

# Nuclear Free Local Authorities

# briefing



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No.105

Subject: **Shale Gas and Fracking: An Energy Solution or an Environmental Nightmare?**

## 1. Overview of Briefing

This report is part of a series of new NFLA Policy Briefings requested by the NFLA Steering Committee that are considering a variety of alternatives to nuclear power and their energy and environmental benefits or externalities. They will assist in clarifying NFLA's overall energy policy of opposing nuclear power and new nuclear build in favour of a combination of a wide renewable energy mix and increased development of energy efficiency and microgeneration across the UK & Ireland in order to satisfy future energy need.

A number of other associated energy briefings are also in development and will be published shortly. Issues that will be considered in these series of briefings include a consideration of the benefits of developing biofuels, biomass and geothermal energy; fuel poverty and the positive role local authorities can play in promoting energy efficiency; an overview of the 'Green Deal' and the Green Investment Bank in comparison with policies in Germany and Austria; and an overview of the UK Energy Bill.

This Policy Briefing has been developed by the NFLA Policy Advisor Pete Roche and the NFLA Secretary and considers the issues around shale gas and fracking in the UK & Ireland.

## 2. Introduction

Shale gas is transforming fossil-fuel markets in North America where gas prices have plummeted, and the US is now moving towards energy independence, according to Dieter Helm, Professor of Energy Policy at the University of Oxford. Helm says shale gas has already significantly reduced carbon emissions in the US, and it is the only thing which can replace coal at the global level over the next couple of decades. (1)

Supporters of shale gas, like UK Chancellor George Osborne, believe it will bring down energy bills and increase energy security by reducing dependency on foreign gas imports. (2) But many analysts have questioned whether the North American experience can be replicated elsewhere. For example Deutsche Bank says:

*"... we do not expect the impact of shale-gas production on EU gas prices to be anywhere near as great as has been the case with US..."*(3)

There are some serious environmental and human health concerns around shale gas drilling including threats to groundwater quality, triggering earth tremors, concerns about how much water is needed and, above all, the potential impact on climate change emissions.

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The possibility of exploiting shale gas in the UK & Ireland raises five questions in particular:

- (1) Does the inhalation of radioactive radon gas in shale gas pose serious health risks?
- (2) Will burning shale gas jeopardise or help achieve climate targets? If it replaces coal with less carbon intensive gas could it be a useful transition fuel or will it hinder efforts to tackle climate change by introducing greenhouse gases into the atmosphere that would otherwise have remained locked underground?
- (3) Will investment in shale gas (in the same manner as for new nuclear build) detract from investment in energy efficiency and renewable energy?
- (4) Are there unacceptably high environmental and health risks associated with shale gas extraction, such as contamination of groundwater and drinking water supplies?
- (5) Does shale gas drilling trigger earth tremors?

This NFLA Policy Briefing looks at whether Government and industry across the British Isles should embrace shale gas as a vital part of the UK's energy future, or ditch it as a high-carbon dead-end with serious local environmental risks. Firstly, it will look at the background to unconventional gas in the UK. Secondly it will seek to answer the five questions above, and then finally it examines regulatory and planning issues which might impact on local authorities.

### **3. Background**

#### **a) Gas Supplies in the UK & Republic of Ireland**

Roughly one-third of the gas used in the UK is used to generate around 46% of its electricity. Another third is for domestic use such as heating and cooking, and the remaining third is used in industry, public buildings and commerce. In contrast, in the Republic of Ireland dependency is even higher with over two thirds of the gas used to generate its electricity.

The use of gas is a very significant contributor to UK carbon dioxide emissions, accounting for just over 45% of total emissions in 2010. In Ireland the use of gas accounts for 25% of total emissions in 2010. With declining production the UK has become increasingly reliant on gas imports to meet demand. In 2012 the UK produced 526 Terawatt hours (TWh) of natural gas, compared to net imports of 400.7 TWh. (4) The Republic of Ireland is almost exclusively dependent on gas imports to meet demand without a significant offshore gas industry.

Conventional gas extraction involves drilling vertically through rock formations into gas pockets, from which the gas rises through the borehole and is captured at the wellhead. However, as these convenient and relatively easily accessed pockets dry up, the industry has been developing ways of extracting gas that is trapped inside the rock formations – known as unconventional gas. Shale gas, coal-bed methane (CBM) and tight gas are all unconventional gases.

#### **b) Unconventional Gas**

An expansion in the exploitation of unconventional gas has been made possible mainly because of significant advances in horizontal drilling and well-stimulation technologies and refinement in the cost-effectiveness of these technologies. 'Hydraulic fracturing' (fracking) is the most significant of these new technologies. Horizontal drilling is required to access more of the reserve because the reservoirs are wider than they are tall. To allow the gas to flow, fractures have to be created in the rock. This is done by 'fracking'. The concrete casing of the well is cracked with small explosive charges and fluid (approx 99% water and sand, 1% chemicals including highly carcinogenic benzene and formaldehyde) is injected down the well and into the shale gas rocks at high pressure. The sand props open the new fractures allowing the gas to flow into the well and be collected at the surface.

