Iea report on carbon capture

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Carbon capture, utilisation and storage (CCUS)will need toform akeypillar of efforts to put the world on the path to net-zero emissions.A net-zero energy system requires a profound transformation inhow weproduceanduseenergythatcanonly be achievedwith a broad suite of technologies.Alongsideelectrification,hydrogenand sustainablebioenergy, CCUSwillneed toplayamajorrole. It isthe onlygroup oftechnologiesthatcontributesboth toreducingemissions in key sectorsdirectlyandtoremoving CO_2tobalanceemissions that cannot be avoided -acritical partof"net" zero goals.

Support for CCUS in economic recovery planscan ensure theCovid-19crisisdoes not derailrecent progress spitealmostUSD 4 billionin government and industry commitments to CCUSso farin 2020, the economic downturnis set toundermine futureinvestment plans.CCUS is in a much stronger position to contribute to sustainable recoveries than it was after the 2008-09 global financial crisis. Sincethen,deployment has tripled (albeit from a small base),the range ofdemonstratedapplications has expanded, costs have declined,and new business models have emerged.

A faster transition to net zero increases the need for CCUS.CCUS accounts for nearly 15% of the cumulative reduction in emissionsin the SustainableDevelopment Scenario.Moving the net-zero goalposts from 2070 to 2050 would require almost 50% more CCUSdeployment.

Underpinned by CCUS, carbon removalplays an important role in the net-zero transition.Technology-based carbon removal approachesare neededto balance emissions that are technically difficult or prohibitively expensivetoeliminate.When net-zero emissionsisreached in the Sustainable Development Scenario,2.9 gigatonnes(Gt)of emissions remain,notablyinthe transport and industry sectors. These lingeringemissionsare offsetbycapturing $CO_2$from bioenergy and the airand storing it.

Direct air capturetechnologieshavesignificantpotential to acceleratethetransition tonetzero,butcostsneed tocome down.Capturing carbon directly from the air and storing is analternative tocapturing it from bioenergy.Direct air captureplants are already operatingon asmallscale,buttheircosts are currently high.With further innovation, the availability ofdirectair capturetechnologiescould offer an importantbackstop or hedge in the event thatother technologies fail to materialise or have slower-than-anticipated pathwaysto becoming commercially viable.

CCUS facilities have been operating for decades in certain industries, but they are still a work in progress in the areas that need them most. CCUS has primarily been used in areas such as natural gas processing or fertiliser production, where the CO_2 can be captured at relatively low cost. But in other areas, including cement and steel, CCUS remains at an early stage of development. These are the sectors where CCUS technologies are critical for tackling emissions because of a lack of alternatives.

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Infrastructure to transport and store CO?safely and reliably isessentialforrolling outCCUStechnologies.The development of CCUS hubs - industrial centres that make use of shared CO2transport and storage infrastructure - couldhelpacceleratedeploymentbyreducingcosts.At least12CCUS hubsare in development globally-includingin Australia, Europe and the United States-andmanyof them arelinked tolow-carbonhydrogen production.Norway"sNorthern Lights project,a large offshore CO2storage facilityin the North Sea,could provide a solution foremissionsfrom neighbouring countries.

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A net-zero energy system requires a profound transformation in the way we produce and use energy that can only be achieved with a broad suite of technologies. Carbon capture, utilisation and storage (CCUS) is the only group of technologies that contributes both to reducing emissions in key sectors directly and to removing CO2 to balance emissions that are challenging to avoid - a critical part of "net" zero goals. After years of slow progress, new investment incentives and strengthened climate goals are building new momentum behind CCUS.

The report examines in detail the role for CCUS technologies in clean energy transitions. It identifies four key contributions: tackling emissions from existing energy infrastructure; a solution for sectors with hard-to-abate emissions; a platform for low-carbon hydrogen production; and removing carbon from the atmosphere. The report considers innovation needs across CCUS technologies and applications. It includes new geospatial analysis of power and industrial emissions in key regions and their proximity to potential geological storage.

Today, CCUS facilities around the world have the capacity to capture more than 40 MtCO2each year. Some of these facilities have been operating since the 1970s and 1980s, when natural gas processing plants in the Val Verde area of Texas began supplying CO2 to local oil producers for enhanced oil recovery operations.

Since these early projects, CCUS deployment has expanded to more regions and more applications. The first large-scale CO2 capture and injection project with dedicated CO2 storage and monitoring was commissioned at the Sleipner offshore gas facility in Norway in 1996. The project has now stored more than 20 MtCO2 in a deep saline formation located around 1 km under the North Sea.