

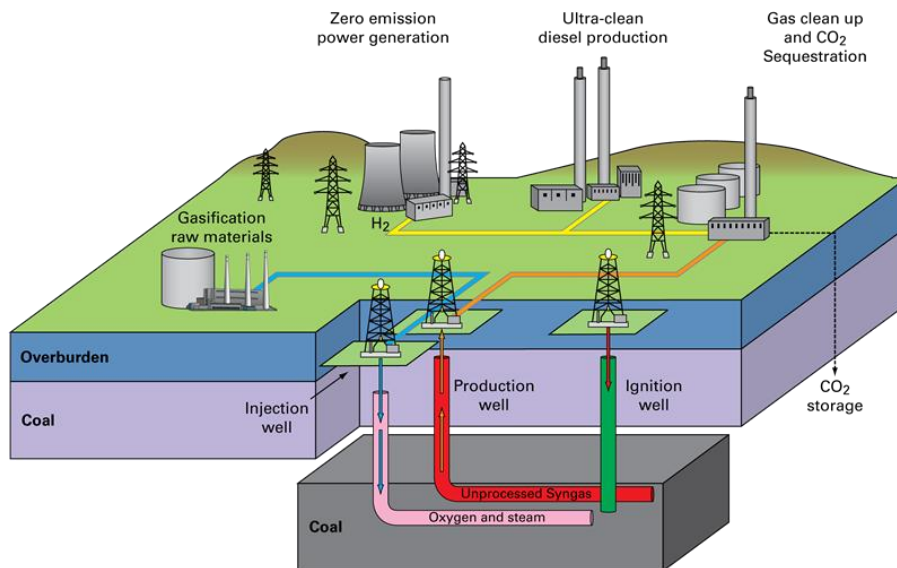
## New life for old coal

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Coal-fired power plants still have a sizeable carbon footprint, despite advances in technology that have made them 'greener'. On the other hand, many of the world's coal reserves are also lying unused because the seams are simply too deep to dig out.

Researchers at the University of Leeds, together with leading Institutions from Bulgaria, Germany, Greece, and Portugal hope to solve these problems by exploring a greener, safer and cheaper way of using coal from deep underground seams as an energy source in a €3 million project funded by the Research Fund for Coal and Steel of the European Commission (UCG & CO<sub>2</sub> STORAGE, RFCR-CT-2010-00003).

Under the proposed Underground Coal Gasification (UCG) scheme, coal would be gasified underground to generate combustible gases, offering a new lease of life to coal seams that are too expensive to mine. The depth is sufficient for UCG to be combined with CCS in the dense phase to fulfill the objectives of low-carbon energy supply and energy security envisaged in the UK Energy White Paper (2010).



The reasons for the increase of UCG trials around the world are fourfold:

- Technology advances such as the improved accuracy of directional drilling, and better utilization of produced gases in gas turbines;
- Economical drivers, such as the higher natural gas prices, increase in energy consumption by industry, concerns about peak oil and uncertainties in price and availability of crude oil in long-term;
- Environmental impact advantages of UCG which include: no ash and coal handling on surface, elimination of need for mining and land reclamation process, minimization of surface disruption due to the depth, reduced air emissions, water contamination and subsidence.
- Finally CO<sub>2</sub> gas produced can be captured and sequestered (re-injected into strata) which will reduce the amount of CO<sub>2</sub> emission up to half of the amount released in surface gasification process.

The potential environmental impact of this scheme is enormous, because all power plants across Europe will have to incorporate some system of carbon capture and storage to meet EU targets on greenhouse gas emissions. This two-step process could make it easy to meet these targets, whilst making the most of coal seams that might otherwise be impossible to exploit.

One of the main objectives of the current project is to investigate Carbon Capture and Storage (CCS) of CO<sub>2</sub> in parallel with the development of UCG technologies, enhanced by high pressure. Laboratory tests, simulations and assessment of technical and economic feasibility will be carried out under the current project to pave the way for the large scale trial and commercial applications that could result from this study.

The project is being coordinated by the Bulgarian company Overgas Inc. AD and sponsored by the European Commission. The other partners are the Geological Institute of the Bulgarian Academy of Sciences (BAN), the Institute for Solid and Fuels Technology Applications (Greece), the Instituto Superior Técnico of Technical University of Lisbon (Portugal), DMT GmbH & Co KG (Germany), Geo-ForschungsZentrum Potsdam (Germany) and UCG Engineering Ltd (UK).



A UCG trial facility at El Tremedal in northeast Spain in 1998