



**CEC SPECIAL REPORT
ON ENERGY
2017**



1. BACKGROUND

- 1.1. This CEC Report supplements GMB energy policy, especially in respect of gas, as part of a facts based analysis of the UK's energy needs and supply.
- 1.2. Congress 2015 received and agreed a CEC Statement which included:
 - reaffirmation of GMB's balanced energy policy
 - recognition that gas will continue to play a crucial role in the development of the low carbon economy as part of a balanced energy mix
 - not ruling out shale gas extraction and to look at the environmental, socio-economic, industrial and safety impacts of fracking for shale gas
 - forming a view on whether the onshore shale gas industry is set to become a significant part of the energy sector and if so, how GMB can seek to influence the development of the industry and recruit and organise the workers it will employ
 - acknowledgement that recruiting and organising gas workers has been a core activity for GMB for 125 years
 - to monitor developments around shale gas and its extraction and to conduct a comprehensive cost-benefit analysis based upon honesty around the economic realities of gas, security of supply and where the gas we need comes from.
- 1.3 Since the 2015 CEC Statement there have been a number of large and key changes in the UK energy sector including:
 - construction beginning on the first new nuclear power station in a generation at Hinkley Point C - the biggest construction project in Europe
 - government cuts to subsidies and support for renewables
 - Britain has voted to leave the EU
 - the planned closures of coal-fired power stations has begun to affect the UK's energy supply and we are using an increasing amount of gas to meet our electricity needs
 - further shale gas extraction licenses have been granted and a fracking industry is starting to develop
 - the financial cost to consumers of the Climate Change Act 2008 are becoming clearer.

2. INTRODUCTION

- 2.1. GMB is one of the largest trade unions for Energy workers in the UK with around 50,000 members working directly and indirectly in all energy sectors including nuclear, gas, electric, oil and renewables across all of the main companies. GMB is by far the largest Union in the gas sector.
- 2.2. 637,000 people are directly or indirectly employed across the UK in the Energy sector (137,000 direct and 500,000 indirect jobs).
- 2.3. The sector contributes around £5.5 billion in direct and indirect taxes to the UK government.
- 2.4. The UK is experiencing an energy crisis. We are living through a period of serious vulnerability which, if not urgently addressed, will have hugely damaging implications for both our economy and our society.
- 2.5. The key problem is that the UK no longer produces enough primary fuels to meet its energy demand leading to issues of security of supply, increased price volatility and harming the UK's balance of trade, tax revenues and jobs.
- 2.6. Ernst & Young report fracking could generate £33 billion in investment and create over 64,500 direct and indirect jobs, mainly high-skilled and well paid.

- 2.7. Many existing areas that GMB are involved in, such as steel, chemical, construction and other manufacturing and service industries could benefit enormously from a fracking supply chain.
- 2.8. Good quality, skilled and well-paid jobs for GMB members is something we will always fight for. 128 years ago Will Thorne set out to organise the gas workers of his day and GMB should stand ready to organise tomorrow's gas workers in the shale gas sector and work with the regulatory authorities to ensure health and safety and environmental issues are dealt with properly.
- 2.9. GMB is, currently and historically, the union for gas workers with other unions in the sector being Unite and Community.

3. GMB ENERGY POLICY

Self-sufficiency and a balanced and sustainable mix

- 3.1. Britain needs a properly regulated government led cohesive approach to achieve a balanced and sustainable energy mix that tackles fuel poverty, contributes to decarbonisation and helps to reduce energy bills.
- 3.2. Part of this must be a reduced reliance on imported energy and refocusing on what we need to create a viable, UK power supply with a well-paid and skilled UK workforce at its heart. After Brexit, common sense should indicate that Energy policy must look at ways of being more self-sufficient. Investment in renewables and nuclear is one way, which GMB strongly supports, but gas still has a key role to play in a balanced mix of energy sources.
- 3.3. GMB wants to see a world where we get most of our energy from renewable sources, not fossil fuels. We have never disputed that climate change is a reality. However, until there is a breakthrough in large-scale, economically viable and reliable solar or wind power storage, there has to be a sensible mix of renewable and non-renewable energy sources that should include energy derived from nuclear and gas.

