



PROJECTS NETWORKS MEETING: SUMMARY REPORT

AMSTERDAM, 19 SEPTEMBER 2010

Context and Objective of the Meeting

A key function of the Global CCS Institute is to facilitate collaboration and knowledge sharing between CCS projects and participating companies, researchers, governments and industry. This function is achieved primarily through:

- accessing project knowledge through direct support relationships with Members' CCS projects;
- disseminating knowledge to Members via the Institute's digital knowledge sharing platform; and
- encouraging and convening Thematic Groups, consisting of Thematic Networks for electronic and face-to-face technical collaboration together with associated sub-groups for work program development.

The Thematic Groups are being specifically aligned with existing collaborative arrangements established by allied and associated organisations so that they add distinct complementary value, and do not conflict with existing arrangements. Four initial themes and associated affiliations have been selected for review with the Institute's Members:

- *Hub Development Challenges*, in collaboration with the Clinton Foundation;
- *Managing Impacts of CO₂ Storage on Groundwater*, in collaboration with IEAGHG;
- *Storage Learning from EOR Operations*, in collaboration with IEAGHG; and
- *Project Integration Challenges*, in collaboration with CSLF Technical Group.

At the 19 September 2010 Amsterdam meeting these themes were introduced by Nick Otter and Bill Koppe (Global CCS Institute); Simon Bennett (European Commission); Ger van Tongeren and Maurice Hanegraaf (Rotterdam Climate Initiative); Tony Wood (Clinton Foundation); Tim Dixon (IEA Greenhouse Gas R&D Programme).

After the presentations, Members were invited to participate in table discussions to provide perspectives and comments on the proposed themes. The proposed scope of each of these themes and the main outcomes of the discussions with approximately 60 Members that were present in Amsterdam are covered below.



Hub Development Challenges, in collaboration with the Clinton Foundation

The proposal to convene a Thematic Group focused on Hub Development Challenges is based on the proposition that CCS hubs are very similar, in that they rely on transport and storage economies of scale to reduce CCS deployment costs in regions of clustered CO₂ sources. The value of the proposed Thematic Group for Hub Development centres on the sharing of studies on similar issues that each hub might otherwise undertake separately, and on the sharing of knowledge from their experiences of tackling hub development challenges.

From the meeting in Amsterdam, it became clear that there is broad support for this theme from Institute Members. However, because there are many issues involved (and challenges encountered) in building a CCS hub, the range of topics that could be covered under this Thematic Group varies, and needs further delineation.

It was noted that CCS Hub Networks can be distinguished by their common CO₂ transportation infrastructure and plans for future scale-up, presenting challenges additional to those faced by point-to-point CCS projects.

- *Cost:* the economies of scale in Network CO₂ disposal systems are premised on over-sizing infrastructure to anticipate later demand. This carries higher upfront capital costs.
- *Risk:* there is a significant risk that later demand does not materialise, due to uncertainties about if and when CCS will become commercial. This would strand investment in oversized infrastructure.
- *Technical:* handling CO₂ from multiple sources complicates technical considerations regarding specifications for CO₂ quality (presence of impurities) and system balancing.
- *Commercial:* the participation of multiple stakeholders, both current and future, complicates commercial structures, terms and contracting, especially due to the need for early users and operators to bear disproportionate amounts of risk.
- *Coordination:* even though sound policy and oversight is needed to facilitate hub development, it does not have to be a government organisation that coordinates the activities in the hub. Setting up a sound a project coordinating body with industry participation/support can be a significant challenge.
- *Political:* asking strained public budgets to support additional infrastructure based on the future needs of an unproven and non-commercial technology.
- *Storage:* in addition to future demand for storage, network systems are premised on future availability of cost-effective and high-capacity storage. Locating and characterising to sufficient detail the structures most appropriate for high volumes of CO₂ is costlier, riskier and more technically difficult than for smaller, better characterised reservoirs.



Although the challenges are manifold, Members indicated that potential program activities could focus on:

- advising the Institute on fact-based advocacy in support of hub development, for instance by seeking to demonstrate the public value of Hubs to key funders and regulators in various jurisdictions;
- commissioning detailed work on specific shared issues, including for instance technical issues related to CO₂ qualities and metering, legal matters such as template contracts; and
- commercial and financial structures to share risks between current and future users.

