



## IEAGHG Information Paper 2017-IP62; CSLF Technology Roadmap 2017

The Carbon Sequestration Leadership Forum (CSLF) have recently released a Technology Roadmap announced during the 7<sup>th</sup> Ministerial Meeting in Abu Dhabi in December 2017. The roadmap provides recommendations for CSLF member countries to help them facilitate the development and deployment of CCS technologies via collaborative efforts that address key technical, economic, and environmental obstacles.

The full report can be found on their website:

<https://www.cslforum.org/cslf/sites/default/files/2017CSLFTechnologyRoadmap.pdf>

The priority recommendations were:

**Governments and industries must collaborate to ensure that CCS contributes its share to the Paris Agreement's aim to keep the global temperature increase from anthropogenic CO<sub>2</sub> emissions to 2°C or below by implementing sufficient large-scale projects in the power and industry sectors to achieve the following:**

- Long-term isolation from the atmosphere of at least 400 mega-tonnes (Mt) CO<sub>2</sub> per year by 2025 (or permanent capture and storage of in total 1,800 Mt CO<sub>2</sub>).
- Long-term isolation from the atmosphere of at least 2,400 Mt CO<sub>2</sub> per year by 2035 (or permanent capture and storage of in total 16,000 Mt CO<sub>2</sub>).

And to facilitate this, the recommendation to CSLF ministers were:

- Promote the **value of CCS** in achieving domestic energy goals and global climate goals.
- **Incentivize investments** in CCS by developing and implementing policy frameworks.
- Facilitate **innovative business models** for CCS projects.
- Implement **legal and regulatory frameworks** for CCS.
- Facilitate **CCS infrastructure development**.
- Build trust and **engage stakeholders** through CCS public outreach and education.
- Leverage existing large-scale projects to **promote knowledge-exchange** opportunities.
- Drive **costs down** along the whole CCS chain through RD&D.
- Accelerate CCS in **developing countries** by funding storage appraisals and technology readiness assessments.
- Facilitate implementation of **CO<sub>2</sub> utilization**.

Following on from the CSLF's 2013 roadmap, one major change is the new time horizons for targets moving forward to 2025 & 2035 from 2030 & 2050 previously. The change emphasizes that the CSLF Technical Group recognizes a need for accelerated implementation of CCS. There is also an emphasis on CCS being applied to industrial processes (e.g. hydrogen and biomass) and the development of industrial clusters and hubs. It is concluded that although positive advances have been made in CCS since the 2013 report progress is at a lower rate than required to meet the objectives outlined.

Overall the report opens by emphasising the importance of CCS and its role in meeting the Paris Agreement targets. It then discusses CCS 'technology needs' categorized into capture, infrastructure, storage and utilization (including EOR).



The roadmap highlights the key findings:

**Based on reviews of several status reports on CCS and technical papers, as well as comments and input from international experts, the main findings of this *Technology Roadmap 2017* are as follows:**

- CCS has been proven to work and has been implemented in the power and industrial sectors.
- The coming years are critical for large-scale deployment of CCS; therefore, a sense of urgency must be built to drive action.
- Substantial, and perhaps unprecedented, investment in CCS and other low-carbon technologies is needed to achieve the targets of the Paris Agreement.
- The main barriers to implementation are inadequate government investment and policy support/incentives, challenging project economics, and uncertainties and risk that stifle private sector investment.
- Rapid deployment of CCS is critical in the industry and power sectors in both Organisation for Economic Co-operation and Development (OECD) and non-OECD countries, especially in those industries for which CCS is the most realistic path to decarbonization.
- Negative CO<sub>2</sub> emissions can be achieved by using a combination of biomass and CCS.
- Costs and implementation risks can be reduced by developing industrial clusters and CO<sub>2</sub> transport and storage hubs.
- Members of the CSLF consider it critical that public-private partnerships facilitate material and timely cost reductions and accelerated implementation of CCS.

All the technical recommendations contained in the TRM chapters are also listed concisely in the four pages of Annex B. Some of these reflect conclusions and recommendations from IEAGHG reports and Network meetings, and not surprisingly others reflect growing areas of activity in IEAGHG's technical programme, for example around hydrogen and biomass. IEAGHG provided many reports as input, some 11 IEAGHG reports are cited. IEAGHG was on the editorial committee and a contributor.

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**08/12/2017**