



Strategic Plan Implementation Report

April 2009

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Strategic Plan Committee
CSLF Task Force Strategic Implementation Report (TFIR)
March 2009

1. Committee Members
<ul style="list-style-type: none">▪ Canada – Ian Hayhow (Chair)▪ Australia – John Hartwell; Bill Koppe▪ European Commission – Wiktor Raldow▪ France – Bernard Frois▪ India – Anil Razdan▪ Mexico – José Miguel González Santaló▪ Netherlands – Hans Bolscher▪ Norway – Tone Skogen; Trygve Riis▪ South Africa – Elizabeth Marabwa▪ United Kingdom – Rachel Crisp; Milton Catelin; Jeff Chapman▪ United States – Bob Gentile, Jeff Jarrett▪ CSLF Secretariat – Barbara McKee
2. Purpose of Committee
<p>Develop a revised and updated CSLF Strategic Plan that will contain:</p> <ul style="list-style-type: none">▪ Significant achievements as strategic destinations,▪ Strategies to reach those destinations,▪ Activities to execute the strategies,▪ Priorities for each of the activities, and▪ Milestones to measure progress. <p>As part of the process, the Committee will consider the role and engagement of the CSLF and how it would achieve its long term goal over the next five years.</p>
3. Milestones
<ul style="list-style-type: none">▪ Strategic Plan Committee created at CSLF Cape Town meeting, April 2008▪ Draft documents: May 2009▪ Approval by Policy Group: June 2009▪ Finalized CSLF Strategic Plan will be a deliverable at CSLF Ministerial Meeting in October 2009
4. Status
<ul style="list-style-type: none">▪ Process to update progress on G8 recommendations is underway.▪ Most drafts received, still waiting on Capacity building▪ First draft should be ready early May

Task Force on Communications
CSLF Task Force Strategic Implementation Report (TFIR)
April 2009

1. Task Force Members
<ul style="list-style-type: none">▪ United Kingdom – Ruth Hampton▪ Australia – John Hartwell▪ Mexico – José Miguel González Santaló▪ Norway – Tone Skogen▪ United States – John Grasser▪ European Commission – Eric Drosin
2. Purpose of Task Force
Implement a communications strategy to raise the profile of the CSLF.
3. Milestones
<ul style="list-style-type: none">▪ Initiated development of an overall CSLF communications plan.▪ Initiated the rebuilding of the CSLF website so as to have a first-rate site and a communications tool available to help promote the organization and the upcoming ministerial meeting.▪ Initiated the redevelopment of the CSLF information kit.▪ Initiated the establishment of a CSLF daily clipping service to all members.▪ Initiated conceptual redesign of CSLF exhibit with new graphics to mirror web page and handout material graphics.
4. Status
<ul style="list-style-type: none">▪ Communications plan circulated to Task Force for review and comment.▪ Completed the development of a totally new CSLF website with improved functionality and graphic presentation. New website was activated in early March 2009.▪ Completed development of the CSLF daily clipping service for all members and stakeholders. CSLF News was activated first week of March 2009.▪ Completed redesign and printing of new CSLF handout “kit.”▪ Artwork and graphical redesign of a new CSLF exhibit underway.

Project Interaction and Review Team (PIRT)
CSLF Task Force Strategic Implementation Report (TFIR)
March 2009

1. Task Force Members

The Team consists of:

- A Core Group comprising the Chair and Vice Chairs of the Technical Group, and other delegates as designated by the Technical Group. Current membership consists of representatives from:

Australia	Clinton Foster
Canada	Bill Reynen
Denmark	Flemming Ole Rasmussen
European Commission	Jeroen Schuppers
France	Pierre Le Thiez
Germany	Jürgen-Friedrich Hake
India	Ishraq Ahmad
Netherlands	Harry Scheurs
Norway	Trygve Riis
Saudi Arabia	Khalid Abuleif
UK	Nick Otter (Chair)
USA	George Guthrie

The chair is performed via a 3 co-lead approach (currently with Australia, E.C., and UK) with 1 person to change on an annual basis, so ensuring continuity, sharing the work load and providing opportunity for change. During the period of this report the chair resides with the UK.

