

House of Lords Economic Affairs Select Committee

The economic impact on UK energy policy of shale gas and oil

Written evidence submitted by
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References and endnotes

1. Royal Society and Royal Academy of Engineering 2012. *Shale gas extraction in the UK: a review of hydraulic fracturing*. DES2597. Available online: www.royalsociety.org/policy/projects/shale-gas-extraction
2. Fisher, K. and Warpinski, N. 2012. Hydraulic-fracture-height growth: real data. Society of Petroleum Engineers Annual Conference Paper SPE 145949, Denver 2011. *SPE Production & Operations*, February 2012, pp 8-19. This paper has to be purchased. It is unlikely that many UK research institutions will subscribe to this journal. However, a conference presentation coming to similar conclusions can be found online.
3. Green, C.A. *et al.* 2012. *Preese hall shale gas fracturing review & recommendations for induced seismic mitigation*. Report to DECC.
4. Pettit, W. *et al.* 2009. Using continuous microseismic records for hydrofracture diagnostics and mechanics. *Soc. Explor. Geophys. Ann. Meeting Expanded Abstracts*. Note: A step change in level of fracking was seen where the level of microseismic activity jumped upwards by 100 m, with no intervening tremors to mark the passage.
5. Borchardt, D. *et al.* 2012. *Abschätzung der Auswirkungen von Fracking-Maßnahmen auf das oberflächennahe Grundwasser- Generische Charakterisierung und Modellierung* (Assessment of the impact of fracking operations on the near-surface groundwater - Generic characterisation and modelling).[full report, in German, available at www.dialog-erdgasundfrac.de]. Note: This report includes modelling of a fault zone, showing that under certain feasible conditions, fracking fluid can extend upwards from 1300 m depth to the surface in 30 years. It also concludes that fracking in faulted areas should be banned.
6. Baker Hughes 2013. *Fault Seal Analysis: Improve reservoir understanding with fault seal analysis*. Web page available at: <http://www.bakerhughes.com/products-and-services/reservoir-development-services/consulting-services/geomechanics/fault-seal-analysis>
7. Allen, D. *et al.* 2013. Measurements of methane emissions at natural gas production sites in the United States. *Proceedings of the National Academy of Sciences*. Available at www.pnas.org/cgi/doi/10.1073/pnas.1304880110.
8. Howarth, R. 2013. *Cornell University press release September 11 2013 re Allen et al. paper in the Proceedings of the National Academy of Sciences*. Note: This critique of ref. 7 says that it shows that industry can do a clean job, but until all the data are made available there are good reasons to mistrust the veracity of its conclusions.

9. Jackson, R.B. *et al.* 2013. Increased stray gas abundance in a subset of drinking water wells near Marcellus shale gas extraction. *Proceedings of the National Academy of Sciences Early Edition*, available at: www.pnas.org/cgi/doi/10.1073/pnas.1221635110.
10. Duncan, W.I., Green, P.F and Duddy, I.R. 1998. Source rock burial history and seal effectiveness: key facets to understanding hydrocarbon exploration potential in the East and Central Irish Sea Basins. *Am. Ass. Petrol. Geologists Bull.* **82**, 1401-1415.
11. Selley, R.C. 2012. UK shale gas: the story so far. *Marine and Petroleum Geology* **31**, 100-109. Note: Professor Selley has unrivalled knowledge of the UK shale gas scene,
12. Smythe, D.K. 2013. Planning application by Celtique Energie to drill at Boxal Bridge, West Sussex: Critique of environmental statement in the context of relevant geology and hydrogeology. Submission to West Sussex County Council. Available on the WSCC website and at <http://www.davidsmythe.org/fracking/fracking.htm>.
13. McMillan, A.A. *et al.* 2011. *The Quaternary Geology of the Solway*. British Geological Survey Geology and Landscape (Scotland) Programme Research Report RR/11/04. Note: freely available online.
14. Environment Agency 2013. *Commitment to streamline and simplify environmental regulation of onshore oil and gas exploratory activities*. Web page available at: <http://www.environment-agency.gov.uk/news/148476.aspx> [updated 27 Sep 2013].
15. Smythe, D.K. 2013. Website page: Faulting and fracking. <http://www.davidsmythe.org/fracking/fracking.htm>.