RECOMMENDATIONS ON SET PLAN ISSUE PAPER NO.9

RENEWING EFFORTS TO DEMONSTRATE CCS IN THE EU AND DEVELOPING SUSTAINABLE SOLUTIONS FOR CCU

Introduction

The Global CCS Institute (the "Institute") is an international membership organisation, with a mission to accelerate the development, demonstration and deployment of carbon capture and storage (CCS), a vital technology to tackle climate change and provide energy security.

Our diverse international membership consists of governments, global corporations, small companies, research bodies and non-government organisations, committed to CCS as an integral part of a low-carbon future. We are headquartered in Melbourne, Australia with offices in Washington DC, Brussels, Beijing and Tokyo.

The Institute welcomes the European Commission's ("the Commission") discussions with EU Member States, and the renewed efforts to demonstrate Carbon Capture and Storage (CCS). Positive government involvement provides greater confidence to investors and lenders while facilitating access to the knowledge generated and reducing costs. The Institute therefore endorse the Commission's renewed efforts.

This memo represents the Institute's response and recommendations to the Commission's Paper No. 9. Further, the Institute is looking forward to future consultation and discussions on this subject.

Executive summary

As pointed out by the Commission, CCS has a vital role to play in a portfolio of low-carbon technologies to tackle climate change at least-cost to the world economy. CCS is the single most promising technology that can reduce emissions on a significant scale from many industrial processes (which require fossil resources as production inputs) and from fossil fuel power plants.

Strong policy support is required globally and the Institute welcomes the proposals made by the Commission to increase effort to realise commercialisation of CCS. Government action is a key driver for strengthening the foundations for widespread deployment of CCS, by providing 'policy parity'- an equitable level of consideration, recognition and support for CCS alongside other low-carbon technologies.

Approximately 4,000 million tonnes of CO_2 captured and stored per annum by 2040 is needed to limit the global temperature increase to under 2°C. Given the scale of this ambition the focus should be on realising one or more full-chain CCS projects in Europe in order to build understanding and expertise. A number of enabling measures must be in place for large-scale CCS projects and demonstration projects to advance through the development pipeline, including:

- Introduce long-term commitments and strong policy action that ensure CCS is promoted equally with other low-carbon technologies
- Set incentives that support a positive business case for CCS projects, including placing a value on carbon and models for EOR
- Speed-up completion of storage site identification and characterisation in Europe, and provide predictability in relation to monitoring requirements and liability issues
- Promote hubs & clusters in in countries with access to the North Sea (maximising synergies with North Sea storage/EOR, local CO_2 utilisation networks and hydrogen networks)
- Continue research and development (R&D) to reduce costs and improve performance of CCS technologies.

Projects

As of today, there are 22 large-scale projects in operation or under construction worldwide, with the capacity to capture up to 40 million tonnes of CO_2 per annum, equivalent to 8 million cars being taken off the road. This represents double the number at the beginning of the decade, a sign of growing confidence in the application of CCS at large scale.

Despite continuing progress in large-scale CCS projects moving into construction and operation, overall global deployment to date has been slower than needed if emission reduction targets are to be met.

The slower path of CCS uptake in Europe, in comparison to initial expectations at the end of the last decade when the European CCS Directive entered into force, reflects a number of factors, including:

- The absence of an explicit target for CCS deployment at the European level, in contrast to the binding targets mandated by 2020 for other low-carbon technologies;
- The sharp fall in the carbon price since the European Energy Program for Recovery (EEPR) projects were announced;[1] and,
- CCS financial support by governments which has been either postponed or cancelled.

The number of CCS projects must rise substantially to help meet climate goals; key enabling measures must gather momentum over the course of the next five years to drive widespread deployment post-2020. Any proposal of pilot projects, and especially large scale projects by the EU, is thus supported by the Institute.

Signals from industry and the significant amount of research made publicly available over the last decade confirm that CCS is a proven technology. As such, emphasis must be placed on realising projects. Operational projects are a strong catalyst in improving community understanding of CCS as a low-emissions technology and re-inforce the role of CCS in reducing global carbon emissions. Although robust R&D must also continue to play an important role in the future, and we endorse the Commission's proposal to support both feasibility studies and pilots on promising new capture technologies, a key focus for the Commission should be on realising one or more full-chain CCS projects.

If the EU intends CCS to play a serious role in carbon mitigation, a far stronger policy drive will be necessary. This was also the key finding of the final report reviewing the Directive 2009/31/EC on the geological storage of carbon dioxide (CCS Directive), published in January 2015, and confirmed by the conclusions of the European Commission (EC) in its own report on the CCS Directive of November 2015.

In Europe, the implementation of CCS projects would be facilitated by:

- Hubs & Clusters: many emissions-intensive industries in the region are located in tight geographical clusters that can leverage CCS common infrastructures, with significant cost savings.
- Enhanced Oil Recovery: EOR can be an enabler for CCS projects, especially in the North Sea where existing wells, platforms and expertise would greatly facilitate its implementation.
- Hydrogen systems: centralised decarbonisation of fuels by conversion into hydrogen, represents an opportunity to enable decarbonisation of decentralised industrial or power assets, not able to develop a dedicated transport and storage infrastructure.

CCS is also the primary mechanism to achieve net negative emissions when applied to bio-energy facilities. The deployment of bio-CCS in Europe needs to consider varying regional conditions

[1] The price of carbon in the EU ETS has dropped from almost €30/t CO_2 in 2008 to around €5-6/tCO_2 in March 2016.

regarding the availability of local biomass and CO_2 storage. The net CO_2 reduction potential of bio-CCS concepts must be accounted for on a case by case basis with a comprehensive methodology that looks at the whole value chain: from biomass sourcing to CO_2 storage or CO_2-use. Also, bio-CCS, and negative emissions in general, can influence public perceptions of CCS, so there is a need for fact-based information on the true impact.

