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Question 24 (in <http://www.nottinghamshire.gov.uk/media/127419/issues-options-2017.pdf>)

(1) Economics of Unconventional oil and gas

On page 35 of the Issues and options paper about the Nottinghamshire Minerals Plan there is a claim that

"Vast quantities of methane exist in many shale deposits worldwide and recent technological advances have now made it economically possible to exploit them."

In fact one of the most noteworthy features of efforts to tap shale oil and shale gas has been that it has rarely been possible to exploit them economically. This is even if one illegitimately defines "economic" in a way that ignores negative impacts to the environment and public health (which in economic theory are called "external environmental costs").

Even with a definition of "economic" that is purely commercial, and only counts private costs and benefits to the fracking companies, the experience in multiple countries, including the USA has been that fracking is loss making. Thus fracking has been abandoned as uneconomic in Poland, Lithuania, Romania, Denmark, Norway and Sweden. In other countries outside Europe too profitability("economic gas fields") have proved illusive.

There is a reason. Unconventional oil and gas fields have much higher costs than conventional ones. Tapping "conventional" oil and gas from permeable geological strata is cheaper in that the oil and gas flows underground and can be pumped out with less engineering. In contrast an "unconventional gas or oil field" has to release the gas from impermeable rock and therefore needs up to 100 more wells for the same amount of gas (or oil). A field must achieve economies of scale to have any chance of making a profit. It needs more activity underground to fracture the rock and it needs more activity on the surface to facilitate that. That is why it is more dangerous to the environment and public health – and also why it is more financially expensive. It requires more ongoing capital equipment too. Without a high gas (or oil) price all of these activities cannot be made profitable.

To be long term viable the fracking sector requires three things: favourable geology, high oil and gas prices and easy and cheap credit. All three have proven elusive, making for disappointing results in all of the locations around the world where it has been tried. Unconventional gas is struggling to get off the ground outside of the USA and Australia. And in the USA, where it started, although it managed to get the credit to pay for the capital expenditure there are now grave doubts that a mountain of credit will ever be paid back. There are now many mainstream analyses saying this in the Economist, the Wall Street Journal, Forbes...and myself too!

<https://www.economist.com/news/business-and-finance/21719436-exploration-and-production-companies-are-poised-go-another-investment-spree-americas>

<https://www.wsj.com/articles/wall-streets-fracking-frenzy-runs-dry-as-profits-fail-to-materialize-1512577420>

<https://www.forbes.com/sites/ellenrwald/2017/08/11/this-is-what-the-end-of-shale-will-look-like/#96241e55a055>

<http://www.credoeconomics.com/shale-euphoria-the-boom-and-bust-of-sub-prime-oil-and-natural-gas/>

Meanwhile in the UK doubts about the profitability of shale gas development also mean that very few investors are prepared to put up money

<http://consciousnessofsheep.co.uk/2017/08/12/the-shale-revolution-ends-with-a-bang/>

None of these basic facts are to be found in the issues and options paper yet they are absolutely central. For example to discuss unconventional gas (or oil) extraction without discussing the high likelihood that it will not be profitable - as well as missing out a mention that the condition of profitability is that the industry must operate at a very high scale - is to miss out the most important features.

(2) Consequences of scale and precarity of this industry

It is one thing to have an industry with a handful of wells throughout the county all of which are comfortably covering their costs - it is quite another to talk about an industry with hundreds, perhaps thousands of wells which are operating under conditions of marginal profitability or of negative cash flow, losses and rising debt.

Let us say there is a 5% chance that each well fails or has a spill that pollutes the water table. With a few wells that is a risk one might make - especially if the industry has the money from profits to pay for a clean up. If there are hundreds of wells and a 5% chance that each well fails AND if the industry is making a loss and is in negative cash flow there is a very different situation. Not only will several pollution incidents be almost inevitable but the companies will be reluctant to spend money being careful about how they operate, they will be likely to cut corners on safety to cut costs. Further, when fails and spills occur the companies will not be in a position to afford the clean up. This is no matter how much government and politicians try to kid themselves that the Environment Agency and the HSE are on top of the situation.