- A Floating Group comprising representatives of CSLF recognized projects with overall management responsibility in the project (e.g. project manager), as well as other subject area experts.

2. Purpose of Task Force

The PIRT has the following tasks:

- Assess projects proposed for recognition by the CSLF in accordance with the project selection criteria approved by the Policy Group. Based on this assessment, make recommendations to the Technical Group on whether a project should be accepted for recognition by the CSLF.
- Review the CSLF project portfolio and identify synergies, complementarities and gaps, providing feedback to the Technical Group and input for further revisions of the CSLF roadmap.
- Identify technology gaps where further RD&D would be required.
- Foster enhanced international collaboration for CSLF projects, both within individual projects (e.g. expanding partnership to entities from other CSLF Members) and between different projects addressing similar issues.
- Promote awareness within the CSLF of new developments in CO₂ Capture and Storage by establishing and implementing a framework for periodically reporting to the Technical Group on the progress within CSLF projects and beyond.
- Organize periodic activities to facilitate the fulfillment of the above functions and to give an opportunity to individuals involved in CSLF recognized projects and other relevant individuals invited by the CSLF, to exchange experience and views on issues of common interest and provide feedback to the CSLF.

- Perform other such tasks that may be assigned to it by the CSLF Technical Group.

3. Milestones

Near-term milestones are:

- Assessment of potential candidate CSLF Projects and make recommendations to the Technical Group as to their suitability. (April 2009)
- Identification of areas that are thought to be appropriate for new projects and to encourage the submission of projects in these areas (April 2009)
- Production of updated version of CSLF Technology Roadmap ready for 2009 Ministerial Meeting. (June 2009)
- CSLF Secretariat is continuing to engage with Member countries to obtain links to current Technology Road Maps for each country, and/or strategic planning documents for CCS that they have generated. This item is in response to the PIRT Action Plan item to have a “Technical roadmap developed for each area including links with member country roadmaps”. (Ongoing)

4. Status

- A mechanism for formalizing a relationship between the PIRT and the IEA GHG has been established and agreed formally by the IEA GHG R&D Programme at the ExCo held in Daejeon, South Korea in October 2007 and by the CSLF Technical Group in Saudi Arabia in January 2008. The `pilot` topic on CO₂ storage capacity coefficients is proceeding and will be considered by PIRT members as part of the formal review process of the IEA GHG. The next IEA GHG ExCo is scheduled for April 2009 in Brisbane.
- Knowledge gained from the EC Zero Emission Platform (ZEP) project is being considered for any relevant PIRT activities. Part of this is to seek to use resources from the EC FP7 R&D Programme in the future, this being open to organizations from CSLF members especially developing countries. An EC call for FP7 will be issued in 2009. The aim is to encourage organizations from CSLF countries to respond together with those from within the EC.
- The base work of updating the CSLF TRM has been performed by the Global CCS Institute [GCCSI] and several drafts have been reviewed between January and March 2009, ready for consideration at the Technical Group meeting in Oslo on 1-2 April 2009. This has been achieved under the leadership of the UK working with the GCCSI.
- The GCCSI was established by the Australian Government in January 2009 as a worldwide initiative to accelerate the deployment of CCS and so it brings a much needed resource into the international arena. The PIRT will continue to develop its relationship with the GCCSI to address areas of work that are common to both.
- The comprehensive Gap Assessment completed and presented at the CSLF Workshop in Paris in April 2007 is being used in the current process reviewing and updating the TRM. This is being used to help identify where CSLF projects to could be encouraged in relation to the CSLF Charter.

