

Can 'unconventional' onshore gas assist the transition to a low carbon future?

This short paper explores whether the extraction and use of onshore unconventional gas resources, i.e. shale gas and coal bed methane (CBM), can assist the transition towards a low carbon economy to the benefit of local communities and the UK's energy security. But only after local safety concerns have also been fully allayed.

The missed golden opportunity

North Sea oil and gas has provided the UK with self-sufficiency in oil and gas but those resources are now depleting. The UK was self-sufficient in oil from 1980 to 2010 and was a net exporter of gas between 1997 and 2004. The UK's oil production currently meets over two thirds of our inland requirements. UK gas production has been decreasing since 2,000 and in 2011 was down a fifth on 2010. Imports of Liquefied Natural Gas (LNG) accounted for almost half of the UK's gas requirements in 2011 (DECC, Digest of UK Energy Statistics 2012).

The UK might have used a significant proportion of the proceeds from the windfall provided by the North Sea to invest in sustainable renewable energy systems for when our oil and gas resources become significantly depleted and also for other public investment in the nation's infrastructure such as our rail and water network thereby providing higher levels of employment and supporting our manufacturing industry. But we failed to do so and are now paying the price of our short-sighted approach to the exploitation of our energy resources.

The UK should now be meeting our energy needs with the highest proportion of renewable energy sources in Europe and have the most modern and efficient rail and water systems with all the economic, social and environmental benefits that would follow.

Instead, and taking energy as the example, in 2011 a mere 3.8% of our total energy consumption came from renewable sources which also accounted for 9.4% of electricity generated*. As a comparison with our European partners, in 2009 renewable energy sources represented 3% of our energy requirement compared to Norway 42.4%, France 7.5%, Germany 8.5%, and an EU 27 average of 9%.**

* DECC, Digest of UK Energy Statistics 2012

** 2009 data from http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Renewable_energy_statistics

Lessons for onshore unconventional gas?

Can we learn from the missed opportunity of North Sea oil and gas and avoid making the same mistake again as the UK starts to look more actively at extracting onshore natural gas? Or will we continue with the short-term approach that has handicapped national policy making in the UK?

Estimates on the amount of economically recoverable onshore gas reserves in the UK vary widely from less than 10 years to several decades of UK gas requirements; the longer estimates tend to be from the gas industry itself. Furthermore onshore gas is seen by some as an opportunity for lower energy prices over the next few decades and a response to the UK's own potential energy gap in the 2010s/2020s and high energy prices as worldwide demand for oil and gas exceeds supply.

However, others, and especially those communities facing gas exploration and extraction within their own local area, raise concerns over the potential contamination of soils, rivers and groundwater from the extraction methods deployed that could be extremely difficult to rectify. The other significant concern is the need to radically reduce our dependence on carbon based fossil fuels as these contribute to climate change through greenhouse gas emissions (principally CO₂ and methane); the UK has international commitments to reduce these emissions.

Natural gas including unconventional gas is the cleanest of the carbon based fuels (gas, oil and coal) in terms of CO₂ emissions from combustion. However, CO₂ and methane emissions arising from the extraction practices deployed (e.g. hydraulic fracturing for shale gas) need to be taken into account also; the relative cleanliness of unconventional gas is not entirely clear cut.

Taking a pragmatic approach to onshore gas production and assuming that gas extraction can be done safely, there are two key requirements that need to be met for this to go ahead as a sustainable path to better energy security and a low carbon economy for the UK.

1. The first requirement concerns the environmental health of the local community. The extraction of onshore gas should only be undertaken with full and proper safeguards in place so that:

(a) the gas will be extracted safely without harming the local environment, or turning natural landscapes that are so important for food production, biodiversity, tourism and leisure into industrial landscapes. It would be for the gas exploration/production company to fully satisfy (i) regulators that its methods were safe and (ii) the local planning authority that any disruption to local roads and environments would be kept to acceptable levels;

(b) guarantees are provided by HM Government that all exploration and extraction activities will be strongly regulated by the Environment Agency and Health & Safety Executive to safeguard against contamination of soils, rivers, and groundwater aquifers etc as well as the safe operation of the associated plant and machinery; and

(c) HM Government requires all risks of water and land contamination to be fully underwritten by the gas production company so that any damage is fully rectified should a pollution incident occur.

2. The second requirement is that an agreed proportion of the revenue generated by the commercial production of onshore gas is invested in the local community, whose gas reserves are being exploited. This investment should be in renewable energy locally, or in the same local authority area where local conditions are unsuitable, so that we start to displace CO₂ from other dirtier fuels and when the gas runs out the local economy and the UK will have sustainable energy resources in place.

Conclusion

This paper suggests that there can be a sustainable approach to the extraction and use of onshore gas. It cannot be fair to expect local communities to take all the risks and disruption with little or no benefit whilst ignoring the increasingly urgent need to replace fossil fuels with renewables. It recommends that any responsible planning authority giving planning permission for the exploration and extraction of onshore gas should only do so by insisting on the two key requirements:

- (i) **safe exploration & extraction with strong regulation**, and
- (ii) **investment in renewables** within the local authority area.

The question that needs to be answered once local environmental and safety concerns have been fully allayed with robust safeguards and guarantees in place is this: Do we have the foresight to use unconventional gas both safely and to finance renewables as part of our transition to a modern low carbon economy that is significantly less dependent on carbon based fossil fuels? Otherwise, when the gas runs out, what then?

In woodland management new trees are planted to replace those cut down for timber. We need to apply this basic principle of sustainability and create new renewable energy resources from fossil fuels to replace those fossil fuels consumed within the economy. If we can also offset the CO₂ emissions from the continued use of fossil fuels, that has to be worth doing.