



Strategic Plan Implementation Report

July 2007

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Legal Issues Task Force
CSLF Task Force Strategic Implementation Report (TFIR)
 June 29, 2007

1. Task Force
<p>Legal Issues Task Force</p> <ul style="list-style-type: none"> ▪ 2nd IEA/CSLF Workshop and Publication on Legal Aspects of Storing CO₂ ▪ Conduct Workshop and produce Publication to further investigate the five priority issues (IP, national legal and regulatory frameworks, international environment protection instruments, creating a level playing field for CCS, public awareness) identified in the 1st Workshop (July 2004) and Publication (2005) on Legal Aspects of Storing CO₂
2. Task Force Members
<ul style="list-style-type: none"> ▪ John Hartwell, Australia (Chair) ▪ Margaret Sewell, Australia ▪ Peter Horracks, European Commission ▪ Scott Brockett, European Commission ▪ Carole Lancereau, France ▪ Philippe Geiger, France ▪ Jacek Podkanski, France (IEA Secretariat) ▪ Thomas Kerr, France (IEA Secretariat) ▪ Hans Spiegler, Netherlands ▪ Caroline van Dalen, Netherlands ▪ Dag Trygve Enden, Norway ▪ Mette Karine Gravdahl Agerup, Norway ▪ Brian Morris, United Kingdom ▪ Tim Dixon, United Kingdom ▪ Barbara McKee, United States (IEA WPPF) ▪ Jeff Price, United States ▪ Mike Smith, United States
3. Purpose of Task Force
<ul style="list-style-type: none"> ▪ Goals or outcomes sought include further exploring the five priority issues to: <ul style="list-style-type: none"> – raise awareness of the issues – create discussion regarding the five issues (IP, national legal and regulatory frameworks, international environment protection instruments, creating a level playing field for CCS, public awareness) and – assist in developing solutions to these issues ▪ Performance indicators include attendance at Workshop, general level of interest in reviewing Publication, number of copies of Publication sold/downloaded
4. Milestones
<ul style="list-style-type: none"> ▪ End May 2006 – complete drafting of discussion papers on five priority issues ▪ 17 October 2006, Paris – 2nd IEA/CSLF Workshop on Legal Aspects of Storing CO₂ ▪ November/December 2006 – Taskforce to finalise draft of legal report and handover to IEA ▪ Mid-2007 – IEA to publish 2nd report on Legal Aspects of Storing CO₂
5. Status
<ul style="list-style-type: none"> ▪ Discussion paper signed off by the Taskforce on 19 December 2006 and handed over to the IEA for editing. ▪ Progress report presented by Chair at CSLF Plenary meeting in Paris in on 26 March 2007. ▪ Discussion paper was reviewed by members in April and provided to IEA for publishing. ▪ IEA launched the publication at the G8-IEA-CSLF Workshop in Oslo in June 2007.

Capacity Building in Emerging Economies Task Force
CSLF Task Force Strategic Implementation Report (TFIR)
June 29, 2007

1. Task Force
Capacity Building in Emerging Economies Task Force
2. Task Force Members
<ul style="list-style-type: none"> ▪ Australia ▪ Canada ▪ Colombia ▪ European Commission ▪ India ▪ Italy ▪ Mexico ▪ Saudi Arabia ▪ South Africa ▪ United Kingdom ▪ United States (Chair)
3. Purpose of Task Force
<p>The objectives of the Task Force (TF) are to assisting emerging economy CSLF Members to develop the knowledge, skills, expertise and institutions needed to deploy carbon capture and storage (CCS), develop training and educational resources that all CSLF Members can utilize, build on lessons learned from CSLF-recognized projects, and collaborate with other international CCS initiatives.</p>
4. Milestones
<ul style="list-style-type: none"> ▪ Final arrangements were announced at the March 2007 CSLF meeting in Paris. ▪ The first workshop was completed on 11 May 2007. ▪ Participants provided comments in ad hoc questionnaire. These will shape future workshops
5. Status
<ul style="list-style-type: none"> ▪ Workshop on Capacity Building for Carbon Capture & Storage (CCS) for CSLF Members in emerging economy was held in Pittsburgh, Pennsylvania on Monday, May 7, the afternoon of May 10, and Friday, May 11. Participants also attended the Sixth Annual Conference on Carbon Capture & Sequestration which provided the workshop participants with the opportunity to hear the latest developments in CCS from world experts. This year, this event was held in Pittsburgh, Pennsylvania, from May 8 to 10. ▪ The workshop provided an overview of carbon management issues and an update on international CCS projects. It also covered such topics as capture costs, economics and financing; risk management; measuring, mitigation, and verification; and legal and regulatory frameworks. ▪ Participants emphasized the current lack of a CCS knowledge base in emerging economies, and insufficient identification of potential sequestration sites. Other points of concern were the lack of appropriate legal and regulatory frameworks and the need to assist emerging economy Members to develop the knowledge, skills, expertise and institutions they need to understand and implement carbon sequestration. ▪ The workshop syllabus/agenda was developed by NETL staff and international CCS experts with a high degree of input from the CSLF emerging economies as to their specific needs. It is expected that this syllabus will be a model for further training. ▪ 49 representatives from Brazil (15), China (1), Colombia (1), India (15), Mexico (3), South Africa (10), and Saudi Arabia (4) participated of the week-long exercise. ▪ Materials from Pittsburgh workshop have been compiled for use by all CSLF members.

- At the Task Force Meeting in Oslo, Norway on 20 June 2007, the TF Chair made a presentation on the successful 1st Workshop.
- Based on responses received on an evaluation questionnaire, there appeared to be strong sentiments for:
 - Developing a suite of basic, mid-level, and advanced CCS technology/policy/market workshops;
 - Convening future workshops in emerging economies;
 - Providing broader international perspectives via delivering keynote speeches and sessions devoted to emerging economy issues;
 - Visiting a pilot CCS demonstration site in conjunction with a future workshop; and
 - Ensuring the broadest possible information dissemination via CDs, websites, and other media.
- In Oslo, Saudi Arabia indicated it will be conducting a capacity building workshop in conjunction with the next CSLF Technical Group meeting. The suggested date for the combined event is 20-24 January 2008. Saudi Arabia stated that they may be able to sponsor two workshop attendees from each CSLF emerging economy country, and that they would like to include a field trip as part of the workshop.
- Other recommendations discussed in Oslo are:
 - The Saudi workshop should build on the experience obtained at the Pittsburgh workshop. To this effect, attendees of the Pittsburgh workshop should be contacted to obtain their ideas.
 - CSLF stakeholders should be involved in future workshops as much as possible.
 - The concept of technology roadmaps should be included in the next workshop; this could include an explanation of what they are and why they are important, with examples.
 - Future workshops could be held in emerging economy countries, and they could be focused or targeted to the needs of the host countries.
 - CSLF projects should be identified that can be used as case studies in the next workshop.
 - The IEA Greenhouse Gas R&D Programme (IEA GHG) should be contacted to gauge its interest in participating in this task force; it would be beneficial to make use of the IEA GHG's knowledge and resources as much as possible.
- Brazil has communicated to the TF Chair its plans for a Capacity Building 3-day workshop for 17-19 October 2007 in Porto Alegre. The first day will cover general CCS issues. The second day will address specific, more advanced CCS topics. On the third day, the workshop will be country-specific to Brazil's near-term CCS deployment. Brazil has indicated that it can assist with travel expenses of workshop lecturers.