*Task Force to Examine Risk Assessment Standards and Procedures
CSLF Task Force Strategic Implementation Report (TFIR)
April 2009*

1. Task Force Members
<ul style="list-style-type: none"> ▪ United States (Chair: George Guthrie) ▪ Australia ▪ Canada ▪ France ▪ India ▪ Japan ▪ Netherlands ▪ Norway ▪ United Kingdom ▪ IEA GHG
2. Purpose of Task Force
<p>In its Phase I activities, this Task Force identified potential risks from CO₂ Capture and Storage (CCS) activities and examined the risk assessment standards and procedures that could be used to place these risks in context based on their likelihood to occur and their possible consequences. Specifically, the focus was on:</p> <ol style="list-style-type: none"> 1. Risks associated with CO₂ injection (including fracturing, fault re-activation, induced seismicity) 2. Risk associated with any CO₂ migration from the storage reservoir, including: <ul style="list-style-type: none"> ▪ the health, safety, and environmental risks of long-term CO₂ storage ▪ the potential impact on natural resources such as groundwater or other resources ▪ fugitive emissions into the atmosphere <p>Specific activities of this task force will include:</p> <ul style="list-style-type: none"> ▪ Review and summarize the existing literature and international activities on geological storage risk assessment ▪ Highlight the critical issues ▪ Propose what is needed to better understand and manage these risks
3. Milestones
<ul style="list-style-type: none"> ▪ March 2007 – Initial meeting of Task Force ▪ June 2007 – Finalize mission statement and agree on planned Phase I activities ▪ January 2008 – Task Force met at Technical Group meeting in Al Khobar, Saudi Arabia. Prior to meeting, a draft of sections 1-3 was circulated. ▪ March 2008 – Completed initial draft and circulated for review ▪ April 2008 – Discussed draft phase I report at task force meeting in Cape Town. Requested additional input from Technical Group members on ongoing country-specific activities. ▪ January 2009 – Final draft completed for review by Task Force ▪ April 2009 – Task Force met at Technical Group meeting in Oslo, Norway to finalize Phase I report.
4. Status
<ul style="list-style-type: none"> ▪ Completed report to be sent to Secretariat for circulation to the Technical Group for review.

Report of CSLF Secretariat
CSLF Strategic Implementation Reporting System (SPIR)
April 2009

A. Meetings and Workshops

- Past
 - CSLF PIRT meeting (12 March 2009). The Secretariat and the PIRT Chair planned and coordinated this meeting, which advanced the process for updating the CSLF Technology Roadmap. The Secretariat prepared appropriate documents that were considered at the meeting. Following the meeting, the Secretariat worked with the PIRT Chair to take the new working draft of the Roadmap through a full comment cycle prior to the CSLF Technical Group meeting in Oslo.
 - CSLF Ministerial Steering Group meeting (12 March 2009). The Secretariat and the delegation from the United Kingdom coordinated this meeting to move toward developing the plans and documents for the upcoming CSLF Ministerial meeting.
 - CSLF Technical Group, PIRT, and Risk Assessment Task Force meetings (31 March-02 April 2009, Oslo, Norway). The Secretariat and the respective Technical Group and Task Force Chairs, planned and coordinated meetings of the CSLF Technical Group, PIRT, and Risk Assessment Task Forces. The Secretariat prepared documents that were considered at the meeting, arranged for invited presentations, and briefed the Technical Group Chair. Following the meeting, the Secretariat worked with the PIRT and Technical Group Chairs to take the new working draft of the CSLF Technology Roadmap through a full comment cycle into a final draft that will be considered by the Policy Group at its meeting in San Francisco. The Secretariat is drafting the minutes for all meetings which will be circulated for comment and posted at the CSLF website.
 - CSLF Ministerial Steering Group meeting (24 April 2009, London, United Kingdom). The Secretariat and the delegation from the United Kingdom coordinated this meeting to develop the plans and documents for the upcoming CSLF Ministerial meeting.
- Future
 - CSLF Policy Group meeting (29-30 June 2009, San Francisco, California, United States). The Secretariat is coordinating, organizing, and convening this meeting, which will move forward all activities, including review and approval of deliverables, for the CSLF Ministerial meeting. A San Francisco meeting information page is now online at the CSLF website (see below).
 - CSLF Ministerial Steering Group meeting (September 2009, London, United Kingdom). The Secretariat and the delegation from the United Kingdom are planning and coordinating this meeting to develop the plans and documents for the upcoming CSLF Ministerial meeting.
 - Ministerial meeting of the CSLF (12-14 October 2009, London, United Kingdom). The Secretariat is planning and coordinating with the Ministerial Steering Group and the host countries (United Kingdom and Norway) to organize the CSLF Ministerial meeting. The timing of the events will allow the Ministers to attend both the CSLF Ministerial and the IEA Ministerial meetings.

