



# The University of Bradford Institutional Repository

<http://bradscholars.brad.ac.uk>

This work is made available online in accordance with publisher policies. Please refer to the repository record for this item and our Policy Document available from the repository home page for further information.

To see the final version of this work please visit the publisher's website. Available access to the published online version may require a subscription.

**Link to publisher's version:** <http://intersentia.com/en/energy-transitions.html>

**Citation:** Elfving S (2017) Regulation of shale gas in the United Kingdom and its potential to inform the EU level harmonising measures in the future. In: Mersinia I and Penttinen S-L (Eds.) Energy transitions: regulatory and policy trends. Intersentia Ltd.

**Copyright statement:** © 2017 Intersentia. Reproduced in accordance with the publisher's self-archiving policy. ([www.intersentia.com](http://www.intersentia.com))  
A CC-BY-NC-SA licence applies (Attribution, NonCommercial, ShareAlike Creative Commons Licence. The licence is available in full text at <https://creativecommons.org/licenses/by-nc-sa/4.0/>)

**PART IV**  
**SHALE GAS DEVELOPMENTS**  
**IN THE EUROPEAN UNION**

# REGULATION OF SHALE GAS IN THE UNITED KINGDOM AND ITS POTENTIAL TO INFORM THE EU-LEVEL HARMONISING MEASURES IN THE FUTURE

Sanna ELFVING

Abstract	190
1. Introduction	190
2. Commission Recommendation 2014/70/EU	193
3. Commission Questionnaire	197
4. The UK Regulatory Regime	198
4.1. Issuance of Exploration and Production Licences in England	199
4.2. Permit Conditions	200
4.3. Planning Permission	201
4.4. Environmental Permits	202
5. Environmental Impact Assessment	204
5.1. Requirement for an EIA in England	205
5.2. Opportunities for Public Participation	207
6. Measures on Fluid Migration, Surface Spills, Seismicity and Monitoring	208
6.1. Suitability of Geological Formations for Hydraulic Fracturing	208
6.1.1. Environmental Risk Assessment	209
6.1.2. Monitoring	210
7. Environmental Liability and Well Abandonment	211
8. Dissemination of Information and Transparency	213
9. Conclusion	213

## ABSTRACT

This chapter evaluates the consistency of the United Kingdom (UK) regulatory framework on shale gas with Commission Recommendation 2014/70/EU on minimum principles for the exploration and production of unconventional oil and gas. In the absence of European-wide legislation, European Union (EU) Member States have the right to determine the conditions for exploiting their unconventional energy sources. However, due to the environmental and human health risks associated with hydraulic fracturing, the EU has expressed its interest in ensuring adequate protection of the environment and to creating clear and transparent common standards for the benefit of operators, investors and the public while promoting the interests of those Member States which are currently exploring unconventional energy. It can be argued that the UK regime has been designed to address the environmental risks arising from hydraulic fracturing operations and as such it sets a high environmental threshold for operations. In fact, the UK legislation appears to be more comprehensive than in many other jurisdictions commercially exploiting shale gas, and therefore it has a potential to inform the content of any future harmonising measures on the exploration and extraction of such resources at the EU level.

## 1. INTRODUCTION

The focus of this chapter is the compatibility of the United Kingdom<sup>1</sup> (UK) regulatory regime for shale gas with Commission Recommendation 2014/70/EU on minimum principles for the exploration and production of unconventional oil and gas.<sup>2</sup> Although a set of energy rules exists at the European level, Member States' approaches towards regulation of energy has varied considerably due to the division of competencies in the field of energy before the Treaty amendment in 2009.<sup>3</sup> Following this, the EU institutions now have the powers to legislate in respect of energy under Article 194 of the Treaty on the Functioning of the European Union (TFEU),<sup>4</sup> meaning that competence in the field of energy is

---

<sup>1</sup> Because Scotland announced a temporary ban on all planning consents for unconventional oil and gas extraction in January 2015 this chapter focuses on the regulatory regime in place in England, rather than the UK as a whole. See Scottish Government, 'Moratorium called on fracking' (28.01.2015) <<http://news.scotland.gov.uk/News/Moratorium-called-on-fracking-1555.aspx>> accessed 29.01.2015.

<sup>2</sup> Commission Recommendation 2014/70/EU of 22 January 2014 on minimum principles for the exploration and production of hydrocarbons (such as shale gas) using high-volume hydraulic fracturing [2014] OJ L39/72.

<sup>3</sup> See R. MOULES, 'Significant EU Environmental Cases: 2014' (2015) 27(1) *Journal of Environmental Law* 151, doi:10.1093/jel/eqv004, accessed 10.05.2015.

<sup>4</sup> Consolidated Version of the Treaty on the Functioning of the European Union [2012] OJ C326/47.

shared between the European Union (EU) and Member States. However, apart from several environmental Directives, no specific European-wide regulatory framework on shale gas exists. In practice, this has been understood to mean that each Member State has the right to determine their own conditions for exploiting their unconventional energy resources. The Commission has nevertheless indicated its interest in creating a harmonised European legal framework for energy. In its 2014 Communication the Commission noted that several neighbouring Member States not only had corresponding energy mixes but there was also excess capacity in one country and potential deficits in the other,<sup>5</sup> requiring the EU to address such issues in order to create a common energy market. However, the Commission is also aware that since harmonisation of national energy systems requires the political commitment of the Member States, any such proposals are likely face opposition<sup>6</sup> and the harmonisation of unconventional energy development appears to be no exception. However, although the UK seemingly opposes further harmonisation of shale gas legislation at the EU level, its approach to the regulation of shale gas development is largely consistent with EU law.<sup>7</sup> Therefore, the UK legislative framework on shale gas could function as a model for any EU level standards, or potentially a harmonising measure, and as such it could also help in assuaging the public of the safety of the industry which is often portrayed negatively in the press and social media.

The UK regulatory framework for unconventional gas appears sufficiently robust and arguably more comprehensive than in many other countries commercially exploiting these resources because it has been designed to address the environmental risks associated with hydraulic fracturing. Existing legislation contains clear requirements for well integrity, disclosure of chemicals in fracturing fluids and the need to avoid any potentially harmful impacts on ground and surface water. For instance, only substances that have been assessed

---

<sup>5</sup> Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, 'Progress towards completing the Internal Energy Market' COM(2014) 634 final, p. 14.