Financial Issues Task Force
CSLF Task Force Strategic Implementation Report (TFIR)
June 29, 2007

1. Task Force
Financial Issues Task Force
2. Task Force Members
<ul style="list-style-type: none">▪ India – Chair▪ Australia▪ European Commission▪ Korea▪ Netherlands▪ South Africa▪ United Kingdom▪ United States
3. Purpose of Task Force
The objective of the Task Force is to develop a detailed plan for financing carbon capture and storage (CCS) projects in emerging economy countries.
4. Milestones
<ul style="list-style-type: none">▪ The Task Force was re-formed at the Paris CSLF meeting in March 2007.
5. Status
<ul style="list-style-type: none">▪ A Task Force meeting will take place in New Delhi on 11-12 October 2007.

Project Interaction and Review Team (PIRT)
CSLF Task Force Strategic Implementation Report (TFIR)
 29 June 2007

1. Task Force																						
Project Interaction and Review Team (PIRT)																						
2. Task Force Members																						
<p>The Team consists of:</p> <ul style="list-style-type: none"> ▪ 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: <table style="margin-left: 40px; width: 100%;"> <tr> <td style="width: 50%;">Australia</td> <td style="width: 50%;">John Bradshaw</td> </tr> <tr> <td>Canada</td> <td>Bill Reynen</td> </tr> <tr> <td>Denmark</td> <td>Flemming Ole Rasmussen</td> </tr> <tr> <td>European Commission</td> <td>Manuel Sanchez-Jimenez</td> </tr> <tr> <td>Germany</td> <td>Volker Breme</td> </tr> <tr> <td>India</td> <td>Malti Goel</td> </tr> <tr> <td>Netherlands</td> <td>Erik Lysen</td> </tr> <tr> <td>Norway</td> <td>Trude Sundset</td> </tr> <tr> <td>Saudi Arabia</td> <td>Khalid Abuleif</td> </tr> <tr> <td>UK</td> <td>Nick Otter</td> </tr> <tr> <td>USA</td> <td>Howard Herzog</td> </tr> </table> <p>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.</p> <ul style="list-style-type: none"> ▪ 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. 	Australia	John Bradshaw	Canada	Bill Reynen	Denmark	Flemming Ole Rasmussen	European Commission	Manuel Sanchez-Jimenez	Germany	Volker Breme	India	Malti Goel	Netherlands	Erik Lysen	Norway	Trude Sundset	Saudi Arabia	Khalid Abuleif	UK	Nick Otter	USA	Howard Herzog
Australia	John Bradshaw																					
Canada	Bill Reynen																					
Denmark	Flemming Ole Rasmussen																					
European Commission	Manuel Sanchez-Jimenez																					
Germany	Volker Breme																					
India	Malti Goel																					
Netherlands	Erik Lysen																					
Norway	Trude Sundset																					
Saudi Arabia	Khalid Abuleif																					
UK	Nick Otter																					
USA	Howard Herzog																					
3. Purpose of Task Force																						
<p>The PIRT has the following tasks:</p> <ul style="list-style-type: none"> ▪ 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. 																						

4. Milestones

Near-term milestones are:

- Assessment of potential candidate CSLF Projects and make recommendations to the Technical Group as to their suitability. (Ongoing)
- Examination of CSLF Technology Roadmap to identify any sections that need updating. (October 2007)
- 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”.

5. Status

- The workshop on “Overcoming Barriers to CCS Deployment” was held at the CSLF meeting in Paris in April 2007 and a form sent out to help gauge the success of the workshop. This item is in response to the PIRT Action Plan item to “Identify key obstacles to achieve improved technological capabilities”.
- A mechanism for formalizing a relationship between the PIRT and the IEA GHG is being developed. Discussion held in Norway on 21st and 22nd June 2007.
- Knowledge gained from the E.C.’s Zero Emission Platform (ZEP) project will now be considered for any relevant PIRT activities. Also through planning ahead over a two year period it is hoped to use where appropriate resources from the EC FP7 R&D Programme, this being open to organizations from CSLF members especially developing countries.
- Two potential candidate CSLF Projects were assessed and recommended to the Technical Group for recognition to the CSLF.
- The new set of metrics to enable PIRT to assess potential CSLF projects was utilized in the Paris CSLF Meeting. Both projects reported that the process was fairly straightforward and has assisted the documentation of what project activities are and what they plan to achieve.
- Prioritization for implementation of CSLF Action Plan items is being developed.
- A comprehensive Gap Assessment was completed and presented at the CSLF Workshop in Paris. It has helped identify where CSLF projects were undertaking research and where they should be encouraged in relation to the CSLF Charter. It has assisted other projects to understand where their work relates to other projects. This item is in response to the PIRT Action Plan item to have “Collaborative RD&D projects that reflect members priorities”, and to have “Collaborative RD&D projects reviewed annually”.
- The rotation of the third co-Chair of the PIRT was put forward to the PIRT and EC opted to step down. However, as no other member nominated for the vacant co-Chair role, the EC has reconfirmed its commitment to remain as co-Chair.

**Task Force for Review and Identification of Standards
for CO₂ Storage Capacity Estimation**
CSLF Task Force Strategic Implementation Report (TFIR)
15 June 2007

1. Task Force

Standards for CO₂ Storage Capacity Estimation (Phase 3)

Previous attempts to assess CO₂ storage capacity used a wide variety of approaches and methodologies that considered various trapping mechanisms, and data sets of variable size and quality, resulting in widely varying estimates of inconsistent quality and reliability. In September 2004 CSLF established a *Task Force for Review and Development of Standard Methodology for Storage Capacity Estimation*. In September 2005 the Task Force presented the results of Phase 1 in a Discussion Paper in which previous estimates were critically analyzed and gaps in knowledge and/or methodology were identified. In March 2007 the Task Force presented the Phase 2 Report covering definitions, concepts and methodologies to be used in estimating CO₂ storage capacity that should serve as a basis for collecting the necessary data and properly estimating the CO₂ storage capacity in geological media. In March 2007 CSLF approved three Task Force recommendations to continue work in Phase 3 on:

- Harmonization of methodologies developed by the CSLF Task Force with methodologies developed by other groups, such as the USDOE Regional Partnerships Geologic Subgroup;
- Compilation of representative case studies of CO₂ storage capacity estimation at various scales in various geological settings and different countries;
- Provision of support to the CSLF Capacity Building Task Force on knowledge transfer to CSLF-member developing countries.