B. Applications for CSLF Membership

New Zealand has formally applied for CSLF Membership. Its application will be considered by the CSLF Policy Group at its June meeting.

C. Updates to CSLF website (<http://www.cslforum.org>)

The following updates to the CSLF website have been accomplished since the last reporting period:

- A “new look” CSLF website with improved functionality and graphic presentation was brought online in early March. Features of the new website include:
 - A new “Meetings/Workshops” page (<http://www.cslforum.org/meetings/>) that includes all information on past CSLF meetings, CSLF Workshops, and CSLF Task Force meetings.
 - A new “Publications” page (<http://www.cslforum.org/publications/>) that includes all CSLF Background Documents, Task Force Final Reports, CSLF Strategic Plan Implementation Reports (SPIRs), Public Communication and Outreach Updates from CSLF Members, and links to carbon sequestration publications by other organizations.
 - A new “Projects” page (<http://www.cslforum.org/projects/>) that includes information on how to propose a project for CSLF recognition and details about all 20 CSLF-recognized projects.
 - A new “About the CSLF” page (<http://www.cslforum.org/aboutus/>) that includes a mission statement, goals of the CSLF, and links to CSLF Member pages (note: the flag is the link).
 - A new “Get Involved” page (<http://www.cslforum.org/getinvolved/>) that includes information on how national governmental entities can apply for CSLF Membership and how organizations can register to become CSLF Stakeholders (and a listing of CSLF Stakeholders).
 - A new “Press Room” page (<http://www.cslforum.org/pressroom/>) that includes press releases, information about CSLF in the news, an archive of press briefing documents from previous CSLF meetings, and an archive of daily news clips about CCS.
- Presentations from the Oslo Technical Group and PIRT meetings have been added to the “Meetings/Workshops” page.
- Presentations from the 5th CSLF Capacity Building in Emerging Economies Workshop, held in Salvador, Brazil, on 8-9 September 2008 have been added to the “Meetings/Workshops” page.
- The next Policy Group business meeting, 29-30 June 2009 in San Francisco, California, United States, has been added to the “Upcoming Events” section of the CSLF home page.
- A new page has been added for the upcoming San Francisco meeting of the Policy Group: <http://www.cslforum.org/meetings/sanfrancisco2009/premeeting.html>
- Listings of Policy and Technical Group delegates have been updated. Please inform the Secretariat of any corrections. These are viewable at the London Ministerial meeting page: <http://www.cslforum.org/meetings/london2009/premeeting.html>

D. Other Activities

The UNFCCC Climate Observer Organization Liaison has informed the Secretariat that based on a review of the CSLF Charter the CSLF's request to be granted status as an Intergovernmental Organization (IGO) may not be granted. The CSLF Secretariat has provided additional information and asked the UNFCCC for an additional review of the CSLF application within the context of the eligibility criterion set by the UNFCCC's Conference of the Parties.

Over this reporting period, the Secretariat handled approximately 450 pieces of incoming e-mail correspondence.