Intermediate fuel in the transition to renewables

- 3.4. When the wind and solar fleets are combined, the power they generate is less than 20% of the installed capacity for 29 weeks of the year, and below 10% for 16 weeks of the year. That means wind and solar together produce no electricity for more than half the time. We need a base load electricity capacity we can rely on. Solar, wind and other renewable energy sources can, and should, form part of a balanced energy mix generating sufficient energy to meet demand.
- 3.5. Gas is the intermediate fuel needed for the foreseeable future. It is currently less expensive than power generated by renewables and nuclear, more reliable than renewables, produces less greenhouse gas emissions than electricity generated from burning coal and is the most responsive to changes in demand. Electricity generated from gas increased from 29.5% to 42.4 % in 2016 and is set to increase further as coal fired generation is reduced.
- 3.6. Gas is around three times cheaper than electricity - the main reason why 85% of homes use gas for heating, and access to gas is a key part of every fuel poverty strategy.
- 3.7. Wind and solar are intermittent and, for now at least, can only be a part of the mix. In the period of transition to greater use of renewables, we need a base load electricity capacity we can rely on and it is not correct to think renewables on

their own can power the country. Conventional methods are needed to generate capacity by way of back-up when the wind doesn't blow and the sun doesn't shine.

- 3.8. The last year saw 46 low wind days, one day in 8, when wind supplied less than 10% of capacity to the grid.

Where our electricity comes from now

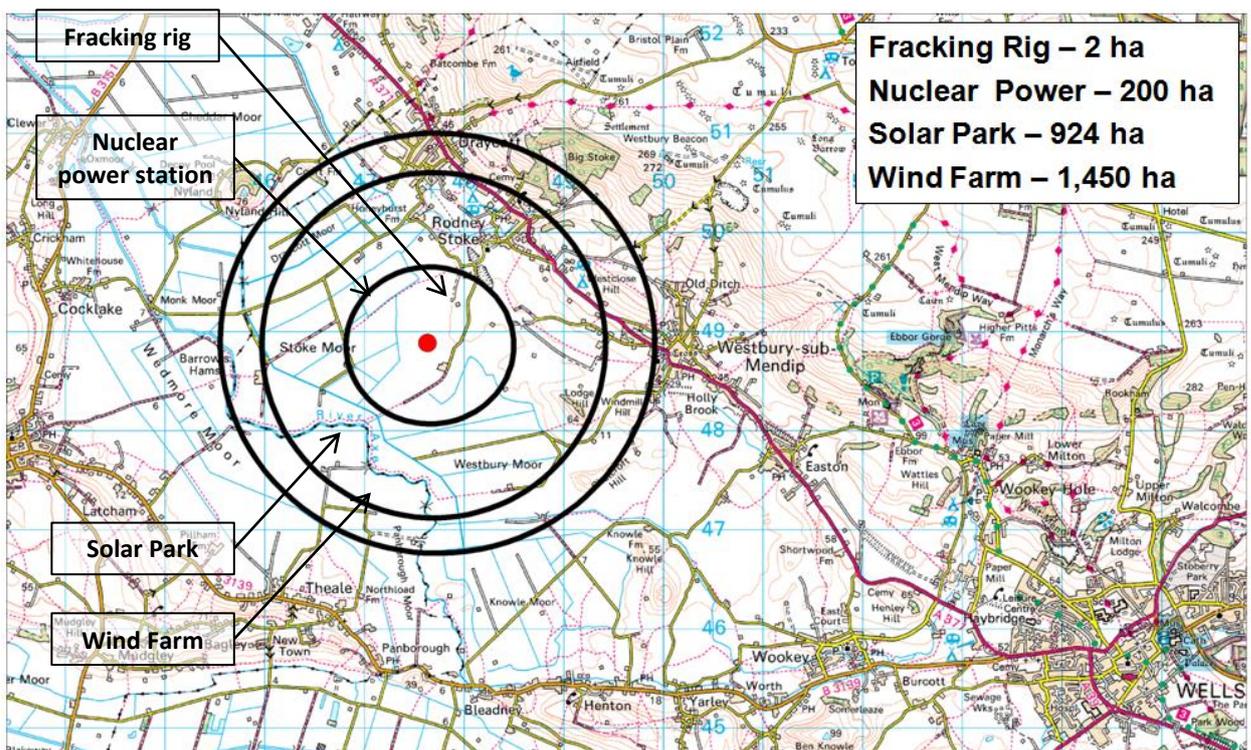
- 3.9. An ordinary day, 6:20pm, Thursday 11th May, 2017, showing where our energy is coming from. The vast majority coming from CCGT (Gas Turbines, 50.35%) and nuclear (18.4%) with back up coming



from other sources including wind (7.07%), coal (1.79%) pumped storage (3.5%), solar (3.3%), biomass (4.3%) and Hydroelectric power (0.8%) plus imported electricity from France (5.9%), Holland (3%) and Ireland (0.7%) via interconnectors.¹