I realise that it is conventional in planning decisions to have a presumption in favour of development. However development is supposed to be "sustainable development" and what has been described above is an unsustainable development. Indeed it is uneconomic development where costs exceed benefits. This is very clear - the balance of available scientific evidence based on repeated experience of hydraulic fracturing and unconventional gas development around the world has demonstrated adverse impacts on the quality and quantity of water resources, including groundwater and water courses; on air quality (including through emissions of methane and sulphur); on seismic activity; on local communities; and on greenhouse gas emissions and climate change. The government and industry repeatedly claims otherwise on the basis of studies that are now at least 5 years out of date, ignoring literally hundreds of academic studies in the meantime. For a peer reviewed review of the academic literature between 2009 and 2015 see <https://www.psehealthyenergy.org/wp-content/uploads/2017/04/Literature-Review-2009-2015.pdf>

The balance of evidence in the UK also demonstrates clearly and unequivocally that the Environment Agency and Health and Safety Executive are NOT capable of effectively regulating this industry and making it safe. Over several years of exploratory activity there have been multiple failures and breaches of the regulations that do not augur well for the future. Nor has the Oil and Gas Agency effectively kept track of firms like IGas which have repeatedly failed to meet OGA criteria for financial stability.

<https://drillordrop.com/2017/09/21/guest-post-by-jon-and-val-mager-why-the-government-must-block-fracking-based-on-what-we-learned-about-regulation-of-the-km8-site/>

(3) Climate Change

Then there is climate change. Astonishingly pages 34-37 on hydrocarbons do not mention climate change as an issue. This is despite the fact that we have an issue of more CO₂ being generated when oil and gas extracted are burned as well as the fact that fugitive methane emissions are recognised as a serious problem with unconventional gas extraction. It is also despite the fact that the government's own advisers have issued a view on the matter of the development of unconventional gas. In fact the Committee on Climate Change has said that shale gas would only be compatible with Britain's climate targets for greenhouse gas emissions if 3 tests are met.

These three tests are: (1) Methane leaks (fugitive emissions) can be controlled. (2) Gas consumption must remain in line with carbon budgets requirements. UK shale gas production must displace imported gas rather than increasing domestic consumption. (3) Accommodating shale gas production emissions within carbon budgets. Additional production emissions from shale gas wells will need to be offset through reductions elsewhere in the UK economy.

Under current conditions there are no policies to achieve these conditions and there is no way the planning committee can ensure that they are achieved either. (Achievability would require administrative and regulatory competence and robustness AND it would require the existence of technological measures and economic capacity to install and operate mitigation strategies. None of these currently exist.)

Furthermore, as regards test 2 whereby UK shale gas production must displace imported gas, what is to stop the gas that would have been imported be re-routed, sold and then burned somewhere else in the world. Of course the UK has no powers to prevent this displaced gas being burned elsewhere so we are talking about a policy fig leaf and a fiction. The fact is that any shale gas extracted in the UK would be additional to what is being produced elsewhere whether or not Britain's carbon budget were met or not. Britain might still be meeting its national carbon budgets but it would be helping undermine the global carbon effort and stoking the global warming.

(4) In conclusion

Finally the evidence of unconventional gas development globally has been that unconventional gas development is rarely commercially economic, is short term and is unsustainable even on narrow conventional criteria. The industry in the USA and elsewhere has accumulated large debts and persistent negative cash flows that are only possible given very low interest rates and a finance sector more interested in earning fees by raising cash, than acting responsibly by ensuring that the industry for which it is acting actually has a credible future. The industry in the USA has been funded on a Ponzi basis and, as such, will eventually collapse leaving the clear up to the public purse. Even if one accepts a presumption in favour of development (which I personally do not) it is supposed to be for sustainable development and shale gas is not even a commercially sustainable industry. While is not usually a matter for planning authorities to assess the commercial viabilities of industries Notts County Council will certainly pick up the bill for setting things right if and when it allows this industry to go ahead and later has to clear up the wasteland when the companies have taken what money they were able to and gone.