GLOBAL CCS INSTITUTE

Global Carbon Capture and Storage Institute

Key Messages

November 2024

Reaching global climate goals will require gigatonne-scale deployment of carbon management technologies, including point source Carbon Capture and Storage (CCS) and Carbon Dioxide Removal (CDR).

- We currently emit around 37 gigatonnes per annum (Gtpa) of CO2 globally. Most of those emissions are from burning fossil fuels and from industrial processes. In addition to such mitigation options as process efficiency, electrification, and technology and material innovations, we need CCS to decarbonise aspects of society we cannot Live without (i.e. essential industrial production of cement, steel, chemicals, fertiliser, and others), that produce emissions we cannot Live with.
- CCS also provides a foundation for technology-based CDR, such as bioenergy with CCS (BECCS), biomass carbon removal and storage (BiCRS) and direct air capture with carbon storage (DACCS).

Carbon management technologies are available today.

- These technologies are being used around the world and they can help us reduce CO2 emissions and atmospheric concentrations of CO2 which are causing climate change impacts on society. CCS is underpinned by technologies that have been available since the 1970s, coupled with decades of global research and collaboration.

CCS is highly versatile and has a role to play across all the highest emitting sectors.

- The versatility of CCS is clearly on display with applications across multiple industries, including hydrogen and chemicals, fertiliser, iron and steel, cement, bioethanol, waste to energy, power generation and direct air capture.
- Heavy industries account for almost 20% of global CO2 emissions and CCS is currently the most viable solution (and in some cases the only solution) for reducing emissions from cement, iron, steel, and chemicals production.
- CCS technology is a critical component of net-zero power generation. Power plants equipped with CCS can supply flexible Low-carbon electricity to complement the variable nature of renewables Like solar and wind generation.
- CCS can also help decarbonise the transportation sector, including reducing emissions associated with hydrogen and ethanol-based fuel production.
- DACCS can address residual emissions in certain sectors, Like aviation, where there are technical Limits to decarbonisation strategies.

Durable geologic storage options are abundant and widespread.

- Dedicated CO2 storage facilities have been in operation since the mid-1990s, coupled with global research and development, providing decades of experience and data.
- The amount of CO2 stored can be directly measured rather than estimated, providing high Levels of certainty about the quantity of emissions abatement delivered.

- Jurisdictions around the world have established and implemented robust regulatory frameworks for environmentally safe and effective storage of CO2. The Intergovernmental Panel on Climate Change has also provided high-level inventory guidelines for geologic storage and the International Standards Organization has developed industry standards.
- Geologic assessments show that there are storage reservoirs around the world, including in almost every high-emitting nation, where we could inject and store thousands of gigatonnes of captured CO2.
- While there is no shortage of storage resources, efforts to develop storage facilities and country-specific regulatory frameworks need to be significantly ramped up to support safe and effective geologic storage globally.

Societal considerations play an important role in the successful deployment of carbon management technologies.

- Addressing our climate and clean energy goals means that we must build new infrastructure that can help reduce CO2 emissions, drive economic development, and create new jobs.
    - CCS can have extensive social value, creating and sustaining jobs in industries such as cement, concrete, steel, fertiliser.
    - CCS can also have co-benefits such as reducing air pollution and improving air quality.
- For all new climate and clean energy infrastructure, including carbon management, it is critical to understand and address any societal impacts at local, regional, and global levels.
- Engaging with affected stakeholders, including communities to provide information and address concerns, should be an integral component of all projects.

Recent global policy developments are accelerating the deployment of CCS, but we have a long way to go to get to gigatonnnes - policy drivers and global coordination are essential.

- More progress is needed on a combination of governmental climate policies and carbon markets to enable a scalable business case for carbon management.
- Geologic storage and CO2 transportation infrastructure are critical for both CCS and CDR. Building CO2 networks or hubs can improve efficiency and reduce the cost of deployment.
- Global collaboration has played a key role in demonstrating and deploying carbon management technologies and more ambitious international calls for action on CCS and carbon management will be important to maintain momentum.