E. Stakeholders

Since the last reporting period, 19 stakeholders have registered bringing the current total to 173. . Nine stakeholders have requested not to list their information on the CSLF website. CSLF Members are encouraged to have their stakeholders register.

The CSLF Secretariat can be contacted as follows:

- E-mail: cslfsecretariat@hq.doe.gov
- Tel : +1 301 903-3820
- Fax : +1 301 903-1591

Report from Stakeholders
CSLF Strategic Implementation Reporting System (SPIR)
March 2009

The Carbon Capture & Storage Association (CCSA)

The CCSA continues to be an extremely active organisation, with membership again growing at a healthy pace over the past few months.

Recent activity in the UK and Europe has included:

- A proposal, which has now been accepted by EU leaders, for €1.05 billion of funding for CCS projects as part of the European economic recovery package. The money comes from a €5 billion budget surplus. Germany, the UK, Poland, the Netherlands and Spain will all receive €180 million each, Italy will receive €100 million and France will receive €50 million.
- The European Commission is continuing to move forward on both the process and the criteria for selection of CCS demonstration projects for the Flagship Programme.
- Recent public announcements suggest that the UK Government is keen to host a second demonstration project (providing that European funding is available). Further announcements are expected in due course.
- As noted in the previous stakeholder report, included in the EU ETS Directive was a provision to set aside 300 million EUAs to support CCS (and innovative renewables). It will be important to influence how this support will be allocated and the CCSA is jointly hosting a conference on 29th April with the office of Chris Davies MEP to discuss this.

* * * * *

South Africa National Energy Research Institute (SANERI)

- Centre for Carbon Capture and Storage in SANERI operationalised 30Mar09 – Charter Signing Ceremony took place 27Mar09.
-
- Carbon Geological Storage Atlas commenced Sep08 and scheduled to be published Apr10 – with industry [PetroSA, AngloCoal, Eskom, Sasol, and SANERI] financial support
- Centre will ramp up operations during 2009.

* * * * *

Director, Powerfuel Power Ltd

- Section 36 permission from UK Government
- Shell gasifier licence in place
- Full FEED study nearing conclusion
- Grid connection agreement in place
- Advanced EPC and O&M discussions
- On EC list for European Economic Recovery Package
- On track for 2013

Alberta and Shanxi Enhanced Coalbed Methane Recovery Projects
CSLF Project Status Report (PSR)
March 2009

1. Project Location
Alberta, Canada and Shanxi, China
2. Project Lead
Brent Lakeman, Alberta Research Council <ul style="list-style-type: none"> ▪ Telephone: 1 780 450-5274 ▪ E-Mail: Lakeman@arc.ab.ca
3. Project Objectives
<ul style="list-style-type: none"> ▪ Reduce greenhouse gas emissions by subsurface injection of CO₂ into deep coal beds of low and high rank ▪ Reduce CO₂ emissions and enhance coal-bed methane recovery factors and production rates as a result of CO₂ injection
4. Recent Milestones
<ul style="list-style-type: none"> ▪ Designed full scale pilot and commercial demo for low rank coals based on micro-pilot results at one Canadian site ▪ Completed conceptual commercial assessment of low rank coals at one Canadian site ▪ Completed assessment of tiltmeter response to short and long term CO₂ injection in low rank coals ▪ Met with CUCBM, Petromin and EcoEnergy on designing a second micro-pilot for high rank coals in China ▪ Both projects have been completed.
5. Status
<ul style="list-style-type: none"> ▪ Simulation design completed for pilot and commercial demo for low rank coals at a Canadian site utilizing 5 spot geometry ▪ Tiltmeter papers submitted for review to Journal of GHG Control ▪ Environmental monitoring assessment completed ▪ Comparison of CO₂-ECBM between low rank and high rank coals being completed. ▪ Suncor-led consortium CSEMP project reviewing economic assessment report for low rank Ardley Canadian coals ▪ Both projects have been completed.

