

# Global Carbon Capture and Storage Institute

## Activity Plan

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### Goals and Objectives

The fundamental goal of the Carbon Capture and Storage Institute (GCCSI) is to accelerate the commercial deployment of Carbon Capture and Storage (CCS) projects so as to ensure that the technology plays an integral part of the portfolio required to make significant reductions in the level of CO<sub>2</sub> emissions. A key element in this process is to establish sufficient confidence in the technology through the establishment of a series of large-scale integrated CCS demonstration projects.

This need for early large scale CCS demonstration has been recognised politically and is exemplified by the G8 desire as stated in July 2008 to support launching of over 20 fully integrated large scale projects globally by 2010 to enable broad deployment of CCS by 2020. An early focus for GCCSI is therefore to work with others to accelerate the establishment of these 20+ projects.

In addition GCCSI will work very closely with CCS project proponents to address barriers to the deployment of CCS, whether they are of a technical, regulatory, financial, infrastructural, awareness or communication nature. It will work in concert with existing bodies to overcome such barriers and have activities which underpin and are complementary to the thrust on establishing large-scale CCS demonstration.

### Strategy and Approach

To meet the goal of GCCSI, three primary work themes are proposed that will cut across all areas of the work programme of GCCSI:

1. **Drive development of CCS demonstration projects** through
  - uniting partnerships including industry, governments and researchers to develop and invest in a diverse portfolio of large commercial scale projects globally;
  - enhancing of co-operation within the partnerships and externally through establishing a culture of `learning by doing` and the sharing of `non proprietary information`;
  - assisting in liaising with national and regional programmes and facilitating the rationale for the support of such demonstration projects;
  - employing, developing and providing expertise and tailored advice to project participants to assist implementation;
  - providing advice on regulatory, economic and public awareness aspects and implications for specific demonstration projects.
2. **Support CCS uptake globally** through
  - developing cooperative links with national, international, regional and domestic bodies engaged in CCS activities;
  - becoming a global information and knowledge broker around issues of technical performance, cost, health and safety and environmental impacts;
  - providing community outreach and public awareness support to clearly communicate benefits and risks to a wide range of stakeholders;
  - identifying and supporting the necessary research on issues around geological storage potential, regulatory arrangements, financial and economic policy considerations; such an action would include identifying R&D barriers for demonstration.

### 3. **Build CCS capability** through

- being a global CCS expert and independent conduit for organisations and governments;
- advising on best practice regulation, legal development and reform;
- understanding and developing the capacity of the industry to deliver on the long term goals of deploying CCS at the large scale necessary to combat the impacts of climate change.

To ensure the successful application of work programmes linked to these themes, it will be necessary for GCCSI to undertake a range of activities. Initially these will include:

- **establishing the base line position for CCS as of March 2009, in particular including an analysis of the `real` status of CCS demonstration projects.** GCCSI needs a baseline against which its impact will be judged in the future. In addition, there needs to be a full assessment of the effect of the current financial crisis on the investments necessary to achieve early large scale demonstration of CCS. Most recent work on the status of CCS demonstration was done prior to the realisation of the magnitude of the crisis in the financial markets. This work needs to estimate the likely trajectory for CCS demonstration out to 2020-2030 timeframe.
- **establishing strategic partnerships with organisations with common aims** and working with them to ensure some rapid progress on demonstration whilst GCCSI gets established in the first half of 2009.
- **defining a commonly accepted position for GCCSI in the `international CCS policy landscape`.** This will entail working with the Carbon Sequestration Leadership Forum (CSLF) and the International Energy Agency (IEA) to establish a modus operandum that optimises the use of the available resource and recognising that GCCSI will bring a much needed additional effort to the international arena. A focus of this should be the mix of responsibilities for the G8/IEA/CSLF recommendations accepted by the G8 countries in June 2008 and a continuing co-ordination action.
- **developing a consensus on the understanding of knowledge sharing aspects** and the role of GCCSI particular so as to accelerate and globalise the learnings in order to reduce the cost of CCS.