The third and last point is of particular interest to Members as there seems to be a 'first mover disadvantage', which triggers a 'wait and see' approach by organisations that could benefit from the hub. It is therefore important a Thematic Group around hubs further explores the business opportunities for companies to be part of a Hub. It was noted that hubs are not only about risks and challenges, but can provide clear business development opportunities along the whole CCS value chain. Finally it has been made clear by several Members that a Thematic Group around hubs should take into account the lessons learned from point-to-point projects and consider the work done on financial risk sharing in other CCS programs like the Industry led Carbon Capture Project (CCP).

Managing Impacts of CO₂ Storage on Groundwater, in collaboration with IEAGHG

Potentially attractive storage resources may be developed in regions where the local communities rely on potable groundwater. That does not pose a material constraint on storage development where the groundwater is drawn from near-surface deposits that are hydraulically isolated from the much deeper storage formations. It may however be a constraint on storage development where potable groundwater is either drawn from deep formations, or from near surface formations that are hydraulically connected to potential storage resources. While the potential impacts of storage in these circumstances may be pressure-related rather than contamination-related, and they may have a favourable rather than adverse impact on water resources, communities will require firm assurance that the groundwater on which they rely will not be adversely affected by storage development. The focus of the Groundwater Thematic Group is the development of knowledge of the potential impacts, both favourable and adverse, of CO₂ storage on potable groundwater resources, and the development of related risk assessment and risk management conventions. It is proposed that the Thematic Group meetings be aligned with those of the IEAGHG risk assessment network.

There is support from Institute Members to establish a Thematic Group around this theme, but it was recommended to change the name to: 'CO₂ Storage and Groundwater Resource Management'. It was noted that semantics are important and that by selecting these themes the Institute sends a message to the general public.

Even though the depth of the groundwater deposits may be very different between for example, Europe and Australia, it was noted that the issues related to groundwater resource management will be similar in its



nature. Several Members have indicated that the recent work done by the US Environmental Protection Agency (EPA) around the protection of underground sources of drinking water in relation to CO₂ storage operations should set the scene for further work on this topic.

There was also a clear signal from Members that this Thematic Group should leverage the learnings from 'real' CO₂ storage projects like Sleipner, Otway and In Salah and/or utilise existing knowledge obtained from natural gas and acid gas storage operations. In other words, this theme should not only be based on desktop studies, but needs information from multiple projects in multiple geologies, and small and large scale project learnings should be used. A similar comment has been made in relation to the third theme: 'Storage Learning from EOR Operations'.

Storage Learning from EOR Operations, in collaboration with IEAGHG

In the absence of carbon pricing and/or other substantial government incentives to drive CCS project development, it is likely that many near-term, industrial-scale projects will rely on enhanced oil recovery (EOR) to provide an economic driver for development. That likelihood is currently most evident in North America, where the majority of proposed CCS projects are associated with EOR, and in China and the Middle East. Given the possibility that, in the near-term, a substantial proportion of CCS projects proceeding to operation will rely on EOR, there is a strong rationale for initiatives to maximise the storage learning and community confidence in storage that can be obtained from EOR operations. The scope of the Thematic Group dealing with storage learning from EOR operations will depend largely on the cooperation of EOR operators, and their perceptions of the potential benefits to them of engaging with the CCS community. Within that context the activity of the Thematic Group would centre on monitoring, modeling and verification (MMV), and meetings would be aligned with the IEAGHG MMV network.

Institute Members have endorsed this theme and there seems to be clear support from the oil and gas majors who are willing to participate in a Thematic Group around this theme and share data in relation to MMV of their EOR operations. Members have also indicated the potential to further explore the business development potential for EOR operators by studies into the optimum between CO₂ injection/recycling and oil production, and developing business cases that are attractive for the CO₂ emitters as well as the EOR operator. Finally, it was noted by several Members that there is an important legislative/regulatory component attached to this theme as it is not always clear how the stored CO₂ in EOR operations is accounted for under the climate policies that are considered/implemented in various parts of the world.

