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British Geological Survey Bowland Shale Gas Assessment

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The latest exuberant shale gas news comes from a report by the British Geological Survey estimating enormous new shale gas resources in the central UK. On June 27, 2013, the British Geological Survey (BGS) released a natural gas resource assessment for the Bowland Shale in the United Kingdom stating that approximately 40 trillion cubic metres (1,300 trillion cubic feet (Tcf)) of shale gas exist in 11 counties in northern England (Exhibit 1). The BGS report, unfortunately, only addresses gas-in-place (total resources) and not extractable resources (technically recoverable resources) much less reserves (commercial supply). The most-likely reserve potential of the Bowland Shale is only about 42 Tcf (3% of gas-in-place) after applying methods used by the U.S. Energy Information Administration (EIA) and Potential Gas Committee (PGC).

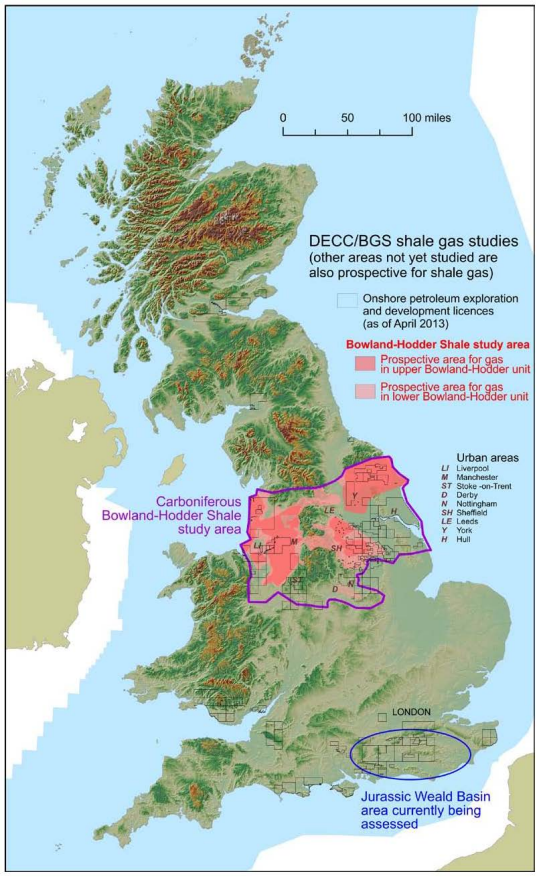

Exhibit 1. Location Map For British Geological Survey Bowland Shale resource assessment.

The potential for misunderstanding of shale resource estimates is great. Various organizations have published resource estimates for shale gas plays in the U.S. and around the world. These reports are commonly misinterpreted as representing commercially producible volumes of gas.

Resources are the volume of natural gas in a particular formation, also known as gas-in-place (Exhibit 2). This has no relation to what is physically or technically producible much less commercially viable. The technically recoverable portion of total resources--Technically Recoverable Resources (TRR)--is that volume that can be produced using present technology. It similarly does not include commercial factors. This is the gas volume most often publicized and confused with reserves, the economically producible subset of technically recoverable resources. The EIA states that TRR represents approximately 25% of gas-in-place for most shale formations.

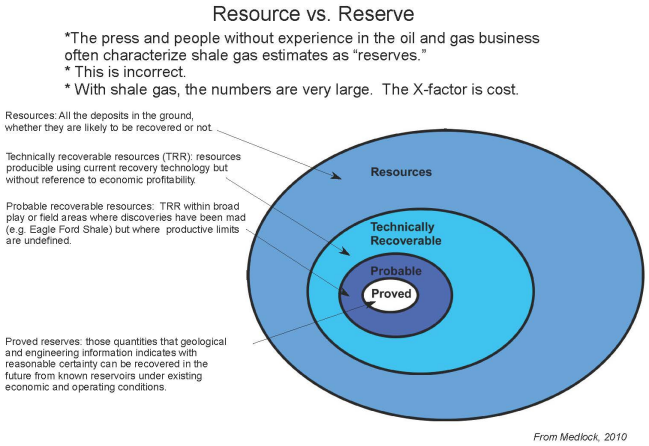

Exhibit 2. Resource vs. Reserve.

Technically recoverable resources are generally divided into three categories based on uncertainty. According to the PGC, probable technically recoverable resources are those gas volumes that are currently being produced in gas fields such as, for example, the Barnett or Marcellus shale plays. Although the history of production is only a few years to perhaps ten years, there is some degree of confidence in projecting ultimate recovery from early producing rates. Possible resources are thought to exist based on new field discoveries. In this category, there is little production history and large areas of potential gas development must be inferred. Speculative resources are gas volumes that are thought to exist but that have not yet been drilled. These clearly have great uncertainty. Reserves are the volume of technically recoverable gas resources that can be produced at a profit based on present assumptions about cost and price. Supply is the much smaller portion of reserves that has been developed and connected to infrastructure so that it is available on demand to consumers.

I first applied the EIA guideline of 25% Gas-In-Place to determine TRR for the BGS low, high and most-likely gas resource cases for the Bowland Shale (Exhibit 3). Next, I used the relative percentages of probable (32%), possible (43%) and speculative (25%) TRR taken from the PGC's latest assessment of the U.S. technically recoverable resource base. Finally, I assumed that 50% of the Speculative TRR would be commercially producible, since there is no production from the Bowland Shale, and used this value as the potential reserve estimate.

Exhibit 3. BGS Bowland Shale Gas-In-Place, Techncially Recoverable Resources and Potential Reserves.

This approach suggests that the most-likely reserve for the Bowland Shale is approximately 42 Tcf. While this is a substantial volume of gas (roughly equivalent to the Barnett Shale accumulation in the U.S. based on a recent evaluation by the Texas Bureau of Economic Geology in press), it will hardly change the energy future of the U.K. Based on well productivity from the Barnett Shale, it will take approximately 30,000 wells to fully develop the Bowland Shale potential reserves.

While the Bowland Shale is the same geological age as the Barnett and Fayetteville shales in the U.S. and is known to be an oil source rock like the U.S.shales, there is no evidence to suggest that U.S. shale production is an analogue for Bowland gas-producing potential. Among the most important factors in shale gas play performance are high organic content, high thermal maturity and high silica or limestone content. These produce brittle shale reservoirs with large volumes of available gas. High organic content also results in creation of important porosity where kerogen is converted to gas because of a volume change.

So far, there is little geochemical data for the Bowland Shale and, while some of the data appears to be in a similar range as for the Barnett Shale, lack of comprehensive data is a risk factor in assessing the potential of the play. Each shale gas play is different and, until industry knowledge is greater, must be viewed as a "one-off" opportunity with a considerable learning curve, unanticipated costs and commercial risk.