 that can be stored
- Risks and uncertainties in CO2 storage
- Relative merits of oil field, depleted gas field and saline aquifer storage

### Dynamics and Engineering

- How do different storage types stack up in the UK context?
- Principles of CO2 enhanced oil recovery (EOR)
- Is CO2 EOR a viable option offshore?
- Engineering disposal in depleted gas fields

### Monitoring and Regulations

- Background to monitoring, measurement and verification
- What needs to be measured (and why and how often)
- Emerging UK and EU monitoring and reporting guidelines
- Existing legislation for acid gas (H2S and CO2) disposal
- CCS under the clean development mechanism (CDM)
- Examples of proven monitoring techniques – 4D seismic
- Strengths and weaknesses of monitoring techniques in the context of emerging regulations
- Monitoring economics

To book this course, please contact **Sarah McPhee** - Training Co-ordinator  
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