## Initial Work Plan

For the purposes of the first meeting of GCCSI Foundation Members, the following activities have been identified to start the actions of GCCSI in the immediate term. These actions will lead to the identification of additional elements of work and the definition of a medium and longer term programme, a topic for consideration with the members of GCCSI as GCCSI develops.

### 1. **Demonstration project related actions**

The initial GCCSI work plan sets up a series of activities to identify and support the global deployment of safe, commercially and environmentally sustainable CCS. This includes identifying early mover projects through establishing strategic partnerships with organisations that have the same fundamental aims as the Institute; identifying gaps in the existing deployment project options; and developing a process to accelerate opportunities for CCS projects proponents to partner with GCCSI.

To this end, the following tasks are proposed:

#### **Task 1.1: Strategic Analysis of the Global Status of CCS [Annex I].**

Develop a comprehensive baseline report on the status of CCS technology deployment covering technical, regulatory, economic, geographical, research/development capability together with an assessment of status of announced projects. It will identify the progress being made towards the desired 20+ demonstration projects and estimate the current

anticipated trajectory of achievement. A major feature of the work will be a status report on the position of large CCS demonstration as of March 2009.

This work also establishes a reference position as of 2009 and assist with identifying the way forward which will result in accrual of a desired portfolio of projects faster than if GCCSI resources had not been available.

It is planned for this work to be fed into the range of Ministerial level meetings scheduled for October 2009 with initial findings being available for the G8 meetings in June-July 2009.

**Task 1.2: Global CCS Portfolio [Annex II]**

Establish a global portfolio of CCS demonstration projects that would maximize and accelerate opportunities for learnings in order to bring down costs and build public confidence. On-going demonstration projects would be contrasted against this portfolio in order to identify gaps. This would also assist in developing rationale for GCCSI support to projects to which may fill identified deployment gaps.

The portfolio would cover a wide range of emitters of CO<sub>2</sub>, a range of technologies within and along the full CO<sub>2</sub> value chain, and include a global geographic perspective. To identify demonstration gaps, this work will be done in parallel with Task 1.1.

**Task 1.3: Global Projects [Annex III]**

Establish a methodology and process that would identify an acceleration of the anticipated trajectory in order to achieve the desired global portfolio by 2020, getting projects announced and committed to by the end of 2010.

It would involve specific discussions with project consortia identified under Task 1.1, in effect determining what GCCSI could do to ensure that projects do in fact move more quickly to fruition. These would be conducted in the early part of the second half of 2009. Complementary to this, it is planned that a series of worldwide workshops would be held to identify the type of projects could be supported by GCCSI and the way in which this could be done. Such an action would be performed in conjunction with the member countries and companies of GCCSI and with those organisations that GCCSI has established strategic relationships. It would be conducted in the second half of 2009 and the first half of 2010.

## **2. Knowledge sharing and community acceptance**

In addition to supporting and driving projects, there is a strong need to develop strong international cooperation on transparent CCS knowledge and communication actions. These activities can facilitate efficient and cost-effective collaborative, global learnings on CCS, and will allow for improved understanding of the global capacity and applicability of CCS, and will strengthen global trust, awareness and public confidence in the technology.

To this end, the following tasks are proposed:

**Task 2.1: Knowledge Sharing [Annex IV]**

Develop the opportunities and role for GCCSI as a global knowledge broker for CCS. Knowledge sharing is the mechanism for building and accelerating the innovation process associated with demonstration and research. This would involve close consultation with Foundation Members and a wide range of stakeholders, including those already active in undertaking knowledge sharing activities.

**Task 2.2: Community Outreach and Public Awareness [Annex V]**

Communication aspects of CCS is recognised as a much needed area to be addressed urgently, both on a local and on a wider global basis giving the rationale and importance of adopting CCS as an element in the portfolio to meet the impacts of climate change. The aim is to work with existing bodies (such as the IEA and its WPPF, and the European Technology Platform on `Zero Emission Plant` [ZEP]) and getting a much more effective network in place (for example with the IEA GHG R&D Programme).