The future land implications

- 3.10. The relative land area needed to deliver 9.5 TW-h (Terrawatt-hours) of electricity over 25 years is stark. If a fracking rig was to be built outside of Wells in Somerset, the land area of the whole facility is 2 hectares. A nuclear power station needs around 200 hectares. In comparison a solar park needs 924 hectares and a wind farm 1,450. The map below shows the different areas needed.²



Put simply, we would need 450 times the land area for solar compared to gas and the land above a fracking well can still continue to be used for other purposes, whilst the land below solar panels cannot.

Socio-economic and industrial considerations

- 3.11. We need an energy policy that will reduce energy bills, help tackle fuel poverty, improve people's health, contribute towards lowering carbon and provide a huge boost to both national and local economies by creating wealth and jobs. Successive governments have failed in this duty and put their heads in the sand, closing power stations without providing clarity regarding viable replacement capacity.
- 3.12. GMB welcomed the decision to give the go ahead to build Hinkley Point C nuclear power station back in September after years of procrastination, hesitation and bewildering postponements. This vital piece of UK infrastructure will provide 7% of the UK's energy needs (6 million homes), creating at least 25,000 jobs during the construction phase and a further 900 during its operation. In addition to this is, an agreed minimum of 1,000 apprenticeships and adult trainees, creating a skill training level that will put other UK projects to shame. The Hinkley deal was the first serious sign that UK plc is open for business post-Brexit.
- 3.13. GMB policy would include the building of at least 6 more nuclear power stations, and we will campaign on the basis of much needed clean energy, well skilled, better paid jobs and security of supply.
- 3.14. Renewable energy has a key part to play in a balanced energy policy. More research and development into energy storage must take place to achieve a significant breakthrough because unless and until the mass storage issue is sorted out, the only way forward is nuclear and gas.
- 3.15. Transporting gas thousands of miles across the oceans is not good for the environment and not good for security of supply in the UK. Given we need gas to heat our homes and power industry, the question is, "where are we going to get our gas from?" We are increasingly going to be dependent on regimes with appalling human rights records for the gas we need. That isn't ethical and is surely an abdication of our environmental and moral responsibilities. It also makes us vulnerable to those regimes - something an Island Nation should never be.
- 3.16. GMB is not saying "frack and be damned", quite the contrary, but more investigatory work needs to be allowed by decision-makers so that informed decisions can be made that ensure we could "frack" as safely and as respectfully to local communities as possible in the UK.
- 3.17. GMB wants a sensible, open and honest facts based debate that will see a low carbon economy with electricity generated from a sensible mix of renewable and non-renewable energy sources which would include nuclear, gas, solar, wind and any other economically viable renewable options that come along.
- 3.18. This is not only how we will keep the lights on and help meet our future energy needs, but by doing so, we will be self-sufficient and secure while providing lower bills for consumers and highly skilled, well-paid and Unionised jobs for hundreds of thousands.

4. WHY GAS IS SO IMPORTANT

- 4.1. Gas is a vitally important source of energy for the UK.
- 4.2. In England the proportion of dwellings with gas central heating has steadily increased from 73% in 1996 (14.8 million dwellings) to 85% (19.9 million) in 2014. That is 8.5 out of 10 households using gas for heating.
- 4.3. Electricity is around three times more expensive per kilowatt hour than gas.³ This is why households with electric heating are far more likely to be in fuel poverty.⁴
- 4.4. We have to accept that the UK will be using gas for many years to come.
- 4.5. A number of our industries, like steel and ceramics, are reliant on high grade heat that can only be produced by gas. These industries employ around 38,000 people, including 4,000 GMB members.
- 4.6. Around 45% of our electricity was generated by gas last year, according to provisional BEIS figures⁵, and more than 50% on cold days.
- 4.7. Gas is a raw material that is used to make many everyday items. Half a million jobs depend on gas as a feedstock⁶, and all of us depend on products that are made with gas including food that will have been grown with the aid of gas-based fertilisers - used on 75% of the farmland⁷ in this country - and medicines such as analgesics.
- 4.8. Natural Gas was the biggest contributor to electricity generation in 2016. It is less expensive than power generated by renewables and nuclear and more reliable than renewables.
- 4.9. Even if we had an electricity system powered completely by renewables, we would still need large amounts of gas. BEIS forecast we will be using roughly the same amount of gas in 2035 as we do today⁸, and the Committee on Climate Change says that the UK will only be using slightly less gas in 2030, in its scenario which meets the Fifth Carbon Budget.⁹
- 4.10. At a global level, gas is part of the solution to climate change. The coal-to-gas switch that we have seen in Britain should be replicated in other countries. In the International Energy Agency's 450 parts per million scenario, global emissions are kept at a level that gives us a decent chance of avoiding more than 2 degrees of warming. In that scenario, global gas use is higher in 2040 than it is today.¹⁰ This scenario is backed up by the UK's Committee on Climate Change which says gas will play a key role through to 2050.
- 4.11. Other methods of gas production must be looked at to form part of a balanced energy mix. In particular, "green gas", (created by the breakdown of organic, household, agricultural and food industry waste) can be examined but questions around whether this gas could be produced on an industrial, national level should be looked at in detail. In Germany, for example, this method competes with food production and has led to large scale land use changes resulting in 'maize deserts.'
- 4.12. In short, it is not a case of "if" we will use gas in the future, because we will; the question that must be faced up to is "where will that gas come from"?

