AIM
Look at shale gas production profiles with greater granularity, to create a model of potential UK production and the implication it will have on development of the industry.

BACKGROUND
After the shale gas revolution that took place in the United States at the beginning of the century, a number of nations around the world started to consider exploiting their own domestic shale resources. The UK is one of a hand full of countries in which the potential has been more frankly considered. In the ten years leading up to 2013, the UK transitioned from a net exporter of natural gas to a net importer. Energy security is at the heart of the UK interest in shale gas exploitation alongside reason such as climate change and customer affordability.

Natural gas that is trapped in shale rock formation is known as shale gas. Shale rock is a fine-grained sedimentary rock that results from the compaction of silt and clay size mineral particles. The depth at which shale gas resources can be found varies significantly and can range between close to surface level and several thousand metres underground. The extraction process often involves more sophisticated drilling technology than that seen in conventional oil and gas operation. Horizontal drilling and hydraulic fracturing (Figure 1) are two of the technologies that sit at the heart of shale gas extraction operation.

Figure 1- Hydraulic Fracturing Process
Hydraulic Fracturing is a mechanical process that creates a large number of fractures within rock that allows trapped hydrocarbons to be released to production. Tanks on the surface pump high-pressure water containing sand and a small percentage of chemical additives deep into the shale. The sand is used as a ‘proppant’ to hold open the fractures for the hydrocarbon to be release to production.

In shale gas operations unlike conventional resources, the gas is stored at high pressure within the fracture network of the shale rock, thus the initial decline in shale gas production is characteristically high. The initial rapid decline in production in the early years exhibits a hyperbolic curve, however, later switches to an exponential relationship.

METHOD
As former scenarios have been relatively obtuse regarding underlying assumptions, to produce the production scenarios; the modeling process was carried out in three levels, well level, pad level and national level. At each level of the model a combination of literature and industry insights was used to extract a set of clear assumption. The method is summarized and simplified in figure 2 and a list of the main assumptions used is shown in figure 3.

Figure 2- Three Level Methodology

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REFERENCES