### 3. Supporting Actions

There is a range of supporting research activities that can underpin information and regulation development in the broader CCS community. GCCSI will undertake a series of supporting actions which will:

- establish regulatory frameworks including 'CCS Ready';
- improve the body of knowledge relating to CO<sub>2</sub> storage worldwide;
- support capacity building actions particularly in key developing countries.

#### **Task 3.1: Definition of CCS Ready [Annex VI]**

Provide input to the development of an internationally harmonised definition of 'CCS Ready' that can be tailored to account for jurisdictional considerations and implementation in a policy context. The aim would be to work to the establishment of a common understanding of the term and so provide a substantial input to the planned IEA Working Party on Fossil Fuels (WPF) workshop to be held in May 2009. The aim is to feed such a definition into the CSLF and IEA process so that agreement could be achieved at the CCS Ministerial meetings to be held in October 2009 by the CSLF and the IEA.

#### **Task 3.2: Global CO<sub>2</sub> Storage Atlas [Annex VII]**

Establish a Global CO<sub>2</sub> Storage Atlas that initially puts together known facts on CO<sub>2</sub> storage worldwide and provides a consistent framework for representing geophysical information. Part of this would be to initiate actions in different parts of the world, in collaboration with countries, to ensure contributions of the appropriate level of quality and assuredness.

#### **Task 3.3: Capacity Building in Emerging Market Economies**

Support for capacity building exercises in emerging market economies will be provided to the CSLF which in the past this has been led several highly successful workshops in different parts of the world. It is proposed that GCCSI works with the CSLF to identify priorities and how best this action could be continued and expanded.

## 2009 timing related aspects

The immediate work programme relates strongly to the current year and its importance. There are several Ministerial level meetings being held in 2009 as part of the 'pathway of discussion' to the COPMOP meeting in Copenhagen between 30<sup>th</sup> November and 11<sup>th</sup> December 2009 when the post 2012 follow-on to the Kyoto Mechanisms will be covered.

A number of events have been targeted as part of this process, although attendance will be subject to the agreement of the meeting organisers. The events are:

- CCS Ministerial Conference, Bergen, Norway : 27-28<sup>th</sup> May 2009
- G8 +5 Heads Meeting, La Maddelena, Italy : 8-10<sup>th</sup> July 2009
- CSLF Ministerial Meeting, London, UK : 12-14<sup>th</sup> October 2009.
- IEA Energy Ministerial Meeting, Paris, France : 15-16<sup>th</sup> October 2009.

An objective of GCCSI will provide position papers and reports to support the acceptance of CCS as an important element of the portfolio to mitigate the impact of climate change. As such these outputs will help define the ongoing activities of GCCSI into 2010 and beyond.

## Looking forward

Beyond 2009 GCCSI will work to a longer term plan that complements and advances GCCSI early activity on CCS projects against the three key work themes:

### **Driving development of CCS demonstration projects**

Year 1 Identify and secure first mover CCS projects and actively engage with and support identified CCS projects

Year 3 Identify and secure further suite of CCS projects towards the 20 G8 CCS projects and initiate consortia to develop potential CCS projects

Year 5 actively support further strategic projects beyond the G8 20 CCS projects

### **Supporting CCS uptake globally**

Year 1 Identify regulatory impediments to CCS deployment; established economic cost of CCS, ongoing support of research and community outreach activities.

Year 3 influence establishment of supportive regulatory frameworks and carbon value mechanisms, established trusted presence in debate on public debate on CCS

Year 5 significant inroads into winning public acceptance and community understand of CCS projects, transfer R&D from pilot projects into commercial scale projects.

### **Building CCS capability**

Year 1 position GCCSI as a global CCS expert and information source

Year 3 consolidate position as an authoritative and independent body providing projects with advice on best practice regulation, legal development and reform, and develop a suite of materials to assist projects, inform the public and provide guidance.

Year 5 position GCCSI as the market leader on CCS information.