5. THE ECONOMIC AND IMPORT PROBLEMS

- 5.1. The Oil and Gas Authority expects that imports will rise to over 75% in 2035¹¹ and, according to National Grid, if Britain doesn't produce shale, then import dependency will rise even further - up to 89% over the same period.¹² At today's

prices, the import bill could hit £9 billion a year¹³ – creating no jobs and generating no tax revenue in this country whilst continuing to have an impact on our balance of payments. The current UK balance of payments deficit is over £90 billion or 5% of GDP. This is not sustainable.

- 5.2. Imports now make up around half of our consumption. These imports come mainly from Norway, from Continental Europe where the gas may well originate from Russia, and by ship from Qatar. Imported gas costs around £14 million per day, money that is not generating jobs or tax revenues.
- 5.3. Qatar currently accounts for almost a third of global LNG (Liquefied Natural Gas) supply, and over 90% of the UK's LNG imports. If the Straits of Hormuz were closed, for example due to renewed US-Iran tensions, it would not only represent a catastrophe for global oil supplies, but also a major threat to UK and global LNG supplies.
- 5.4. We know there is a huge resource in the ground. According to the British Geological Survey, over 1,300 trillion cubic feet of shale gas can be found in the North of England¹⁴, and 80 trillion cubic feet in Scotland.¹⁵ We use less than 3 trillion cubic feet a year¹⁶, so if we could only get a tenth of the shale gas out of the ground, it would be enough for more than 40 years self-sufficiency.
- 5.5. Ernst & Young believe fracking could generate £33 billion in investment and create over 64,500 direct and indirect jobs, mainly high-skilled and well paid.
- 5.6. Imported energy creates no jobs, generates no tax and hits balance of payments.

6. CLIMATE CHANGE

- 6.1. UK CO₂ emissions are at their lowest level since the latter days of the reign of Queen Victoria, however climate change is a reality.
- 6.2. GMB believes the government should commit to complete transparency, efficacy, value for money and equity on all of the costs associated with decarbonising the economy and to commission a review of the cost effectiveness and fairness of the policies being pursued, including whether these cost should be paid for from general taxation rather than levies on consumer bills.
- 6.3. GMB established that if the cost of the implementation of the Climate Change Act 2008 of £6.76 billion was to recur until 2030, then the total cost would be £123.6 billion. However, as it is not possible to put figures on carbon taxes, emissions permits, capacity auction costs, renewable levies or any indirect costs associated with decarbonising the economy, the figure is likely to be much higher.
- 6.4. Loading the costs of decarbonising the economy onto individual bill payers is highly regressive and will hit those who can least afford it the hardest. This is likely to be thousands of pounds extra on the bills of every household in Britain over the coming decade and a half.
- 6.5. Lifecycle greenhouse gas emissions from UK-produced shale are lower than for gas imported by LNG or long-distance pipeline.
- 6.6. The Committee on Climate Change produced a report for the Scottish Government and stated:

“There may be benefits for energy security and domestic industry if new domestic sources of natural gas production reduce dependence on imported gas.”