2. Task Force Members

- Stefan **Bachu**, Canada, Chair
- Didier **Bonijoly**, France
- John **Bradshaw**, Australia
- Robert **Burruss**, USA
- Niels Peter **Christensen**, EC
- Sam **Holloway**, UK
- Marcelo **Ketzer**, Brazil
- Odd-Magne **Mathiassen**, Norway

3. Purpose of Task Force

- The main goal of the Task Force is to develop and disseminate a clear set of definitions and methodologies that will allow:
 - 1) Consistent assessments of CO₂ storage capacity in geological media at various levels based on jurisdiction and/or geological domains that will provide decision makers in government and industry with the information needed for making the right decisions regarding CCS implementation;
 - 2) Comparison of CO₂ storage capacity at various levels (country, basin, regional) and among sites;
 - 3) Understanding of the basis for estimation and critical review of results.
- Performance indicators are:
 - 1) Adoption of the report by the CSLF Technical Group (*realistic*)
 - 2) Publication of Task Force work in technical & scientific journals to achieve wide dissemination (*realistic*)
 - 3) Adoption of definitions and methodologies by CSLF member countries (*realistic*)

- 4) Provision on an ad-hoc basis of support to the CSLF Task Force on Capacity Building and to CSLF member countries on knowledge transfer and estimation of storage capacity (*realistic*)
- 5) Adoption of definitions and methodologies by other countries (*ambitious*)
- 6) Use of the recommended definitions and methodologies by government, research and/or industry groups in producing assessments of CO₂ storage capacity at various levels (country, basin, regional, local and site specific)

4. Milestones

- Phase 2 Report to be completed and adopted at the CSLF Joint Meeting of the Policy and Technical Groups in Paris, March 25-28, 2007
- Recommendations regarding future work to be presented at the next CSLF Joint Meeting of the Policy and Technical Groups in March 2007
- Possibly a paper to be submitted to and published in the International Journal of Greenhouse Gas Control, summer 2007
- Inclusion of definition and methodologies in training materials to be produced by the CSLF Capacity Building Task Force

5. Status

- The Phase 2 report was adopted at the CSLF meeting in Paris in March 2007.
- All three recommendations by the Task Force for continuation of activities in Phase 3 were adopted at the CSLF meeting in Paris, March 25-28, 2007
- A paper based on Phase 1 Discussion Paper was published in the International Journal of Greenhouse Gas Control, v. 1, no 1, p. 62-68.
- A paper based on the Phase 2 report was submitted to, and accepted for publication in the International Journal of Greenhouse Gas Control, thus ensuring wide dissemination of the Task Force work. The paper is scheduled for publication in the 4th issue (last quarter) of 2007.
- A committee comprising two members of the Task Force and two members of the US Regional Partnerships Geologic Subgroup was struck to look into possible harmonization of methodologies for CO₂ storage capacity estimation developed by the two groups.
- Work on compilation of representative case studies has begun; however, experience to date suggests that:
 - Limited data and/or funds lead to qualitative rather than quantitative assessments
 - A realistic goal at the country-scale assessment is to rank geological entities (e.g., basins) in terms of CO₂ storage potential and identify the most promising ones in relation to CO₂ sources (similarly to work done for APEC by the Australian and Canadian members of the Task Force)
 - It may be possible to estimate storage capacity at country-scale for oil and gas reservoirs if data are available (as per conclusion in Task Force Phase 2 Report)
 - It may be possible to screen coal beds for storage potential provided that screening criteria are agreed on and coal beds reserved for coal mining are identified
 - The country-scale storage potential cannot be assessed for aquifers (also consistent with conclusions in Task Force Phase 2 Report)
- The methodologies for estimating CO₂ storage capacity developed by the Task Force in the Phase 2 report were presented to an audience of ~50 participants from Brazil, Colombia, India, Mexico, Saudi Arabia and South Africa at the workshop organized by the CSLF Capacity Building Task Force in Pittsburgh, USA, May 7-11, 2007.

Task Force to Examine Risk Assessment Standards and Procedures
CSLF Task Force Strategic Implementation Report (TFIR)
 29 June 2007

1. Task Force
Task Force to Examine Risk Assessment Standards and Procedures: Phase I Activities
2. Task Force Members
<ul style="list-style-type: none"> ▪ Howard Herzog, United States (Chair) ▪ John Bradshaw, Australia ▪ Bill Koppe, Australia ▪ Stefan Bachu, Canada ▪ Hubert Fabriol, France ▪ Mathieu Feraille, France ▪ R.R. Sonde, India ▪ Makoto Akai, Japan ▪ Chiaki Shinohara, Japan ▪ Ton Wildenborg, Netherlands ▪ Odd-Magne Mathiassen, Norway ▪ Tim Dixon, United Kingdom ▪ George Guthrie, United States ▪ John Gale, IEA GHG
3. Purpose of Task Force
<p>In this task force, we will identify potential risks from CO₂ Capture and Storage (CCS) activities and we will examine 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. We will focus on risks that are unique to CCS: the risks associated with the injection and long-term storage of CO₂, a reactive, mobile, and buoyant fluid, in geologic reservoirs. Specifically, we will focus on:</p> <ol style="list-style-type: none"> 1. Risks associated with CO₂ injection, including: <ul style="list-style-type: none"> ▪ 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 and hydrocarbon deposits ▪ 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
4. 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 ▪ April 2008 – Complete Phase I activities and report on progress to CSLF
5. Status
<ul style="list-style-type: none"> ▪ Mission statement completed. ▪ Draft outline of final report completed ▪ Currently putting together action plan for drafting of report

Report of CSLF Secretariat
CSLF Strategic Implementation Reporting System (SPIR)
29 June 2007

A. Meetings and Workshops

- Past
 - CSLF Policy and Technical Groups (25-28 March 2007, Paris, France). The Secretariat worked closely with the Policy and Technical Group Chairs and also the host country, France, in planning and organizing the meeting while resolving all logistical problems and arranging all necessary support. All Secretariat action items related to the meeting are now complete. Minutes from the meeting were prepared and sent to the delegates for comments; draft versions of the minutes, which incorporate comments received, have been posted to the CSLF website.
 - CSLF “Overcoming Barriers to CCS Deployment” Workshop (27 March 2007, Paris, France). This workshop took place on one of the days of the Paris CSLF meeting. The agenda, all presentations, and posters from the workshop have been posted to the CSLF website (see below). At the request of the CSLF Projects Interaction and Review Team (PIRT), the Secretariat has developed an online survey to determine the opinions and preferences of the attendees of the workshop. As of 29 June, thirteen responses have been received.
 - CSLF Capacity Building Workshop (7-11 May 2007 in Pittsburgh, USA). The agenda and all presentations from the workshop have been posted to the CSLF website (see below).
 - CSLF Executive Committee Teleconference (1 June). The Secretariat supported and also participated in this teleconference. The teleconference resulted in the following outcomes:
 - > Jeff Kgobane has confirmed his election as Policy Group Vice Chair.
 - > The recent Capacity Building Workshop in Pittsburgh was very successful.
 - > The 2008 CSLF meeting, tentatively scheduled for April in South Africa, should have a theme.
 - > Saudi Arabia will host the next stand-alone Technical Group meeting, in January 2008.
 - > The Secretariat will continue to be the reviewer on all requests for use of the CSLF logo.
- Future
 - CSLF Technical Group (January 2008, Saudi Arabia). The Secretariat and the host country, Saudi Arabia, are working together to plan the meeting.
 - CSLF Capacity Building Workshop (January 2008, Saudi Arabia). This will be a follow-on to the Pittsburgh workshop and will be held in conjunction with the Technical Group meeting.