Another form of unconventional gas – coal-bed methane (CBM) - is extracted from coal seams using a variety of techniques including deep vertical and horizontal drilling and fracking. In most CBM developments the seam needs to be 'dewatered' before gas extraction can happen, whether or not fracking is used. This involves pumping a significant quantity of water (which has been stewing in coal for centuries) out of the coal seam and disposing of it. Sometimes

pumping out water from seams is enough to stimulate gas flow sometimes the seam needs to be fracked to extract the gas.

**c) Size of the resource**

Estimates as to the UK's unconventional gas reserves vary wildly. The British Geological Survey (BGS) estimates the UK's recoverable shale gas reserve at 150 billion cubic metres (Bcm) or about 1.5 years current consumption. Cuadrilla, a key player in the emerging UK shale industry claims to have discovered 5,600 bcm of gas (approx 60 years worth) in Lancashire alone. The CBM resource is potentially much bigger with an estimated 2,900bcm, although there is considerable uncertainty as to how much of this is recoverable. Estimates of Ireland's recoverable shale gas reserve is around 124.6 bcm shared roughly equally between Northern Ireland and the Republic of Ireland). (5)

**d) Fracking Fluid**

A huge number of different chemicals can be used in fracking fluid, including many that are highly carcinogenic and cause birth defects. While the chemical component of fracking fluid is a tiny proportion (up to 2 percent), because of the sheer quantities of liquid used, a single fracking project can involve a significant volume of toxic chemicals. Clearly it is very problematic if these chemicals get into water for human or animal consumption and local ecosystems.

There are also concerns about how much water is needed, worries over the impact of fracking on air quality and its stimulation of earthquakes.

**4. Where might fracking take place in the UK and Ireland?**

A quarter of Scotland has been opened up for drilling. More than 20,000 square kilometres (7800 square miles) covering the entire central belt and a part of the southwest, have been earmarked for possible exploitation. Plans are most advanced near Falkirk and Stirling where there are proposals to drill 22 wells to tap the methane gas in coal seams. These proposals are facing hundreds of objections from local communities. Opposition has also come from leading house-builders Cala and Persimmon, and from Network Rail, which is concerned about the railway line to Perth and Dundee being damaged by a gas blast. (6)

There are currently six areas in Scotland licensed for onshore oil and gas exploration and development. Two of these areas have fairly advanced CBM exploration projects. The first is at Airth, near Stirling, where an Australian company called Dart Energy is using horizontal and vertical drilling techniques, but not fracking, to extract CBM. They also hope to exploit shale reserves in the Lothian. Some 16 exploratory wells have already been dug, and Dart Energy, has now applied for planning permission to sink 22 production wells at 14 sites. It has signed a five-year, £300 million deal with Scottish and Southern Energy for the supply of gas, and hopes to start delivery towards the end of 2013. But if all goes well, this will only be the beginning.

The second is in Dumfries and Galloway where a company called Greenpark Energy – also testing for CBM – was the first company to get permission to frack in Scotland, at a site near Canonbie. The company is currently seeking another fracking related license for a second site. Again, although it's still in the testing stage, over 20 planning applications have been granted for this project already. Dart Energy recently bought out Greenpark's CBM licenses and also has the exploration rights to an area in Fife, so is the company now leading Scottish CBM development.

A third company – REACH Coal Seam Gas – is hoping to develop CBM in North Lanarkshire, but recently withdrew a planning application for a development at Moodiesburn, following significant public opposition.

It looks like CBM is going to be a bigger issue than shale for Scotland, simply because the central belt is covered with coal beds.

In England and Wales the only test drilling that has taken place to date is in Lancashire, where Cuadrilla Resources has drilled several wells. Cuadrilla says it could drill over 800 wells in the area by 2028. Planning applications for drilling have been granted in Kent and East Yorkshire (though Rathlin Energy says it will not use fracking in East Yorkshire). Vale of Glamorgan Council last year refused an application from Coastal Oil & Gas for shale gas test drilling at Llandow but the company has appealed to the Planning Inspectorate against the decision. Applications for drilling have been made or interest expressed in several other locations, including the Mendips.