“Current evidence suggests that well-regulated domestic production could have an emissions footprint slightly smaller than that of imported liquefied natural gas.”¹⁷

7. FRACKING – IS IT SAFE?

Myths versus facts

- 7.1. There are many myths out there with some preferring to deal with the propaganda of fear rather than facts. The facts are very simple: the industry has been reviewed by many eminent institutions and bodies including the Royal Society and Royal Academy of Engineering, Public Health England, Chartered Institute of Water and Environmental Management, the independent panel for the Scottish Government to name but a few. All have categorised the industry as low risk in a properly regulated environment.
- 7.2. The Environment Agency commissioned several expert panels to assess the safety aspects of fracking. In 2012, the Royal Academy of Engineering and Royal Society reviewed the scientific and engineering evidence on shale gas and stated¹⁸:
- “The health, safety and environmental risks associated with fracking as a means to extract shale gas can be managed effectively in the UK as long as operational best practices are implemented and enforced through regulation.”***
- 7.3. In 2013, the late Professor David MacKay (then the Department of Energy and Climate Change's Chief Scientist) and Dr Timothy Stone wrote a report on potential greenhouse gas emissions from UK produced shale gas and wrote¹⁹:
- “With the right safeguards in place, the net effect on UK Greenhouse Gas emissions from shale gas production in the UK will be relatively small.”***
- 7.4. In 2014, Public Health England assessed the risk to human health of extracting shale gas. They evaluated available evidence on issues including air quality, radon gas, naturally occurring radioactive materials, water contamination and waste water. They wrote²⁰:
- “We conclude that the currently available evidence indicates that the potential risks to public health in the vicinity of shale gas extraction sites will be low if shale gas extraction is properly run and regulated.”***
- “Caution is required when extrapolating experiences in other countries to the UK since the mode of operation, underlying geology and regulatory environment are likely to be different.”***

Risk management and regulation

- 7.5. Every industrial process presents a degree of risk. The issue is the extent to which this is controlled and managed. There have been several health and safety concerns raised over the process of hydraulic fracturing which centre on the development of seismic activity; the release of hydrocarbons and the potential exposure risk to workers from chemicals and substances, primarily silica.
- 7.6. As with any new process, the precautionary principle must apply. That is that until the health and safety risk is quantified, it must be assumed that harm will be caused and the risk must be reduced to the lowest reasonably practicable level.

- 7.7. Britain has a strong and well-developed regulatory system for high-risk industries. The HSE and the Environment Agency both have enforcement responsibility for fracking activity, and the work is covered by existing regulations which have been in place for more than 20 years.
- 7.8 These are the Health and Safety at Work Act 1974, with specific requirements detailed under the Borehole Sites and Operations Regulations 1995 and the Offshore installations and Wells (Design and Construction etc) Regulations 1996.
- 7.9. These place specific requirements on well operators, including providing a safety case assessment before any work is commenced; putting detailed protective requirements into place for the well operation which must be reported upon every week; and site inspections from both HSE/EA and independent Well Examiners.
- 7.10. HSE currently has enough Inspectors to manage the exploratory phase of fracking operations, but will need increased resources if and when large scale production goes live.
- 7.11. Ultimately, the crucial aspect is the enforcement of the Regulations. Onshore pressure fracturing has been operating at Wytch Farm in Furzey Island, Poole, Dorset since the late 1970s without incident, largely due to the strong regulation of the activity. GMB will seek to ensure that the HSE has the resources and impetus to maintain and improve these standards should large scale production from fracking begin in the future.

The US experience – inadequate regulation

- 7.12 The experience of the United States, where regulation is minimal and poorly enforced, would strongly suggest that fracking is highly dangerous and unsafe. Britain has a far stronger approach to safety regulation, and crucially the opportunity to learn from American mistakes and make sure we get it right.
- 7.13. Most of the safety issues relating to fracking are the same as for any gas extraction, so GMB has experience of the types of risks and hazards that workers are exposed to.
- 7.14 Overall, the oil and gas extraction industry has a poor track record on health and safety and internationally, fracking is no different. In the US, fracking workers are seven times more likely to die on the job than other types of workers .Some of the safety hazards that US fracking workers regularly encounter include:
- fatigue from working long shifts (the production workers work an average 20 hour shift)
 - being struck by moving equipment and high-pressure lines
 - working in confined spaces.
- In Britain, health and safety law is much stricter, which reduces or removes these risks. The Working Time Regulations drastically reduce the length of shifts and there are specifically legal requirements on work with pressure systems and in confined spaces.
- 7.15. There is also the risk of explosion through the release of hydrocarbons. In the UK, this is the risk the HSE is most concerned with. The regulations on well design and construction specify measures to mitigate this risk and to control the release.

