House of Commons

Energy and Climate Change Committee

Shale Gas: Government Response to the Committee's Fifth Report of Session 2010–12

Seventh Special Report of Session 2010–12

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The Energy and Climate Change Committee

The Energy and Climate Change Committee is appointed by the House of Commons to examine the expenditure, administration, and policy of the Department of Energy and Climate Change and associated public bodies.

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The Reports and evidence of the Committee are published by The Stationery Office by Order of the House. All publications of the Committee (including press notices) are on the internet at www.parliament.uk/parliament.uk/ecc. A list of Reports of the Committee in the present Parliament is at the back of this volume.

The Report of the Committee, the formal minutes relating to that report, oral evidence taken and some or all written evidence are available in a printed volume. Additional written evidence may be published on the internet only.

Committee staff

The current staff of the Committee are Nerys Welfoot (Clerk), Richard Benwell (Second Clerk), Dr Michael H. O'Brien (Committee Specialist), Jenny Bird (Committee Specialist), Francene Graham (Senior Committee Assistant), Jonathan Olivier Wright (Committee Assistant), Emily Harrisson (Committee Support Assistant) and Nick Davies (Media Officer).

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Seventh Special Report

On 23 May 2011 the Energy and Climate Change Committee published its Fifth Report of Session 2010-12, *Shale Gas* [HC 795]. On 15 July 2011 the Committee received the Government's response to the Report. It is appended below.

Appendix: Government Response

Introduction

In the light of the wide ranging nature of the Committee's report, this is a joint response which includes contributions from the Department of Energy & Climate Change (DECC), the Treasury, the Department for Environment Food & Rural Affairs (Defra), the Health & Safety Executive (HSE), and the environment agencies of England, Wales and Scotland: The Environment Agency (EA), and the Scottish Environment Protection Agency (SEPA).

Committee Recommendations and Government Response

Background

1. Mitigation of the risk to water aquifers from hydraulic fracturing relies on companies undertaking the proper measures to protect the environment from pollution. However, there is no evidence that the hydraulic fracturing process itself poses a direct risk to underground water aquifers. That hypothetical and unproven risk must be balanced against the energy security benefits that shale gas could provide to the UK. We conclude that, on balance, a moratorium in the UK is not justified or necessary at present. But evidence must continue to be collected and assessed. We recommend that the Department of Energy and Climate Change monitor current drilling activity in the Bowland Shale formation extremely closely during its early stages in order both to assess the likely environmental impact of large scale shale gas extraction in the UK and also to promote public confidence in the regulation of the activity (Paragraph 17).

As is the case with all UK onshore oil and gas activities, DECC has a regular dialogue with those companies which are licensed to operate within the UK, and further consents from DECC are required before such companies are able to go ahead with exploration drilling or move to production. In view of the fact that the exploration taking place in the Bowland Shale is the first shale gas project to be undertaken in the UK, DECC has been monitoring, and will continue to monitor, this exploration activity very closely and liaise with the other regulatory bodies, the HSE and the EA, as the activity moves forward.

Following the seismic tremors which took place in April and in May, DECC had discussions with the operator, Cuadrilla, and agreed that a pause in hydraulic fracturing operations is appropriate so that a better understanding can be gained of the cause of the

seismic events experienced in Poulton-le-Fylde. A geomechanical study is being undertaken, along with further work by the British Geological Survey and Keele University. The implications of this information will be reviewed before any decision on the resumption of these hydraulic fracture operations is made.

Prospects for Shale Gas

2. We conclude that shale gas resources in the UK could be considerable. However, while they could be sufficient to help the UK increase its security of supply, it is unlikely shale gas will be a "game changer" in the UK to the same extent as it has been in the US. It is more likely that in countries such as Poland—with a larger reliance on gas imports and greater potential shale gas resources—the impacts of shale gas production will be significant. (Paragraph 24)

3. We conclude that it is important for the UK to monitor the development of shale gas in Poland—the "barometer of Europe" on this issue—both in terms of exploration and regulation. We are concerned that there could be adverse competitive consequences for the UK if Poland unilaterally develops its shale gas resources within the EU, particularly if their energy policy is driven by energy security—in spite of the environmental concerns associated with hydraulic fracturing—owing to their reliance on imported gas. (Paragraph 37)

Along with other Member States, the UK plays a key role in helping to shape European energy policy. We also closely monitor developments taking place in Member States and beyond. The UK Government is aware that Poland is looking to exploit potentially large shale gas resources and will be keeping a close eye on any exploration and development success there. Once the size of that potential becomes clear from a commercial perspective, we will also be considering the wider implications from UK security of supply perspective.