CO2CRC Otway Project
CSLF Project Status Report (PSR)
March 2009

1. Project Location
Southwestern Victoria, Australia
2. Project Lead
Sandeep Sharma, CO2CRC, Kensington WA 6151, Australia, - Ph: 08 6436 8736 - Mob: 0412 515 494 - E-mail: ssharma@co2crc.com.au
3. Project Objectives
The Otway project has been designed to demonstrate geological storage and monitoring of CO ₂ under Australian conditions. It aims to provide technical information on geosequestration processes, technologies and monitoring and verification regimes that will help to inform public policy and industry decision-makers and assurance to the community.
4. Recent Milestones
<ul style="list-style-type: none">▪ Repeat 3D seismic survey performed. Data currently being processed.▪ Geochemical sampling using U-Tube set up on a weekly basis. The rich data set being collected will help understand the CO₂ movement and rock/fluid interactions.▪ Multiple site visits by local and international visitors.▪ Community exercise with Local fire authority conducted in November.▪ Over 45,000 tonnes of CO₂ have been injected to date and monitoring is ongoing.
5. Status
<ul style="list-style-type: none">▪ Seismic testing using permanently installed geophones to continue▪ Otway Stage 2 concepts discussed with regulators/CRC board and long lead items ordered. The drilling site is going to be prepared soon in preparation for drilling later in the year.▪ Public meetings planned to update the community on forward plans.

CO₂ Separation from Pressurized Gas Stream Project
CSLF Project Status Report (PSR)
April 2009

1. Project Location
Kyoto, Japan (membrane module development) Pittsburgh, Pennsylvania, USA (testing)
2. Project Lead
Dr. Shingo Kazama, RITE (Research Institute of Innovative Technology for the Earth) <ul style="list-style-type: none"> ▪ E-mail: kazama@rite.or.jp
3. Project Objectives
<ul style="list-style-type: none"> ▪ Development of membrane material with molecular gate function and composite membrane of excellent CO₂ selectivity over H₂ ▪ Development of commercial size membrane module ▪ Testing of the module (with NETL, USA)
4. Recent Milestones
<ul style="list-style-type: none"> ▪ Improvement of membrane material for molecular gate function (2008FY) ▪ Improvement of composite membrane of an excellent CO₂ selectivity over H₂ (2008FY) ▪ Bench membrane module production (2009FY) ▪ Real gas pre-testing of bench membrane module (2009FY) ▪ Preproduction sample of commercial size membrane module (2010FY) ▪ Real gas pre-testing of commercial size membrane module (2010FY) ▪ Process simulation (2008FY-)
5. Status
<ul style="list-style-type: none"> ▪ 1st duration: 11/2003 – 03/2006 Completed ▪ Development of novel dendrimer materials for CO₂ separation ▪ Fabrication of dendrimer composite membrane modules and their test <p>References:</p> <p>Shingo Kazama, Teruhiko Kai, Takayuki Kouketsu, Shigetoshi Matsui, Koichi Yamada, James S. Hoffman, Henry W. Pennline, Experimental Investigation of a Molecular Gate Membrane for Separation of Carbon Dioxide from Flue Gas, Session 30, Proceedings of Pittsburgh Coal Conference, Pittsburgh, USA (2006)</p> <p>T. Kai, T. Kouketsu, S. Duan, S. Kazama, K. Yamada, Development of commercial-sized dendrimer composite membrane modules for CO₂ removal from flue gas, Separation and Purification Technology 63 (2008) 524–530 and so on.</p> <ul style="list-style-type: none"> ▪ 2nd duration: 04/2006 – 03/2011 ongoing ▪ Improvement of CO₂/H₂ selectivity and CO₂ permeance of dendrimer composite membrane (12/2008) ▪ Launch of bench and commercial membrane module production (1/2009)