# Strategic analysis of the global status of CCS

## Objective

Build on existing work to develop a comprehensive baseline report on the global status of CCS covering technical, regulatory, economic, geographical, research and development network, and project perspectives that will allow the GCCSI to:

- identify challenges and related opportunities that should be focused on to accelerate the broad deployment of CCS technology;
- evaluate and track annually the deployment of CCS; and
- prepare an annual publication on the international state of CCS.

## Background

There are a number of publications and databases produced each year profiling various elements associated with carbon capture and storage, the challenges faced and development pathways. Many of these publications have an industry, sector, country or regional focus but employ different metrics and models.

The regular compilation of a consistent set of reports containing robust analysis from a global perspective will facilitate the sharing of reliable and consistent information across the world and will support CCS policy development, CCS project proponents, and public awareness and understanding. This information and analysis will also advise GCCSI of specific areas that are experiencing deployment roadblocks and the kinds of actions necessary to remove these, informing the Institute's work plans.

## Outputs

Initially, six reports across the following areas are required:

- A report on the status of industrial-scale, demonstration and pilot CCS projects.
- A report on the cost structure of CCS technologies and projects.
- A report on existing policies that support creating carbon value and other regulatory and economic incentives for supporting CCS around the world.
- A report on current CCS research and development networks including identification of technical barriers and gaps to deployment.
- A report that identifies the 'commercial gap' between current CCS project costs and the various economic and financial incentives to develop integrated CCS projects.
- A synthesis report drawing on the above work, together with work on public awareness (Annex VI), to identify various technical, financial, regulatory and community concerns that create potential 'deployment gaps'.

## Further Issues

A key element of this work will require:

- Building on the expertise and information resources of the IEA, CSLF, ZEP and other existing organisations.
- Identifying which actions from the analysis GCCSI should directly resource and address and which actions GCCSI should collaborate on and work with existing organisations to ensure that resources are utilised efficiently across the industry.
- Working with a wide range of countries, relevant international organisations, governments, and various expert bodies to provide information inputs for a comprehensive global information resource and outcome.
- Input from project proponents and developers on perceived gaps and barriers together with identified opportunities for GCCSI to assist in overcoming some of these barriers.

## Global CCS Portfolio

Establish the detail of a desired global portfolio of CCS demonstration projects that would maximize and accelerate opportunities for learnings in order to bring down costs and build public confidence. On-going demonstration projects, identified through the 'Strategic analysis' task (Annex I) would be contrasted against this portfolio in order to identify gaps. This would also assist in developing rationale for GCCSI support to projects to which may fill identified deployment gaps.

The portfolio would cover a wide range of emitters of CO<sub>2</sub>, a range of technologies within and along the full CO<sub>2</sub> value chain, and include a global geographic perspective.

### Objective

- Characterise a desired portfolio of CCS projects types needed to give confidence in CCS globally and increase opportunities for learning across a range of CCS technologies.
- Inform GCCSI's work program.
- Identify priority projects to receive financial and technical support from GCCSI through identifying demonstration gaps.

### Background

Characterisation of the desired portfolio is central to the role of GCCSI in accelerating CCS deployment. Defining the portfolio will assist GCCSI by identifying gaps in the range of CCS projects across technology types and geographical locations, where GCCSI can work to identify and reduce barriers to deployment. The portfolio will be designed to maximize and accelerate learning by integrating different components (within areas of technological, regulatory, geological, financial and other relevant variations) of a complete CCS system and enabling transparency of information and data that might otherwise be difficult to obtain.

All CCS demonstration projects will contribute to increasing global confidence in CCS technologies. Recognising that some demonstration projects may be similar in nature, considering demonstration efforts through the lens of the desired portfolio offers an opportunity to identify projects with the greatest potential for contributing to commercial deployment. For example the first-of-a-kind project for a particular country or company is important for that entity and for broad CCS deployment, even though it might be the fifth in the world. However the first-of-a-kind in the world is important for all.

