

BG Group Response to DECC's call for evidence on unconventional gas

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

Outside the United States, the biggest coal-bed methane projects are underway in Australia. The wider industry is also looking at opportunities in China. Recent industry estimates, which show the global resource potential for CSG and Shale gas, are contained in this box. N.B North American estimates may be on the low side, given recent developments.

Region	Coalbed Methane (Tcf)	Shale Gas (Tcf)	Tight-Sand Gas (Tcf)	Total (Tcf)
North America	3,017	3,842	1,371	8,228
Latin America	39	2,117	1,293	3,448
Western Europe	157	510	353	1,019
Central and Eastern Europe	118	39	78	235
Former Soviet Union	3,957	627	901	5,485
Middle East and North Africa	0	2,548	823	3,370
Sub-Saharan Africa	39	274	784	1,097
Centrally planned Asia and China	1,215	3,528	353	5,094
Pacific (Organization for Economic Cooperation and Development)	470	2,313	705	3,487
Other Asia Pacific	0	314	549	862
South Asia	39	0	196	235
World	9,051	16,112	7,406	32,560

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?

From a BG Group perspective, this is a difficult question to answer because we have no onshore cost benchmark for conventional plays. Costs for onshore conventional gas in Europe can range from \$2 to \$30 boe and there would be a similarly broad range for unconventional gas.

What are the key drivers of these costs?

The key drivers for unconventional gas costs in Europe are the costs of drilling and the productivity of the basin. Access to infrastructure, including rigs, is important, as are land planning procedures and access to markets. However, the main determinant at this time is the quality of the resource, which in turn is shaped by

issues relating to the permeability of the coal beds or resource density of the shale rock.

The key economic drivers are the cost of the wells and services, and the cost of well stimulation, e.g. fracking. To be successful, unconventional gas production requires low cost services and supplies, which is a challenge in many parts of the world. Underlying everything, the gas price needs to be robust.

□ What are main technical and economic challenges to bringing unconventional gas to market?

The main technical challenges, beyond quality and quantity of resource, are around access to markets. This includes ensuring that infrastructure is in place to transport the gas to market.

It is important to note that the industry has not yet proven that there's an unconventional gas resource in Europe which is economic to develop at large scale. In this context, it is difficult to anticipate the nature of the challenges that could face us. However, if the subsurface is robust then anticipated challenges will revolve around cost of drilling and services, and planning constraints.

Cost of access to technology is another factor in shaping the economics of future projects. For example, the cost of high strength proppant will differ depending on how deep the plays are.

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

BG Group's biggest unconventional gas projects are in the United States and Australia.

□ At what stage are these investments (e.g. FID, under construction, development stage)?

As things stand, the Haynesville and Marcellus shale gas projects in the United States are proceeding. The FID for our Australia CBM to LNG project is due to be made in the coming weeks.

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

The most important starting point in the successful development of unconventional gas is the subsurface: A good and abundant resource must be in place. If it is, then access to land must be established, and there must also be availability of low-cost services and suppliers.

Perhaps one of the most important barriers is access to high value markets. In Europe, access to liberalised markets through pipelines must be in place as an outlet for the gas Operators produce. Elsewhere in the world, LNG terminals could also provide export options for unconventional gas.