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CARBON CAPTURE, UTILISATION, AND STORAGE: THE KEY TO REVOLUTIONISING GLOBAL ENERGY USE?

The article provides an introduction to CCUs technologies and explains their role in fighting climate change and revolutionising global energy use.

CLIMATE CHANGE AND ENVIRONMENT

NEW PRODUCTS AND TECHNOLOGIES

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Global warming caused by greenhouse gas emissions is posing a major challenge to mankind, especially due to the ever-increasing global energy demand. The Paris Agreement has united more than 170 nations in tackling the common cause of slowing down climate change and adapting to its effects. The Agreement contains measures aiming to keep the temperature rise below 2 degrees Celsius compared to pre-industrial levels.

Through the European Green Deal, the European Union has made a commitment to become climate-neutral, that is with net-zero greenhouse gas emissions, by 2050. A strong reduction of source greenhouse gas emissions from industry and energy sectors (decarbonization) is crucial to reaching these ambitious goals. Unfortunately, as the International Energy Agency points out, emissions from industrial processes can be hard to abate, as they result from chemical or physical reactions, which are vital to the processes themselves. In this context, CCUS technologies have attracted growing attention thanks to their

potential of significantly reducing emissions in energy intensive industries.

What are CCUS technologies?
Carbon capture, utilisation, and storage (CCUS) is a set of crucial technologies aimed at capturing carbon dioxide (CO_2) emissions from point sources (especially industrial sources within the power, chemicals, cement, and steel sectors) in order to avoid the release of these gasses into the atmosphere. CCUS can be divided into two categories, namely Carbon Capture and Storage (CCS) and Carbon Capture and Utilization (CCU) technologies.

CCS processes capture carbon dioxide, which allows its separation from other gases through one of three methods (pre-combustion capture, post-combustion capture and oxyfuel combustion). The captured CO_2 is then transported to a suitable site for its final long-term storage (i.e. geological or ocean storage). The carbon dioxide capture stage also occurs in CCU processes but, in this case, the captured CO_2 is converted into other components and products, such as chemical feedstocks, fuels or building materials, which are otherwise typically derived from fossil-based resources. In addition to carbon dioxide, the inputs required for the conversion of CO_2 are essentially energy and water. Hence, CCS and CCU differ in the final destination of the captured CO_2, namely long-term storage versus conversion into products.

Thus, CCUS can play a key role not only in meeting CO_2 emission reduction targets, such as the ones set by the Paris Agreement, but also in accelerating the energy transition and in accomplishing the industry redeployment. These are reasons why the European Commission recognises CCUS technologies as a primary research area, with an increasing number of projects in this field funded under the Horizon 2020 Programme.

CO2Fokus is one such European funded project, which aims at developing a sustainable, energy-efficient, and economically viable CCU technology to convert industrial CO_2 into Dimethyl Ether (DME). DME is an added-value gas largely used in the chemical industry and in the energy sector, which can also be used as clean and efficient fuel. In this way, CO2Fokus will allow not only to reduce emissions and to advance innovative CCU technologies, but also to reduce dependence on fossil fuels in the chemical and energy sectors, thus moving towards a low-carbon society. More information about CO2Fokus is available here: https://www.co2fokus.eu/

Are you interested in large scale CO_2 capture and re-use technologies, which have lower costs, are environmentally safe, have higher conversion efficiency, and are available for different markets?

SAVE THE DATE OF THE INTERNATIONAL 2021 WORKSHOP ON CCUS:
https://www.eventbrite.com/e/international-workshop-on-co2-capture-and-utilization-

tickets-111483752906

Together with CO2Fokus, several EU-funded projects will be there to discuss the potential and progress of CCU technologies.

Keywords

carbon capture, ccu, carbon storage, DME, energy

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