Placing CCS demonstration efforts in the context of the desired portfolio, if designed and managed well, has the potential to accelerate learning across a diverse range of project types and consequently drive cost reductions through increased efficiency.

GCCSI recognises the significant work carried out by the ZEP in this area. Rather than duplicate the ZEP work GCCSI seeks to build on, and expand it to cover a more comprehensive range of global projects.

### Outputs

The portfolio will seek to identify the project types essential to demonstrating CCS on a global scale. The portfolio will describe the combination of project types that, given limited resources, will provide a portfolio of projects to give the greatest confidence in CCS globally. The portfolio will be informed by a full range of theoretical CCS project types that address the range of possible project type variations globally. The knowledge of all possible CCS project type variations will contribute to identifying which project types are essential to accelerate global CCS deployment.

Characterisation of the portfolio will, in addition to technological variation, take into consideration geologic, regional, financial and other relevant aspects, such as anticipated global energy mix, that will contribute to a global demonstration portfolio. The portfolio will also identify the types of projects that provide the opportunity to give the best value and coverage in terms of the global knowledge needed to accelerate deployment of CCS. The

portfolio will also enhance the understanding and identification of barriers to wide-scale deployment and highlight where resources can be directed towards reducing them.

The desired portfolio and formulation of rationale for support of CCS projects to be prioritised by GCCSI are closely interlinked. The use of broad guidelines to enable selection of CCS projects will need to align with the project types identified in the portfolio. The rationale for support will be adapted as the portfolio is populated by projects. Adaptation may reflect shifts in focus on technology types or regions, depending on which barriers to deployment are identified as most critical at different times.



## Global Projects

### Objective

- Establish a methodology and process that would accelerate the anticipated trajectory of demonstration projects GCCSI will undertake consultation with project consortia identified in the work on the strategic analysis of the global status of CCS in the early part of the second half of 2009.

In addition GCCSI proposes to initiate a series of workshops in selected countries in the second half of 2009 and first half of 2010 to identify potential projects for GCCSI support.

The workshops would bring together project proponents and relevant government representatives to obtain information on the progress of projects and analyse the major impediments to each project proceeding.

In cooperation with the workshop host country and Foundation Members a proposal for priority actions to support selected projects could be put to GCCSI Board for consideration.

### Background

A large number of CCS projects have been proposed around the world with only a limited number progressing to demonstration and operation.

Many countries have commenced processes to identify CCS projects for support through a variety of mechanisms. These processes are on-going, however, it is foreseeable that not all potential projects will be supported through these processes and hence will not contribute to accelerating the deployment of CCS globally. Projects may not gain support for a number of reasons, which tGCCSI may be able to address.

The GCCSI is proposing to conduct a Strategic Analysis of the Global Status of CCS (Baseline Study), which will include a report on the status of known CCS projects. The Baseline study and the proposed workshops will work together to map the CCS landscape and undertake actions to accelerate the deployment of projects.

### Outputs

A series of workshops held in a number of Foundation Member countries will enable GCCSI, and through it, GCCSI members, to gain a comprehensive and up to date analysis of the status of CCS projects in that country.

The findings of the workshops will be provided to GCCSI Board for consideration and to determine priority projects and activities within these projects for support by GCCSI.

## Knowledge Sharing

The process of knowledge sharing is central to accelerating the deployment of CCS. The key outcome of both research and development activities and industrial scale demonstrations is the creation of knowledge around the technical performance, costs and project management. At the same time, knowledge is also created around health and safety issues and the environmental impact of CCS technologies.

Knowledge sharing activity adds value to created knowledge through collation, analysis, and dissemination. It is the mechanism for accelerating the innovation process by building on knowledge created through demonstration and research. Accelerating the innovation process is the key mechanism for achieving cost reductions and to achieve the commercial deployment objective.

Similarly, developing transparent information around the issues of health, safety and environmental impacts will be critical to developing community acceptance and support for CCS to be part of the portfolio of future energy technologies.