Health and environmental considerations

- 7.16. As well as the safety issues, there are considerable health issues. One is from exposure to the hydrocarbons, and chemicals used in fracking fluids, including biocides. The other is exposure to silica.

- 7.17. Transporting, moving and refilling silica sand into and through sand movers, along transfer belts and into blender hoppers can release dusts containing silica into the air. Workers can be exposed if they breathe the dust into their lungs.
- 7.18. Breathing silica can cause the lung disease silicosis. Silica can also cause lung cancer and has been linked to other diseases, such as tuberculosis, chronic obstructive pulmonary disease (emphysema) and kidney and autoimmune disease.
- 7.19. Silica exposure can be greatly reduced if the correct measures are taken, primarily by enclosing as much of the process as possible and providing extraction to remove the dust where this is not possible. The experience of Unions in the US is that employers rely too much on simply issuing workers with facemasks (which are uncomfortable and often not worn) rather than addressing the actual problem.
- 7.20. As no gas wells comparable to those in the US exist yet in the UK, comparisons have to be sought elsewhere. Unfortunately much of the evidence is not there. In the US, where fracking has increased massively over the past decade, the data is collected - often by the gas companies themselves - but not shared due to privacy issues.
- 7.21. One detailed study in the US was published in March 2016 in the journal *Marine and Petroleum Geology*. It looked at the data from Pennsylvania, one of the main areas of fracking in the US. It examined 3,533 wells between 2008-2011 and found that 91 wells (2.6%) suffered some internal or external well barrier failures, including four blowouts (0.01%). Whilst the US study showed overall risk of serious failure was relatively low, it was not tolerable to current UK standards and our stronger regulatory requirements which would have reduced the risk.
- 7.22. The key environmental safety factor is leakages through the well casing (the industry term for the sheath of cement that surrounds a newly drilled well). Strong and careful regulation can reduce risks by ensuring that well-shafts are leak-proof and the International Energy Agency estimates that proper regulation would add about 7% to the cost of each shale gas well. Likewise, the potential risk of groundwater contamination can be managed through evaporation and disposal or re-use, so long as this is designed into the process from the outset.

8. CONCLUSION

- 8.1 Britain needs an energy policy that will reduce energy bills, help tackle fuel poverty, improve people's health, contribute towards lowering carbon and provide a huge boost to both national and local economies by creating jobs and wealth.
- 8.2. We need a properly regulated government led cohesive approach to achieve a balanced and sustainable energy mix coupled with a reduced reliance post Brexit on imported energy through a viable, UK power supply with a skilled UK workforce at its heart.
- 8.3. Climate change is a reality. GMB wants to see a world where we get most of our energy from renewable sources, not fossil fuels. We also need a base load electricity capacity we can rely on until there is a breakthrough in large-scale, economically viable and reliable solar or wind power storage. GMB wants a sensible, open and honest facts based debate that will see a low carbon economy powered by a sensible mix of renewable and non-renewable energy sources.

- 8.4. In the interim that should include energy derived from nuclear, gas, solar, wind and any other economically viable renewable options that come along.
- 8.5. GMB will continue to campaign for the building of at least 6 more zero-carbon, nuclear power stations.
- 8.6. Renewable energy has a key part to play in a balanced energy policy. More research and development into energy storage must take place to achieve a significant breakthrough.
- 8.7 Britain needs gas and Britain will use gas. Gas is around three times cheaper than electricity - the main reason why 85% of homes use gas for heating, and access to gas is a key part of every fuel poverty strategy.
- 8.8. The UK has very large shale gas resources. It is estimated that if only 10% could be extracted, it would be equivalent to 40-50 years of UK gas consumption.
- 8.9. If, as looks likely, shale exploration is going to happen, GMB should work with the industry and put pressure on the employers to make it as safe as possible. If fracking is to develop in a way that does not harm the health and safety of workers, strong Union structures and organisation will be needed to hold employers to account and to maintain standards and performance. Exactly as GMB has done in the gas industry for over 125 years, delivering jobs offering better pay and conditions and with the risks from fracking controlled and reduced so long as lessons are learned and applied from the mistakes made in the USA, best practice is adopted and regulations are strongly enforced.
- 8.10 Shale gas production should be permitted, alongside the development of the UK's renewable and nuclear capacity, benefitting the security of our energy, the economy and the environment.

Endnotes

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