<sup>6</sup> Commission, *EU Energy Markets in 2014* (European Union 2014) 14. The Commission has noted itself that opposition is likely in cases where one State satisfies a large part of its energy needs with domestic production such as in the case of the UK which satisfies a sizeable share of its energy needs with domestic oil and gas production.

<sup>7</sup> In his Explanatory Memorandum of 11.02.2014, the Minister of State for Energy and Climate Change stated that the existing regulatory framework in the UK was already robust to ensure safe and environmental responsible shale gas operations, and that it was largely consistent with Recommendation 2014/70/EU because much of the latter's content fell within the remit of a number of existing EU Directives. See House of Commons, European Scrutiny Committee, 37th Report, Session 2013–14 (11.03.2014) (European Scrutiny Committee Report), paras. 3.13–3.14 <<http://www.publications.parliament.uk/pa/cm201314/cmselect/cmeuleg/83-xxxiv/83-xxxiv.pdf>> accessed 29.01.2015.

as being non-hazardous pollutants under the Groundwater Directive<sup>8</sup> may be used in fracturing fluids in England.<sup>9</sup> National legislation further incorporates the requirements of other EU Directives on mining waste,<sup>10</sup> conservation of air, water<sup>11</sup> and soil quality as a result of mining activities<sup>12</sup> as well as national provisions on radioactive substances. Therefore, it seems to sufficiently address the protection of freshwater resources; the approval of chemicals used in fracturing fluids; the treatment and disposal of solid and gaseous wastes produced during drilling, fracturing and flaring; and the treatment and management of any naturally occurring radioactive materials.

At the same time, however, from the industry's point of view questions remain over the practicability of the regime since very few operators have been able to move from the exploratory phase to the appraisal phase.<sup>13</sup> At the time of writing no permits for hydraulic fracturing have been granted.<sup>14</sup> In fact, the current regime has been described as 'unnecessarily complicated' and 'bureaucratic'.<sup>15</sup> While the need to ensure adequate protection of the environment and the safety of the public has been widely acknowledged in the context of shale gas development, a regulatory regime that does not enable operators to proceed is unnecessarily restrictive. This is specifically so since the Government recognises that the industry input in the development of the regime is crucial to ensure

<sup>8</sup> Council Directive 2006/118/EC of 12 December 2006 on the protection of groundwater against pollution and deterioration [2006] OJ L372/19 (Groundwater Directive).

<sup>9</sup> Environment Agency, 'Guidance Note: Regulation of exploratory shale gas operations' (November 2012), p. 3 (EA Guidance Note) <[http://www.groundwateruk.org/downloads/EA\\_ShaleGasRegulation.pdf](http://www.groundwateruk.org/downloads/EA_ShaleGasRegulation.pdf)> accessed 30.01.2015.

<sup>10</sup> Council Directive 2006/21/EC of 15 March 2006 on the Management of Waste from Extractive Industries and amending Directive 2004/35/EC [2006] OJ L102/15 (Mining Waste Directive). Article 2 requires all any activity involving generating extractive waste to be the subject of an environmental permit.

<sup>11</sup> In accordance with Council Directive 2000/60/EC of 23 October 2000 establishing a framework for Community action in the field of water policy [2000] OJ L327/1 (Water Framework Directive).

<sup>12</sup> Mining Waste Directive, Article 13 requires that operators implement measures to prevent waterstatus deterioration and air and soil pollution in respect of mining waste facilities and mining waste operations.

<sup>13</sup> See also House of Lords' Select Committee on Economic Affairs, 'The Economic Impact on UK Energy Policy of Shale Gas and Oil' (08.05.2014) (Economic Impact Report), para. 212 <<http://www.publications.parliament.uk/pa/ld201314/ldselect/ldeconaf/172/172.pdf>> accessed 29.01.2015.

<sup>14</sup> Local authorities rejected permit applications for exploratory activities at two Lancashire sites in June 2015. See e.g., A. VAUGHAN, 'Fracking application rejected by Lancashire county council' *The Guardian* (29.06.2015) <[http://www.theguardian.com/environment/2015/jun/29/fracking-application-cuadrilla-rejected-lancashire-county-council?CMP=share\\_btn\\_tw](http://www.theguardian.com/environment/2015/jun/29/fracking-application-cuadrilla-rejected-lancashire-county-council?CMP=share_btn_tw)> accessed 29.06.2015.

<sup>15</sup> Economic Impact Report, above n. 13, para. 212.

that shale gas legislation is not unnecessarily restrictive on operators.<sup>16</sup> The Commission's interest in adopting further measures to regulate shale gas development at the EU level has caused some uneasiness in the UK that approval processes may be further delayed.<sup>17</sup>

However, it does not appear that the current developments at the EU level are the likely cause of delays in the approval of shale gas development in the UK, but the problems experienced by the operators could be argued to originate from the rigorous permit processes together with multiple government departments and agencies sharing responsibilities over the regime.<sup>18</sup> It could be argued that the need for stringent requirements is justified on the grounds that any shale gas legislation, which has been developed with a view of promoting transparency, public participation, safety of operations and sustainable use of water, is capable of mitigating public concerns over the negative impacts of the industry on the environment.<sup>19</sup> Both the UK and EU regulatory frameworks can be argued to have been developed taking into account many of these principles.<sup>20</sup>

## 2. COMMISSION RECOMMENDATION 2014/70/EU

Commission Recommendation 2014/70/EU was adopted together with a Communication<sup>21</sup> and an Impact Assessment<sup>22</sup> in January 2014. Member States were subsequently invited to notify the Commission of their national measures by December 2014.<sup>23</sup> The Recommendation proposes a set of

<sup>16</sup> See e.g., House of Lords, 'Unrevised transcript of evidence taken before the Select Committee on Economic Affairs: Inquiry on the economic impact on UK energy policy of shale gas and oil' Evidence Session No. 8 Heard in Public Questions 96–114 (12.11.2013), Q107 <<http://www.parliament.uk/documents/lords-committees/economic-affairs/EnergyPolicy/uc%20Transcripts/ucEAC20131112Ev8.pdf>> accessed 29.01.2015.

<sup>17</sup> Economic Impact Report, above n. 13, para. 224.

<sup>18</sup> *Ibid.*, para. 221.

<sup>19</sup> See International Energy Agency, 'Golden Rules for a Golden Age of Gas: World Energy Outlook Special Report on Unconventional Gas' (2012) 17 (Golden Rules) <[http://www.worldenergyoutlook.org/media/weowebsite/2012/goldenrules/weo2012\\_goldenrulesreport.pdf](http://www.worldenergyoutlook.org/media/weowebsite/2012/goldenrules/weo2012_goldenrulesreport.pdf)> accessed 29.01.2015.