4. In the crowded UK we cannot afford to risk the creation of contaminated and abandoned sites where shale gas production has stopped. The prospect of such a risk must be carefully considered when licences and other permissions are granted. We recommend that DECC should require that a fund be established to ensure that if wells are abandoned they can be "plugged". Such a fund could be established through a levy on shale gas well drilling or an upfront bond. (Paragraph 41)

The drilling of any shale gas well already requires specific consent from DECC, which gives DECC the opportunity to prevent the well from being drilled if it is not satisfied about any aspect of the well, including the applicant's financial capacity.

A requirement to provide for post-activity site restitution would be an issue for the planning process, and the relevant planning authority may attach conditions to the planning permission to ensure that this happens. We do not consider that further powers are necessary.

In England and Wales, in the event that a permit is required under the Environmental Permitting Regulations 2010 for certain activities at the surface, such as large scale refinement or combustion, controls would be in place to require site restoration in the event that the activity led to the site becoming contaminated. Such permits would be issued by the Local Authority or the EA, depending on the nature of the activity. Where the activity does not require a permit and pollution to water occurs, an anti-pollution works notice under the Water Resources Act 1991 may be served. In Scotland equivalent regulatory controls exist to ensure environmental damage caused by permitted sites is remediated prior to permit surrender.

5. There is substantial evidence that UK offshore unconventional gas resources could dwarf the potential onshore supplies. While these might be economically unviable at present, "uneconomic" reserves can become economic quickly as technology and prices shift. We recommend that DECC encourage the development of the offshore shale gas industry in the UK, working with HM Treasury to explore the impacts of tax breaks to the sector. (Paragraph 47)

We are not aware of any offshore shale gas exploration anywhere in the world at present, and because of the much higher costs of offshore operations, no early change in the prospects for such activity seems likely. A few companies have discussed with us possible shale gas prospectivity that they have identified offshore, along with conventional oil and gas prospectivity in the nearshore area. If these prospects were pursued it would most likely be done using horizontal drilling from onshore locations. As usual, the Government is happy to maintain a dialogue with companies on the impacts of the fiscal regime, but has so far not been presented with any evidence making the case for tax changes.

6. Planning for any new gas transport infrastructure required to exploit shale gas should take into account the opportunity to minimise disruption and costs by sharing pipelines between different companies operating near to each other. We recommend that the Government consider amending the Town and County Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 to require Environmental Impact Assessments for smaller gas pipeline projects, with the aim of avoiding unnecessary duplication of infrastructure. (Paragraph 54)

The statutory regimes under the Pipelines Act 1962 for consenting pipelines over 10 miles allow the Secretary of State to impose requirements for pipelines to be rerouted or diverted to minimise duplication. As regards environmental impact assessment, while proposed pipelines less than 40km long may not automatically require assessment under the EIA, the Directive and implementing Regulations allow for an EIA to be required on a case by case basis where the impacts of such a proposal (including cumulative impacts) make this appropriate.

UK Policy Implications

7. We conclude that a glut in shale gas production could drive the price of conventional gas down, but there is uncertainty as to the extent of this. If there were to be a fall in prices it is unlikely to be as dramatic as that seen in the US. (Paragraph 65)

The unexpected growth in unconventional gas production in the US in conjunction with other factors helped to depress UK and global spot wholesale gas prices over the course of 2009 by reducing the US need for LNG imports. However, as the global economy emerged from recession, gas markets have tightened with UK wholesale prices rebounding strongly. There is now a substantial gap between US and UK spot prices.

The prospects for unconventional gas production outside North America are uncertain. Most analysts suggest that a range of factors make unconventional gas more costly and harder to access in regions outside North America and it is unlikely that significant production of unconventional gas will occur in Europe in this decade.

