



## **Competitiveness and potentials of UCG-CCS on the European energy market**

T. Kempka (1), N. Nakaten (1), R. Schlüter (2), T. Fernandez-Steeger (1), and R. Azzam (1)

(1) Department of Engineering Geology and Hydrogeology, RWTH Aachen University, Aachen, Germany (kempka@lih.rwth-aachen.de), (2) DMT GmbH & Co. KG, Essen, Germany (ralph.schlueter@dmt.de)

The world-wide coal reserves can satisfy the world's primary energy demand for several hundred years. However, deep coal deposits with seams of low thickness and structural complexity do currently not allow an economic exploitation of many deposits.

Here, underground coal gasification (UCG) can offer an economical approach for coal extraction. The intended overall process relies on coal deposit exploitation using directed drillings located at the coal seam base and the subsequent in situ coal conversion into a synthesis gas. The resulting synthesis gas is used for electricity generation in a combined cycle plant at the surface. A reduction of the CO<sub>2</sub> emissions resulting from the combined process is realized by subsequent CO<sub>2</sub> capture and its injection into the previously gasified coal seams.

The scope of the present study was the investigation of UCG-CCS competitiveness on the European energy market and the determination of the impacting factors. For that purpose, a modular model for calculation of UCG-CCS electricity generation costs was implemented and adapted to the most relevant process parameters. Furthermore, the range of energy supply coverage was estimated based on different German energy generation scenarios.