- CSLF Policy and Technical Groups (April 2008, South Africa). The Secretariat and the host country, South Africa, are working together to plan the meeting. The meeting may include another workshop.

B. CSLF Public Meeting Place (PuMP)

A CSLF online discussion forum, titled the CSLF Public Meeting Place (or “PuMP”), is now online at the CSLF website for an extended trial. Its purpose is to facilitate greater involvement of the stakeholders and to foster greater communications both among stakeholders, and between stakeholders and the CSLF. The Secretariat will report on the performance of the PuMP at the April 2007 Policy Group meeting in South Africa.

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

The following changes have been made to the CSLF website in order to improve its ease of navigability:

- A new “Roadmaps” section was created which contains links to the CSLF Technology Roadmap and technology roadmaps of three CSLF Members (Australia, Canada, and the United States).
- A new “Task Forces” section was created which contains links to minutes from CSLF task force meetings and final reports from task forces that have completed their activities.
- A search function for the website is being developed.

Additional updates to the website include the following:

- Presentations from the Paris CSLF meeting of 25-28 March are now online in the “Presentations” section of the website.
- Agendas and presentations from the “Overcoming Barriers to CCS Deployment” Workshop (March 2007) and the Capacity Building Workshop (May 2007) are now online in the “Workshops” section of the website.
- Posters from the “Overcoming Barriers to CCS Deployment” Workshop are now online in both the “Workshops” and “Projects” sections of the website.
- The Otway Basin Pilot Project and the Zama Project, both recognized by the CSLF at the Paris meeting, have been added to the “Projects” section of the website.
- The Phase II Final Report of the Technical Group’s Storage Capacity Estimation Task Force is now online in the “Documents” section of the website.
- Listings of delegates’ contact information have been updated.
- The updated CSLF Terms of Reference and Procedures, revised at the Paris meeting, is now online replacing the previous version that dated back to the Berlin meeting of September 2005.

D. Stakeholders

There are now 93 registered stakeholders, four of which have requested not to be shown in the CSLF website listing. Members are encouraged to have their stakeholders register.

Report from Stakeholders
CSLF Strategic Implementation Reporting System (SPIR)
29 June 2007

**THE AUSTRALIAN PETROLEUM PRODUCTION & EXPLORATION ASSOCIATION
LIMITED REPORT**

Gorgon Project

The process of gaining Australian Government and Western Australia State Government environmental approval for the Gorgon Project is continuing with environmental approval anticipated to be in place during the second half of 2007.

Moomba Gas Storage Project

Australian upstream oil and gas producers Santos Ltd submitted a proposal to the Australia Government in June 2007 regarding the proposed Moomba Carbon Storage project. It is important to note that the Government has not responded to this proposal and it remains under consideration.

Moomba Carbon Storage has the long-term objective of establishing a large-scale (20+ million tonnes per annum) carbon storage hub at Moomba, capable of storing, on conservative estimates, in excess of 400 million tonnes of carbon dioxide (CO₂). It would do so by injecting CO₂ into the depleted and/or depleting oil and gas reservoirs of the Cooper Basin, thereby providing a secure storage solution for major carbon emitters in Queensland, New South Wales and South Australia.

CCS legislative and regulatory developments in Australia

The industry has continued to present its views to the Australian Government on the proposed development in the second half of 2007 of a legislative and regulatory framework for CCS activities in Australia.

* * * * *

**RIO TINTO STAKEHOLDER REPORT
HYDROGEN ENERGY JOINT VENTURE**

- On 17 May BP and Rio Tinto announced the formation of an incorporated Joint Venture Company, Hydrogen Energy, to develop commercial scale low carbon fossil fuel energy projects.
- Hydrogen Energy is a 50/50 partnership with headquarters in Weybridge England.
- Hydrogen Energy is currently progressing two projects. Both are at feasibility study stage.
 - The first is in Carson California. It is a 500MW IGCC power station with petroleum coke as the fuel and CO₂ being used for Enhanced Oil Recovery. About 4Mt per annum CO₂ would be sequestered.
 - The second is in Kwinana Western Australia. It is a 500MW IGCC power station with sub bituminous coal as the fuel and CO₂ being sequestered in an offshore saline aquifer. About 4Mt per annum CO₂ would be sequestered. This project was announced on 21 May.

* * * * *

UNITED KINGDOM HYDROGEN ASSOCIATION ADOPTS POLICY PAPER

The United Kingdom Hydrogen Association (UKHA) announced the adoption of a policy position paper on 23 May 2007 today that will be used to shape the direction of future hydrogen activities in the UK. The UKHA's second annual UKHA Membership Meeting was held on 22 May in Aberdeen. The United Kingdom Hydrogen Association membership, including several leading industrial companies, overwhelmingly adopted the policy position paper that describes the UKHA's commitment and priorities in working with the U.K. government.

This will be the public unveiling of the document, which represents a consensus position of the UK hydrogen energy sector. "It is fitting that this first public announcement should take place at H207.

The United Kingdom Hydrogen Association (UKHA) draws together an extensive network of industry stakeholders. Membership is open to companies, organisations and individuals with a commitment to increasing opportunities for hydrogen energy in the United Kingdom.

For more information please visit the association website at: <http://www.ukha.org>.

