CO₂QUEST
Techno-economic Assessment of CO₂ Quality Effect on its Capture Transport and Storage

Haroun Mahger efteh
h.mahger efteh@ucl.ac.uk
University College London, London, UK
http://www.co2quest.eu

UKCCSRC Meeting _ Manchester 13-14 April 16
The $m$ question:

What is the optimum range and concentration of impurities that can be permitted in the CO$_2$ stream to enable its safe and cost-effective transportation and storage?

The presentation provides an overview of the CO2QUEST project aimed at answering the above question.
Cost trade-offs associated with CO2 purity
CO₂QUEST: Techno-economic Assessment of CO₂ Quality Effect on its Storage and Transport

WP1: Fluid Properties & Phase Behaviour
- WP1.1: Typical Impurities
- WP1.2: Equation of State and Validation
- WP1.3: Experimental Evaluation

WP2: CO₂ Transport
- WP2.1: Pressure Drop/Compressor Requirement
- WP2.2: Near-field Dispersion
- WP2.3: Materials Selection
  - WP2.3.1: Ductile Fractures
  - WP2.3.2: Brittle Fractures

WP3: CO₂ Storage Reservoir Integrity Performance
- WP3.1: Experimental Evaluation Impurities Effects on Storage
- WP3.2: Modelling Impurities Effects on Geological Storage

WP4: Techno-economic Assessment
- WP4.1: Cost/Benefit Analysis
- WP4.2: Integrated Whole System Approach

WP5: Impacts and Risk Assessment
- WP5.1: Risk Profiles of Impurities
- WP5.2: Safety and Impacts Decision Making Method
- WP5.3: Risk Mitigation and Prevention of Long-Term Impacts

The project is funded by the European Union 7th Framework Programme FP7-ENERGY-2012-1-STAGE under grant agreement number 309102

Funding: FP7-ENERGY-2012-1
Start date: 1st March 2013
Duration: 40 months
Budget: 5m€
Coordinator: UCL

Tolerance Levels

Important Impurities (Transport)

Important Impurities (Storage)
WP2.3: Large-scale CO₂ release experiments
Large-scale CO$_2$ release experiments - setup

New DAQ system was employed

0-80 m field measurement
WP2.3: Experimental validation (DUT)

$CO_2$ release experiment
Large-scale CO$_2$ release experiments - results

Unmanned Drone

3.8 tons of Supercritical CO2 FBR release
Medium scale CO$_2$ release experiments
WP3: CO₂ Storage Reservoir Integrity

Injection of industrial grade CO2 in a shallow freshwater aquifer

- Investigate the impact of impurities on freshwater aquifer
- Recommend methods for monitoring of trace elements impurities and groundwater quality above the future CO₂ geological storage sites
WP3: CO₂ Storage Reservoir Integrity

Singe-well push-pull CO₂ injection experiments

Super-critical CO₂ injection into a reservoir layer at 1600 m depth, with sophisticated monitoring and sampling

• Impact of impurities on the two key trapping mechanisms of CO₂ (residual trapping and dissolution trapping) at field scale

• Validation of predictive models, measurement and monitoring techniques
Fluid-structure coupling model
Communication and Exploitation Event

The European Commission funded CO$_2$QUEST FP7 project consortium is delighted to announce that it is organising a 1-day Communication and Exploitation event presenting some of the project’s major achievements.

Date: Friday 20$^{th}$ May 2016

Venue: UCL, London, UK

Contact: Dr R. Porter
r.t.j.porter@ucl.ac.uk
Thank you

Questions

Contact details

Haroun Mahgerefteh
University College London
Gower Street, London, United Kingdom
Tel: +44-2076793835

www.co2quest.eu