GCCSI has the opportunity to significantly add value to the range of knowledge creating activities underway globally by taking up the role of a global information and knowledge broker. The collection and analysis surrounding intellectual property, general know how, legislation and permitting, amongst other issues, offers opportunities for a coordinated and consistent distribution to a broad class of stakeholders. Additionally, by acting as a repository for CCS knowledge, there would be increased opportunities for stakeholders to approach and identify knowledge (or knowledge gaps) specific to their needs. At the highest level, the opportunity to collect confidential information could also provide for benchmarking of individual, regional and global performance outcomes across a range of issues.

Taken together, opportunities to build on and disseminate knowledge also lowers investor risk by reducing uncertainty; facilitates technology transfer within and across countries; and offers the opportunity to accelerate increases in skills capacity, particularly in emerging economies

### Process

It is proposed that a two day workshop be held in August to establish a common understanding of the opportunities and role of GCCSI as a global knowledge broker, including the development of an appropriate framework for managing and achieving desired outcomes. This would involve close consultation with Foundation Members and a wide range of stakeholders, including those already active in undertaking knowledge sharing activities.

At the workshop, the following range of issues will be covered:

- What types of knowledge should be shared and who holds the knowledge?
  - This could include information around costs, technical performance, project management, health and safety issues, permitting etc.
  - Identifying the issues and opportunities around intellectual property, licensing, know how and broader knowledge of interest to the community.
- What knowledge are project proponents or other knowledge holders (eg regulators) prepared to share?
  - This could include what incentives and structures exist to increase the level of sharing.
- With whom this knowledge could or will be shared?
  - That is, what stakeholders have an interest in the knowledge elicited through demonstration projects and R&D activities (eg manufacturers, investors, communities, governments, research institutes, etc).
  - This includes identifying the specific interest and need of each group

- What are the constraints and limits to knowledge sharing?
  - This could include competition law, intellectual property law, international treaties etc
- How should the knowledge be organised?
  - This includes identifying the appropriate level of detail for which stakeholder, does changing the level of detail change the willingness to share, are there issues around third party access or management.
- How is the knowledge to be shared?
  - This includes methods of dissemination, levels of aggregation, establishment of a 'CCS knowledge library'.

Subject to further consideration, the two day workshop could be organised around a number of themes such as:

- organising knowledge share to accelerate innovation;
- creating a learning community to move to the next level of the technology;
- knowledge sharing as an appropriate quid pro quo for public funding. That is, ensuring the value added through public financing is high; and
- creating trust with the public through open and transparent information mechanisms.

## **Further Issues**

A key element of this work will require:

- Working closely with other organisations currently working in this area such as the European Technology Platform for Zero Emission Fossil Fuel Power Plants (ETP-ZEP), the US Regional Carbon Sequestration Partnerships Program, and the recently announced European Commission 'CO<sub>2</sub> networking and knowledge sharing' program to be managed by DNV.
- The opportunity to coordinate the learning outcomes from CCS demonstration efforts through the 'desired global project portfolio' work program offers the opportunity to further accelerate learnings through integrating different individual CCS components.
- Develop linkages with the 'community awareness and public outreach' work program.

## Community outreach and public awareness

### Objective

- Develop a communication and awareness raising program to achieve public acceptance of CCS technologies. Specific elements will include mechanisms that engage broad and different types of stakeholders and that incorporate education and outreach efforts; and mechanisms to support community engagement for demonstration projects.

### Background

One of the less tangible but more complex barriers to CCS deployment relates to public support for CCS. Public perception studies have shown a 'reluctant rather than enthusiastic' attitude towards CCS. However, the importance of public acceptance of CCS has been highlighted by developers and policy makers as a fundamental factor in the future success of CCS. In particular, public acceptance may ultimately determine whether, where, and how CCS projects may be undertaken.

To date, relative to technical and regulatory issues, there has only been a limited allocation of resources to both developing a baseline understanding of public attitudes and into understanding how different stakeholders respond to information on CCS. Further, of the communication materials available, there are few that meet current best practice standards or reflect programs successfully implemented in other areas of public communications on science and technology.