Alberta Enhanced Coalbed Methane Recovery Project
CSLF Project Status Report (PSR)
June 2007

1. Project
Alberta Enhanced Coalbed Methane Recovery Project Alberta, Canada
2. Project Lead
<ul style="list-style-type: none">▪ Brent Lakeman, Alberta Research Council▪ 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▪ Enhance coal-bed methane recovery factors and production rates as a result of CO₂ injection
4. Recent Milestones
<ul style="list-style-type: none">▪ Completion of a single-well micro-pilot test at Suncor's CSEMP site▪ Injecting N₂ tracer▪ Seismic data survey completed
5. Status
<ul style="list-style-type: none">▪ CO₂ testing completed for single well micro-pilot▪ Engineering and Reservoir Modelling analysis being completed for micro-pilot▪ Tiltmeter response being reviewed▪ Long term CO₂ injection being planned to start in July in multi-well pilot

CASTOR
CSLF Project Status Report (PSR)
June 2007

1. Project
CASTOR “CO2 from Capture to Storage” Capture: Esbjerg, DK (Castor pilot plant) Storage: Casablanca (Spain), Atzbach (Austria), K12B (The Netherlands), Snohvit (Norway)
2. Project Lead
<ul style="list-style-type: none">▪ Pierre Le Thiez, IFP, France, +33 1 47 42 67 23, pierre.le-thiez@ifp.fr
3. Project Objectives
<ul style="list-style-type: none">▪ Develop innovative technology for post-combustion capture, tests in pilot plant (1 tonne CO₂ / hour)▪ Detailed feasibility studies of 4 storage sites in Europe – Update of Best Practice Manual
4. Recent Milestones
<ul style="list-style-type: none">▪ Jan 06: Start of the capture pilot plant tests – Base case with MEA▪ March 07: Start of testing CASTOR 1 solvent in the pilot
5. Status
<ul style="list-style-type: none">▪ Start in Feb 04 – End Feb 08▪ CASTOR 2 solvent to be tested (Sept. 07)▪ Four site studies in progress (modeling, monitoring design, ...)

China Coalbed Methane Technology / CO₂ Sequestration Project
CSLF Project Status Report (PSR)
 June 2007

1. Project
China Coalbed Methane Technology / CO₂ Sequestration Project
2. Project Lead
<ul style="list-style-type: none"> ▪ Brent Lakeman, Alberta Research Council ▪ Telephone: 1 780 450-5274 ▪ E-Mail: Lakeman@arc.ab.ca
3. Project Objectives
<ul style="list-style-type: none"> ▪ Accurately measure data while injecting into and producing from a single well ▪ Obtain estimates of reservoir properties and sorption behavior ▪ Use calibrated simulation models to predict the behavior of a larger scale pilot project or full field development ▪ Design and implement a multi-well pilot and evaluate the commercial prospects of this technology
4. Recent Milestones
<ul style="list-style-type: none"> ▪ Completion of final project report ▪ Completion of preliminary economic evaluation ▪ Completion of multi-well pilot test design
5. Status
<ul style="list-style-type: none"> ▪ Conclusion: enhancement of coalbed methane recovery and storage of CO₂ is feasible in the anthracitic coals of Shanxi Province ▪ Current bi-lateral country funding phase (Canada and China) completed ▪ Recommendation 1: proceed to multi-well pilot at test site ▪ Recommendation 2: evaluate deeper coal seams at alternative sites ▪ Project paper in the <i>International Journal of Greenhouse Gas Control</i> Volume 1(2007) p. 215-222, available at http://www.sciencedirect.com

CO₂ Capture Project, Phase 2
CSLF Project Status Report (PSR)
June 2007

1. Project
CO₂ Capture Project, Phase 2 (CCP2) Project Office: 150 West Warrenville Road, Naperville, Illinois, 60563 USA
2. Project Lead
<ul style="list-style-type: none"> ▪ CCP2 Program Manager: Linda Curran, BP ▪ CCP2 Executive Board Chairman: Gardiner Hill, BP ▪ Capture Team Lead: Ivano Miracca, ENI ▪ Storage Team Lead: Scott Imbus, Chevron ▪ Communications Team Lead: Iain Wright, BP ▪ Policy Team Lead: Arthur Lee, Chevron ▪ CCP2 Advisory Board Chair: Vello Kuuskraa
3. Project Objectives
<ul style="list-style-type: none"> ▪ Develop advanced technology that will reduce costs and improve efficiencies of CO₂ Capture ▪ Increase knowledge and reduce uncertainties in technology performance and deliver low-cost CO₂ capture technologies to demonstration stage by 2009 ▪ Demonstrate geological storage of CO₂ is secure and can represent a viable Greenhouse Gas mitigation technique. Develop technology and protocols to address critical issues such as storage site/project certification, well integrity and monitoring ▪ Increase public awareness and acceptance of CCS ▪ A distinctive aspect of CCP2 is the emphasis on collaboration and partnership with governments, industry, NGOs, and other stakeholders. The members of the partnership recognize the challenges associated with global climate change require solutions that are economically and socially accepted to all.
4. Recent Milestones
<ul style="list-style-type: none"> ▪ Well Exposure Information: Quantitative assessment of materials stability in a well exposed over several decades to humid CO₂ ▪ Development of a stream-lined, integrated, risk-based model for technical assessment of potential storage sites, including operational parameters, monitoring systems, and success criteria for demonstrating long-term containment. The model framework is completed and construction of additional developments is underway. ▪ Concluded first year of activity for the EU-funded Project CACHET, developing novel technology for CO₂ Capture through pre-combustion approach. A Seminar illustrating main results was held in Athens (April 2007).
5. Status
<ul style="list-style-type: none"> ▪ Progressing 10 capture (post-combustion, pre-combustion and oxy-fuel) technologies to be ready for pilot or demonstration in 2009 ▪ Fundamental data on the status of wells materials after decades-long CO₂ exposure; Simple, transparent and integrated certification framework suitable for regulator use ready for testing by end 2007; Code integration for Coupled Geochemical and Geomechanical simulation; Novel approaches to optimize the resolution and cost effectiveness of monitoring and leakage detection are under development ▪ Recent reports: <ul style="list-style-type: none"> - Regulatory Treatment of CO₂ Impurities for CCS - Incentives for CO₂ Capture, Transport and Storage - Public Perception of Carbon Dioxide Capture and Storage: Prioritized Assessment of Issues and Concerns <p>These reports can be found on the CCP2 website: http://www.co2captureproject.org/index.htm</p>

CO₂ GeoNet
CSLF Project Status Report (PSR)
June 2007

1. Project
CO₂ GeoNet Location: W. Europe
2. Project Lead
<ul style="list-style-type: none">▪ Coordinator: Dr. Nick Riley (British Geological Survey)▪ Network Manager: Isabelle Czernichowski-Lauriol (BRGM)▪ Secretariat: Sergio Persoglia (OGS)▪ Chairman: Niels Peter Christensen (GEUS)▪ Contact: info@co2geonet.com
3. Project Objectives
<ul style="list-style-type: none">▪ Focus is R&D into geological storage of CO₂ and strengthening the European Research Area.▪ Form a durable integration of the original 13 partners over 5 years, involve more partners.▪ Provide the underpinning science capability and knowledge to help enable deployment of large scale CO₂ storage in Europe as quickly as possible▪ Collaborate internationally▪ Be a source of impartial scientific information on CO₂ geological storage for stakeholders▪ Train existing and new researchers▪ Develop and share research infrastructure
4. Recent Milestones
<ul style="list-style-type: none">▪ Just finished year 3 (April 2007) of the 5 year project funding period
5. Status
<ul style="list-style-type: none">▪ 2nd Annual Stakeholder workshop held April 2007. Joint research activity areas summarized up to end of year 3 and feedback given from stakeholders▪ Student training programme established▪ Secretariat established▪ Research infrastructure increasingly being shared and deployed▪ Network has world-class unique expertise in monitoring and understanding CO₂ migration in the shallow subsurface and ecosystem responses to CO₂ in marine, freshwater and terrestrial settings▪ Network will be running a training and dialogue workshop on CO₂ geological storage in Paris on October 3rd 2007. To attend this free event, which is focused at policymakers, non-geoscientists from industry and members of the public, register by e-mail: info@co2geonet.com or at the CO₂ GeoNet website: http://www.co2geonet.com