Policy and regulatory

In order to advance CCS deployment, certainty is needed about the timing, nature, extent and durability of emissions reduction policies. Importantly policies to support the development and deployment of CCS need to be comparable with those provided to renewables and energy efficiency.

In Europe, there is a need for policies that provide sufficient incentives for CCS projects to develop robust long-term business cases and attract the private funding needed to create market conditions conducive to broad-based CCS deployment. Without reform or enhancement, most CCS funding programs will be exhausted on current projects, as government or EU funding is needed to develop projects when there is no commercial market.

A number of jurisdictions have implemented or are implementing arrangements such as emission performance standards and / or placing a value on carbon to limit CO_2 emissions. This may act to incentivise a wide range of technologies, including CCS. The current price per ton CO_2 under the existing ETS regime is too low to create a real incentive to invest in CCS. In the early stage of CCS development and deployment, the role of governments is crucial to address key policy and regulatory risks. There are strong arguments to policymakers for the provision of different CCS incentives such as tax credits or exemptions, loan guarantees, grants, and feed-in tariffs, or review cap and trade programs. None of these incentives alone is sufficient to entirely address the breadth of risks, thus project developers typically combine various policy measures to make projects viable.

Comprehensive legal and regulatory models underpin many national and regional policy commitments that are critical for deploying the technology. These frameworks continue to evolve alongside policy priorities and technology developments. We would like to emphasise a couple of examples here. Signals from private stakeholders and potential storage operators imply that the requirements relating to monitoring and liability issues under the CCS Directive are too unpredictable. It may be difficult to procure an insurance policy that covers the potential liability the operator is facing. Further, there is uncertainty relating to the current low carbon price.

The Institute endorses the Commission’s focus on Projects of Common Interest, and all other forms of policy support for collaboration between public and private stakeholders. The importance of collaboration in the successful deployment of CCS is rapidly becoming more evident, and such collaboration needs to involve both industry and authorities. As already mentioned in our section about projects, hubs and clusters would be an important tool to reduce costs. Hubs and clusters may further provide commercial incentives for CCS, by enabling the development of a market for CCS related goods and services (for example CO_2 transport capacity and services, and CO_2 storage space and services).

Hubs and clusters also provide for an opportunity for the countries to collaborate on projects across borders, and may initially provide support for commercial industries as EOR, by ensuring a steady flow of CO_2 from a number of capture plants. The Commission needs to push for policies that support such business models, and one significant contribution would be to unlock the prohibition of cross-border transportation by urging all Member States to ratify and implement the changes of the London Protocol Article 6.

Technology R&D

CCS is a proven technology that can achieve large reductions in carbon dioxide (CO_2) emissions, not only in the power sector, but also from industries such as iron and steel, chemicals and cement, which together emit around 20% of the world's CO_2. Many industries have no other technology choice (other than CCS) to significantly reduce carbon emissions.

For the next generation of CCS projects, significant cost savings can be realised by continuing R&D efforts on promising new concepts, followed by pilot testing at facility sizes that can provide confidence for technology users to scale up to commercial projects. In particular, in Europe it is essential to support the development of optimised capture system concepts for the industrial sectors of cement, iron & steel and oil & gas refining.

Carbon dioxide utilisation concepts are welcome when they can be integrated to CO_2 capture projects and improve their business cases. From a climate mitigation, perspective effective CCU concepts are only those that allow long term CO_2 sequestration (e.g. EOR, mineralization). Therefore, it is important to guarantee that funds to R&D in the CCU space are primarily directed to solutions that would support the implementation of CCS and that have demonstrated real effectiveness in long term displacement of CO_2 from the atmosphere. CCU is expected to give very limited contributions to achieve the 1.5 °C target. Therefore, it is important to keep in mind that that only geological sequestration (including EOR) can ultimately contribute to the achievement of longer term climate goals.

Recommendations:

- Introduce long-term commitments to climate change mitigation and strong policy action that ensure CCS is treated equally with other low-carbon technologies
- Set legal and infrastructure foundations for wide-scale deployment post 2020. Key enabling measures include:
    - Policy incentives that support a positive business case for CCS
    - Placing a value on carbon
    - Comprehensive law and regulations supporting CCS
- Continue developing the regulatory and policy framework to encourage the financial community to invest in CCS
- Speed-up completion of storage site identification and characterisation, and provide predictability in relation to monitoring requirements and liability issues
- Urge Member States to ratify and implement the amendment to London Protocol Article 6
- Promote collaboration with other regions and states when reforming the ETS regime and setting performance standards
- Implement measures to deal with the remaining critical regulatory uncertainties, such as trans-boundary movement of CO_2 and long-term liabilities
- Promote hubs & clusters (maximising synergies with North Sea storage/EOR, local CO_2 utilization networks and hydrogen networks)
- Continue and expand funding support for CCS R&D (including Demonstration projects) in the following areas:
    - Hubs & Clusters
    - Enhanced Oil Recovery (off-shore and on-shore)
    - CO_2 capture in industrial assets
    - Hydrogen systems
    - CCU concepts with real effectiveness in sequestrating CO_2 for long term

For further information on any of the issues raised in this submission please contact Andrew Purvis, General Manager EMEA, Global CCS Institute (Andrew.Purvis@GlobalCCSInstitute.com)