Similarly, little research has been done so far on 'non-government organisation' (NGO) positioning on CCS. Some NGOs have made their position known – either for or against CCS – but with the emerging development of real projects and real policies supporting CCS, this is placing the NGOs into a position of making open stands with a diversity of viewpoints occurring. NGO advocacy in turn influences wider public perceptions.

There is an understanding that early action in engaging the community in a dialog produces maximum benefits, particularly in countries where there are a number of CCS activities planned in the short to medium term. Even where a technology is in the early stages of development, previous experience has emphasized the value of early engagement.

### Outputs

- Assessment of the public awareness studies to date:
  - What general and detailed assessments on CCS already exist;
  - What gaps exist – for example, analysis of media trends?
  - What lessons from other energy technologies exist and can they be transferred to CCS?
  - What is the public acceptance of CCS relative to other energy infrastructure options?
- Analysis of acceptance of CCS globally and locally:
  - What factors influence public acceptance in general?
  - What factors influence risk perception by stakeholders?
  - Development of case studies for projects that have both progressed or ceased due to community concerns;
- Development of a coordinated communication strategy globally including wider communication and awareness raising options across all stakeholders. Issues could include:
  - Identify the necessary conditions to achieve for objective, transparent and credible communication activities.
  - How should the strategy be tailored to address specific jurisdictional issues?

- Specific elements might include the development of a clearing house of communication materials for demonstration projects; the development of a risk assessment – social characterisation tool; identification of opportunities to partner with existing initiatives.
- Initiate on-going monitoring and analysis of public perceptions.
- GCCSI will be available to work with CCS proponents to aid in the provision of best available practice outreach materials for community awareness and engagement.

### **Further issues**

Even where there is an understanding of the role of CCS could play in addressing climate change, there can be a divergence in acceptance between general public views and local community views associated with specific CCS projects. Communities where CCS projects may be undertaken will need enough information to be accurately informed.

Potential future work could work towards developing an understanding of how information of CCS technologies can be improved in order to better predict future public support. Another avenue is to work with the CSLF in expanding the Capacity Building program to include work on community attitudes and outreach opportunities in emerging economies.

## Definition of CCS Ready

This work, to be conducted in conjunction with the IEA and CSLF aims to assist governments and industry by working towards establishing a common understanding of 'CCS Ready' and to provide substantial input to the planned IEA Working Party on Fossil Fuels workshop to be held in May 2009.

### Objective

- Provide input to current developments of CCS Ready definitions with the longer term objective of working towards an internationally harmonised definition that can be tailored to account for jurisdictional and industry considerations.

### Background

Enabling a power plant to be made CCS ready provides an opportunity to reduce any future adjustment costs in retrofitting CCS technologies by undertaking plant modifications at the time of construction or refurbishment. Although this may reduce the costs of addressing climate change, there is no agreed global definition of CCS ready to facilitate this.

Current attempts to provide 'CCS ready' definitions have been constructed with either a focus on the technical requirements of adapting CCS to existing and new power plant specifications or on regulatory and policy requirements that can be adapted by jurisdictions to allow for the development of possible mandatory regulation.

Defining 'CCS ready' on the basis of technical or financial considerations has proven to be difficult due to the level of uncertainty associated with technologies under development and the individual and site specific variables involved in constructing a power plant. There has been growing support for a broader definition that places a higher focus on the policy and regulatory aspects of CCS ready with the underlying principle that plant designs or investment to ease retro fitting can be called CCS ready.

Work in defining CCS ready has been progressed in the by the European Commission (EC) and the United Kingdom (UK). However, there is a need to expand on these efforts to develop an internationally harmonised approach, building on, and working with the IEA, the CSLF and others.

### Outputs

The key outputs for this work will be developed over a period of time, with the focus of CCS ready changing as the study develops and takes form. The study will provide input to assist in establishing an internationally harmonised definition that incorporates issues surrounding the management of interactions between policy makers and project proponents.

