Environment and Sustainability Committee

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Shale gas and gasification – Evidence from UCG Association

The potential for Underground Coal Gasification in Wales

The UK has a long history with coal, which is not always viewed as a positive, but its pivotal role in powering the economic growth and modern development of the nation during the industrial revolution was highlighted for the world to see at the opening ceremony of the 2012 London Olympics.
The UK also has a long history with UCG, as the concept was originally developed here by Sir William Siemens in 1868.

Today advances in science and technology have transformed every aspect of life, eradicated diseases and alerted us to unseen dangers such as carbon emissions - coal has publicly fallen from grace.

But is that about to change?

'*The United Kingdom is well placed within Europe in having large reserves of indigenous coal both onshore and offshore in the southern North Sea,"* points out the UK's Coal Authority.
The department of energy and climate change (DECC) said*: "These reserves have the potential to provide security of future energy supplies long after oil and natural gas are exhausted. UCG has the potential to provide a clean and convenient source of energy from coal seams where traditional mining methods are either impossible or uneconomical.*

So why is UCG now coming to the attention of policy makers as an economic and politically acceptable method to meet growing energy needs?
Advances in science and technology!

The UK resource suitable for deep seam UCG is estimated at **17 billion tonnes, or 300 years'** supply at current consumption, according to a 2004 Department of Trade & Industry report
UCG therefore offers enormous potential to contribute to the energy security and independence of the UK for decades and could constitute a key component of the energy mix that secures transition to a low-carbon economy.

Development of Modern UCG

UCG has been piloted around the world for decades; one installation at Angren, Uzbekistan has been in production for more than 50 years.
There have been too many milestones in the history and development of modern UCG to detail here, but most significant advances have been pioneered in the oil and gas industry.
Sophisticated horizontal and directional drilling techniques, improved control of the process, and better intersection of the coal seam. Plus greater understanding of site selection criteria, hydrogeology, seismic technology and environmental impacts - ***which are fully manageable with the right coal and overburden structure.***
But please note UCG does not involve fracking!

Most recently successful trials of modern UCG undertaken in Australia, Canada and New Zealand have proven the technology viable and capable of recovering up to 80% of the calorific value of coal. This is a significant increase compared with other extraction methods

Costs

In terms of production costs, in 2002 the UK Government's then DTI completed a cost analysis in its study which indicated that UCG could be competitive with above ground coal gasification, maybe at prices of around 2-4p/kWh, depending on carbon capture options and project size the cost of UCG is highly dependent on local conditions and the scale of the project.

UCG – CCS

When coupled with carbon, capture and storage (CCS), UCG becomes an even more attractive proposition. As syngas is produced at temperatures, pressures and CO_2 concentration levels that enable relatively simple, low-cost carbon removal prior to use. The CO_2 can then be used for enhanced oil recovery, or reinjected into spent UCG cavities Other UCG - CCS synergies are also being investigated, including the common spatial coincidence of deep coal seams and deep saline aquifers or depleted gas reservoirs.

UK Licenses

The UK Coal Authority has already issued 20 UCG licenses to six companies to operate in the UK:
BCG Energy, Clean Coal Ltd, Europa Oil and Gas, Five Quarters, Riverside Energy and most recently to Cluff Natural Resources.
Most have not progressed beyond initial licensing, apart from Five Quarters, having recently been awarded funding by the government to explore gas fields in the North Sea, using a variety of available technologies including UCG.
Most of these sites are off the east coast of England and Scotland, two are in Wales
All are close to regions that once thrived on coal production

Benefits for Wales

The benefits for Wales will be economic, due to an influx of skilled workers and increased local spending.
Local employment opportunities, as UCG is a localised energy source, the produced syngas does not travel distances in the way of natural gas, so all processing and probably utilisation of the syngas will be local. This should in turn produce and attract interest from industry.
Added to this a UCG site would also be used for training, adding to local skills, plus as UCG is being looked at globally, opportunities to benefit and participate in overseas projects.
There would also be presumably revenue from taxes and site rents.

Regulatory and Planning Issues

The UCG Association has worked with both UK regulators, the Environment Agency and the Health and Safety Executive to discuss in detail how UCG projects work.
The result is now a clear defined regulatory regime that specifies what conditions UCG projects must meet in order to obtain the necessary permits.
This should provide confidence to local planning authorities that UCG will be undertaken responsibly and safely and that all necessary investigations, monitoring and independent verification will be completed before syngas can be produced.

So what is stopping Commercial UCG Development?

The main issues hindering development are planning consent, financing and public concerns. While the latter two are trying to be addressed by the industry, the former relies on planning authorities having a firm understanding of UCG, its prospects and practicalities.
Generally, the UK's planning authorities have been very open to the idea of UCG.

But on top of the regulatory barriers there is a "barrier of public acceptance".

Reticence towards UCG among those evaluating planning applications is understandable due to public concerns over the process and potential impacts it can have on communities.

Can these concerns be addressed?

The biggest issue is the view of many in today's society that anyone working in the energy sector is driven by financial gain with a total disregard for the environment.
The companies that are promoting the commercial application of new energy techniques are rarely the people who have perfected the process.

New energy technologies are developed by scientists and engineers.
Only when an application is scientifically proven, after many years of applied research, can it be taken to commercial stage. Few companies have R + D departments, most advances are from the scientific and technical communities.
This view is not only hampering energy it is hampering the future of the UK economy and the futures of generations to come.

In Wales both Cardiff and Swansea Universities, who have been researching UCG, have young geologists and chemical engineers in earth science departments exploring and learning techniques that have no future if attitudes do not change. Across the whole country there are students investigating every aspect of energy technology and application - there will be no future employment and no energy scenario until both industry and government work to change the public perception of new energy technologies and get past negative media dogma.

But the industry and companies exploring and developing UCG are not shying away from these concerns, they are addressing them and attempting to allay fears through information and application.

It is in the interests of all that the UCG process is safe and fully tested and that public and political concerns are acknowledged and explored.

Enabling Wales and other parts of the UK to again flourish and benefit from a new era of indigenous energy production, industrial and economic growth and back in a position to show the world how to use coal.

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Further information on UCG can be obtained from:
UCG Association - www.ucgassociation.org
The IEA CCC – www.iaeccc.org
The World Coal Association - www.wca.org
The Coal Authority – www.coal.decc.uk.

More information on the permitting process for underground coal gasification is available at www.environment-agency.gov.uk/business/topics/122756.aspx