CO₂ Separation from Pressurized Gas Stream
CSLF Project Status Report (PSR)
 June 2007

1. Project
CO₂ Separation from Pressurized Gas Stream Coordinator: RITE, Japan
2. Project Lead
<ul style="list-style-type: none"> ▪ Shingo Kazama, RITE (Research Institute of Innovative Technology for the Earth) ▪ E-mail: Kazama@rite.or.jp
3. Project Objectives
<ul style="list-style-type: none"> ▪ Development of membrane material for molecular gate function and composite membrane of excellent CO₂ selectivity over H₂ ▪ Development of membrane module ▪ Testing of the module (with NETL, USA)
4. Recent Milestones
<ul style="list-style-type: none"> ▪ Development of membrane material for molecular gate function (2007FY) ▪ Development of composite membrane of excellent CO₂ selectivity over H₂ (2007FY) ▪ Trial product of pencil module (2007FY)
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><u>References:</u> 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", Pittsburgh Coal Conference, Pittsburgh, USA (2006)</p> <p>Takayuki Kouketsu, Shuhong Duan, Teruhiko Kai, Shingo Kazama*, and Koichi Yamada, "PAMAM Dendrimer Composite Membrane for CO₂ Separation: Formation of a Chitosan Gutter Layer", <i>J. Membrane Sci.</i> 287 (2007) 51-59 and so on.</p> <ul style="list-style-type: none"> ▪ 2nd duration: 04/2006 – 03/2011 ongoing ▪ Development of novel CO₂ molecular gating materials for a CO₂/H₂ mixture ▪ Development of membrane modules of CO₂ molecular gate membrane ▪ Bench scale testing (2010FY)

CO₂SINK
CSLF Project Status Report (PSR)
June 2007

1. Project
CO₂SINK - In situ R&D Laboratory for Geological Storage of CO₂ Ketzin, State of Brandenburg, Germany
2. Project Lead
GeoForschungsZentrum Potsdam Telegrafenberg D-14473 Potsdam http://www.gfz-potsdam.de Coordinator: Prof. Dr. Frank Schilling Tel: +49.331.288-1510 Fax: +49.331.288-1502 E-mail: fsch@gfz-potsdam.de
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▪ 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 and geochemical techniques▪ Development and benchmarking of numerical models▪ Definition of risk-assessment strategies
4. Recent Milestones
<ul style="list-style-type: none">▪ Feb. 27, 2007 Spud-in of the CO₂SINK injection well IW▪ May 25, 2007 Spud-in of the 1st of the observation wells OW1▪ June 13, 2007 Opening of the Ketzin Field Lab, CO₂ Storage Site and Info Centre▪ June 27, 2007 Annual Review of the Project by EU
5. Status
<ul style="list-style-type: none">▪ 5-years lifetime 04/2004 - 03/2009▪ 09/2007 start injection of up to 60,000 tonnes CO₂ <p>Completed subprojects:</p> <ul style="list-style-type: none">▪ Storage site development▪ Baseline Storage Site Modeling <p>Ongoing subprojects:</p> <ul style="list-style-type: none">▪ Rock/fluid interactions laboratory experimentation▪ Economic/ecological analysis and safety concepts▪ GeoEngineering: drilling, coring, logging▪ CO₂ supply, transport, intermediate storage, conditioning and injection▪ Monitoring and verification of CO₂ storage▪ Project coordination and public outreach <p>Reference: Förster, A., Bech, N., Bielinski, A., Borm, G., Christensen, N.P., Cosma, C., Erzinger, J., Giese, R., Heidug, W., Hurter, S., Juhlin, C., Knöss, S., Kopp, A., Kulenkampff, J., Norden, B., Spangenberg, E., Zimmer, M., Zink-Jørgensen, K. (2005): Baseline Survey in the Preparatory Phase of CO₂SINK. Environmental Geosciences, Vol. 13, No. 3, 145-161</p> <p>Website: http://www.co2sink.org</p>

CO₂STORE
CSLF Project Status Report (PSR)
June 2007

1. Project
CO₂STORE Coordinator Statoil, Norway
2. Project Lead
Tore A Torp and Hans Aksel Haugen, Statoil
3. Project Objectives
<ul style="list-style-type: none">▪ Sleipner field North Sea: Continue monitoring CO₂ injection: 3D Seismik repeated, Gravimetric repeated and High Resolution seismic tested▪ Sleipner long term behavior: Flow and geochemistry simulated by models▪ New Field Cases: Feasibility studies for Schwartz Pumpe (DE), Valleys (UK), Kalundborg (DK) and Mid-Norway (NO) concluded. Next possible step drilling?.▪ “Best Practice Manual” from SACS project rewritten and updated
4. Recent Milestones
<ul style="list-style-type: none">▪ Project completed by 31 December 2006
5. Status
<ul style="list-style-type: none">▪ Completed▪ Report: “Best Practice Manual” summing up results from the previous SACS project and CO₂STORE (http://www.co2store.org, look in “Archive”)

