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Underground CO2 storage in Denmark; the key role of DTU Offshore in energy transition

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Abstract

Carbon Capture and Storage is one of the most significant technologies if we are to reduce CO2 emissions and tackle climate problems. It is therefore a top priority for the Danish government and is also one of DTU Offshore - Danish Offshore Technology Centre's key technology areas. Beside the potential of underground CO_2 storage, there are certain challenges such as CO_2 capture, transport, storage safety, etc. that need to be addressed. The North Sea chalk is mainly composed of calcite ($CaCO_3$), for which the solubility in water is strongly enhanced by carbonation. Therefore, there is a dynamic reaction between $CaCO_3$ and CO_2 in aqueous solutions, which implies the importance of rock-fluid chemistry. The risks associated with CO_2 storage in chalk fields prevented any field case so far. Therefore, unlocking the potential for CO2 storage in chalk reservoirs will open up large additional storage capacities both in the North Sea and globally. DTU Offshore plays a key role on energy transition in Denmark by conducting two research programs targeting two different underground chalk fields in the Danish part of the North Sea. One of which is the ambitious and innovative CCS project, Bifrost, that is showing very promising results for storing CO2 in the Danish North Sea is funded by EUDP - Det Energiteknologiske Udviklings- og Demonstrationsprogram, and carried out in collaboration with partners from industry and academia. Therefore, the central position of DTU Offshore - Danish Offshore Technology Centre as Denmark’s national R&D centre for offshore technologies and the overall view of the research on CCS in chalk reservoirs through our ongoing research programs are discussed in this presentation.