There is also interest in Northern Ireland in the Larne Basin, in North Antrim and in Fermanagh near the border between Northern Ireland and the Republic of Ireland. In the Republic of Ireland there is strong interest in considering shale gas extraction in the north west of the country. The energy company Tamboran Resources claims there are shale basins containing 10 to 20 Trillion cubic feet (Tcf) of gas in place in Leitrim, Cavan, Sligo, Donegal, Monaghan, Roscommon and Fermanagh. Explorations of shale gas deposits are also taking place in the Clare Basin by the company Enegi Oil Ltd. (7)

## **5. Green Gas**

The Anaerobic Digestion and Biogas Association say the Governments in the British Isles should be pushing for more green gas generated from waste rather than shale gas. Green gas is something of a no-brainer, ticking boxes for energy policy, environment and the economy. It should lead the future of unconventional gas in the UK and Ireland. Putting it at the centre of the Government's energy strategy would deal with the hurdles to deployment, and allow gas to be part of energy decarbonisation rather than a challenge to it. Green gas has the potential to deliver £2-3bn of green gas a year and create 35,000 jobs. Morton says the maximum potential of biomethane from anaerobic digestion (AD) is equivalent to 10 per cent of domestic gas demand not a dissimilar figure to that which the Institute of Directors suggests for shale gas potential in the UK alone. (8)

Alan Whitehead MP, a member of the House of Commons Energy and Climate Change Committee, compares the economics of the two methods of putting that gas into the grid. One shale gas well costs between £6 -10 million to drill and frack. It is difficult to assess total output of gas, but the average well in Texas at the moment is producing about 2 million cubic meters of gas per year for only about five years of production. One large farm size Anaerobic Digestion plant costs about £2million to build and then provides a steady stream of gas from then onwards, varying only to the extent that cows stop producing manure or people stop eating food. The first plant currently operational and injecting gas into the grid (the Poundbury plant in Dorchester) produces a bit more gas in a year than the average shale gas well. (9)

## **6. Does the inhalation of radioactive radon gas pose serious health risks?**

Shale gas, unlike gas from oil and gas wells, contains radioactive radon gas<sup>1</sup>. This arises from radioactive decay of uranium minerals found in all shale formations. Radon is chemically inert and cannot be separated from shale gas. This means that when shale gas is piped into boilers, ovens, hobs and other gas appliances in homes and burnt, radon gas is released into indoor areas.

Radon is a recognised public health threat, and the Health Protection Agency (HPA) has issued guidance stating the existing homes should be remediated where radon levels reach 200 Bq per cubic metre. For new homes, the target is 100 Bq per cubic metre.

High indoor radon concentrations from shale gas are already a serious health problem in parts of the United States including New York City. The vital parameters are the concentrations of uranium in shale formations; the consequent radon concentrations in shale gas; and the time delay from extraction to delivery in homes. According to a parliamentary reply to a recent PQ

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<sup>1</sup> In fact, oil and gas wells do contain some radon but shale gas contains much higher concentrations.  
NFLA Briefing No 105 – Shale gas & extraction

from Paul Flynn MP, the Government has requested the Radiation Protection Division of the HPA to urgently examine this matter and to prepare a report for Ministers. When this is published, the NFLA Secretariat will issue a summary for NFLA members. The NFLA Secretariat is keeping this matter under close review.

## **7. Will burning shale gas jeopardise or help achieve climate targets?**

Proponents of shale gas frequently say that because burning gas in power stations releases roughly half the carbon emissions of coal, shale gas could provide a suitable 'transition fuel' to allow us to shift from carbon intensive fossil fuels to a cleaner energy mix more quickly.

However, the UK Climate Change Committee is advising that there is an urgent need to decarbonise electricity by 2030 altogether, not just reduce emissions by 50%, as part of a strategy to reduce all carbon emissions by 80% by 2050. (10) Building new gas-fired power stations with a life beyond 2030 in this scenario makes little sense in either the UK or in Ireland (apart from a small number to balance the intermittency of renewables).

Added to this a recent study from the European Commission (EC) suggests that shale gas activities are more carbon-intensive than conventional gas and oil fuels. The fracking process itself also results in 'Greenhouse Gas' emissions. Emissions from shale gas production have been the subject of a number of studies since 2010. These studies have yielded a large variation in the estimated impacts of shale gas, but the majority of them suggest that emissions from shale gas are lower than coal, but higher than conventional gas. The EC study suggests that emissions per unit of electricity generated are around 4% to 8% higher than for electricity generated by conventional pipeline gas from within Europe. But emissions could be 7% to 10% lower than that of electricity generated from Liquid Natural Gas (LNG) imported into Europe. (11)

Not all of the gas released from shale rock formations is captured - some of it leaks out. Methane is a greenhouse gas, which approximately creates 25 times more harm to increasing global warming figures than carbon dioxide. Experts don't really know how much methane leaks out during the fracking process and researchers currently don't agree on the figures. One study suggests that this could mean that shale gas is just as damaging to the climate as coal. (12) A recent article in the scientific journal *Nature* reported that up to 9% of the methane produced could be escaping into the atmosphere after studies conducted in Colorado and Utah. At this level shale gas would be worse than coal. (13) Whether these high leakage rates are typical remains unclear.