CO₂SINK
CSLF Project Status Report (PSR)
 April 2009

1. Project Location
Ketzin, State of Brandenburg, Germany
2. Project Lead
GeoForschungsZentrum Potsdam, German Research Centre for Geosciences (GFZ) Telegrafenberg, D-14473 Potsdam; http://www.gfz-potsdam.de Coordinator: Dr.-Ing. Hilke Würdemann Tel: +49.331.288-1516; Fax: +49.331.288-1529; e-mail: hilke.wuerdemann@gfz-potsdam.de Project website: http://www.co2sink.org
3. Project Objectives
<ul style="list-style-type: none"> ▪ Developing a basis for geologic storage of CO₂ into a saline aquifer ▪ Establishing the first European in-situ laboratory for onshore storage of CO₂ ▪ Creating a field laboratory with one injection well and two observation wells ▪ Characterization of flow and reaction processes in geologic storage, including detailed analysis of samples of rocks, fluids and microorganisms from the underground reservoir ▪ Intensive monitoring of the injected CO₂ using a broad range of geophysical (time-lapse seismic, electrical and thermal), geochemical and microbiological techniques ▪ Development and benchmarking of numerical models ▪ Definition and testing of risk-assessment strategies
4. Recent Milestones
<ul style="list-style-type: none"> ▪ Feb./May 2007: Spud-in of the CO₂SINK injection and observation wells ▪ June 13, 2007: Opening of the Ketzin Field Lab, CO₂ Storage Site and Info Centre ▪ Sept. 8, 2007: One injection and two observation wells drilled and cemented (smart wells with electrical and fibre-optical permanent sensors behind casing) ▪ Feb. 8, 2008: Injection facility installed and tested ▪ Feb. 29, 2008: Hydraulic testing successful ▪ June 18, 2008: Final lifting of injection and observation wells; slug injection ▪ June 24, 2008: Commissioning of injection facility, start of injection test phase ▪ June 30, 2008: Start of CO₂ injection ▪ Nov. 17, 2008: Presentation of the CO₂SINK Status Report to HGT-9, Washington
5. Status
<ul style="list-style-type: none"> ▪ 5-years lifetime 04/2004 - 03/2009; extension of project lifetime is applied for ▪ July 2008: start injection of up to 60,000 tonnes CO₂ ▪ July 15, 2008: arrival of CO₂ at first observation well ▪ March 2009: arrival of CO₂ at second observation well ▪ April 2009: 11,500 tonnes of CO₂ injected till now <p>Completed subprojects:</p> <ul style="list-style-type: none"> ▪ Storage site development ▪ Baseline Storage Site Modeling ▪ GeoEngineering: drilling, coring, pre-injection logging

Ongoing subprojects:

- Rock/fluid interactions laboratory experimentation
- Economic/ecological analysis and safety concepts
- CO₂ supply, transport, intermediate storage, conditioning and injection
- Geophysical and geochemical borehole and surface MMV of CO₂ storage
- Project coordination and public outreach
- Preparation (permitting and operation) of CO₂ wellbore abandonment and post-injection MMV

The present state of the CO₂SINK Integrated Project has been summarized in the Proceedings of GHGT-9 by *Schilling, F. Borm, G. Wuerdemann, H. Moeller, F., Kuehn, M. and the CO₂SINK Group: Status Report on the First European on-shore CO₂ Storage Site at Ketzin (Germany).*