Given the uncertainties around when, and the degree to which, unconventional gas will be produced outside North America, we continue to take a cautious view of the implications for gas prices.

8. Shale gas has the potential to diversify and secure European energy supplies. Domestic prospects—onshore and potentially offshore—could reduce the UK's dependence on imports, but the effect on energy security is unlikely to be enormous. We conclude that energy security considerations should not be the main driver of policy on the exploitation of shale gas. (Paragraph 71)

Within the UK, as we move towards a lower carbon economy, one of the Government's main objectives is to maximise indigenous resources, both offshore and onshore. We will continue to encourage industry to invest in exploration and development, but recognise that the full potential for commercial shale gas production in the UK remains to be proven. On this basis, overall policy on security of supply is based on achieving a diverse and sustainable supply of energy supplies from indigenous and external sources. Government recognises the need to take a balanced approach and does not believe that security of supply considerations will be the main driver of policy in relation to the exploitation of shale gas in the UK.

9. Conventional sources of natural gas in the North Sea are diminishing. We conclude that if a significant amount of shale gas enters the UK market (whether from domestic sources, imported from another European country, or from the global market via LNG) it will probably discourage investment in more-expensive—but lower carbon—renewables. The UK needs to manage this risk in order to achieve its aim of generating more electricity from renewable and other low carbon sources This could be done through the progressive implementation of an Emissions Performance Standard (EPS) that would prevent gas power stations operating as base load providers after a certain date unless fitted with carbon capture and storage. (Paragraph 82)

Fossil fuels will continue to play an important role in our energy mix as the UK makes the transition to a low carbon economy. Gas in particular will be needed to provide vital flexibility to support an increasing amount of low carbon generation and to maintain security of supply. It is important that we do not undermine investment in gas generation over the next few years, and provide sufficient certainty for investors. As such, as part of energy market reform (EMR) we proposed to introduce an EPS in a way which will provide guarantees to gas plant over the EPS level they would face. We consider that introducing an EPS now which restricted the operation of gas plant in the future could add significant uncertainty, given that CCS has not yet been demonstrated at commercial scale. This could, in turn, prevent investment and have implications for security of supply. Following consultation, the Government has therefore concluded that it will introduce an EPS above the level of emissions of gas plant, and those plant consented before the end of 2015 will be offered a guaranteed EPS for a pre-determined period. We will work be working with stakeholders over the coming months to determine how this should be implemented and what the period should be, recognising that we must balance investment certainty, security of supply, and support for decarbonisation. It may be appropriate to use an EPS in a different way in the future, which is why we will review it in line with the decarbonisation reporting process required under the Energy Act 2010.

10. We conclude that shale gas has the potential to shift the balance in the energy markets that the Department has tried to create away from low carbon electricity generation. We recommend that the Department take account of the impact of shale gas in its decisions on reform of the electricity market and its expectations of future investment in the energy industry. (Paragraph 83)

The modelling shows that the effect of electricity market reform (EMR), in particular the Carbon Price Floor and the Feed-in-Tariff for low carbon generation, will be an increase in low carbon forms of generation, including nuclear, renewables and CCS. The proposals are tested against a range of fossil fuel prices (including low gas prices up to 2030) to assess their robustness to changing assumptions. We are confident that EMR will create a framework that will ensure we can meet our renewable and carbon emissions reduction targets.

11. We recommend that UK legislation and regulation should take specific account of the challenges unique to shale gas exploration and production; specifically, the combination of hydraulic fracturing and horizontal drilling at multiple wells that requires large volumes of water and chemicals, and leads to the production of large volumes of waste water that must be managed and disposed of. (Paragraph 93)

The technologies used in shale gas operations are not generically novel or unfamiliar. Hydraulic fracturing, water injection and lateral drilling, individually or in combination, are all familiar techniques that DECC and the other regulators have had to deal with robustly for a long time.

Waste water management is mainly an environmental issue, but requirements in health and safety legislation (e.g. relating to maintaining well integrity), can help to mitigate the

risk on an environmental incident. HSE feels that existing health and safety legislation (especially the regulations that address well design, construction integrity and control) already takes specific account of the challenges unique to shale gas exploration and production. However, HSE will not be complacent and will continue to monitor the health and safety legislation relating to shale gas that is introduced by other Member States to highlight any gaps.