In 2012 the International Energy Agency (IEA) announced that the US's CO<sub>2</sub> emissions had fallen by 2% (92 Mt) the previous year but its analysis excludes fugitive emissions from fracking. The fall was attributed to the switch from coal to less polluting gas. Aside from the fact that it was in fact increased use of renewables, not gas, which accounted for most of that change, if fugitive emissions really do amount to around 9% of the gas produced this would be enough to cancel out the 92 Mt reduction in US emissions. (14)

## **8. Carbon Logic**

Even if we assume that emissions from shale gas are similar to conventional gas, the kind of gradual transition from coal to gas and then on to lower carbon technologies later – a model which is being promoted by shale gas supporters - is no longer an option. To have an approximately 50% chance of keeping global warming below the widely accepted target of 2 degrees, atmospheric greenhouse gas concentrations must stabilize below 450 parts per million (ppm). But the IEA has found that a global energy mix high in natural gas would result in atmospheric levels of GHGs reaching 650 ppm CO<sub>2</sub> – leading to catastrophic consequences from the resulting, long term, global temperature rise of more than 3.5 degrees Celsius. (15) The development of carbon capture and storage (CCS) could change this, but at the moment this remains uncertain. Relying on CCS would be dangerous because the technology is unproven and may be extremely expensive. There are no power plants currently using CCS at scale.

It is possible to calculate a global carbon budget - the amount of fossil fuels which could be burnt globally over the next century in order to limit the increase in global average temperatures to 2 degrees. Such a calculation demonstrates that it is only possible to burn a small fraction of the total oil, coal and gas that has already been discovered in order to avoid dangerous climate change. To stay within the ecological limits of the planet we need to tackle deforestation; phase out the use of coal as quickly as possible; significantly constrain the exploitation of known oil and gas reserves and not develop unconventional oil and gas reserves any further. (16)

If there is going to be some development of unconventional gas then, in order to remain within the carbon budgets determined by the UK and Irish Governments, efforts need to be made to ensure it is used only to replace carbon emissions from other fossil fuels which will remain firmly locked underground.

## **9. Will investment in shale gas detract from investment in energy efficiency and renewable energy?**

Given the virtual impossibility of enforcing a global carbon budget in this way, the impact of support for shale gas on the renewable sector is a key area of concern. The IEA found that the impact of falling gas prices as a result of increased shale gas development could threaten the viability of low carbon alternatives and put pressure on government support schemes. Chief economist of the IEA, Fatih Birol, admitted that *“if gas prices come down, that would put a lot of pressure on governments to review their existing renewable energy support policies ... We may see many renewable energy projects put on the shelf.”* (17)

While advocates of shale gas argue that it will act as a ‘bridging fuel’, to shift Europe from its current over-reliance on fossil fuels to a greater use of sustainable renewable energy, recent studies show that, in reality, shale gas could “substitute not for coal but for renewables”, stifling the growing renewable sector. In terms of tackling climate change, this would be seriously bad news. (18) Senior executives in the fossil fuel industry are reported to be lobbying governments and business groups to reject wind and solar power in favour of gas, in a move that could choke the fledgling green energy industry. (19) A report from the European Gas Advocacy Forum suggested that Europe could meet its carbon-cutting targets hundreds of billions of euros more cheaply by pursuing gas than by relying on renewables. But building a massive fleet of new gas-fired power stations around the world would effectively lock in fossil fuel generation for decades, because each new plant has an operating life of at least 25 years. (20)

Just as with nuclear power, UK (and in this energy policy area, potentially the Irish) Government enthusiasm for shale gas risks distracting investors and operators from the real opportunity to develop the renewable sector, guaranteeing long term supply, and to invest in greater energy efficiency, both of which will bring added long-term benefits in terms of jobs.

A report by the influential Tyndall Centre illustrates how a £32bn capital investment in shale gas could potentially displace up to 12GW of offshore or 21GW of onshore wind capacity raising the prospect of the UK not meeting its renewable energy obligations. (21) A recent study by Cambridge Econometrics for WWF and Greenpeace showed that large-scale investment in offshore wind would generate more wealth for the economy and create more jobs than relying on gas-fired power plants. Substantial deployment of offshore wind by 2030 would have only a marginal impact on electricity prices but would boost growth, cut dependence on gas imports and reduce emissions, the report said. (22)

The Tyndall Centre has also calculated that drilling shale gas wells and building gas-fired power stations to produce 8GW of electricity from shale gas would cost the same as the cost of building offshore wind turbines producing 17% more electricity or onshore wind turbines producing up to twice as much electricity. If CCS technology were fitted to the gas-fired power stations, the amount of electricity that could be generated from spending the same amount on wind turbines increases still further. (23)

