

DECC questions on unconventional gas

Douglas-Westwood Response

We are currently carrying out research for a report on unconventional gas which we plan to publish end Q1 2011 so at this stage find it difficult to give meaningful answers to your questions. However, some comments are appended below.

John Westwood, Chairman Douglas-Westwood 20 Nov 2010

1) Where and how great are unconventional gas resources outside of North America?

- In particular, how do you see the distribution of gas resources within Europe?

Considering both shale gas and coal bed methane, it is very widespread. There is also smaller but still significant potential for underground coal gasification in Europe. Douglas-Westwood

2) What do the economics of developing unconventional gas look like?

- How do the costs compare across unconventional plays or between unconventional and conventional plays?
- What are the key drivers of these costs?
- What are main technical and economic challenges to bringing unconventional gas to market?

There seems to be a very large range of views on this subject area with some believing that the full-cycle cost to be 1.5 to 2 X present US gas prices.

The major difference between shale gas and conventional development (apart from the need to fracture the formation to release the shale gas) is that shale gas development demands drilling of very large numbers of wells as the fracturing process covers a very small area. This is almost an 'industrial production line processes' compared with conventional gas drilling. The economic viability of shale gas is also dependent upon a high conventional natural gas price.

Economics will therefore vary widely by region due for example, due to the very different availability of land drilling and frac rigs (for example, there are very few in Europe versus the thousands that exist in N America). There have also been tax breaks available for shale development in N America which have not been seen in Europe.

3) Where (in which region) and what magnitude are current and planned unconventional gas projects?

- What fraction / magnitude of investments are aimed at developing unconventional gas?
- At what stage are these investments (e.g. FID, under construction, development stage)?
- What do you see is that likelihood of different plays being delayed or not coming to market at all?
- What are your projections for the amount of unconventional gas (in your portfolio) that will be produced in the coming years?

We hold a considerable amount of data on this but are unable to release it into the public domain for commercial reasons (it has been expensive and time consuming to gather and the data is central to our forthcoming published report).

4) What are the barriers in each region to the further development of unconventional gas?

- These might be:
 - Environmental regulations;
 - Land rights;
 - Geology;
 - Technology; and the availability of infrastructure

This is dependent upon the situations in specific locations within a region so it is difficult to generalise. For example despite the huge BG investment in CBM in Queensland Australia, Perth in WA has in effect unconventional gas stranded due to lack of rigs and pipeline infrastructure compounded by aboriginal land rights.

In Europe land rights may affect development. In the US landowners retain rights of the development of the subsoil, but in Europe this is not the case. Therefore there is little economic benefit for landowners to allow development and drilling. Population density is also a factor with European development. Much of the identified European shale reserves are under or close to urbanised areas. The population density of Europe is approximately three times greater than that of the US.

In both N America and Europe concerns have been raised surrounding the environmental impact of hydraulic fracking. Issues exist with both the water used in the fracking process (volumes needed and subsequent treatment of produced water), and the contamination of ground water aquifers after fracking has been carried out.

In N America inter-state gas infrastructure is more developed than in Europe. Increasing interconnectedness (in particular gas pipelines within central and northern Europe, where the shale reserves are to be found) has been identified by the European Commission as a priority of EU energy policy.