The EA and SEPA not foresee significant challenges for wastewater treatment and disposal that are unique to unconventional gas activities. Operators will either transfer wastewater offsite for treatment to a permitted facility, or treat and dispose of wastewater onsite for which they will require an environmental permit themselves. Provisions for the safe handling of wastewater onsite will be a condition of local authority planning permission, and will be considered during the respective environment agencies' assessment of a site's environmental permitting requirements.

Likewise, adverse effects on water resources as a result of possible expansion of the shale gas industry in the UK are not expected.

Should a supply of water be needed directly from the environment for shale gas or coal bed methane, operators will need to hold an abstraction licence. The respective environment agencies license water use to control the level of abstraction to protect both water supplies and the environment. A licence will only be issued where a sustainable water supply is available.

Operators may also obtain water from mains water supplies, subject to the agreement of the water company and there being availability of such a supply. Water companies must operate within their own abstraction licences and would determine whether a sufficient supply could be made available to any industrial customer.

Abstractions (other than of very small quantities) from and discharges to the water environment require authorisation. Applications for authorisation are rigorously assessed to ensure that significant adverse impacts do not occur. This means that there will be adequate protection of the water environment and other water users irrespective of whether operators undertaking hydraulic fracturing:

- abstract water directly from the environment, or indirectly by making use of mains supply; or
- discharge directly to the water environment, or instead make use of a treatment and disposal facility authorised to a third party

Where assessments identify a potential impact adequate mitigation measures will need to be put in place or the application will be refused.

Enforcement action can be taken against operators who cause pollution as a result of an unauthorised release of contaminants into the water environment

12. We note that stronger environmental regulations and increased population density means that in the UK, and Europe more broadly, shale gas development here will follow a different route to that of the US. Although energy is not an EU-level competence, the UK Government will need to work with its European partners to ensure, so far as is possible, a reasonable degree of level competition between domestic shale gas producers. (Paragraph 94)

13. We recommend that the UK Government monitors carefully the regulatory approach adopted by Poland and any other EU countries where shale gas exploration and production takes place. We recommend that the Government explores the possibilities of common environmental standards within the EU for shale gas exploration and production. (Paragraph 95)

In its dealings with Europe, the UK Government will always look to encourage competition in markets and, although energy is not an EU-level competence, the EU has a range of legislation in place to facilitate competition within the market and within Member States.

As indicated in response to recommendation 3 above, the UK closely monitors developments taking place in Member States and beyond, and will be watching shale gas activity in Europe, including that taking place in Poland. If the European Commission concludes that there is a need for common environmental standards above and beyond those already in place to deal with issues specific to shale gas activity, the UK would be ready to feed into such considerations. We believe that the UK regulatory approach could provide a good benchmark in this respect.

Environmental Risks of Shale Gas

14. We recommend that the Government consider the future funding for the Environment Agency should the shale gas industry expand in the UK. As the situation stands, shale gas operators are unlikely to explore in areas where the Environment Agency will determine there is a risk to groundwater, so an Environmental Permit will not be necessary. However, the Environment Agency will still be expected to monitor for contamination and pollution, without being able to recover costs through the issuance of a permit. (Paragraph 101)

Indicative budgets have been set for the Environment Agency (EA) and for Defra for the Spending Round 10 period up to 2014/15. EA reviews business planning on an annual basis and seeks Defra approval for this through its corporate plan. In the event of new pressures arising (such as this) Defra would first seek to identify with EA how these could be met through reprioritisation of existing work. Any additional funding needs beyond this would of course have to compete with other EA and Departmental priorities.

Although shale gas operators are unlikely to explore in areas where there are risks to groundwater; coal bed methane operators are more likely to undertake exploratory drilling in proximity to ground or surface water resources and are likely to require a permit. Where a permit is issued the Environment Agency can charge the operator a fee proportionate to the amount of resource required for this service.