ENCAP
CSLF Project Status Report (PSR)
June 2007

1. Project
ENCAP “Enhanced capture of CO₂” <i>Development and verification of a number of pre-combustion technologies. Companies and research providers in a number of places in Europe</i>
2. Project Lead
<ul style="list-style-type: none">▪ Leif Brandels, Vattenfall AB, Sweden, +46 8 739 60 40, leif.brandels@vattenfall.com
3. Project Objectives
<ul style="list-style-type: none">▪ Develop and verify IGCC/IRCC, Oxy-Fuel and Chemical Looping Combustion technologies with CO₂ capture for large scale power plants▪ By 2008 Recommend one of the technology for a demonstration in 350 MW scale▪ Develop and test high temperature oxygen production technologies▪ Investigate an number of novel CO₂ technologies
4. Recent Milestones
<ul style="list-style-type: none">▪ Reference cases and guidelines for evaluation for a number of large power plants developed▪ IGCC/IRCC concepts developed▪ Tests of ALSOM and Siemens developed gas turbines fuelled by H₂ rich gas executed▪ Concept developed for large Oxyfuel PF, CFB power plants▪ Successful test of oxyfuel combustion in 20kW and 100kW scale completed. Initial test in a 500kW test facility completed.▪ Chemical looping combustion based on CFB technology developed▪ Three high temperature oxygen production technologies further developed and investigated for integration in power plants with CO₂ capture▪ A number of new technologies possible for CO₂ capture investigated▪ The project has entered into phase II and the large scale testing in phase II is under further preparation in the 30MW Oxyfuel Pilot in Germany (Vattenfall power plant site Schwartze Pumpe)
5. Status
<ul style="list-style-type: none">▪ Some further test with gas turbines with lean-premixed H₂-rich combustors will be executed at DLR during 2007. Further comparison with test results and development of CFD combustion model including H₂ reaction mechanisms continues during 2007 and 2008.▪ Test programmes starts autumn 2007 in the 500kW oxyfuel test rig at Stuttgart.▪ Preparation of the test programme for verification large scale testing in the 30MW oxyfuel Pilot plant continues during 2007. The test period is planned to autumn 2008.▪ The final benchmarking of the pre-combustion technologies in ENCAP and the recommendation for a demonstrator will be done during 2008.

Frio Brine Pilot Project
CSLF Project Status Report (PSR)
June 2007

1. Project
Frio Brine Pilot Project 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 ▪ Tom Daley, Lawrence Berkley National Lab, Berkeley, California, USA ▪ Yoursif 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 ▪ Post injection monitoring underway though summer 2007
5. Status
<ul style="list-style-type: none"> ▪ Second test underway: Frio 2, September 2006 – June 2007 ▪ Storage permanence – quantifying residual saturation and dissolution ▪ Post- injection monitoring under stable conditions TBD June 2007 ▪ Buoyancy in thick sand ▪ Inject “deep”: 6 feet perforation in base 32 feet thick sandstone ▪ Inject slowly: 50 tons/day x 5 days ▪ Rock-water reaction, tracer fractionation as a result of dissolution ▪ Novel tool – tubing-conveyed seismic array ▪ Reports can be found at http://www.gulfcoastcarbon.org

IEA GHG Weyburn-Midale CO₂ Monitoring & Storage Project
CSLF Project Status Report (PSR)
June 2007

1. Project
IEA GHG Weyburn-Midale CO₂ Monitoring & Storage Project Weyburn & Midale Units, Weyburn area of south east Saskatchewan, Canada
2. Project Lead
<ul style="list-style-type: none"> ▪ Natural Resources Canada (NRCan) – Carolyn Preston, Project Integrator ▪ PTRC – Brian Kristoff, Acting Executive Director ▪ PTRC – Ray Knudsen, Project Director- technical research component of the Project ▪ Sask. Industry & Resources (SIR) – Floyd Wist, Chair of leading sponsors executive committee (LSEC)
3. Project Objectives
<ul style="list-style-type: none"> ▪ Develop a comprehensive Best Practices Manual for CO₂ geological storage ▪ Building on the successes of the First Phase, focus the technical research component on Site Characterization, Monitoring & Verification, Wellbore Integrity and Performance (Risk) Assessment ▪ Within the new Policy Component, focus on Public Communication & Outreach, Regulatory Issues and the Business Environment
4. Recent Milestones
<ul style="list-style-type: none"> ▪ December 2006 – Umbrella Agreement executed effective ▪ December 2006 – Contract executed with Bluewave Resources to develop CO₂ storage communications materials ▪ January 2007 – Aramco Services Company (subsidiary of Saudi Aramco) joins as co-sponsor for the final phase of the Project ▪ 2nd Qtr 2007 – Final phase technical research activities started
5. Status
<ul style="list-style-type: none"> ▪ Umbrella Agreement executed by leading sponsors, PTRC, Apache Canada & EnCana ▪ Primary Research Provider Agreement in place, alternate RP Agreement being finalized ▪ Working with research providers to launch first round of technical research activities ▪ Public communication initiatives underway ▪ Major sponsors have committed funding, sponsorship campaign ongoing, PTRC press release May 3, 2007 announcing Aramco Services Company available at www.ptrc.ca

International Test Center (ITC) CO₂ Capture with Chemical Solvents
CSLF Project Status Report (PSR)
June 2007

1. Project
International Test Center (ITC) CO₂ Capture with Chemical Solvents University of Regina, Regina, Saskatchewan, Canada
2. Project Lead
<ul style="list-style-type: none"> ▪ Malcolm Wilson University of Regina ▪ Paitoon Tontiwachwuthikul University of Regina ▪ Raphael Idem University of Regina
3. Project Objectives
<ul style="list-style-type: none"> ▪ To reduce the cost of post combustion CO₂ capture through <ul style="list-style-type: none"> - solvent development - process optimization & integration - reduction of heat duty for solvent regeneration ▪ Perform cost study for post-combustion CO₂ capture in collaboration with an Engineering company on a site specific case
4. Recent Milestones
<ul style="list-style-type: none"> ▪ Received prestigious NSERC Synergy award for Innovation – October 2006 ▪ Breakthroughs in solvent development ▪ Breakthroughs in heat duty reductions ▪ Breakthrough in process integration ▪ Site specific cost study in progress
5. Status
<ul style="list-style-type: none"> ▪ US provisional patent on process integration ▪ US provisional patent on solvents ▪ Cost study winding up. ▪ Check website: http://www.co2-research.ca

Otway Basin Pilot Project (OBPP)
 CSLF Project Status Report (PSR)
 June 2007

1. Project
<p><i>Otway Basin Pilot Project (OBPP)</i> Demonstrating the geological storage and monitoring of CO₂ under Australian conditions</p>
2. Project Lead
<p>Sandeep Sharma, CO2CRC, Kensington WA 6151, Australia, Ph: 08 6436 8736, Mob: 0412 515 494, ssharma@co2crc.com.au</p>
3. Project Objectives
<p>The OBPP project has been designed to demonstrate all aspects of CCS. It will aim 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.</p> <ul style="list-style-type: none"> ▪ Operation: <ul style="list-style-type: none"> - Safely produce CO₂ from Buttriss; - Safely process the gas stream and transport to the injection site; - Safely inject CO₂ into the reservoir formations; - Maintain an effective risk management system; - Safely abandon the site and facilities including necessary restoration work. ▪ Research: <ul style="list-style-type: none"> - Effectively model the CO₂ behaviour in the sub-surface; - Demonstrate safe storage of the CO₂ in the sub-surface to satisfaction of stakeholders; - Verify that CO₂ remains within the storage formation, or in the unlikely event of migration from the primary reservoir, it remains contained in the secondary reservoir; - Develop, test and deploy new and enhanced M&V technology; - Contribute to the technology and other objectives of the CO2CRC towards reducing greenhouse gas emissions. ▪ Regulation: <ul style="list-style-type: none"> - Map the legislative framework necessary including overlapping jurisdictions and in doing so provide data to inform a future regulatory regime for CCS; - Contribute to test the existing regulatory environment with the development of CCS technologies ▪ Communication <ul style="list-style-type: none"> - Communicate effectively with the community and stakeholders through a defined outreach program to inform them of the nature, progress and outcomes of the project - Capture research outcomes and contribute to the development of acceptance of CCS as a greenhouse gas mitigation mechanism in Australia and globally
4. Recent Milestones
<ul style="list-style-type: none"> ▪ New injection well (CRC-1) successfully drilled (targeted depth) within timeset and budget: <ul style="list-style-type: none"> - Reservoir targeted (total depth of 2249m) - 5 cores + samples (fluid, mud gas & cuttings) taken and currently analysed - Good quality logs recorded and samples collected ▪ Integrated downhole assembly for geochemical and geophysical measurements in the monitoring well (Naylor-1): designed and engineered together with Berkeley Labs (currently being built); ▪ Atmospheric Lo-Flo (precision CO₂ measurement) and flux tower (eddy covariance measurements) installed and operating; ▪ Dataloggers installed in water bores for monitoring shallow groundwater;