**10. Are there unacceptably high environmental and health risks associated with shale gas extraction?**

There are several routes by which shale gas extraction may pose potentially significant risks to the environment. Concerns remain about the adequacy of current regulation practices in the UK and Ireland of groundwater and surface water contamination and the assessment of environmental impact. So if shale gas is to make a significant contribution to the energy mix in both the UK and Ireland, a rigorous monitoring regime is essential to contain the risks of contamination, from thousands of wells, within 'acceptable' levels. Similarly, fugitive emissions (see above) need to be kept to 'acceptable' levels, so it is paramount that appropriate regulatory, monitoring and enforcement regimes are developed and in place prior to full scale extraction. (24)

There have been a number of incidents and reports of contamination from shale gas developments in the US. However, there remains a paucity of information and data on which to base a quantified assessment of environmental and human health risk. Fracking involves injecting fracturing fluids at very high pressure into the wellbore to generate fractures in the target rock formation. Fracturing of a single well requires a considerable volume of water and, with reported chemical additives of up to 2% by volume, around 180-580 cubic metres of chemical additives. After fracturing, a proportion of the fluid is returned to the surface.

US Federal law currently exempts the underground injection of fluids for hydraulic fracturing purposes from regulation, so there is very little information on the identity and concentration of substances in hydraulic fracturing formulations. But an analysis of what is known so far suggests that 58 of the 260 substances have one or more properties that may give rise to concern because of their toxicity.

Some 15-80% of injected fluid returns to the surface. Whilst these fluids include the fracturing fluids pumped into the well, they also contain chemicals formed due to chemical reactions, chemicals mobilised from within the shale and naturally occurring radioactive materials (NORM). Altogether, the toxicity profile of the flowback fluid is likely to be of greater concern than that of the fracturing fluid itself. For shale development delivering 9 billion cubic metres (bcm) per year, about 10% of UK consumption, 3.6-26 million cubic metres of potentially hazardous wastewater would be recovered over a 20 year period requiring storage, transport and treatment.

By implication 20-85% of the fracking fluid remains underground. The hazardous substances contained in the fluid could contaminate groundwater and result in potentially severe impacts on drinking water quality and/or surface waters and wetland habitats. The severity will depend on, for example, the significance of the aquifer for abstraction; the extent and nature of contamination; the concentration of hazardous substances; and connection between groundwater and surface waters.

**11. Demand for Land**

Due to the large number of wells used, fracking impacts a vast geographical area. Each well has a number of drill/pump heads, sludge ponds where flowback fracking fluids and water are stored, storage tanks and compressor stations. This has a high visual impact, creates noise pollution and can have implications for local residents, farmers, the natural habitat and biodiversity. In the Blackpool area alone for example, commercialisation by Cuadrilla resources suggests between 400 to 800 wells on 40-80 sites or pads with production only sufficient for the equivalent of 5 to 10 months of UK gas consumption. Each site would likely cover several acres. (25)

**12. Air Pollution**

Evidence of air pollution connected to fracking has been firmly established in the US, including "elevated levels" of benzene, and other potentially toxic petroleum hydrocarbons, including ethylbenzene, toluene and xylene which have been linked to eye irritation, headaches, sore throats, breathing difficulties and a higher risk of cancer. (26)

### **13. Does shale gas drilling trigger earth tremors?**

A number of incidences of seismic activity linked to fracking have been recorded, including minor earthquakes and tremors. These are generally attributed to either the fracking process itself or the injection of fracking wastewater into wells. These links have triggered widespread public concern.

In April and May 2011, Cuadrilla Resources, the company carrying out fracking at Preese Hall, Lancashire, suspended exploration following two earthquakes with magnitudes of 1.5 and 2.3. Experts investigating the quakes stated that they may have occurred as a result of the fracking process. An independent scientific report commissioned by the British government confirmed that “the earthquake activity was caused by direct fluid injection” during the fracking process and conceded that it was not possible “to categorically reject the possibility of further quakes”. However it concluded that operators could resume fracking operations, as long as they were effectively regulated.

It is clear, then that seismic events can be caused by hydraulic fracturing and, whilst these are unlikely to be of a sufficient magnitude to cause structural damage on the surface, structural damage to the wellbore itself (and in all likelihood other wellbores in the vicinity) is possible and has been documented in this case.

Cumulative impacts may be a particular issue, when one considers the development of shale gas at a scale sufficient to deliver gas at meaningful volumes. To sustain a 9bcm level of production for 20 years in the UK would require around 2,500-3,000 horizontal wells.

