



PhD student Rana Faisal Shahzad and Dr Shahid Rasul discussing a CO₂ recycling project with Dan Ferguson of SUEZ recycling and recovery UK, at the SUEZ plant in North Tyneside.

Jun 28, 2022 14:44 BST

UK-wide net zero target takes a step forward with CO₂ recycling project

Carbon dioxide and water could be recycled into renewable future fuels under a new system being developed by engineering experts at Northumbria University.

Funding for this project has been awarded by [Northern Accelerator](#), a partnership between all five of the North East's universities that supports the creation of innovative businesses based on research by regional academics.

This £50,000 award will further an existing collaboration between Northumbria University and [SUEZ recycling and recovery UK](#) which could create a safe and sustainable pipeline of carbon-based fuels made from waste flue gases.

Led by [Dr Shahid Rasul](#), a senior lecturer in the University's Department of [Mechanical and Construction Engineering](#), the team has successfully used an inexpensive copper-based catalyst to convert CO₂ into both gas and liquid fuels.

Carbon monoxide is used in processes such as metal fabrication, drug, alcohol and fragrance manufacture, and in industrial and domestic heating. It is hoped this development will have a major impact on both society and industry, including the areas of speciality chemical production, pharmaceuticals, electronics, and the metallurgy sector.

A leading early career researcher on developing efficient catalysts for CO₂ utilisation, Dr Rasul explained: "Production of on-site and on-demand renewable fuels from recycling CO₂ and water will be a significant development for the process industries and gas distributors.

"For example, if we produce on-site and on-demand carbon monoxide (CO) from recycling CO₂, it could support industrial partners, such as SUEZ, in delivering an affordable supply of CO from their waste flue gases. It will provide flexibility and ease of operation and eliminate workload in ordering supplies, monitoring stock, and logistics. Our technology will produce both the quantity and quality of CO required, according to demand."

The process, which uses cost-effective and efficient materials and electrolyzers that in turn use renewable electricity, will not only produce future fuel more sustainably, but will generate energy from waste, including landfill waste, and prevent atmospheric emissions by capturing and re-using gases such as methane.

Andrew Hughes, Regional Director at Energy North, SUEZ said: "We're developing a number of Carbon Capture, Utilisation and Storage (CCUS) projects in the region, so this partnership immediately felt like a natural fit for us, very much aligned to our sustainability targets.

“We’re pleased to have the opportunity to collaborate with Dr Rasul and his team at Northumbria University. Together we’ll explore the long-term feasibility of recycling the CO₂ captured from our energy assets.”

Dr Carolyn Horrocks, IP Commercialisation Manager at Northumbria University said: “To meet the UK’s ambitious CO₂ emission target, it is clear that new technological developments which utilise waste CO₂ as a resource are essential.

“With significant expertise in CO₂ conversion to CO, Northumbria will through this collaboration with SUEZ gain a real understanding of the needs of industry, making Dr Rasul and his team well placed to deliver a proof of concept that could provide a major step forward in this area.”

Northumbria University is ranked highly for its engineering research power in the [Research Excellence Framework 2021](#), with 90 per cent of its studies rated as either world-leading or internationally excellent.

This 12-month project is one of a number to have received funding from Northern Accelerator across all disciplines, including health, wellness and social care, business, and climate change. Northern Accelerator is funded by Research England’s Connecting Capability Fund. Click here to [find out more](#).

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