CSLF Technical Group
Project Initiation and Review Team

Status
November 2006

PIRT : Terms of Reference – 1

Agreed at Technical Group in Berlin 27th September 2006

- 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.

- Identifying 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.

PIRT : Terms of Reference – 2

Agreed at Technical Group in Berlin 27th September 2006

- **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 which may be assigned to it by the CSLF Technical Group**.

PIRT : Organisation

Agreed at Technical Group in Berlin 27th September 2006

- **Core Group :** representation from

  Australia (Co-Chair PIRT)
  Canada (Vice chair TG)
  Denmark
  European Commission (Co-Chair PIRT)
  Germany
  India (Vice chair TG)
  Norway (Chair TG)
  United Kingdom (Co-Chair PIRT)
  United States of America

- **Floating Group :**

  Made up of representatives of CSLF recognized Projects and subject area experts

PIRT : Progress

- **Core Group :**
  - Meetings held in
    - Trondheim Norway (GHGT8) 23rd June 2006 and discussed
      - Progress report on existing 5 Action Items and established 5 new Action Items; including Project Workshop in Paris
    - San Francisco USA (IEA/CSLF) 23rd August 2006 (informal)
      - Progress reports and follow up on Trondhem meeting agenda – 5 new Action Items

- **Floating Group :**

  Contacted for assistance with regard Gaps Analysis of CSLF recognized projects

PIRT : Progress

- Following the CSLF Meeting in Delhi in April 2006 the following key actions were agreed:
  - Complete a comprehensive gap assessment in 2006 with the aim of identifying where CSLF projects should be encouraged in relation to the CSLF Charter
    - Input to come from a wide range of sources including the CSLF Technical Group Gap Analysis work
    - Utilise expertise from the Floating Group
- **Outcome:**

Completed a comprehensive gap assessment with the aim of identifying where CSLF projects should be encouraged in relation to the CSLF Charter **December 2006**

CSLF Gaps Assessment: Capture Storage, & Monitoring
For CSLF Recognised Projects

Will your project outcomes encompass any of these issues?	Examples;	Project to expand on the specific issues they will address under the relevant gaps and document the levels at which issues are being examined	Reference to relevant work ; Publication or website
		Project X	

Injection	
Optimum **well spacings** and patterns	Eg so as to **maximise the access to storage capacity** in a given reservoir,
Optimum **injection parameters**	Eg to **avoid geomechanical impacts**, or to avoid pressure interference.
Definition of **variable rock facies** or rock property types for injectivity.	Eg the need to **compare** the **injectivity** of thick good reservoir quality (marine deposited sandstone) versus poorer thin bedded (fluvial channel sandstone) reservoirs.
Sustainability of **high injection rates**	To **match the supply rates and storage volumes** at regional or local basin level eg how many separate injection operations could the North Sea sustainably manage in a single reservoir sequence for the time period required?
Formation water compression / displacement in closed or open system	Eg **impacts** on potentially **compromising groundwater** in open system or pressure build-up in closed system.
Reservoir engineering aspects	Eg **Near well bore formation damage**, hydrate formation, mineral precipitation, effects of impurities in CO_2 stream, etc

Storage Options	
Saline Aquifers – fluids/rock relationships and interactions	**Reservoir / seal** continuity, mineralogical considerations, chemical reactions, accessible capacity, stochastic modelling methods, **migration pathway prediction**, migration pathway volumetric assessment, seal capacity evaluation at regional scale, injection flow path prediction, **reservoir property heterogeneity**, etc
Coal – rock properties	**Injectivity**, swelling, capacity, adsorption, desorption, sealing potential, unmineable coal and change in **storage parameters with depth**, migration/escape of injected CO_2 or released methane, etc
EOR	CO_2 **sweep characteristics**, injection flow path prediction, storage effectiveness, etc
Depleted oil and gas fields	Timing of **availability**, implication for **trap and seal integrity** due to **production operations**, ongoing use of existing materials and facilities (remediation /abandonment), etc
Basalts - proof of concept	Demonstration of **injectivity**, capacity methodology, sub-basalt sedimentary basins, intra-basalt sediments, sealing properties, chemical reactions, etc
Ultra-low permeability rocks	eg organic rich shales, non-conventional reservoirs - **Injectivity**, geomechanical impacts, adsorption properties, etc