<sup>20</sup> See House of Lords, Select Committee on Economic Affairs, 'The Economic Impact on UK Energy Policy of Shale Gas and Oil: Oral and Written Evidence', p. 460 (Economic Impact Report: Oral evidence) <<http://www.parliament.uk/documents/lords-committees/economic-affairs/EnergyPolicy/EAC-energy-ev-vol.pdf>> accessed 29.01.2015.

<sup>21</sup> Communication from the Commission to the Council and the European Parliament on the exploration and production of hydrocarbons (such as shale gas) using high volume hydraulic fracturing in the EU COM(2014) 23 final.

<sup>22</sup> European Commission Staff Working Document, 'Impact Assessment, Accompanying the document Communication from the Commission, A policy framework for climate and energy in the period from 2020 up to 2030' SWD(2014) 21 final.

<sup>23</sup> Commission, 'Energy and Environment' <[http://ec.europa.eu/environment/integration/energy/unconventional\\_en.htm](http://ec.europa.eu/environment/integration/energy/unconventional_en.htm)> accessed 21.10.2014.

minimum standards which are loosely based on best practices adopted by the industry and would ‘improve investors’ confidence’ and ‘help alleviate public concerns’ over the unconventional oil and gas development within the EU.<sup>24</sup> The Commission considers the principles outlined in the Recommendation as complementary to the existing environmental and safety legislation,<sup>25</sup> and as such the Recommendation does not appear to affect significantly the existing national legal frameworks, inter alia, in the UK, Spain and Poland, or prevent other Member States from proceeding with shale gas development.<sup>26</sup> This is primarily because the Recommendation recognises the right of Member States to ‘determine the conditions for exploiting their energy resources’, provided that they ‘respect the need to preserve, protect and improve the quality of the environment’.<sup>27</sup> However, since hydraulic fracturing raises environmental challenges, some form of EU-level standards, or even harmonised measures, may be necessary.<sup>28</sup>

Further, although recital 9 explicitly states that Member States are not prevented ‘from maintaining or introducing more detailed measures matching the specific national, regional or local conditions’, critics have raised concerns over whether Member States genuinely have a right to legislate in the area. For instance, Member States are thought to have very little discretion to restrict the use of chemicals in fracturing fluids due to harmonisation of European chemicals legislation.<sup>29</sup> Therefore, Member States are precluded from limiting the use of chemicals which comply with the existing legislation.<sup>30</sup> Further, any national measures capable of hindering intra-EU trade in areas covered by harmonising legislation would need to be justified under Article 36 TFEU or ‘mandatory requirements’ relating to, inter alia, the protection of the environment.<sup>31</sup> Consistent with the case law of the Court of Justice, national rules would need to meet the requirements of the principle of proportionality.<sup>32</sup>

<sup>24</sup> Commission Recommendation 2014/70/EU, above n. 2, preamble, recital 9.

<sup>25</sup> *Ibid.*, recital 11.

<sup>26</sup> See e.g., C. GARCÍA MOLYNEUX and L. TOSONI, ‘What’s in a Name? Legal Implications of the EU Recommendation on Shale Gas’ (2014) 44(5) *Environmental Law Reporter* 10351.

<sup>27</sup> Commission Recommendation 2014/70/EU, above n. 2, preamble, recital 1.

<sup>28</sup> *Ibid.*, recitals 2–3. See also European Parliament, Resolution of 21 November 2012 on the environmental impacts of shale gas and shale oil extraction activities (2011/2308(INI)).

<sup>29</sup> Regulation (EC) No. 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) and establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No. 793/93 and Commission Regulation (EC) No. 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC [2006] OJ L396/1 (REACH Regulation). See e.g., C. GARCÍA MOLYNEUX and L. TOSONI, above n. 26, p. 10352.

<sup>30</sup> See *ibid.*

<sup>31</sup> See e.g., C-573/12 *Ålands Vindkraft AB v. Energimyndigheten* [2015] ECLI:EU:c:2014:2037, para. 77.

<sup>32</sup> See *ibid.*, paras. 73 and 83.



Although Commission Recommendations are generally considered non-binding on Member States, Recommendation 2014/70/EU may have significant legal impacts for Member States for several reasons.<sup>33</sup> First, the Commission's explicit invitation to apply the Recommendation's principles in industry guidelines or legislation governing shale gas may promote harmonisation of national laws through the 'back door'. Previous instances exist where Commission Recommendations have been implemented into national legislation and have subsequently produced legal consequences before courts.<sup>34</sup> This is because under Article 267 TFEU the Court of Justice has a 'jurisdiction to give preliminary rulings concerning the interpretation of the Treaty and the acts of the institutions of the Community',<sup>35</sup> including Recommendations.<sup>36</sup> Indeed, even where 'a measure of Community law' has no binding effect, the Court may give its interpretation on such measure in proceedings for a preliminary ruling where national law refers to a Commission Recommendation.<sup>37</sup> Additionally, although Recommendation 2014/70/EU is not considered to confer any enforceable rights upon individuals before national courts, the latter will be required to take such rights into account in disputes submitted to them.<sup>38</sup> Therefore, the UK courts would be obliged to consider any requirements in Commission Recommendations.

Second, the adoption of legally binding measures on shale gas at a later date has not been excluded by the Commission. The Recommendation notes that the Commission monitors 'the Recommendation's application by comparing the situation in Member States'.<sup>39</sup> Following a review in summer 2015, the Commission will decide whether legally binding provisions are necessary. According to a representative of the Directorate-General for Environment, the Commission is in the process of reviewing the effectiveness of Recommendation 2014/70/EU in the light of information received from Member States, technical

<sup>33</sup> See C. GARCÍA MOLYNEUX and L. TOSONI, above n. 26, p. 10351.

<sup>34</sup> E.g., Commission Recommendation 2003/361/EC of 6 May 2003 on the Definition of Micro, Small, and Medium Sized Enterprises [2003] OJ L124/36 was implemented into national legislation of six Member States either by adopting a specific legislative instrument that copied almost verbatim the provisions of this Recommendation or by amending existing legislation and guidance to implement the principles of the Recommendation. See C. GARCÍA MOLYNEUX and L. TOSONI, above n. 26, 10352.

