



## **POLICY GROUP**

### **Key Messages and Recommendations from the 2013 CSLF Technology Roadmap**

#### Background

The CSLF Technical Group Executive Committee has overseen a complete and major rewrite of the CSLF Technology Roadmap. This new version of the Roadmap contains several key recommendations for advancing carbon capture and storage (CCS) technologies towards the year 2020 and beyond. Additionally, the Roadmap includes eight key messages concerning CCS and its utilization as a climate change mitigation option.

This paper summarizes the messages and key recommendations from the Roadmap.

#### Action Requested

The Policy Group is requested to review the key messages and recommendations from the 2013 CSLF Technology Roadmap.



# **Key Messages and Recommendations from the 2013 CSLF Technology Roadmap**

*Prepared by the CSLF Technical Group Executive Committee*

## **Key messages from the Technology Roadmap**

- First generation CO<sub>2</sub> capture technology for power generation applications is available today (albeit expensive).
- CO<sub>2</sub> transport is an established technology.
- CO<sub>2</sub> storage is safe provided that proper planning; operating, closure and post-closure procedures are developed and followed. However, sites display a wide variety of geology and other *in situ* conditions.
- Data collection for site characterization, qualification and permitting currently requires a long lead-time (3-10 years) mostly before an investment decision on detailed design work and then construction for a large new capture facility.
- There are no technical challenges per se in converting CO<sub>2</sub>-EOR operations to CCS, although issues like availability of high quality CO<sub>2</sub> at an economic cost, infrastructure for transporting CO<sub>2</sub> to oil fields; and legal, regulatory and long-term liability must be addressed for this to happen.
- There is a broad array of non-EOR CO<sub>2</sub> utilization options that, when taken cumulatively, could provide a mechanism to utilize CO<sub>2</sub> in an economic manner. These options are at various levels of technological and market maturity
- Need for plain language communication to allay any public fears and concerns that may arise from transport and geological storage of CO<sub>2</sub>.

## **Key Recommendations from the 2013 Technology Roadmap**

***Towards 2020 nations should work together to ensure that CCS remains a viable GHG mitigation option, building upon the global progress to date through:***

### **International Collaboration**

- Establish international networks of laboratories (like the European Carbon Dioxide Capture and Storage Laboratory Infrastructure, ECCSEL) and test centres and comprehensive RD&D programmes.
- Establish international collaborative R&D programmes that facilitate the demonstration of safe long term CO<sub>2</sub> storage.
- Address the different priorities, technical developments and needs of developed and developing countries.

### **Demonstration Projects**

- Implement large-scale demonstration projects in power generation in a sufficient number to gain experience with 1<sup>st</sup> generation CO<sub>2</sub> capture technologies and their integration into the power plant;
- Encourage and support the first demonstration plants for CO<sub>2</sub> capture in other industries than the power sector and gas processing and reforming, particularly in the cement and iron and steel industries.
- Develop sizeable pilot-scale projects for CO<sub>2</sub> storage that can provide greater understanding of the storage medium, establish networks of such projects to share the knowledge and experience for various geological and environmental settings, jurisdictions and regions of the world, including monitoring programmes.

### **Common Standards, Specifications and Best Practices**

- Agree on common standards or best practices for establishing CO<sub>2</sub> storage capacity in geological formations.
- Develop common specifications for impurities in the CO<sub>2</sub> stream for the transport and storage of CO<sub>2</sub>.
- Develop internationally agreed common standards or best practices for the screening, and selection of CO<sub>2</sub> storage sites in order to reduce lead-time and have the sites ready for permitting between 2020 and 2025, including CO<sub>2</sub>-enhanced oil recovery (CO<sub>2</sub>-EOR) sites.

### **Regional networks and opportunities for CCS**

- Design large-scale, regional CO<sub>2</sub> transport networks and infrastructure that integrate CO<sub>2</sub> capture from power generation as well as other industries, CO<sub>2</sub> transport and storage
- Conduct regional (nationally as well as internationally) impact assessments of large-scale CCS implementation as part of an energy mix with renewables and fossil fuels.
- Map regional opportunities for CO<sub>2</sub> utilization and start implementing projects.

### **CO<sub>2</sub> Utilization Options**

- Continue R&D and small-scale testing of promising non-EOR CO<sub>2</sub> utilization options.

### ***Towards 2030 nations should work together to:***

- Move 2<sup>nd</sup> generation CO<sub>2</sub> capture technologies for power generation and industrial applications through demonstration to commercialisation, with possible targets of 30% reduction of energy penalty, normalized capital cost, and normalized operational and maintenance (O&M) costs compared to 2013 costs for 1<sup>st</sup> generation technologies
- Implement large-scale regional CO<sub>2</sub> transport networks and infrastructure, nationally as well as internationally.
- Demonstrate safe, large-scale CO<sub>2</sub> storage and monitoring
- Qualify regional, and potentially cross-border, clusters of CO<sub>2</sub> storage reservoirs with sufficient capacity.
- Ensure sufficient resource capacity for a large-scale CCS industry, by starting widespread exploration as soon as possible, because of the long lead times.
- Scale-up and demonstrate non-EOR CO<sub>2</sub> utilization options.