### **14. Regulation**

The Department of Energy and Climate Change view is that UK regulation is “well-designed with clear lines of responsibility among several different bodies including DECC, the Health and Safety Executive (HSE), the respective Environment Agency, and Local Planning Authority” and that the UK has a “robust regime which is fit for purpose” and will ensure that unconventional gas operations are carried out in a “safe and environmentally sound manner”. (27)

In addition, the perception is that the regulatory framework that operates in the UK/EU is likely to be much more robust than that operating in the US where issues and problems have been reported. The Tyndall Centre however, concludes that the regulatory situation in the EU is not so very different. Whilst there are harmonised requirements for the protection of groundwater, environmental impacts and chemicals across all Member States, there is variation in interpretation of how these requirements are to be met and powers applied as well as different regulation (particular with regard to well design and construction). Of particular concern in the UK is the Environment Agency’s intention not to routinely require an environmental permit, suggesting that shale gas operations do not constitute groundwater activity.

In new regulatory guidance, the Scottish Environment Protection Agency (Sepa) warns that fracking for gas is “very likely” to bring radioactive wastes to the surface in fluids. The radioactivity is naturally present in the ground, but is released by the process. Sepa also points out that, in addition to the climate pollution caused by burning the gas, there could be accidental emissions. Releasing methane, a much more potent greenhouse gas than carbon, would help accelerate global warming, it says. Sepa is tightening up its regulation of unconventional gas extraction, and says that after April 2013, operators will be required to say what chemicals they want to use for drilling operations. Inspectors would “fully assess the additives proposed to be used in order to ensure the protection of the water environment.” (28)

The Republic of Ireland and Northern Ireland Governments are considering the safety of shale gas extraction and further planning controls that would need to be developed in 2014, when the findings of a joint Northern Ireland / Republic of Ireland environmental report are published. Such development would only occur if the report says it will be safe to permit shale gas

extraction. The Good Energies Alliance Ireland (GEAI) remains concerned though that exploration licenses could still be granted in the meantime and are seeking urgent clarification from the two Governments on the implications of permitting such licenses. (29)

Given the potential impacts of shale gas developments, there is a clear need for a regulatory framework in order to protect the public and the environment from the impacts of pollution. The European Commission, through a recent study produced by DG Environment in September 2012, has specifically highlighted a list of gaps and uncertainties in the current EU environmental legislation and confirmed that shale gas activities are not adequately covered by the EU regulatory framework. (30)

## 15. Planning

Above ground developments linked to shale and CBM projects go through normal planning processes, but communities may struggle to identify where developments on the ground relate to unconventional onshore gas, and specifically where fracking might take place.

In England and Wales the Growth and Infrastructure Bill would allow government to by-pass local decisions on major planning applications including shale gas fracking proposals. (31) Liberal Democrat Tessa Munt, MP for an area which includes the Medip Hills where fracking is proposed, warns that fracking is not “appropriate” for the area. She wants the clause in new legislation which would give central government ultimate say over a fracking application to be dropped. She says:

*“It is absolutely ridiculous pumping 540 chemicals into the ground with no plans for what would happen to a huge quantity of waste water after”.* (32)

In Scotland Labour’s environment spokeswoman, Claire Baker MSP, says confusion over the planning rules could allow a “fracking free-for-all” with the technology being introduced “under the radar”. She says companies can move from exploratory work to extraction by fracking without even informing the local authority, never mind seeking any additional planning permissions. She sought information from five local authorities about coalbed methane and fracking proposals in their areas: Falkirk, Stirling, Clackmannanshire, Fife and Dumfries and Galloway. Their responses revealed a “very concerning” level of confusion over how to deal with the issue, she said. “Unless urgent action is taken, there is a real risk that fracking could come to communities across Scotland under the radar”, she argued. “The Scottish government is in danger of allowing the expansion of this industry without robust scrutiny.”

Mary Church, a campaigner with Friends of the Earth Scotland, said it was “completely unacceptable” that communities across Scotland were faced with the prospect of fracking by stealth. “The current regulatory framework is clearly not fit to deal with this and other new forms of unconventional gas. As it stands, coalbed methane developers can get through the planning system with no discussion or scrutiny of fracking plans.” Although fracking permits might be required from the Scottish Environment Protection Agency (Sepa) this need not involve consultations with the local community. The Scottish government argued that energy companies would need licences, registration and permission from the UK government, Sepa, the Health and Safety Executive and local authorities. They would also have to adhere to strict construction, control and monitoring processes. (33)

In Ireland the Good Energies Alliance (GEAI) are concerned that, at a time when all public services including environmental regulation are being cut back and both the Northern Ireland Government and the Republic of Ireland Government are under severe pressure to reduce state spending, there will not be enough resources to establish an effective planning regulatory system over shale gas extraction. As they note: “The resources required to independently monitor shale gas extraction would be huge; self-regulation by the industry is shown to be totally unreliable wherever this industry operates...(We) cannot rely on our anti-pollution regulations to protect us.” (34)

## 16. Conclusion and recommendations

The crucial point in this briefing is that even if exploiting these new sources of fossil fuels was proven to be 'safe', the impact of burning them on the climate will topple us into potentially catastrophic global warming.