<sup>35</sup> See Joined Cases C-297/88 and C-197/89 *Dzodzi v. Belgium* [1990] ECR I-3763, para. 31. See also C. GARCÍA MOLYNEUX and L. TOSONI, above n. 26, p. 10352.

<sup>36</sup> See C-110/13 *HaTeFov.FinanzamtHaldensleben* (27.02.2014) where Germany made a request for a preliminary ruling concerning the interpretation of the provisions of Commission Recommendation 2003/361/EC. See also C. GARCÍA MOLYNEUX and L. TOSONI, above n. 26, p. 10352.

<sup>37</sup> See e.g., C-188/91 *Deutsche Shell AG v.Hauptzollamt Hamburg-Harburg* [1993] ECR I-363, para. 18.

<sup>38</sup> *Ibid.*

<sup>39</sup> Commission Recommendation 2014/70/EU, above n. 2, point 16.

and regulatory studies,<sup>40</sup> as well as views of the key stakeholders, including a Eurobarometer survey.<sup>41</sup> Findings will be summarised in a report which is expected to be adopted by the end of 2016.<sup>42</sup> In fact, a Commission representative has explicitly acknowledged before the House of Lords that the adoption of a non-binding measure may not be acceptable for those Member States which prefer a more robust regulatory approach from the EU.<sup>43</sup> He further noted that many issues associated with hydraulic fracturing were not addressed by current EU legislation because it predates the development of horizontal drilling techniques, indicating that further amendment of existing laws is necessary.<sup>44</sup> Third, the European Parliament has also referred to Recommendation 2014/70/EU during its revision of Directive 2011/92/EU<sup>45</sup> when it proposed that all projects involving hydraulic fracturing should be subject to a mandatory environmental impact assessment in accordance with Point 3 of the Recommendation.<sup>46</sup> Although due to strong opposition from some Member States, the proposal was excluded from the final text of the Directive,<sup>47</sup> the Parliament is not prevented from referring to the Recommendation in the context of legislative proposals under its consideration.

From this background the UK's reservations concerning the Commission's approach may not be entirely unjustified. In 2014, the Minister of Energy and Climate Change vocalised<sup>48</sup> the Government's fears that the Recommendation could extend existing powers of the EU, specifically under Point 7 which states that activities involving hydraulic fracturing are covered by the Mining Waste Directive.<sup>49</sup> The Government's interpretation is that under Point 7 Member States must apply Article 3(1) of the Environmental Liability Directive<sup>50</sup> to all

<sup>40</sup> Commission, 'Energy and environment' <[http://ec.europa.eu/environment/integration/energy/uff\\_studies\\_en.htm](http://ec.europa.eu/environment/integration/energy/uff_studies_en.htm)> accessed 10.10.2016.

<sup>41</sup> Commission, *Flash Eurobarometer: Attitudes of citizens towards shale gas in selected European regions* (European Union 2015) doi 10.2779/802305.

<sup>42</sup> Email from ENV-SHALE-GAS@ec.europa.eu to author (10.10.2016).

<sup>43</sup> Economic Impact Report: Oral evidence, above n. 20.

<sup>44</sup> *Ibid.*

<sup>45</sup> Council Directive 2011/92/EU of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment [2012] OJ L26/21.

<sup>46</sup> European Parliament Legislative Resolution of 12 March 2014 on the Proposal for a Directive of the European Parliament and of the Council Amending Directive 2011/92/EU of the Assessment of the Effects of Certain Public and Private Projects on the Environment COM(2012) 0628 (C7-0367/2012–2012/0297(COD)). See also C. GARCÍA MOLYNEUX and L. TOSONI, above n. 26, p. 10352.

<sup>47</sup> See C. GARCÍA MOLYNEUX and L. TOSONI, above n. 26, p. 10352.

<sup>48</sup> European Scrutiny Committee Report, above n. 7.

<sup>49</sup> Mining Waste Directive, above n. 10.

<sup>50</sup> Council Directive 2004/35/EC of 21 April 2004 on Environmental Liability with regard to the Prevention and Remedying of Environmental Damage [2004] OJ L143/56 (Environmental Liability Directive), Article 3(1).

activities involving hydraulic fracturing, regardless of whether they currently fall under the scope of the Directive or not.<sup>51</sup>

Although EU law does not currently require that strict liability should be applied to unconventional gas development, it would seem logical to extend the strict liability regime to shale gas development, considering that many activities relating to the development are already covered by Annex III of the Environmental Liability Directive. This includes, inter alia, the management of waste from extractive industries,<sup>52</sup> water abstraction,<sup>53</sup> discharge of substances into groundwater<sup>54</sup> or inland surface water,<sup>55</sup> and injection of pollutants into surface water or groundwater.<sup>56</sup> However, the area of unconventional gas cannot be harmonised through a referral to binding provisions in the Recommendation, but needs to proceed through the appropriate legislative procedure for adopting EU environmental laws.

### 3. COMMISSION QUESTIONNAIRE

The Commission Questionnaire on the application of Recommendation 2014/70/EU contains an introductory question concerning national permit regimes for shale gas operations both in onshore and offshore locations.<sup>57</sup> A further 15 questions concern the requirement for the selection of exploration and production sites, environmental impact assessment, risk assessment and management, installation design and construction, and monitoring. Many of the questions address overlapping areas relating to shale gas development and therefore they have been combined for the purposes of this chapter.<sup>58</sup> Some areas have also been left outside the scope of this chapter because no publically

<sup>51</sup> Commission Recommendation 2014/70/EU, above n. 2, point 12.

<sup>52</sup> Council Directive 2004/35/EC, Annex III(2): 'Waste management operations, including the collection, transport, recovery and disposal of waste and hazardous waste, including the supervision of such operations and after-care of disposal sites, subject to permit or registration'. See also M. BALLESTEROS, F. PELS and L. REINS, *Regulatory Provisions Governing Key Aspects of Unconventional Gas Extraction in Selected Member States: Final Report* (01.07.2013), p. 15 <<http://ec.europa.eu/environment/integration/energy/pdf/Final%20Report%2024072013.pdf>> accessed 12.01.2015.

<sup>53</sup> Council Directive 2004/35/EC, Annex III(6).

<sup>54</sup> *Ibid.*, Annex III(4).

<sup>55</sup> *Ibid.*, Annex III(3).

<sup>56</sup> *Ibid.*, Annex III(5).