Trapping	
Understanding **physical or chemical trapping mechanisms**	Eg **time frames** (10s to 100s years) and **effectiveness** of the variety of trapping processes that occur in reservoirs, eg structural, buoyancy, residual gas, adsorption, mineralisation, dissolution
Migration rate	Eg **Quantification of migration rate** of CO_2 and its **impact on various trapping mechanisms** (hydrodynamic, dissolution)
Hydrodynamics	
Petroleum **field development impact on hydrodynamic regime**	Eg. **Pressure draw down** in depleting(ed) oil and gas fields – how it **affects migration pathways** of injected CO_2 within the basin.
CO2 properties	
Behaviour of CO_2 under different regimes of pressure, temperature and fluid mixtures	Eg **dissolution** trapping processes, **multi phase fluid flow**, etc

Assessments

Storage Capacity assessment methodologies or standards	**Improved methods** to accurately assess potential storage capacity at local or regional level
Country wide or **regional assessments** of storage potential	Eg need to **have regions "storage ready"** prior to power plant construction
Innovative methods for assessments of geological storage potential	Eg improved methods / standards to assess **areas** where there is **a paucity of direct data**, both in shallow and deeper sections or where petroleum potential is poor, etc
Geological **site characterisation**, methodologies, techniques and standards	Eg what approaches and standards will be acceptable to adequately characterise a site, **best practice manuals**, or **derive rock parameters where there are no physical samples** – eg geophysical remote sensing techniques to predict reservoir quality.
Protocols for **evaluation of potential sterilisation** of existing resources	Eg **impact on groundwater, petroleum production or coal mining**

Leakage	
Flux rates of modern and ancient systems	Eg **analogue studies** both as seepage at surface and leakage within the subsurface migration system
Quantification and modelling of potential **subsurface leakage impacts**	Eg **what leakage is acceptable** (in both volume and time) out of the primary storage formation relative to timing and volume of potential final escape to the atmosphere.
Existing **facilities and materials**	Eg Risks of **leakage from abandoned wells** caused by material and cement degradation.
Economics	
Costs of storage	Eg **impacts on costs** of source sink matching, hub development, reservoir parameters, **economies of scale**, “smart” well design, etc

Software	
Parameters for **modelling fluid and rock interactions**	Eg **improved algorithms** specifically for CO_2 behaviour either physically or chemically, or long time periods required
Improvements in software for **basin wide** geological, reservoir engineering and hydrodynamic **model**	Eg most software is **only fully functional at local field level**, not basin scale – heterogeneity issues (see Sustainability of the high injection rates)
Integration in **single software system** of geological, reservoir engineering and hydrodynamic aspects	Eg – allow for **single predictive software system** rather than “bolting” together different systems and results.
Risk	
Risk assessment models	Eg Development, verification and quantification, and grow with experience base
Public Outreach	
Procedures and approaches for **communicating the impacts** of geological storage to the general public	Eg **Education programs**

PIRT : Progress – cont'd

- Review CSLF project selection criteria in 2006 to ensure consistency with the CSLF Charter, CSLF Technical Road Map, and Gap Assessment action.
    - Propose metrics to assess a project proposal for CSLF acceptance
    - Set guidelines/metrics to be used by the PIRT within its project assessment activity
- **Outcomes:**
    - Completed a review CSLF project selection criteria to
        - ensured consistency with CSLF Charter, CSLF Technology Roadmap and Gap Assessment, and
        - established a set of guidelines/metrics to be used by PIRT within its project assessment function.
    - Streamlined and formalised recognition process considerably
        - Placed emphasis on projects to provide adequate documentation
        - Projects must build technical case for recognition
        - Linked project recognition to CSLF gaps analysis

December 2006

Recommendations for TG

- Issue invitation for other CSLF members to join PIRT
- Accept Strategic Implementation Report : PIRT
- Accept Gaps Analysis
  - Can use as template to help plan Paris Workshop themes
  - Floating Group responses on their way
  - Guidance for Project Identification will follow
- Accept and Implement guidelines attached to Project Recognition for all new projects
- Accept new Project Submission form to alleviate shortcomings of previous process
- Statement with regard to Action Plan and its implementation