This will include:

- The development of possible best practice guidelines to assist regulators in the development of appropriate mechanisms to create an industry standard;
- Identifying economic gains associated with any potential CCS ready regulations;
  - This will include the sensitivity of the economic gains around future energy penalty ranges for CCS technologies;
- How to provide effective regulation for technologies that are still in development, including what elements should be regulated given the uncertainty around future technology developments, and what boundaries to regulation are created because of that uncertainty;
  - Consideration will be given to the range of uncertainties around potential future technologies and costs in order to clearly identify if there are net economic benefits in requiring plants to be made CCS ready.
- The level of detail to be included in an internationally harmonised definition in consideration of jurisdictional specific issues.

## **Further Issues**

GCCSI recognises that significant progress on the issue has been made by the IEA, the EC and the UK Government and that further work is being progressed through the CSLF and the Asia-Pacific Economic Cooperation forum. GCCSI study will endeavour to build on existing material and collaborate closely with existing work programs.

As GCCSI mandate extends to commercial deployment of CCS technologies in industrial applications, assessment on the regulatory need for CCS ready should also extend to industrial plants (e.g. steel making, aluminium smelters, petroleum refineries, Liquid Natural Gas processing and cement facilities).

# Global CO<sub>2</sub> Storage Atlas

## Objective

To address the apparent lack of cohesive and comparable world-wide information on geological storage and develop a publicly available Global Atlas on CO<sub>2</sub> storage sites across the world that will allow CCS project proponents to:

- Identify potential storage sites in the proximity of current or future emissions sources;
- Obtain information on sites' suitability for storage, preliminary estimates of CO<sub>2</sub> capacity where available, and other geological storage characteristics; and
- Have available other supplementary details such as the presences of significant emission sources and other relevant geographical overlays.

The Global Storage Atlas is designed to assist with the development of least cost, fully integrated CCS pathways and will have an initial focus on the use of pre-competitive data in constructing the Atlas.

## Background

It is commonly accepted that CO<sub>2</sub> can be stored in saline aquifers, depleted oil and gas reservoirs, and unmineable coal beds but there is a need to characterise the extent of these sites and their suitability for CO<sub>2</sub> storage. An informative Global CO<sub>2</sub> Storage Atlas is intended to be a useful resource that will provide project proponents and others with a quality source of information that will enhance the viability of CO<sub>2</sub> storage.

Various countries and regions around the world have developed regional storage atlases albeit with different styles and conventions. By bringing these data sets together into a single information base under a consistent and agreed presentation protocol and identifying and filling information gaps, an effective and up to date information source on storage sites, their suitability and preliminary guidance on estimating injection capacity will be provided to the CCS industry.

In addition to being a comprehensive reference that will assist with site identification, it is envisaged that the Atlas will incorporate a number of suitable overlays such as emission sources and storage integrity details that can be associated with suitable storage sites.

## Outputs

- An interactive graphical atlas of the world displaying storage sites and details of intensity and type of emissions sources by area, seismic activity and other information relevant to storing large amounts of CO<sub>2</sub>. This will be hosted, updated and maintained on a publicly accessible website.
- A Geographical Information System (GIS) database that contains information on storage sites and their suitability, geological storage characteristics and references to supporting information.
- Usage protocols that explain how to operate the web site, how to interpret the information presented, the limitations of the information and advice for obtaining more detailed analytical information if required.
- Analysis and ongoing work to develop and maintain a comprehensive atlas over time.

## Further Issues

The global storage atlas will be developed by:

- Actively engaging with and working in partnership with relevant international organisations such as geological organisations, governments, and various expert bodies to provide inputs for a comprehensive global product
- Mapping available information and data sets onto the Atlas and then filling gaps as new information is acquired.
- Promoting standard methodologies to the graphical display of information, estimates of CO<sub>2</sub> storage capacity and other areas that is widely accepted, and is sufficiently rigorous for the purpose of a definitive Global Atlas.
- Monitoring the use of the Atlas and responding to the needs of users for improvements and updates.