



MESSAGE FROM CSLF TECHNICAL GROUP TO CEM AND CSLF MINISTERS

Distinguished Ministers:

At the CSLF's 7th Ministerial Meeting, in Abu Dhabi in 2017, the CSLF Technical Group published a new edition of the **CSLF Technology Roadmap**. The clear message to Ministers is that **Governments have a critical role in accelerating the deployment of carbon capture, utilization and storage (CCUS)**. Widespread deployment of CCUS is a necessity for the Paris Agreement goal of limiting global temperature increase to 2°C to be achieved. The Roadmap recommends that the CSLF adopt the following targets for CCUS:

2025: Permanent storage of at least 400 megatonnes (Mt) CO₂ per year (or have permanently captured and stored 1,800 Mt CO₂)
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2035: Permanent storage of at least 2,400 Mt CO₂ per year (or permanent capture and storage of in total 16,000 Mt CO₂)

The Roadmap provided priority recommendations to achieve these goals:

- **Facilitate CCUS infrastructure development.** Coping with the large volumes of CO₂ from power plants and industrial clusters will require CO₂ infrastructure and networks that include capture from sources, transport, and storage. Shared infrastructures have the potential to drive down costs and lower barriers for CCUS projects.
- **Leverage existing large-scale projects for knowledge-exchange opportunities.** The first large-scale CCUS facilities have indicated that significant cost reductions can be achieved for the next facilities. Knowledge transfer can give important input to achieve reduced capital and operational expenditures and to provide increased confidence for deployment.
- **Drive down costs along the whole CCUS chain through research, development and demonstrations (RD&D).** CCUS technologies are continuously in development, both with regard to improvements of currently available commercial technologies as well as novel or emerging technologies. The aim of the RD&D is to find affordable solutions.
- **Facilitate innovative business models for CCUS projects.** The development of infrastructure and networks is closely linked to the split of risks and costs between the stakeholders, including private enterprises and governments.

In addition, the Roadmap provides more detailed recommendations on technology developments that are required for CCUS for it to make a contribution in reaching targets.

The CSLF has evaluated progress since 2017 for the four technical priority recommendations:

Good Progress:

- **“Leveraging existing large-scale projects to promote knowledge-exchange opportunities”** has been successful. Existing projects have shown a willingness to share lessons learned at CSLF Technical Group meetings and workshops and by information exchange through allied organizations such as the IEAGHG, GCCSI, and CO₂GeoNet. There has also been a significant

amount of activity at the national and sub-national level. New developers should be further encouraged to learn from existing large-scale projects.

Challenges Remain:

- The action **“facilitating CCUS infrastructure development”** has shown poor progress regarding real investments despite several good studies. Commercial projects include networks of CO₂ pipelines onshore in the United States and a smaller one offshore Brazil, primarily for utilizing CO₂ for enhanced oil recovery (EOR). One onshore network is scheduled to come online in Canada in 2019. However, stronger actions are needed if the overall target is to be achieved.
- For the strategic action **“driving down costs through RD&D”**, some progress has been made but not enough to reach the overall target. Significant research and development (R&D) investments are occurring globally and there is good progress and sustained efforts at the lab- and bench-scale. There is also increasing collaboration internationally. However, the challenge is on scaling up technologies.
- For the strategic action **“facilitating innovative business models”**, there are various public-private models under consideration/development but there is a need in many cases to develop guidance or rules for sound decisions regarding CCUS. Much will be dependent upon local and regional market conditions.

The evaluation also considered progress towards the CO₂ storage target, which depends on six other non-technical CSLF recommendations. **The CSLF concludes that insufficient progress is being made for achieving the Roadmap’s 2025 target and that increased efforts are needed to achieve the 2035 target.**

The CSLF’s Recommendations

The CEM Ministers should:

- **Foster a predictable business environment for development of large-scale CCUS projects.** This could include policy and financial incentives, a practical regulatory environment, cost- or risk-sharing for early stage demonstration or commercial-scale projects, and stimulating cross-business and cross-border cooperation.
- **Facilitate (e.g., through co-funding) cross-industry projects** to ensure lowest total cost for the combined capture, transportation, utilization and/or storage infrastructure and networks.
- **Continue to promote RD&D investments in CCUS to drive down costs:**
 - Continue to fund early stage R&D and encourage transformative technologies as well as incremental advancement to progress technologies to the pilot-scale.
 - Support continued RD&D efforts that promote commercial deployment and business opportunities for more advanced carbon utilization, in particular for early-stage technologies. Lifecycle analyses should continue to ensure that technologies result in net greenhouse gas emissions reductions.
 - Continue to promote global RD&D collaboration that leverages knowledge, capabilities, facilities and funding that further drives down costs and increases the availability of CCUS as a greenhouse gas mitigation option around the world.
- **Continue to promote knowledge-sharing from large-scale projects.** This is important in framing continued RD&D and informing the development and refinement of business models for CCUS deployment.