



Key Messages for Ministers
 12th Clean Energy Ministerial Meeting
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Carbon Sequestration
TECHNOLOGY
ROADMAP



12th Clean Energy Ministerial meeting, June 2021

Accelerating Carbon Capture, Utilisation and Storage

The Carbon Sequestration Leadership Forum (CSLF) Technical Group brings together countries to share technical experience on carbon capture, utilization and storage (CCUS). The group provides technical background for the work of the CEM CCUS Initiative whose aim is to accelerate CCUS together on strategic and policy levels. The CEM CCUS Initiative is glad to highlight the following key messages from the recent update of the CSLF Technology Roadmap (TRM) for CCUS:

1. Many countries have announced net-zero emission targets by middle of the century, providing a vitally important backdrop for rapid deployment of clean energy and emission reduction technologies. However, by the end of 2020 the world was far from being on track to reach the targets of the Paris Agreement of keeping the anthropogenic temperature rise to well below 2°C, and preferably close to 1.5°C, by the end of the 21st century. Global energy-related CO₂ emissions have steadily increased over the past ten years, reaching 33.4Gt in 2019.
2. CCUS will be required to meet the targets of the Paris Agreement. A great majority of climate scenarios show that CCUS will play a crucial role to reduce direct emissions from industrial processes and the use of fossil fuels in power generation, industry and fuel transformation. CCUS is particularly important for hard-to-abate industries.
3. Recent years have seen both a significant increase in attention on and growing momentum in large-scale investment in CCUS. There has been progress in many aspects of CCUS since the TRM 2017, including additional projects, advancing technology, and increasing policy and legal frameworks.
4. Regardless of progress, CCUS deployment lags behind what is required by leading sustainable development scenarios, e.g. IPCC and IEA. At the end of 2020, the global carbon capture and injection capacity in operation was approximately 40 Mt CO₂/year. Projects under planning and that may come on-line in the period 2025 – 2030 may add some 300 Mt CO₂/year, less than 50% of what is needed.
5. The CSLF Technical Group stresses the challenging deployment pathway for CCUS in the coming decades, based on IEA Sustainable Development Scenario (SDS):
 - By 2030: CO₂ capture and storage should increase by a factor of 10 – 15 from the 2020 level of 40 megatonnes (Mt) CO₂ per year;
 - By 2050: CO₂ capture and storage should increase by a factor of 100 or more from the 2020 level.

The CSLF Technical Group invites all its members, Clean Energy Ministerial members, and all other relevant countries, as well as industry and the financial sector, to join forces to achieve rapid and tangible progress on the above pathway.

Deployment of CCUS at scale is not possible without supportive policy settings, long-term political commitment, public acceptance, and financing suited for early and long-term CCUS deployment.

The CCUS Initiative will continue to convene its member governments, industry and the financial sector to identify both immediate and longer-term investment opportunities and to accelerate CCUS deployment.

Following from the above key messages, the 2021 CSLF CCUS TRM outlines priority actions and recommendations, as follows:

Technology development, innovation and cost reduction

- Invest heavily in RD&D to:
 - Reduce capture costs by 25% from the 2020 benchmark (\$60/t CO₂ avoided, average of commercial technologies);
 - Bring enabling and emerging capture technologies to Technology Readiness Level (TRL) 7 or above;
 - Reduce storage monitoring and verification costs by 25% relative to 2020;
 - Mature sustainable negative emission technologies;
 - Continue the development and deployment of CO₂ utilisation technologies;
 - Develop novel, emerging and enabling technologies along the whole CCUS chain;
- Continuously transfer knowledge from existing large-scale projects to new projects;
- Make investments in public-private partnerships or projects that continue to develop and mature promising utilization technologies and meet a low-carbon or “green” standard;
- Advance the science and technology of Negative Emissions technologies (NETs).

Strategic build-out of CCUS projects and hubs

- Bring to operation all projects under development today, or an equivalent volume of carbon capture capacity by 2030;
- Identify, plan, and build strategic power and industrial CO₂ capture clusters with common CO₂ transportation and storage infrastructure (hubs), to ensure a 10-fold increase of industrial production facilities and power and heat plants;
- Implement CCUS at 30% of fossil fuel hydrogen production facilities;
- Ensure that sufficient CO₂ storage sites are characterized and developed, and necessary permits obtained.

Development of strategy, policy, legal and financial frameworks

- Implement policies to mitigate the impacts of climate change;
- Communicate the importance of CCUS and articulate the role it can hold in a portfolio of clean technology solutions;
- Develop national or regional CCUS strategies and implementation plans;
- Develop incentive frameworks, business models and risk-sharing mechanisms that will enable CCUS projects to be financeable;
- Implement legal, regulatory and accounting frameworks to ensure safety and environmental integrity of CCUS
- Implement frameworks to enable cross-border transport of CO₂ for storage purposes.
- Share best practices to foster cost reduction and help countries and industries accelerate CCUS investment.

The CSLF 2021 Technology Roadmap is available at: www.cslforum.org