15. We conclude that hydraulic fracturing itself does not pose a direct risk to water aquifers, provided that the well-casing is intact before this commences. Rather, any risks that do arise are related to the integrity of the well, and are no different to issues encountered when exploring for hydrocarbons in conventional geological formations. We recommend that the Health and Safety Executive test the integrity of wells before allowing the licensing of drilling activity. (Paragraph 113)

It is the operator's responsibility to ensure the integrity of the well, not the regulator. HSE will proactively regulate these activities using the same approach it adopts for any onshore hydrocarbon gas extraction and production activity. HSE will assess an operator's well design in advance of work activities starting, review weekly updates on progress of the well and inspects well activities. These interventions allow HSE to intervene when appropriate, including taking formal enforcement action (e.g. stopping the well operations). Well operators are also required to put in place a scheme of examination where an independent competent examiner reviews all programs of work that a well operator proposes to undertake on a well.

16. We recommend that the Environment Agency should insist that all companies involved in hydraulic fracturing should declare the type, concentration and volume of all chemicals they are using. (Paragraph 114)

Injection into groundwater of water containing pollutants, including fracturing fluids, requires authorisation. Any application for authorisation must be accompanied by information on the type and concentration of these pollutants.

In England and Wales where a permit is required, information on the type, concentration and volume of all the substances that they intend to discharge to ground, including frack fluids, will be included on the public register. Where frack fluids are injected into formations that do not contain groundwater a permit may not be required. The Environment Agency still expects companies to disclose the nature and composition of the discharge and can use powers under the Environmental Permitting Regulations to obtain such information.

In Scotland where operators can demonstrate that information on discharges to ground is commercially sensitive they may request that it is withheld from the public register.

17. We recommend that before the Environment Agency permits any chemicals to be used in hydraulic fracturing fluid, they must ensure that they have the capabilities to monitor for, and potentially detect, these chemicals in local water supplies. (Paragraph 115)

When assessing the permitting requirements for any hydraulic fracturing activity the respective environment agencies review the chemical additives to be used by an operator and assesses their potential environmental impact. The agencies will routinely challenge any use of chemicals that would not normally be monitored for or would not be detected in local water supplies, and will prohibit or not authorise the use of any chemicals they

consider unsafe or inappropriate. This may include, for example, substances that are difficult to detect or for which adequate analytical techniques are not available.

The environment agencies do not routinely monitor the chemical content of return fracking fluid if it is not being disposed of directly to the environment. However, it will be necessary for operators to undertake their own analysis to allow them to dispose of waste fracking fluid via an appropriate waste management route (disposal off site).

If it was proposed to discharge fracking fluid back into the environment e.g. to surface water after treatment, this activity in itself requires authorisation by the appropriate environment agency. Full disclosure of all chemicals to be discharged into the environment would be required and the environment agencies would expect the operators to monitor the discharge and, if necessary, would undertake compliance monitoring themselves. In England and Wales, any substances or group of substances liable to cause pollution would be subject to conditions, would be noted on the permit and therefore lodged on the public register.

In order to gain some baseline data for future reference, the EA will complete selected monitoring of the hydraulic fracturing process at Cuadrilla's Preese Hall site in Lancashire. This will include an analysis of radioactivity, the concentration of chemical additives used in the fracking process, as well as other indicators of pollution in the return waters.

18. We conclude that there is only a small risk that the large volumes of water required for hydraulic fracturing will place undue stress on the water supply, though this could be more significant at times of drought in low rainfall areas. We recommend that the Environment Agency should have the power to prescribe the minimum amount of water recycling that takes place during unconventional gas exploration, on a site-by-site basis that takes into account the water stresses particular to the region. (Paragraph 125)

It is possible that wastewater could be recycled at individual fracking operations. However recycling may also significantly concentrate pollutants in return fracking waters, which may have other disadvantages and may complicate final disposal routes. Varying geological conditions means that it is not possible to forecast the volume of water that might be available for recycling.

The UK environment agencies may recommend a minimum amount of water recycling as part of the permitting process, where it is safe to do so. The suitability of recycling water would need to be assessed on a site by site basis, and whilst the Agency would encourage any methods to improve the efficient use of water, it may not be feasible to recycle at some sites. In Scotland, water users have a duty to use water efficiently. SEPA will encourage operators to maximise the re-use of water and can make it a condition of an authorisation that operators use certain amount of recycling.