<sup>57</sup> Commission, 'Questionnaire on the application of Commission Recommendation 2014/70/EU on minimum principles for the exploration and production of hydrocarbons (such as shale gas) using high-volume hydraulic fracturing' (Commission Questionnaire) <<http://ec.europa.eu/environment/integration/energy/pdf/Questionnaire.pdf>> accessed 21.10.2014.

<sup>58</sup> *Ibid.*, points 8, 13.1–13.2.

available information exists<sup>59</sup> or because they relate to using hydraulic fracturing to extract oil, rather than gas.

The most striking feature of the Commission Questionnaire is that responding is entirely voluntary since respondents are explicitly prompted to indicate whether they wish to proceed beyond Point 1. Out of 28 Member States, 17 said that they did not plan to grant authorisations for unconventional oil and gas development and did not answer any remaining questions.<sup>60</sup> On average six Member States answered all the questions. This means that informing the establishment of EU-wide standards, or potentially binding measures, depends on those Member States which completed the questionnaire. On the other hand, not all Member States are involved in the development of unconventional energies and therefore it may be challenging for them to respond to the questionnaire.

#### 4. THE UK REGULATORY REGIME

Even though the UK Government's response to Recommendation 2014/70/EU has been rather critical, the UK regulatory regime complies with many of the minimum principles outlined in it.<sup>61</sup> Further, although no specific shale gas legislation exists in the UK, almost every aspect from the initial exploration right through to the decommissioning of wells is covered by existing legislation applying to conventional oil and gas.<sup>62</sup> Since this regime is fairly new, it has been assessed as very effective in terms of its readiness to enable operators to proceed to the exploratory drilling phase.<sup>63</sup> However, since the current regulatory roadmap covers only the exploration and appraisal phases, the actual production phase needs to be complemented by additional rules.<sup>64</sup> Despite this, not many operators have proceeded to the exploratory drilling phase, and in order to

<sup>59</sup> Limited information exists as to whether any guidelines or regulatory provisions in the UK contain requirements to develop transport management plans; capture all gases for subsequent use and minimise flaring and venting except for safety reasons. Additionally, according to the Government, the matter whether national permitting authorities have sufficient resources and knowledge to perform their duties is the competence of Member States. See Commission, 'Energy and Environment' (27.02.2015) (UK response to the Commission) <[http://ec.europa.eu/environment/integration/energy/unconventional\\_en.htm](http://ec.europa.eu/environment/integration/energy/unconventional_en.htm)> accessed 04.06.2015.

<sup>60</sup> The Commission website contains individual country reports, including the UK's response to the Commission Questionnaire. See EU Survey, 'Published Results: Shalegas Rec 2014' <<https://ec.europa.eu/eusurvey/publication/ShalegasRec2014#>> accessed 08.05.2015.

<sup>61</sup> See also European Parliament, Resolution of 21 November 2012 on the environmental impacts of shale gas and shale oil extraction activities (2011/2308(INI)).

<sup>62</sup> J. PHILLIPS and S. SANDILANDS, 'Shale Gas and Fracking' *Insight* (May 2014) <<http://login.westlaw.co.uk/maf/wluk/app/document?docguid=I4419A2F0E7D411E29DC89EA037C850DE>> accessed 21.10.2014.

<sup>63</sup> Economic Impact Report, above n. 13, para. 210.

<sup>64</sup> *Ibid.*, paras. 209 and 220.

reduce the complexity of the regime improvements such as the appointment of a single body to lead regulatory responsibilities have been suggested.<sup>65</sup> However, it is also feared that such reorganisation of responsibilities at this stage would further delay the approval of operations.<sup>66</sup>

#### 4.1. ISSUANCE OF EXPLORATION AND PRODUCTION LICENCES IN ENGLAND

In England, the process of obtaining consent to drill a shale gas well is the same as for conventional gas.<sup>67</sup> Exploration and production licences<sup>68</sup> are issued through a competitive process under section 3(1) of the Petroleum Act 1998<sup>69</sup> administered by the Oil & Gas Authority<sup>70</sup> to accommodate shale gas development. A production licence grants exclusivity to operators in a specified licence area and although it does not grant a right to drill a well, operators may commence seismic surveys to identify prospective geological structures.<sup>71</sup> Since obtaining planning permission<sup>72</sup> is not necessary for the exploratory phase, seismic assessments can begin, provided that owners of adjacent lands and local authorities, which exercise the duties of mineral planning authorities, are notified of such plans.<sup>73</sup> Whereas prior to 2015 a failure to negotiate access with each landowner before the commencement of underground operations meant a trespass in relation to the adjacent subsurface land,<sup>74</sup> with the adoption of the Infrastructure Act 2015,<sup>75</sup> operators have the right to use deep-level land '[within a landward area at a depth of at least 300 metres below surface level] in

<sup>65</sup> *Ibid.*, para. 221 referring to Royal Society and Royal Academy of Engineering, 'Shale gas extraction in the UK: a review of hydraulic fracturing' (2012) (Royal Society Report) <<https://royalsociety.org/~media/policy/projects/shale-gas-extraction/2012-06-28-shale-gas.pdf>> accessed 30.01.2015.

<sup>66</sup> *Ibid.*, para. 231.

<sup>67</sup> Department for Energy and Climate Change, 'Onshore oil and gas exploration in the UK: regulation and best practice' (December 2013) (DECC Guidance), p. 6. The Department of Energy and Climate Change (DECC) became part of the Department for Business, Energy and Industrial Strategy in July 2016.

<sup>68</sup> Also known as 'petroleum exploration and development licence'.

<sup>69</sup> C. 17.

<sup>70</sup> Oil & Gas Authority. 'Overview' <<https://www.ogauthority.co.uk/licensing-consents/overview/>> accessed 10.10.2016.

<sup>71</sup> Economic Impact Report, above n. 13, para. 194.

<sup>72</sup> Planning permission is needed for any proposed activity meeting the statutory definition of 'development' in the Town and Country Planning Act 1990, section 55, including 'mining, engineering and building operations'.

<sup>73</sup> Economic Impact Report, above n. 13, para. 194. See also DECC Guidance, above n. 67, 14.

<sup>74</sup> See *Bocardo SA v. Star Energy UK Onshore Ltd* [2008] EWCA Civ 579 [59].

