



## Geological Solutions in the QUEST for Decarbonization

Shell's Quest carbon capture and storage (CCS) project is proof that large scale CO<sub>2</sub> capture is a feasible method of reducing industrial CO<sub>2</sub> emissions. To date Shell has captured and stored over 6 million tonnes of CO<sub>2</sub>. To put this into perspective, it is approximately 6% of South Africa's national pledge for absolute reduction between 2025 and 2030.



Geological carbon sequestration, the process of storing carbon dioxide (CO<sub>2</sub>) in suitable underground geological formations, could play a significant role in reducing GHG emissions. The Council for Geosciences in partnership with the Government of the Republic of South Africa has received financing from the World Bank through the Carbon Capture and Storage Trust Fund towards a Carbon Capture, Utilisation and Storage (CCUS) facility in the proximity of the Eskom's Kusile Power Station.



Notwithstanding the early indicators of CCS efficacy in reducing CO<sub>2</sub> emissions, the full repercussions and consequences of CCS are not yet fully understood, with more research needed to understand the effects of fluid flow combined with chemical, thermal, mechanical and biological interactions between fluids and surrounding geological formations.

Accordingly, to fully realise the potential benefits of CCS it is critical that industry and finance houses form strategic and research partnerships with knowledgeable professionals and academic institutions towards ensuring the scientific rigor and long-term effectiveness of these solutions.

*It is likely therefor that the Geosciences, and its practitioners, are set to play a key role in creating geological carbon capture and storage solutions that not only ensure a reduction in CO<sub>2</sub> emissions but also that this is done safely and sustainably.*

In this context, the University of Cardiff, for example, is doing some excellent work in generating novel CCS solutions that could have positive broad and global impacts.

It is with these far-reaching impacts in mind that [XMS](#) has taken the lead in driving the development of novel carbon sequestration methodologies through the various global standards and frameworks for certifying carbon emissions reductions.

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**Sources:**

Donald J. DePaolo, David R. Cole, Alexandra Navrotsky, and Ian C. Bourg. Mineralogical Society of America, Volume 77: Geochemistry of Geologic CO<sub>2</sub> Sequestration

[https://m.engineeringnews.co.za/article/south-africa-aims-to-bring-pilot-carbon-capture-project-online-in-2023-2021-08-23/rep\\_id:4433](https://m.engineeringnews.co.za/article/south-africa-aims-to-bring-pilot-carbon-capture-project-online-in-2023-2021-08-23/rep_id:4433)

[https://www.shell.ca/en\\_ca/about-us/projects-and-sites/quest-carbon-capture-and-storage-project.html](https://www.shell.ca/en_ca/about-us/projects-and-sites/quest-carbon-capture-and-storage-project.html)

U.S Geological Survey (USGS), 2011: The Concept of Geologic Carbon Sequestration