

Westmorland Geological Society

The geology of carbon capture and storage: why we need it, what it is and what is holding it up

Professor Richard Worden

Department of Earth, Oceans and Ecological Science, University of Liverpool

Wednesday 21 April 2021, 19.30

Hosted on Zoom - guests email westmorlandgeolsoc@gmail.com to register

Carbon capture and storage (CCS) is a strategy designed to cut emission of the greenhouse gas: carbon dioxide. Carbon (dioxide) emissions result from practically all human activity from farming, cement, steel and other metal manufacture, as well as electricity, heat and power generation by burning fossil fuels. Carbon emissions must be cut to avoid catastrophic global warming which will otherwise result in sea-level rise by metres, loss of farmland, drowning of coastal cities, contamination of precious fresh water, increased storminess and the attendant human disasters that will result from any one of these consequences.

A major problem is that countries, corporations, and individuals are unwilling to change the way they function and live and are reluctant to face up to the long-term consequences of today's actions. Note carefully, this is not just a question of building windfarms or more nuclear power stations as cement, steel, and farming account for a massive proportion of carbon emissions. Carbon capture and storage collects CO₂ from industrial point sources of generation (power stations, and cement and steel factories), and injects it deep underground, to be locked up forever. Whilst there are serious factors holding up large-scale adoption of CCS, there are precedents from a few oil and gas production companies that have already injected separated CO₂, naturally present in some oil and gas fields, back into the sub-surface, over a period of 60 years. What is needed now is on a wholly different scale: all globally-produced industrial CO₂ must be separated from exhaust gas streams and piped or shipped to CCS sites. In this talk we will cover some of the background but focus on the geology of carbon capture and the factors inhibiting large-scale adoption of CCS. We may also touch on possible public resistance to CCS given that it will almost certainly cause micro-earthquakes, like shale-gas exploitation.

Richard is a Professor of Geology in the Department of Earth Ocean and Ecological Sciences at the University of Liverpool in the UK. Richard studied Geology with Geochemistry at the University of Manchester, graduating in 1984, and then continued with a PhD in Geology in 1988, also at Manchester. He has published more than 160 peer-reviewed papers and edited six special publications. He was formerly chief editor of Geofluids and was a long-serving associate editor for the Journal of Sedimentary Research. Richard has supervised nearly 40 PhD students and 13 research assistants. He has taught modules on petrophysics, carbon capture, basin analysis, sedimentary (rock and fluid) geochemistry and hydrogeology and has led field classes all over the UK. Richard has undertaken research in CCS for more than 20 years, focusing on issues linked to reservoir and top-seal rock properties in the presence of high-pressure CO₂ injection.

Westmorland Geological Society welcomes new members

<https://www.westmorlandgeolsoc.co.uk/>

https://www.youtube.com/channel/UC6uVPL3DMpqJXyTS-Z_6ADA