<sup>75</sup> Infrastructure Act 2015, c. 7.

any way for the purposes of exploiting petroleum or deep geothermal energy.<sup>76</sup> Consequently, there is no requirement to notify landowners of any activities involving drilling, boring, fracturing or otherwise altering adjacent deep-level land,<sup>77</sup> unless the Secretary of State requires this by specific regulations.<sup>78</sup> New rules may prove problematic for landowners in practice since shale deposits frequently extend beyond licence areas.

#### 4.2. PERMIT CONDITIONS

Point 4 of the Commission Questionnaire covers the issue whether the conditions and procedures for obtaining permits in accordance with applicable EU legislation are fully coordinated in cases where either various regulatory authorities are responsible for the issuance of permits, several operators are involved, or multiple permits are necessary for a specific project phase under national or EU legislation. The complexity of permit processes in England has been criticised by the industry since in order to commence drilling and hydraulic fracturing several approvals are needed from various government departments and agencies which share regulatory responsibilities, including the Department of Energy & Climate Change (DECC), local planning authorities, the Environment Agency and the Health and Safety Executive (HSE).<sup>79</sup> For instance, consent to drill must be sought from the DECC,<sup>80</sup> which also approves the operators' plans to mitigate the risk of induced seismicity.<sup>81</sup> However, before obtaining drilling consent operators must have obtained permission to drill from the planning authority, obtained the necessary environmental permits from the Environment Agency,<sup>82</sup> and approval of the well design from the HSE.<sup>83</sup> The permission to drill is nevertheless fundamental because exploratory drilling is the only way to verify the presence and extent of economically recoverable resources.<sup>84</sup> Since little exploratory drilling and appraisal has been undertaken to date, the estimates of the economically recoverable shale gas resources in the UK are largely incomplete.<sup>85</sup>

In order to streamline permit procedures operators are recommended to discuss the requirements of all relevant permissions with the Environment

<sup>76</sup> *Ibid.*, sections 43(1)–(2), (4).

<sup>77</sup> *Ibid.*, section 44(1)(a).

<sup>78</sup> *Ibid.*, section 46(1).

<sup>79</sup> Economic Impact Report, above n. 13, paras. 193 and 198.

<sup>80</sup> DECC Guidance, above n. 67, p. 6.

<sup>81</sup> Economic Impact Report, above n. 13, para. 223.

<sup>82</sup> The Environment Agency, for example, approves the plans for air emissions to mitigate risks to public health.

<sup>83</sup> Economic Impact Report, above n. 13, para. 223.

<sup>84</sup> DECC Guidance, above n. 67, p. 8.

<sup>85</sup> Economic Impact Report, above n. 13, paras. 70–71.

Agency at the pre-application stage and apply simultaneously for environmental permits and planning consent since some of the technical documentation supporting permit applications may need to be submitted both to the Environment Agency and the planning authorities.<sup>86</sup> However, according to the industry the processes are too lengthy and complicated,<sup>87</sup> and significant levels of duplication exist.<sup>88</sup> For instance, operators have raised issues such as that it is only possible to conduct some aspects of the Environmental Impact Assessment (EIA) such as the surveys investigating the impacts on wintering birds during certain times of the year.<sup>89</sup> Moreover, a successful planning consent or environmental permit may become subject to judicial review challenge, which further delays the permit process.<sup>90</sup> Furthermore, although the HSE and the Environment Agency have agreed to jointly inspect, for instance, cementing of wells,<sup>91</sup> operators are, inter alia, required to discuss their plans to mitigate risks to groundwater in four different contexts: under the environmental risk assessment required by the DECC; the pre-EIA environmental screening required by the planning authorities; an application for groundwater permit to the Environmental Agency; and review of well design by the HSE.<sup>92</sup> In the light of such arguments the calls for simplification of the permit processes are easily understandable.

#### 4.3. PLANNING PERMISSION

Under the Town and Country Planning Act 1990<sup>93</sup> operators are required to obtain planning permission for wells and well pads in order to conduct further exploratory and appraisal work.<sup>94</sup> Since the planning system focuses on whether the development forms an acceptable land use and the impacts on the environment, local authorities are likely to scrutinise issues such as the proposed site location and the likely impacts on groundwater and surface water.<sup>95</sup> Additionally, issues such as noise, increased traffic volumes, possible

<sup>86</sup> Environment Agency, 'Onshore oil and gas exploratory operations: technical guidance' (August 2013) (EA technical guidance), p. 6.

<sup>87</sup> Economic Impact Report, above n. 13, Figure 13.

<sup>88</sup> *Ibid.*, para. 224.

<sup>89</sup> *Ibid.*, Figure 13.

<sup>90</sup> *Ibid.*

<sup>91</sup> *Ibid.*, para. 208.

<sup>92</sup> *Ibid.*, para. 224.

<sup>93</sup> C. 8.

<sup>94</sup> See DECC Guidance, above n. 67, p. 8; Department for Communities and Local Government, 'Planning practice guidance for onshore oil and gas' (July 2013). <[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/224238/Planning\\_practice\\_guidance\\_for\\_onshore\\_oil\\_and\\_gas.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/224238/Planning_practice_guidance_for_onshore_oil_and_gas.pdf)> accessed 30.01.2015.

<sup>95</sup> Economic Impact Report, above n. 13, paras. 198–199.

on-site storage facilities,<sup>96</sup> potential for induced seismicity, and generation of waste may be considered.<sup>97</sup> Before their decision, local authorities consider the advice provided by other regulatory agencies on matters such as the protection of the environment and public.<sup>98</sup> Should the local authority refuse planning permission, operators may appeal to the Secretary of State for Communities and Local Government under section 78 of the 1990 Act. Should planning permission be granted, the local authority will monitor and inspect operations to ensure that they comply with any permit conditions before issuing the permit.<sup>99</sup>

#### 4.4. ENVIRONMENTAL PERMITS

The environmental permitting regime in England is specifically aimed at addressing public concerns raised over shale gas development and consequently highlighted in the Commission Questionnaire, namely protecting freshwater resources, assessing and approving of chemicals, treatment and disposal of waste produced during borehole drilling and hydraulic fracturing, disposal of waste gases through flaring and venting to atmosphere, and treatment and management of any naturally occurring radioactive materials.<sup>100</sup> According to the Government, there is a presumption that a permit for a groundwater activity will be required for hydraulic fracturing due to the risk of freshwater contamination<sup>101</sup> which arises specifically for two reasons: injection of fracturing fluids underground and accidental discharge of waste waters into the environment.<sup>102</sup> Separate environmental permits are required for drilling, hydraulic fracturing and testing of exploratory wells.<sup>103</sup> According to the evidence presented to the House of

<sup>96</sup> A risk to freshwater resources exists when extractive waste is stored temporarily on the site. See EA technical guidance, above n. 86, p. 11; Environment Agency, 'How to comply with your environmental permit. Additional guidance for: mining waste operations' Version 2.0 (February 2011) section 3.3.1 (Environmental permit guidance) <[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/296493/LIT\\_8451\\_eb68e4.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/296493/LIT_8451_eb68e4.pdf)> accessed 07.05.2015.