The suitability of recycling water would need to be assessed on a site by site basis, and whilst the agencies would encourage any methods to improve the efficient use of water, it may not be feasible to recycle at some sites.

19. We recommend that DECC and DEFRA ensure that the Environment Agency monitors randomly the flowback and produced water from unconventional gas operations for potentially hazardous material that has been released from the shale formation. In order to maintain public confidence in the regulators—and in the shale gas industry—we recommend that both water and air be checked for contamination both before and during shale gas operations. (Paragraph 132)

The environment agencies do not routinely monitor the chemical content of return fracking fluid or produced water from unconventional gas operations if it is not being disposed of directly to the environment. However, it will be necessary for operators to undertake their own analysis to allow them to dispose of waste fracking fluid via an appropriate waste management route (disposal off site). Waste treatment operators will be subject to their own environmental permit ensuring the safe transport, treatment and disposal of waste waters.

If an unconventional gas operator proposed to discharge fracking fluid back into the environment e.g. to surface water after treatment, this activity would require authorisation by the appropriate environment agency. The agencies would expect the operator to monitor this discharge and would require operators to undertake analysis of hydraulic fracturing fluid before injection is authorised. Where necessary the relevant environment agency would undertake compliance monitoring itself. Analysis of return and production waters will be a condition of an abstraction licence issued by SEPA.

The environment agencies do not monitor air quality at unconventional gas operations unless there are specific permitted activities onsite (e.g. large scale refining or combustion of gas) however it may make recommendations as part of the planning application process to ensure operations' designs allow appropriate management of emissions to air.

Local authorities also have a statutory duty under the Government's Air Quality Strategy and Local Air Quality Management process to monitor and assess local air quality. If necessary local authorities may take action to reduce emissions in the event that they might risk contributing to any breach of air quality standards.

UK environment agencies take a risk-based approach to the monitoring and regulation of unconventional gas operations, and considers the existing provisions for the monitoring of wastewater from these operations to be appropriate. In the event of a significant increase in the commercial development of unconventional gas wells, the environment agencies may review the suitability of their monitoring regimes.

Given the general lack of knowledge of actual fugitive emissions, UK environment agencies are currently investigating options to monitor unconventional gas sites for emissions of methane to gain a better understanding of their likely carbon footprint.

20. We encourage the Government to insist that as the shale gas industry develops, companies are required to work together in order to optimize the use of waste water treatment plants, to minimise both the number of plants and the distance waste water has to be transported. (Paragraph 133)

UK environment agencies will monitor the development of the unconventional gas industry in relation to the provision of appropriate wastewater treatment, and work within the wastewater industry's Periodic Review process to make recommendations as and when required. The agencies do not foresee the need for new wastewater treatment infrastructure unless there was very significant commercial development of unconventional gas requiring hydraulic fracking or coal bed dewatering.

Market signals due to any significant increase in demand for wastewater treatment, may prompt operators to treat wastewater onsite and dispose to the environment where it was safe to do so (i.e with the appropriate environmental permits)

21. We recommend that the Environment Agency should have the powers to insist that—in collaboration with the Health and Safety Executive—planned onshore venting and flaring of natural gas for extended periods are not permitted. (Paragraph 140)

Onshore venting and flaring are already regulated by DECC. For all oil and gas activities, onshore and offshore, DECC requires that flaring or venting should be kept to the minimum that is justified to achieve the technical objectives during the exploration and testing phase.

For onshore oil and gas activity during the development phase, some flaring or venting of gas is sometimes unavoidable either for safety reasons or because there is no economic evacuation route for the gas. DECC already has the power to grant consent to long term flaring or venting of small quantities of gas.

Operators are required to minimise flaring and avoid venting by implementing best practice at an early stage in the design of the development and by continuing to improve on this during the subsequent operational phase in accordance with good oil field practices. In relation to shale gas, alongside the commercial imperative for companies seeking to exploit this resource, DECC will be pressing operators to ensure that any such gas disposal is kept to the absolute minimum.

HSE would only be able to prohibit the "planned onshore venting and flaring of natural gas for extended periods" if there was a risk of serious personal injury to personnel associated with that operation. HSE does not give consent for flaring or venting operations. HSE would expect the notification of well operations submitted to it as per Regulation 6(1) of the Borehole Sites and Operations Regulations 1995 (BSOR) to include details of any venting / flaring operations. HSE would inspect the notification and asses if the risks to personnel from the venting / flaring operations were as low as is reasonably practicable.

