UNDERGROUND COAL GASIFICATION

UCG versus SHALE GAS: CHALK and CHEESE

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(in dissolution, March 2015)
OUTLINE OF PRESENTATION:

• Cost of clean power in UK
• Opportunity for UCG
• Compare and contrast UCG and shale gas
• Public attitude to unconventional oil and gas in UK
• Debunking myths about renewables
• Prognosis for UCG in Britain
FORECAST UK GENERATING COSTS
(including CCS for new fossil fuel stations)

- OFFSHORE WIND £140 – 170/MWh
- ONSHORE WIND £80 – 100/MWh
- NEW NUCLEAR £93/MWh
- CLEAN COAL (combustion) £110/MWh
- COAL GASIFICATION (IGCC) £110/MWH
- EXISTING CCGT (no CCS) £60 – 100/MWh
- NEW CCGT + CCS £90 - 110/MWh
- UCG + CCS £70/MWh
HOW ABOUT UCG IN 2015?

In 2010, the cost of generating power in UK on a CCGT fed with UCG gas, including CCS, was calculated as £66/MWh (using methodology of Mott Macdonald report for DECC, June 2010, comparing a wide range of power generation methods).

Today, that figure may have inflated to around £70/MWh.

N.B. No cost of coal (royalty) is included.
CURRENT UK BULK POWER PRICES

• WERE £40/MWh,
• THEN £50/MWh,
• SOON £60/MWh?
• BUT NONE OF THE FORECAST CLEAN GENERATION COSTS EXCEPT UCG COMES CLOSE TO MAINTAINING THIS
In common with many European countries, UK is facing a crisis of shortage of generation capacity and increase in generation costs.

- Coal has been the lowest-cost source of power, but coal burning has been coming under increasing environmental pressure.
- Enormous resources of coal remain in Britain.
- No other generation method, not even prolific shale gas, can match the expected cost of power generated from UCG gas.
RAW SYNGAS IS TYPICALLY 20 – 40% CO2, PLUS CH4, CO AND H2, WITH CV ABOUT ONE-THIRD THAT OF NATURAL GAS;

- BY SCRUBBING OUT THIS CO2, CV INCREASES TO ABOUT HALF THAT OF NATURAL GAS;

- CH4 AND CO CAN BE REFORMED TO CO2 PLUS H2;

- BY REMOVING ALL CO2, RESIDUAL FUEL GAS IS ESSENTIALLY H2;

- SYNGAS IS NOT READILY CONVERTIBLE TO PIPELINE-SPEC NATURAL GAS EQUIVALENT;

- SHALE GAS IN CONTRAST IS MARKETABLE AS CONVENTIONAL NATURAL GAS.
UCG vs. SHALE GAS (2) CO2 REMOVAL

- NOT PERMISSIBLE TO BURN UCG SYNGAS IN UK WITHOUT CARBON CAPTURE;
- UCG WELLHEAD PRESSURE TYPICALLY ABOVE 30 BAR AND HIGH CO2 CONTENT ALLOWS PHYSICAL RATHER THAN CHEMICAL ABSORBENTS;
- COST OF CO2 CAPTURE AND STORAGE FROM UCG IS CALCULATED AT LESS THAN $30/T CARBON ($14/T CO2)
- COST OF FLUE GAS SCRUBBING FROM SHALE GAS CAN BE FIVE TIMES GREATER;
- SHALE GAS COULD BE REFORMED AND CO2-SCRUBBED BEFORE COMBUSTION - EXPENSIVE
UCG vs. SHALE GAS (3) ECONOMICS

• WILL COST OF SHALE GAS UNDERCUT UCG?
• PROBABLY NOT; SHALE GAS IN UK IS FORECAST TO COST AROUND PRESENT COST OF NATURAL GAS

• WILL SHALE GAS BE ABLE TO BE BURNT WITHOUT CCS?
• MAYBE INITIALLY, NOT IN MEDIUM / LONG TERM
UCG vs. SHALE GAS  (4) ENVIRONMENT

• UCG REQUIRES THE STRATA AND GROUNDWATER TO BE UNDISTURBED AND GAS-TIGHT

• IT DOES NOT ENTAIL FRACTURING
• IT DOES NOT ENTAIL PUMPING OUT WATER
• IT DOES NOT ENTAIL PUMPING IN CHEMICALS

“CHALK AND CHEESE”
UCG vs. SHALE GAS (5) LICENSING

- SEPARATE LICENSING REGIMES APPLY IN UK FOR SHALE GAS AND FOR UCG
- BOTH CANNOT BE WORKED IN PRACTICE IN THE SAME LOCATION
- ARRANGEMENTS TO CO-ORDINATE AND PRIORITISE GIVE PRESUMPTION IN FAVOUR OF SHALE GAS
UCG vs. SHALE GAS (6) AREA REQUIRED