<sup>97</sup> DECC Guidance, above n. 67, p. 23.

<sup>98</sup> *Ibid.*

<sup>99</sup> *Ibid.*

<sup>100</sup> J. PHILLIPS and S. SANDILANDS, above n. 62. See also D.J.C. MACKAY and T.J. STONE, 'Potential Greenhouse Gas Emissions Associated with Shale Gas Extraction and Use' (DECC 2013), p. 36 <[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/237330/MacKay\\_Stone\\_shale\\_study\\_report\\_09092013.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/237330/MacKay_Stone_shale_study_report_09092013.pdf)> accessed 11.06.2015.

<sup>101</sup> UK response to the Commission, above n. 59.

<sup>102</sup> See e.g., UK Onshore Oil and Gas, 'Who is responsible for what?' (2013) <<http://www.ukoog.org.uk/knowledge-base/regulation/who-is-responsible-for-what>> accessed 27.01.2015.

<sup>103</sup> DECC Guidance, above n. 67, pp. 7 and 28. A separate permit is also required for extended well testing lasting more than 96 hours.



Lords in 2014, in some cases operators may be required to obtain between eight and nine separate environmental permits for their activities.<sup>104</sup> This is because all onshore gas exploration sites currently require bespoke permits which set conditions for activities for which standard rules do not yet exist because the necessary controls are too complex.<sup>105</sup> According to the Government, the Environment Agency has powers to combine various permits into one, enabling the issuance of a single permit covering several activities<sup>106</sup> and it hopes to produce standard permits for shale gas operations in the near future.<sup>107</sup>

In assessing applications for environmental permits the Environment Agency takes into account the requirements of EU law, including the European chemicals legislation,<sup>108</sup> Water Directives,<sup>109</sup> and the Mining Waste Directive, most of which are implemented by the Environmental Permitting Regulations 2010.<sup>110</sup> Although in line with regulatory practices in other jurisdictions both venting and flaring should be kept to the minimum that is technically and economically justified,<sup>111</sup> operators are not explicitly required to use ‘reduced emissions completions’ where gas recovered during flow-back is typically injected into a pipeline.<sup>112</sup> The only reference to specific legally binding targets is the limit set by the Industrial Emissions Directive,<sup>113</sup> according to which an environmental permit is necessary if an operator intends to flare or vent more than 10 tonnes of natural gas daily.<sup>114</sup> According to the Government, venting is only permitted if flaring is technically impossible, for instance due to safety reasons.<sup>115</sup>

Since drill cuttings or flow-back fluid may contain low levels of naturally occurring radioactive minerals an environmental permit for handling these minerals will be required<sup>116</sup> if their concentration in flow-back fluid exceeds

<sup>104</sup> Economic Impact Report, above n. 13, Figure 13.

<sup>105</sup> EA technical guidance, above n. 86, p. 11.

<sup>106</sup> UK response to the Commission, above n. 59.

<sup>107</sup> *Ibid.* During the deliberations of the Economic Affairs Committee in February 2014, the Secretary of State for the Environment and the Environment Agency revealed their plans to issue standard permits from early 2015 onwards. See Economic Impact Report, above n. 13, para. 206.

<sup>108</sup> REACH Regulation, above n. 29. See also UK response to the Commission, above n. 59 referring to Recommendation, point 10.1.

<sup>109</sup> Water Framework Directive; Groundwater Directive.

<sup>110</sup> Environmental Permitting (England and Wales) Regulations 2010 (SI 2010/675).

<sup>111</sup> UK response to the Commission, above n. 59.

<sup>112</sup> D.J.C. MACKAY and T.J. STONE, above n. 100, p. 21.

<sup>113</sup> Council Directive 2010/75/EU of 24 November 2010 on industrial emissions (integrated pollution prevention and control) [2010] OJ L334/17.

<sup>114</sup> DECC Guidance, above n. 67, p. 28.

<sup>115</sup> UK response to the Commission, above n. 59.

<sup>116</sup> EA Guidance Note, above n. 9, p. 3.

the threshold in Table 1 of Schedule 23 to the 2010 Regulations.<sup>117</sup> An environmental permit is required even if concentrations fall below this threshold because flow-back fluid is covered by Regulation 12(1) of the 2010 Regulations which stipulates that all installations and activities involving ‘mining waste operation’,<sup>118</sup> radioactive substances, water discharge, or groundwater<sup>119</sup> must be operated under the authority of an environmental permit.<sup>120</sup> Additionally, any operator intending to dispose of radioactive materials must make a radiological assessment, which provides a detailed plan for safe handling and disposal at an approved facility<sup>121</sup> and demonstrates sufficient protection for the public and the environment.

In conclusion, the assessment of the UK permit regime for shale gas operations demonstrates that many concerns raised by the public as well as the Commission are addressed in permitting conditions.

## 5. ENVIRONMENTAL IMPACT ASSESSMENT

Point 3 of the Commission Questionnaire investigates whether an Environmental Impact Assessment (EIA) is completed in accordance with Directive 2001/42/EC<sup>122</sup> before exploration and production licences are issued.<sup>123</sup> Because of the impacts on the environment, the EIA forms an important part of any regulatory framework governing shale gas development. However, the EIA is not mandatory for all shale gas development, and this is likely to remain highly controversial in public debates. In February 2015 the Court of Justice ruled that no obligation existed under Directive 2011/92/EU<sup>124</sup> to conduct an EIA of exploratory drilling of natural gas and petroleum.<sup>125</sup> According to the Court, competent national

<sup>117</sup> DECC, ‘Fracking UK shale: water’ (February 2014), p. 6 <[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/277211/Water.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/277211/Water.pdf)> accessed 30.01.2015.

<sup>118</sup> A mining waste operation is defined as meaning the management of extractive waste, whether or not involving a mining waste facility that falls within the meaning of Article 2 of the Mining Waste Directive: Environmental Permitting Regulations 2010, Schedule 20.