22. We conclude that the development of the UK shale gas industry will be different from the US—greater population density and stricter environmental legislation in Europe will give a greater incentive to drill fewer, better wells that take advantage of multiwell pad technology and horizontal drilling to minimise the impact on the landscape. (Paragraph 147)

The Government agrees with the Committee that the development of shale gas in the UK is likely to show significant differences from the pattern of development in the US. In addition to the factors cited by the Committee, it should be noted that the US experience is that different shales perform in different ways, and evolution of effective production techniques for particular shales may need considerable time. It is not therefore to be assumed that the success of US production techniques in any location can simply be transferred into UK geological conditions.

23. We recommend that the Environment Agency and the Department of Energy and Climate Change take lessons from unconventional gas exploration in the US, especially at the state-level where much of the expertise lies. The US has a great deal of regulatory experience of dealing with the issues of water contamination, the volume of water required, waste water treatment and disposal, air pollution, and infrastructure challenges. The UK Government must use this experience to ensure the lowest achievable environmental impacts from unconventional gas exploitation here. (Paragraph 148)

As noted above, there are many differences between UK and US conditions, but we agree with the Committee that there is value in evaluating the experience of the US in regulating the shale gas industry for over a decade, and it is important to have a dialogue with US regulators so that we can gain a clearer picture of the potential challenges which can arise if shale gas activities build.

The EA has had informal discussions with the US Environmental Protection Agency to understand the statutory framework in place in the US, and to establish key points of contact if required in the future. They will continue to liaise to ensure environmental management is informed by robust evidence, and to exchange information about best practice. For example, the US EPA are currently undertaking an assessment of risks to drinking water from shale gas activities, to be completed in 2012. The EA will study its findings to identify lessons to be learned for the UK.

Carbon Footprint of Shale Gas

24. We conclude that in planning to decarbonise the energy sector DECC should generally be cautious in its approach to natural gas (and hence unconventional gases such as shale gas). Although gas emissions are less than coal they are higher than many lower carbon technologies. (Paragraph 159)

25. Shale gas could lead to a switch from coal to gas for electricity generation, thereby cutting carbon emissions, particularly projected emissions from developing economies.

We conclude that this will help to reduce the impacts of climate change, but will not be sufficient to meet long term emissions reduction targets and avoid the worst effects of global climate disruption. (Paragraph 164)

We need a diverse mix of energy technologies so we are not dependent on any one type or source. Fossil fuels will continue to play an important role in this energy mix as the UK makes the transition to a low carbon economy. For example, gas will be needed to provide vital flexibility in the electricity sector in order to support an increasing amount of low-carbon generation and to maintain security of supply.

Emissions from shale gas extraction processes will be determined by the design and conditions of a particular development. Provided that good practice is adhered to, particularly in the control of fugitive emissions of methane, shale gas should have a carbon footprint of the same order as natural gas from conventional onshore fields, and significantly lower than that of other hydrocarbon sources including coal.

26. The emergence of shale gas increases the urgency of making carbon capture and storage (CCS) technology work for gas as well as coal. We recommend that both gas and coal carbon capture technology should be pursued in parallel and with equal urgency. (Paragraph 165)

Government recognises that, over the longer term it is likely that gas plant will need to reduce their emissions if we are to largely decarbonise the electricity sector and meet our climate change targets. There is therefore likely to be a role for gas plant equipped with carbon capture and storage, which is why new gas plants are required to be built carbon capture ready.

The Government is committed to public sector investment in CCS technology for four power stations. In November last year the Government announced that the CCS demonstration programme would include at least one gas-fired power station. We are now in high level negotiations for the contract for the first demonstration project with a consortium led by Scottish Power. This project will demonstrate post-combustion capture on the coal-fired Longannet power station in Fife. DECC published information in December about the process for selecting demonstrations 2 to 4 and we are currently undertaking a market sounding exercise with potential bidders. We intend to launch a call later this year, this will be open to applications for projects on both coal- and gas-fired power stations.