THE ENERGY PRODUCED BY UCG PER SQ KM OF LICENSED AREA IS AN ORDER OF MAGNITUDE, EVEN ORDERS OF MAGNITUDE, HIGHER WITH UCG THAN WITH SHALE GAS, DEPENDING ON THE NUMBER OF COAL SEAMS ACCESSIBLE

THE COMPARISON IS ANALOGOUS TO COALBED METHANE (CBM) WHERE A GIVEN BLOCK OF COAL WILL PRODUCE C. 20 TIMES AS MUCH ENERGY BY UCG COMPARED TO CBM
TYPICAL COASTAL SITES LICENSED FOR UCG
ENGLAND AND WALES
DEBUNKING MYTHS ABOUT WIND FARMS

Ed Davey’s plan for 400 turbines to be erected off the Yorkshire coast will be a serious burden on the taxpayer. That is the view of Dr. James Delingpole, who writes:

“Ed Davey’s plan is the most unashamedly political and unscientific project in UK energy policy for many a year and it is hard to see how a government which is so intent on dividing the country could have so little regard for the environment or the taxpayer.

The government has estimated that the project will cost £5 billion and will provide 400 megawatts of electricity. This is a small proportion of the UK’s energy needs, but it is significant because it will require vast amounts of land and sea space.

The project will also have a significant impact on the local community. The government has said that it will provide jobs and economic benefits, but there is little evidence to support this claim.

The government has also said that the project will help to reduce carbon emissions, but there is little evidence to support this claim. In fact, the project is likely to increase carbon emissions, as the turbines will require a significant amount of energy to operate.

The government has also said that the project will help to reduce energy costs, but there is little evidence to support this claim. In fact, the project is likely to increase energy costs, as the turbines will require a significant amount of energy to operate.

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Wind farms win contracts in first competitive auction

By Emily Gosden

TWO offshore and 15 onshore wind farms have won subsidy contracts in the Government’s first competitive green energy auction, significantly undercutting the prices that have been handed to other projects.

The results of the auction suggest consumers may be paying hundreds of millions of pounds a year too much on their energy bills because ministers previously allocated subsidies without competition, providing much higher returns to investors.

More generous subsidy schemes should now be shut down and excess subsidies clawed back, critics said.

In total, ministers gave the go-ahead to 27 green energy projects, with estimated lifetime subsidy costs totalling £4bn.

Energy companies were forced to bid against each other in “reverse auctions” with the cheapest proposed projects in each category being awarded subsidies.

As a result ScottishPower’s East Anglia offshore wind farm, due to start generating in 2018-19, secured a contract at £114.39/MWh.

Until now the Government has not required companies to compete for green energy subsidies and has offered a blanket level of subsidy to each technology, irrespective of actual costs.

Last April £16.8bn of subsidy contracts were awarded on that basis. Three offshore wind farms due to start generating power in 2017 were guaranteed £150/MWh, while two others due to be running by 2018 or 2019 were guaranteed £140. The lack of competition in the process was heavily criticised by the National Audit Office.

Keith Anderson, chief executive of ScottishPower, said the East Anglia project had set a new “benchmark” for costs and would be “one the best value offshore wind farms ever developed anywhere in the world”.

“It signals a major industry breakthrough in efforts to reduce the costs of offshore wind,” he said.

Ed Davey, the energy secretary, said yesterday’s projects were “a lot cheaper because we brought in competition” but denied the Government had overpaid previously, insisting it could not have introduced competition sooner.
PROGNOSIS FOR UCG IN UK

COMPARED WITH OTHER AVAILABLE MEANS OF POWER GENERATION, UCG OFFERS THE LIKELIHOOD OF BEING A MAJOR, AFFORDABLE, CLEAN, DOMESTIC ENERGY SOURCE

UCG DOES NOT JUSTIFY THE “READING-Across” OF OBJECTIONS RAISED TO SHALE GAS
A global alliance of knowledge, expertise, training, networking & information for Underground Coal Gasification

(in dissolution, March 2015)

www.ucgassociation.org