- 3D seismic test surveys performed and different seismic sources tested. 3D seismic acquisition planned for July 2009;
- CO₂ Injection & Storage permits successfully acquired;
- Community consultation meetings;
- Concept of OBPP Stage 2 (injection of CO₂ into a saline aquifer) granted \$8.145 M from Government

5. Status

- Install of CO₂ sniffers (continuous soil gas flux and atmospheric measurements) (Jul 07)
- Construct and install the compressor and pipeline (CO₂ transport from production well to injection well ~2.25km) (Jul-Sept 07);
- Complete baseline atmospheric, geochemical and geophysical monitoring (Sept 07);
 - Carry out baseline 3DVSP and surface seismic
 - Analyse atmospheric samples
 - Continue water chemistry and measurements
- Instrument and test the integrated downhole assembly in the monitoring well (Oct 07);
- Revisit reservoir modeling & simulation with new data acquired from CRC-1 (Aug 07);
- Revisit the injectivity test plan (Jul-Aug 07);
- Review Quantitative Risk Assessment (QRA 2) (Jul 07);
- Resolve landowner agreements (Jul 07);
- Resolve long term liabilities issue (Sept 07);
- Continue community consultation (ongoing);
- Further develop the OBPP Stage 2 activities (ongoing);

Regional Carbon Sequestration Partnerships
CSLF Project Status Report (PSR)
 June 2007

1. Project
Regional Carbon Sequestration Partnerships National Initiative Managed by the U.S. Department of Energy National Energy Technology Laboratory (NETL)
2. Project Lead
<ul style="list-style-type: none"> ▪ Sean Plasynski, Sequestration Technology Manager, National Energy Technology Laboratory ▪ John Litynski, Coordinator, Regional Carbon Sequestration Partnerships, National Energy Technology Laboratory
3. Project Objectives
<ul style="list-style-type: none"> ▪ Government/industry effort of seven Partnerships tasked with determining the most suitable technologies, regulations, and infrastructure needs for carbon capture, storage, and sequestration in different areas of the country. ▪ Working to develop the necessary infrastructure for the future deployment and commercialization of carbon capture and storage (CCS) technologies as a critical strategy for climate change and greenhouse gas emissions mitigation. ▪ Administered in three phases: <ul style="list-style-type: none"> - Characterization Phase outlined opportunities for sequestration. Partnerships collected data on CO₂ sources and sinks; develop the human capital to support and enable future carbon sequestration field tests and deployment; determined which sequestration approaches are best suited for specific regions of the country; and studied regulations and infrastructure requirements for potential wide-scale deployment of sequestration - The Validation Phase is focused on validating the most promising regional opportunities to deploy sequestration technologies through field testing. This phase builds upon Characterization Phase accomplishments and begins field testing geologic and terrestrial sequestration technologies in areas designated as favorable for carbon storage. - The Validation Phase will demonstrate at large scale that CO₂ capture, transportation, injection, and storage can be achieved safely, permanently, and economically. The primary goal of the Deployment Phase is the development of large-scale CCS projects across North America, where large volumes of CO₂ will be injected into a geologic formation representative of a relatively large storage capacity for each Region.
4. Recent Milestones
<ul style="list-style-type: none"> ▪ Characterization Phase completed in 2005. ▪ Validation Phase initiated in 2005, with small-scale field tests currently underway and scheduled for completion in 2009 ▪ Deployment Phase activities scheduled to begin in FY2008 ▪ Recently documented over 3,400 gigatonnes of estimated geologic CO₂ storage capacity
5. Status
<ul style="list-style-type: none"> ▪ 25 geologic and 11 terrestrial field tests currently underway under the Validation Phase ▪ Deployment Phase applications submitted in June 2007, awards expected 3rd Qtr 2007. ▪ Carbon Sequestration Atlas of the United States and Canada: http://www.netl.doe.gov/publications/carbon_seq/refshelf.html ▪ An Introduction to Carbon Capture and Sequestration (video): http://www.netl.doe.gov/publications/carbon_seq/refshelf.html

- Carbon Sequestration Technology Roadmap and Program Plan 2007:
http://www.netl.doe.gov/publications/carbon_seq/refshelf.html
- Regional Carbon Sequestration Partnerships Phase I Accomplishments:
http://www.netl.doe.gov/publications/carbon_seq/refshelf.html

Zama Acid Gas EOR, CO₂ Sequestration, and Monitoring Project
CSLF Project Status Report (PSR)
June 2007

1. Project
Zama Acid Gas EOR, CO₂ Sequestration, and Monitoring Project Zama City, Alberta, Canada
2. Project Leads
<ul style="list-style-type: none"> ▪ Ed Steadman, Energy and Environmental Research Center, Grand Forks, ND, USA ▪ Steven Smith, Energy and Environmental Research Center, Grand Forks, ND, USA ▪ Bill Jackson, Apache Canada Ltd, Calgary, Alberta, Canada
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"> ▪ Collection of core through the cap rock and into the pay zone of the pinnacle occurred in early March 2007. Analytical work is ongoing. ▪ Evaluation of wellbore leakage potential completed in March 2007 ▪ Initial testing for Uniaxial, Triaxial, and Elastic Rock properties were completed in March 2007. ▪ Acid Gas/Brine Static Partitioning study completed in May 2007.
5. Status
<ul style="list-style-type: none"> ▪ Injection of Acid Gas is ongoing. Cumulative Acid Gas injection volume of 70,000 mcf (4000 tons) through April 15, 2007, has occurred. ▪ February 2007 press release through Natural Resources Canada (NRCan) can be accessed at: http://www.nrcan.gc.ca/es/etb/cetc/combustion/co2network/htmldocs/newsletter_e.html ▪ Core collection planning is underway for rock that has been exposed to Acid Gas