Even if some way were found to exploit unconventional gas in a way that meant it was only replacing coal, it would require much stricter regulation than currently appears to be the case. The NFLA believe Local Authorities will need to build up an in-house expertise in this new area, even if they are only being consulted upon by central government. Evidence from around the world indicates inherent and unacceptably high environmental and health risks associated with shale and CBM drilling – whether or not hydraulic fracturing takes place – particularly in relation to groundwater contamination with methane and fracking fluids.

Developing this industry and the strict regulation it will require is clearly a distraction – in the same way as new nuclear build – which the UK and the Republic of Ireland Governments and the devolved governments simply cannot afford when they are already trying to develop energy efficiency and renewable energy programmes. Green gas, which fits much better with a local decentralised sustainable energy strategy, could provide around the same amount of gas as shale gas is expected to provide, but at a much cheaper price and without the same concerns over environmental damage and degradation.

NFLA member authorities should fully consider this report and forward it to officers and elected members responsible for minerals planning, environmental strategy, environmental health, environmental protection and the Council's wider energy policy. NFLA members may also consider passing a resolution outlining their own policy view on shale gas and extraction. A number of resolutions that have been passed by Councils in England, Northern Ireland and the Republic of Ireland are attached for information as Appendix 2 of this briefing.

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## **Appendix 1: 5 Differences between the UK / Ireland context and the US context re shale gas**

The US 'shale gas revolution' cut the price of gas by more than half and is reported to have created around half a million jobs. It means gas has partially replaced coal helping the US to cut carbon emissions, but there are some key differences between the US and UK / Ireland.

- 1) The US has more gas than the UK and Ireland: an estimated 862 trillion (trn) cubic feet, compared with our 20 trn. That works out as 2.7trn cubic feet of shale gas per million Americans, versus about 0.3 per million in the British Isles.
- 2) The US had very little gas export infrastructure. All the gas that flowed went into the domestic market. On the other hand, the UK is a 'gas hub' with two European interconnector pipelines and

large LNG infrastructure. So UK and Irish shale gas would be sold to the highest bidder from around the world and so do little - on its own - to lower UK and Irish prices.

- 3) The economics are different. In the US shale when shale gas came on stream the resulting steep fall in methane prices was remarkable and unpredicted. That wouldn't happen in the British Isles because shale gas could be exported to more lucrative markets. In the US some gas was even being sold at a loss.
- 4) The geologies and resulting costs are different. There is some debate over whether the geology in the UK, Ireland and the European continent would be as promising as that in the US. The IEA believes extracting the gas in Europe would be between two and three times per cubic foot more expensive due to different geologies and regulations.
- 5) We don't own the land under our feet (on the whole the Crown does). In the US you own the land under your feet and most of the initial fracking was vertical - straight down. In the UK and much of Ireland you don't, and a lot of the drilling will be horizontal. That means, in the US, if a farmer finds shale gas under his land, he may become a rich man. In the UK and Ireland if a farmer finds shale under his land he might be able to sell the land to a firm with a license to explore in his area. But they may drill under his neighbour's land. People are far more willing to have things in their backyard, if they also make them rich.

Reference: Greenpeace Energy Desk 12<sup>th</sup> December 2012

<http://www.greenpeace.org.uk/newsdesk/energy/analysis/fracking-go-ahead-four-differences-between-us-and-uk>

## **Appendix 2: Resolutions passed by local & devolved government on shale gas**

### **a) Republic of Ireland:**

**Leitrim County Council:** 6th February 2012

Notice of Motion unanimously agreed:

"That Leitrim County Council calls on Ministers and Government to ensure that the practice of Hydraulic fracturing be excluded as a method of extracting Gas/Oil on the Island of Ireland as in the case of some European countries."

**Clare County Council:** 9th January 2012

Notice of Motion proposed and agreed:

"Based on the vast available evidence and the well documented international concerns on the detrimental effects of fracking on:

- the environment;
- its potential impacts on local communities;
- the damage to all farming and tourism industries which are the backbone of the economy in Co. Clare with particular reference to the strong probability in the West Clare Area, of contamination to the ground water supply, due to the nature of the local geology.

The Council calls on the Minister for Communications, Energy and Natural Resources to ban fracking."

**Sligo County Council:** 16th January 2012

Notice of Motion agreed:

"That Sligo County Council calls on the government to ban the practice of hydraulic fracturing/fracking and that this Council commences the process of amending the Sligo County Development Plan so as to ban the practice of hydraulic fracturing/fracking in County Sligo."

Second Notice of Motion agreed:

“That Sligo County Council imposes a ban on Hydraulic Fracturing (also referred to as Fracking) in County Sligo because of public concerns of its effects on tourism, farming and local communities.”