Frio Brine Pilot Project
CSLF Project Status Report (PSR)
April 2009

1. Project Location
South Liberty oilfield, east of Houston, Texas, USA
2. Project Lead
<ul style="list-style-type: none">▪ Susan Hovorka, Gulf Coast Carbon Center, The Bureau of Economic Geology, Jackson School of Geosciences, The University of Texas at Austin, USA<ul style="list-style-type: none">- E-mail: susan.hovorka@beg.utexas.edu▪ Tom Daley, Lawrence Berkley National Lab, Berkeley, California, USA▪ Yousif Kharaka, U.S. Geological Survey, Menlo Park, California, USA
3. Project Objectives
<ul style="list-style-type: none">▪ Project Goal: Early success in a high-permeability, high-volume sandstone representative of a broad area that is an ultimate target for large-volume sequestration.▪ Demonstrate that CO₂ can be injected into a brine formation without adverse health, safety, or environmental effects▪ Determine the subsurface distribution of injected CO₂ using diverse monitoring technologies▪ Demonstrate validity of conceptual and numerical models▪ Develop experience necessary for success of large-scale CO₂ injection experiments
4. Recent Milestones
<ul style="list-style-type: none">▪ Second injection completed October 1, 2006▪ Confirm no-detect at surface of perfluorocarbon tracers▪ Post injection monitoring of second injection completed September 2007▪ Permission to plug and abandon both wells has been received
5. Status
<ul style="list-style-type: none">▪ Project is approaching completion▪ Post- injection stable conditions attained – monitoring program nearing completion▪ Final repeat VSP prior to plug and abandon scheduled for winter 2008▪ Two short duration injection tests completed: Frio 1, Oct 2004; Frio 2 September 2006▪ Assessment of storage permanence – quantifying residual saturation and dissolution of year long period following injection▪ No change in status since September 2008 report▪ Reports can be found at http://www.gulfcoastcarbon.org

*In Salah Industrial-Scale CO₂ Geological Storage Project
CSLF Project Status Report (PSR)
September 2008*

1. Project Location
In Salah, Algeria, Africa
2. Project Lead
Iain W. Wright, BP Alternative Energy, Chertsey Road, Sunbury, Middlesex TW16 7LN, UK – E-mail: iain.wright@uk.bp.com
3. Project Objectives
<ul style="list-style-type: none">▪ Provide assurance that secure geological storage of CO₂ can be cost-effectively verified and that long-term assurance can be provided by short-term monitoring.▪ Demonstrate to stakeholders that industrial-scale geological storage of CO₂ is a viable GHG mitigation option.▪ Set precedents for the regulation and verification of the geological storage of CO₂, allowing eligibility for GHG credits
4. Recent Milestones
<ul style="list-style-type: none">▪ Good results from INSAR program, confirmed by monitoring well and tracer work▪ Quantified Risk Assessment updated
5. Status
<ul style="list-style-type: none">▪ Storing 1mmtpa CO₂ in a deep saline aquifer (1900 deep, 2m thick, 10mD permeability).▪ Expect to repeat seismic data acquisition in Q2 2009.▪ No change in status since September 2008 report.

Zama Acid Gas Enhanced Oil Recovery, CO₂ Sequestration, and Monitoring Project
CSLF Project Status Report (PSR)
March 2009

1. Project Location
Zama City, Alberta, Canada
2. Project Leads
<ul style="list-style-type: none">• Ed Steadman, Energy & Environmental Research Center, Grand Forks, North Dakota, USA<ul style="list-style-type: none">- E-mail: esteadman@undeerc.org• Steven Smith, Energy & Environmental Research Center, Grand Forks, North Dakota, USA<ul style="list-style-type: none">- E-mail: ssmith@undeerc.org• Bill Jackson, Apache Canada Ltd, Calgary, Alberta, Canada<ul style="list-style-type: none">- E-mail: bill.jackson@apachecorp.com
3. Project Objectives
<ul style="list-style-type: none">• To validate the sequestration of CO₂-rich acid gas in a depleted oil reservoir.
4. Recent Milestones
<ul style="list-style-type: none">• Geochemical analysis has been completed.
5. Status
<ul style="list-style-type: none">• Injection is ongoing. Over 30,000 tons of acid gas has been injected to date.• Approximately 22,000 barrels of oil have been produced to date.• Draft Regional Technology Implementation Plan and Final Reporting have been initiated.