Project Integration Challenges, in collaboration with CSLF Technical Group

The existing industrial-scale operations are all oil and gas-related, and were generally developed by an oil and gas operator. The current portfolio of proposed industrial-scale projects includes a large proportion of power-related projects which extend the scope of project integration, and for which the project proponents may have or may not have experience or expertise in all of that scope, particularly the storage components.



There is a body of CCS project development history and experience that, if documented, would be of value to the newer generation of projects and proponents. The work of the Thematic Group will centre on the development of integrated CCS project schedules and the high-level scoping of associated project development tasks. It will draw on the experience of existing and developing projects either as case histories or as input to generic schedules and task descriptions. Given that a working group with a comparable project integration scope is currently being established within the Project Review and Implementation Team (PIRT) of the CSLF Technical Group, it is proposed that the Institute Thematic Group consolidate its activities and resources with the CSLF action.

There was broad support amongst Members for this theme and there were not many comments or suggestions with regard to the proposed work scope. It was noted several times that making available integrated CCS project schedules could be very valuable for project developers.

General outcomes

The four initial themes selected for review with the Institute's Members in Amsterdam on 19 September 2010 were broadly endorsed. Besides the specific comments on the proposed work scopes outlined above, there were several general comments made by the Institute's Members that would apply to the operation of all four Thematic Groups.

First, the Thematic Groups must be aligned with existing collaborative arrangements established by allied and associated organisations so that they add distinct complementary value, and do not conflict with existing arrangements. According to Members there is great value in the proposed themes, but the Institute should be smart in implementing its Thematic Groups and utilise existing initiatives and R&D networks around these themes (it is key not to overburden Members with meetings). The Thematic Groups should therefore make contributions that are regarded as meaningful, such as:

- being action-oriented and carrying as few obligations as possible;
- addressing future needs rather than past experiences;
- taking a bottom-up approach that focuses on real project related issues;
- internationalising knowledge from national CCS programs and initiatives;
- minimising consultations and meetings, maximising the use of electronic means of communication (such as the Institute's Knowledge Platform); and
- targeting and working with project developers and proponents.

At the 19 September 2010 Amsterdam meeting and in subsequent comments and suggestions, Institute Members suggested additional themes to consider for the creation of Thematic Groups, including:

- Local Community Stakeholder Engagement;
- Scaling Up Capture Technologies;



- CCS and Biomass; and
- Safety and Integrity of CO₂ Storage.

Way forward

Once the initial four Thematic Groups are operational, the Institute will canvass the support of Members for additional Thematic Groups.

It should be remembered that the Thematic Groups are project-based and the aim is to use them as a platform for direct collaboration and knowledge sharing between projects and Institute Members on key issues for CCS project development. They will also be used to draw upon the combined experience and expertise of Members in developing proposals for consideration by the Institute for support. In performing this function from more of a 'bottom-up' perspective, it is essential that the outcomes interact and inform the Institute's complementary more 'top-down' policy-related work on Strategic Enablers for CCS deployment. The aim is to establish an integrated approach using knowledge acquired from real projects on the ground to help set the conditions for commercial deployment worldwide.

The topics of future Thematic Groups therefore have to be considered in light of the strategy, activities and work plans emerging from the Enabler Working Groups (covering Policy and Regulation, Commercial and Finance, Technology, Public Awareness and Capacity Development). It is recognised that the outcomes from a Thematic Group could well inform and influence several Enabler actions.

It is therefore proposed to move forward with the initial four Thematic Groups, see how they operate and learn from the experience to establish an effective and efficient modus operandum for the future. With regard to their operations, it is considered important that Institute facilitates Members to do the work (possibly with third party assistance). The meeting in Amsterdam pointed out that these Thematic Groups should be member-driven with secretariat support from the Institute. It is important that these Thematic Groups are in the first instance inclusive and focus on a wide range of industries.

In summary :

- the concept and initial themes reviewed with Members on 19 September 2010 in Amsterdam have been confirmed with minor amendments;
- an Implementation Document on how the Thematic Groups will operate will be distributed by the end of October 2010 and at the same time request registrations of participation interest; and
- the aim is to establish the basis of the Thematic Groups in early November 2010 and the first telephone conference meetings of all four initial Working Groups be held before the end of November 2010.