**Donegal County Council:** 16th January 2012

Agreed that the following policy be inserted into the County Development Plan:

“It is a policy of Donegal County Council that the process of Hydraulic Fracturing (or fracking) will not be permitted within the County of Donegal. Therefore, this Council will not allow the intrusive shale gas extraction practices.”

**Roscommon County Council:** 28th November 2011

Notice of Motion agreed:

“That Roscommon County Council contacts the Department and the Minister to request a complete ban on fracking in Ireland.”

**b) Northern Ireland:**

**Fermanagh District Council:** January 2012

Notice of Motion passed:

“That this council opposes the use of hydraulic fracturing for gas exploration in the Lough Allen Basin, and in the light of the backing by the Northern Ireland Assembly for the motion put forward by Steven Agnew MLA on hydraulic fracturing, that we call for the Minister for the Department of Enterprise, Trade, and Investment, Arlene Foster to place a moratorium on the licence granted to Tamboran Resources.”

**Northern Ireland Assembly:** 6th December 2011

Notice of Motion passed:

“That this Assembly believes that a moratorium should be placed on the onshore and offshore exploration, development and production of shale gas by withdrawing licences for hydraulic fracturing (fracking), at least until the publication of a detailed environmental impact assessment into the practice; notes that hydraulic fracturing can put local water sources at risk of contamination; further notes that, amongst a variety of adverse environmental impacts, the process of fracking can cause serious well blowouts, which put both workers and local communities at risk; considers that the production of hard-to-reach fossil fuels is not compatible with efforts to achieve carbon reduction targets; and urges the Minister of Enterprise, Trade and Investment to give greater support to the generation of energy from renewable sources instead.”

**c) England:**

**Wirral Borough Council:** 18<sup>th</sup> July 2011

Wirral Council unanimously passed the following resolution:

- (a) Wirral Council states its opposition to any application by IGas or other companies to carry out any shale gas or coal gas methane testing or extraction in Wirral until such time as the Council is satisfied as to the safety of the process and that the risk of adverse environmental impacts have been fully addressed.
- (b) Requests the appropriate chief officer prepare a report for the Planning Committee, the Economy and Regeneration and Sustainable Communities Overview and Scrutiny Committees to aid members in better understanding the council’s responsibility and regulatory role in relation to gas exploration.
- (c) Further requests the Economy and Regeneration OSC to include a study of the potential economic impacts of shale gas exploitation in Wirral in its workplan, including whether the impact of a proliferation of shale gas drilling on the Liverpool City Region will adversely impact on it becoming a leading area for the manufacture of low carbon technologies and development of a green economy.

**Manchester City Council:** 6<sup>th</sup> July 2012

Notice of motion passed:

“Manchester City Council is committed to acting to mitigate the impacts of climate change, in line with the objectives of the Climate Change Act, and section 19 of the Planning and Compulsory Purchase Act 2004 (amended by Planning Act 2008) and calls on the Chief Executive to implemented a policy that supports the Friends of the Earth campaign that would ensure that planning permission will not be given for test drilling or extraction of shale gas (fracking) unless reasonable scientific doubt as to any adverse impacts can be excluded; the proposal is environmentally acceptable, or it can be made so by planning conditions or obligations.”

**Brighton & Hove City Council:** 25<sup>th</sup> October 2012

“This Council asks the Policy & Resources Committee to resolve that Brighton and Hove City Council should become a ‘frack-free’ zone;  
asks the Chief Executive to write to the Secretary of State for the Environment calling on him to impose a moratorium on onshore and offshore exploration, development and production of Coal Bed Methane, Shale Oil and Shale Gas, at least until a full independent environmental impact of the processes involved has been carried out;  
calls on the Government to make it easier for co-operatives such as the Brighton Energy Co-op, housing associations and local authorities to generate their own renewable energy.”

**Appendix 3: Further Reading:**

- Shale Gas: An updated assessment of environmental and climate change impacts, by Broderick et al. Tyndall Centre, commissioned by Co-operative Group, November 2011. <http://www.co-operative.coop/Corporate/Fracking/Shale%20gas%20update%20-%20full%20report.pdf>
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- Friends of the Earth Scotland Briefing on Unconventional Gas and Fracking, April 2012 [http://www.foe-scotland.org.uk/sites/files/Unconventional\\_GasandFracking\\_briefingApril2012.pdf](http://www.foe-scotland.org.uk/sites/files/Unconventional_GasandFracking_briefingApril2012.pdf)
- Shale Gas: Energy Solution or Fracking, Friends of the Earth, (EWNI), March 2012 [http://www.foe-scotland.org.uk/sites/files/Unconventional\\_GasandFracking\\_briefingApril2012.pdf](http://www.foe-scotland.org.uk/sites/files/Unconventional_GasandFracking_briefingApril2012.pdf)
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