The In Salah Project:
CO_2 Storage Monitoring and Verification

In Salah Gas

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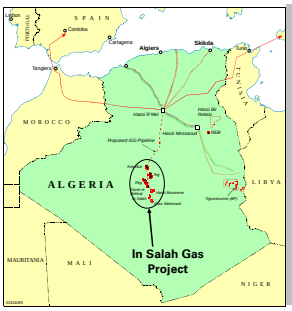
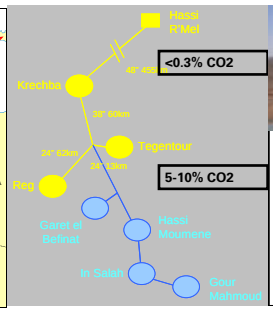
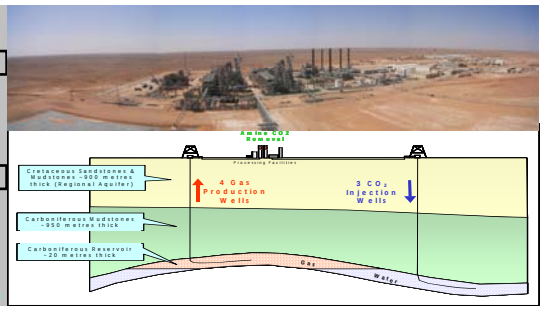
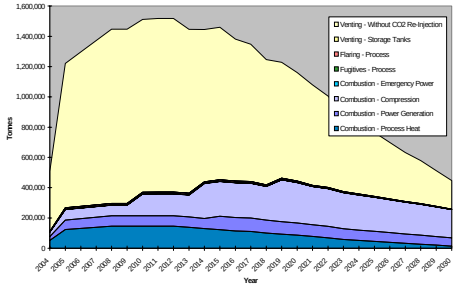
Significance and Objectives

Industrial-scale (1 million tonnes/year) Geological Storage of CO_2 (ongoing)
Started storing CO_2 in August 2004. State-of-the-art CO_2 Compression
CO2 storage in the water-leg of a producing gas reservoir
Excellent geological analog for US Mid-west and European North Sea
Full Suite of Sub-surface data available. State-of-the-art Horizontal Wells
Enhanced MMV Program being implemented as a joint industry/government project (JIP)









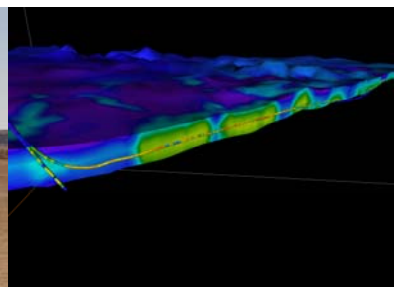
CO_2 Storage Project: Key Statistics

CO_2 Storage rate: 1 million tonnes/year Lifetime stored CO_2 volume: 17 million tonnes
Cost of Storage Infrastructure: $ 100 million (compression, transportation and injection)
Project Access: Direct charter flight from London (Mondays, Wednesdays and Thursdays)
Storage reservoir depth: 1850 metres Cap-rock thickness: 950 metres
Geology: Reservoir = Carboniferous Sandstone, Caprock = Carboniferous Mudstone
Reservoir Permeability: 5 millidarcies

CO_2 is Compressed for Transportation

CO_2 Pipeline leaves the Process Plant

CO_2 arrives at an Injection Well



CO_2 arrives in the Storage Reservoir

CO_2 Monitoring and Verification Project: Objectives and Challenges

1. Provide assurance that secure geological storage of CO_2 can be cost-effectively verified and that long-term assurance can be provided by short-term monitoring.
2. Demonstrate to stakeholders that industrial-scale geological storage of CO_2 is a viable GHG mitigation option.
3. Set precedents for the regulation and verification of the geological storage of CO_2, allowing eligibility for GHG credits

In Salah Technology Research and Development Program

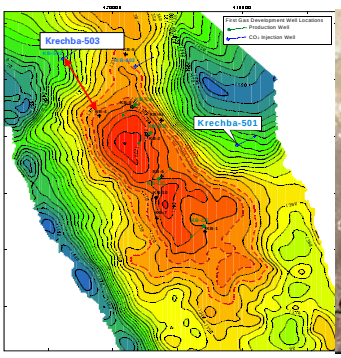
$30 million, 5 year program including: Project Management, Integration Baseline Measurements (Vadose zone sampling), Communications (External Website)
Formation Characterization (cap-rock core and cuttings analysis), CO2 Migration Imaging (seismic – permanent active, passive),
Well-based Monitoring (VSP, electromagnetic, cement integrity), Rock/Fluid Interaction studies, Surface Seepage Detection Technology,

Implications

Opportunity to develop and demonstrate technologies to address gaps in CO2 Monitoring and Verification of Geological Storage
Integrated with other Industrial-scale Storage Projects at a European Level through "CO2ReMoVe"
Lessons learned will be directly applicable to key geological settings such as the US Mid-West and European North Sea

Example Technology: Permanent Seismic Array – Planned Installation is Spring 2006

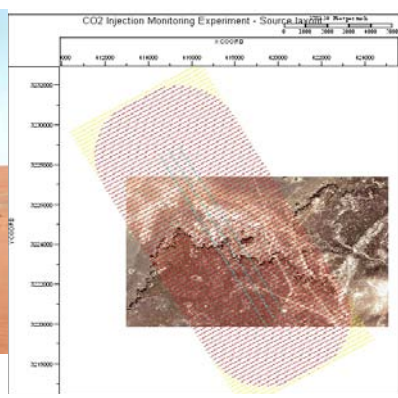
Reservoir Depth Map



Permanent Seismic: Surface Location

Seismic Source: Vibrosis Truck

Permanent Seismic: Monitoring



Future Plans

Gain CSLF Support, Engage collaborators from other CSLF Nations (ie US GEOSEQ)
Implement the $30million, five-year program
Encourage Algeria to join CSLF

Project Manager

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