GLOBAL CCS INSTITUTE

THE VALUE OF CCS

FOR CLIMATE, ECONOMY AND SOCIETY

BACKGROUND

- **Carbon capture and storage (CCS) is an essential technology to tackle climate change and achieve a net-zero economy.** Analysis by the Intergovernmental Panel on Climate Change (IPCC) and International Energy Agency (IEA) consistently show CCS being deployed at significant scale to meet long-term climate targets.
- **Globally, 20 large-scale facilities currently capture around 40 million tonnes of CO_2 per year.** A further 38 are in various stages of development, which will bring the total capture capacity of CCS facilities to more than 100 million tonnes per annum of CO_2, once completed.
- **To meet climate targets, a one-hundred fold increase in the number of facilities in operation relative to today is required.** The IEA estimates that the global carbon capture industry will need to scale-up to over 2,000 facilities capturing 2.8 gigatons of CO_2 per year by 2050 to limit warming to 2°C. To meet the more ambitious 1.5°C scenario, the IPCC estimates that 10 gigatons of CO_2 per year must be captured.

CCS MITIGATES CLIMATE CHANGE BY

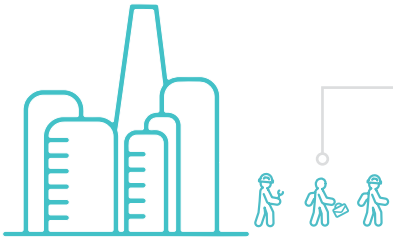
- **Achieving deep decarbonisation in hard-to-abate industry.** The cement, iron and steel, and chemical sectors are amongst the hardest to abate due to their inherent process emissions and high temperature heat requirements. CCS provides one of the most mature and cost-effective options for reducing emissions from these sectors.
- **Enabling the production of low-carbon hydrogen at scale.** To reach net-zero emissions, global hydrogen production will need to grow significantly, from 70 million tonnes per annum today to 425-650 million tonnes per annum by mid-century. Hydrogen produced using coal or natural gas with CCS is currently the lowest cost option for producing low-carbon hydrogen and likely to remain so in regions where fossil fuel prices are low or low-cost ample renewable energy is not available for electrolysis.
- **Providing low-carbon dispatchable power: CCS equipped power plants play an important role as they help ensure that the low-carbon grid of the future is resilient and reliable.** Flexible power plants with CCS supply dispatchable and low-carbon electricity as well as grid-stabilising services, which cannot be provided by renewable generation. Therefore, CCS complements the increased deployment of renewables.
- **Delivering negative emissions: The deployment of negative emissions technologies will be needed to compensate for residual emissions in hard-to-abate sectors if net-zero emissions targets are to be met.** CCS provides the foundation for technology-based carbon dioxide removal (CDR) solutions including bioenergy with CCS (BECCS) and direct air capture (DAC).

CCS NUMBERS AT A GLANCE

260 Mt
OF CO_2 HAS BEEN CAPTURED AND STORED SAFELY TO DATE

20
CCS FACILITIES ARE FULLY OPERATIONAL

2000
CCS FACILITIES NEEDED TO REACH 2050 GLOBAL CLIMATE TARGETS



100,000
NEW JOBS CCS DEPLOYMENT WILL SUPPORT

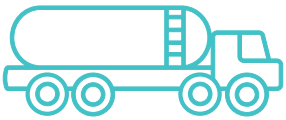
CCS DRIVES ECONOMIC GROWTH AND EMPLOYMENT BY

- **Creating New Jobs and Sustaining Existing Ones.** CCS creates new jobs during the construction and the operation of new facilities, as well as in the supply chain. To reach the levels of deployment outlined in IEA's Sustainable Development Scenario, more than 2,000 facilities will be needed by 2050, requiring at least 100,000 employees in 2050. There will also be jobs associated with the supply of new materials, equipment and professional services. In addition to creating new jobs, CCS enables high emission industries and the jobs they support to continue, thereby avoiding local economic and social dislocation that could otherwise occur whilst meeting climate targets
- **Facilitating a just transition.** One of the key challenges of achieving a just transition is the disconnect between the geographic spread of job losses and gains, and the timing of these changes. Jobs created in low-carbon industries may not occur at the same time as job losses in high-emission industries. CCS facilitates a just transition by enabling existing industries to make a sustained contribution to local economies while transitioning to a net-zero economy.
- **Enabling infrastructure re-use and deferral of decommissioning costs.** Where oil or gas production fields are at the end of their lives, there may be opportunities to re-use their existing infrastructure by repurposing it for CO_2 transport and storage.
- **Creating innovation-led economic growth:** CCS could also be a source of high-value innovation spillovers and therefore play a role in supporting innovation-led economic growth alongside other technologies.

POLICY CONSIDERATIONS

PLACING A VALUE ON CO_2 EMISSIONS REDUCTIONS

A range of options, including carbon taxes, emissions trading and tax credits or payments linked to delivered emission reductions.



INVESTING IN SHARED CCS TRANSPORT AND STORAGE INFRASTRUCTURE

Coordinated investment in CCS hubs and cluster networks can offer commercial synergies and reduce CO_2 storage costs through economies of scale.

CREATING CLEAR AND SUPPORTIVE LEGAL AND REGULATORY FRAMEWORKS

Robust legislative frameworks reduce cross-chain, and long-term liability risks.

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