PRESS RELEASE

Dr. Richard Porter
Department of Chemical Engineering, UCL,
London WC1E 7JE
Email: r.t.j.porter@ucl.ac.uk

Friday, 21st August 2020

EU invests 13.8 million Euro into state-of-the-art carbon dioxide capture technology

London, August 21, 2020

Society demands vast amounts of iron and steel, the production of which releases a staggering 2.8 billion tonnes of carbon dioxide (CO_2) annually. This is 7% of global energy-related CO_2 emissions and over 3 times the emissions from aviation in 2018.

To limit global warming to 1.5 degrees Celsius, as is needed to meet the Paris Agreement goals, CO_2 emissions must be reduced to net zero by 2050. For the iron and steel industry, achieving this goal is going to require a range of solutions, which will include huge leaps in technology innovation.

Carbon Capture, Utilisation and Storage (CCUS) refers to a range of CO_2 reduction and reuse technologies that can be applied to heavy industries, including steel production, to separate CO_2 from emissions, so that it can be stored safely and permanently in geological formations, or recycled by industry to produce commodity products such as fuels, polymers, fertilisers, proteins, foams and building materials.

The European Union Horizon 2020 programme has awarded 13.8 million Euro in research funding to advance cutting-edge CCUS technology. Led by University College London in the UK, the project 'Advanced Carbon Capture for steel industries integrated in CCUS Clusters' (C^4U), will boost the development of CCUS in the iron and steel industry while considering in detail the safety, environmental, societal, policy and business aspects. The project aims to bring two promising CO_2 capture technologies closer to deployment, through pilot-scale technology testing in an operational environment.

The capture technologies are based on the use of two novel high temperature gas-solid reaction and separation processes, which cover a range of off-gas emission sources on a steel plant. The processes also transform off-gasses into valuable inputs for industry, such as heat and hydrogen. In combination, the two C^4U technologies could tackle up to 94% of the total emissions in a steel plant, resulting in an overall CO_2 emission reduction of 89%.

Full-scale systems will be designed for integration with a steel plant run by ArcelorMittal in Belgium, which include a pipeline network to transport the CO_2 captured from the plant and a number of other industries along its route for geological storage under the North Sea bed.

With 21 partners across 11 countries, the study goes beyond high-tech engineering solutions – scientists will also examine the societal readiness of industry, policy makers and other societal actors such as communities for using CCUS technology to tackle climate change. The research will also look at what

governments can do to help advance this type of technology, and how companies can innovate on business models to enable CCUS.

Whilst CCUS is not the only answer to making steel production more climate-friendly, it's a crucial piece in the puzzle of making this invaluable commodity truly Paris-compatible.

If you would like more information on the project, please contact chemeng.c4u@ucl.ac.uk

QUOTES

The project coordinator, Haroun Mahgerefteh, Professor of Chemical Engineering at University College London said:

"The C^4U project focuses on one of the largest industries in the world in order to significantly cut its CO_2 emissions through the use of CCUS. I am delighted to be working with such a multi-disciplinary team of world-leading engineers, social scientists, business and policy experts to realise this goal. We aim to help the iron and steel industry to continue to play its significant role to the benefit of society, with minimal impact on the environment."

Andy Hemingway, President of Development and Life cycle Optimisation at Wood said:

"Collaboration and innovation are key to successfully transition towards more sustainable industrial processes, like steel and cement production, and achieving ambitious but necessary net zero targets. Wood is proud to be one of the partners of C^4U and to be bringing our insights to industrial decarbonisation, as well as our technical knowledge and experience with CCUS technology to support the reduction of harmful emissions."

Heleen de Coninck, full Professor at Eindhoven University of Technology, and Associate Professor at Radboud University:

"Reducing CO_2 emissions is incredibly urgent; each year that we reduce a tonne of CO_2 means that we don't need to remove that tonne later on because we've busted our carbon budget. Though non-fossil technologies for steelmaking are under development, it will be a while before those are commercially available. To bridge those years and still reduce emissions, CCS comes into play. A condition is, however, that it can be deployed fast, and to this we hope to contribute in the C^4U-project."

Andrzej Błachowicz, Managing Director of Climate Strategies said:

"CCUS is not a panacea to solve climate change, but has a crucial role to play in reducing emissions from heavy-industry. Working hand in hand with other solutions, wisely implemented CCUS technology will help us to deliver on net-zero, protect livelihoods and retain core industries in Europe."

In their 2019 Climate Action Report, The Chairman and Chief Executive, Lakshmi N. Mittal, of ArcelorMittal said:

"As the world's leading steel company, we are committed to the objectives of the Paris Agreement and I want to reassure our stakeholders that we will do our best to contribute effectively to a low-carbon world and, in doing so, help them manage their own risks and ambitions" ... "we need to develop

breakthrough low-emissions steelmaking technologies. We are working on the technologies for several potential pathways including circular carbon and clean power, and these underpin our ambition to significantly reduce our carbon footprint by 2050. We are in the process of running pilots of these different technologies at various plants in Europe, where regulation today is most advanced, and where we have an ambition to reach carbon neutrality by 2050."

In their 2019 Climate Action Report, ArcelorMittal stated:

"While steel may have a lower carbon intensity than many other materials, the large volumes of steel produced globally mean that the industry emits over three gigatons of CO_2 annually."