<sup>119</sup> *Ibid.*, reg. 8(1).

<sup>120</sup> *Ibid.*, reg. 12(1).

<sup>121</sup> EA Guidance Note, above n. 9, p. 1.

<sup>122</sup> Council Directive 2001/42/EC of 27 June 2001 on the assessment of the effects of certain plans and programmes on the environment [2001] OJ L197/30.

<sup>123</sup> Commission Questionnaire, above n. 57, points 3.1 and 3.3.

<sup>124</sup> Council Directive 2011/92/EU of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment [2012] OJ L26/1.

<sup>125</sup> C-531/13 *MarktgemeindeStraßwalchen and Others v. BundesministerfürWirtschaft, Familie und Jugend* (2015) ECLI:EU:C:2015:79. In this case the Austrian Federal Minister authorised exploratory drilling in the municipality of Straßwalchen up to a depth of 4,150 metres without an EIA. *Ibid.*, para. 10.

authorities should conduct an evaluation as to whether an EIA is necessary, taking account of the criteria set out in Annex III to Directive 2009/31.<sup>126</sup>

Further, to identify the potential risks involved in shale gas development, the Commission investigates whether the public has 'early and effective opportunities' to participate in the EIA process, whether minimum depth limitations exist between proposed sites and groundwater zones, and whether national law imposes restrictions on activities near sensitive sites which may be affected by the development, including residential areas, regions prone to flooding or seismicity, as well as nature conservation, cultural heritage and water protection sites.<sup>127</sup>

### 5.1. REQUIREMENT FOR AN EIA IN ENGLAND

In accordance with Directive 2011/92/EU<sup>128</sup> all public and private projects which are likely to have significant environmental impacts must be subject to an EIA.<sup>129</sup> Under the Town and Country Planning (Environmental Impact Assessment) Regulations 2011,<sup>130</sup> which transpose Directive 2011/92/EU, all development falling within the scope of Schedule 1 to the 2011 Regulations automatically requires the planning authorities to issue a written statement affirming whether an EIA is necessary. In contrast, any development falling within the scope of Schedule 2 is subject to consideration as to whether significant impacts on the environment are likely. Whether a particular project is subject to an EIA is determined based on the screening criteria provided in Schedule 3.<sup>131</sup> Under Schedule 1, extraction of natural gas exceeding 500,000m<sup>3</sup> per day is subject to an automatic screening, whereas all applications for the exploratory and appraisal phases can be interpreted to fall under Schedule 2, and hence be subject to a screening assessment, if an applicable threshold in column 2

<sup>126</sup> Council Directive 2009/31/EC of 23 April 2009 on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No. 1013/2006 [2009] OJ L140/114.

<sup>127</sup> Commission Questionnaire, above n. 57, points 3.2 and 3.4.

<sup>128</sup> Council Directive 2011/92/EU, above n. 124.

<sup>129</sup> *Ibid.*, Article 1(1).

<sup>130</sup> Town and Country Planning (Environmental Impact Assessment) Regulations 2011 (SI 2011/1824).

<sup>131</sup> EA technical guidance, above n. 86, p. 8; Department for Communities and Local Government, 'Planning practice guidance for onshore oil and gas' (July 2013), p. 53 <[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/224238/Planning\\_practice\\_guidance\\_for\\_onshore\\_oil\\_and\\_gas.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/224238/Planning_practice_guidance_for_onshore_oil_and_gas.pdf)> accessed 30.01.2015.

is exceeded,<sup>132</sup> or if any part of the development occurs in a ‘sensitive area’, which are generally understood as nature conservation sites. Even if Schedule 2 does not explicitly mention ‘hydraulic fracturing’, it contains a table entitled ‘extractive industry’ with a reference to ‘deep drillings’<sup>133</sup> which further indicates that an EIA is required if ‘the works exceed 1 hectare’. Thus, in accordance with Directive 2011/92/EU, an EIA is mandatory only for a sizeable development or development near nature conservation sites.

Under Regulation 2(1) of the Town and Country Planning (Environmental Impact Assessment) Regulations 2011 sensitive areas are defined as, inter alia, all habitats for wildlife and plants and bird conservation areas designated under EU law<sup>134</sup> and transposed into national law by the Conservation of Habitats and Species Regulations 2010<sup>135</sup> and the Wildlife and Countryside Act 1981.<sup>136</sup> Therefore, if the development occurs in a ‘sensitive area’, the Government’s adviser, Natural England, must be consulted and any representations made by it taken into account.<sup>137</sup> If appropriate, also the public must be heard.<sup>138</sup> Other ‘sensitive areas’ under the 2011 Act include national parks;<sup>139</sup> world heritage sites and properties;<sup>140</sup> monuments protected under the Ancient Monuments and Archaeological Areas Act 1979;<sup>141</sup> and areas of ‘outstanding natural beauty’ designated as such by an order made under section 82(1) of the Countryside and Rights of Way Act 2000.<sup>142</sup>

In addition to nature conservation sites, shale gas activities are restricted in flood-prone areas<sup>143</sup> and water protection sites.<sup>144</sup> The Environment Agency objects to shale gas extraction activities within the vicinity of drinking water

<sup>132</sup> Department of Communities and Local Governments, ‘Planning Practice Guidance’ (2014) <<http://planningguidance.planningportal.gov.uk/blog/guidance/environmental-impact-assessment/screening-schedule-2-projects/>> accessed 30.01.2015.

<sup>133</sup> This interpretation is also supported by the Environment Agency, according to which, exploratory drilling operations may fall under Schedule 2. See EA technical guidance, above n. 86, p. 8. See also Royal Society Report, above n. 65, p. 5.

<sup>134</sup> Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora [1992] OJ L206/7; Council Directive 2009/147/EC of 30 November 2009 on the conservation of wild birds [2010] OJ L20/7.

<sup>135</sup> Conservation of Habitats and Species Regulations 2010 (SI 2010/490), reg. 8.

<sup>136</sup> Wildlife and Countryside Act 1981, c. 69, section 28(1).

<sup>137</sup> Conservation of Habitats and Species Regulations 2010, reg. 61(3).

<sup>138</sup> *Ibid.*, reg 61(4).

<sup>139</sup> National Parks and Access to the Countryside Act 1949 c 97 12–14 Geo 6.

<sup>140</sup> Within the meaning of Article 11(2) of the 1972 UNESCO Convention for the Protection of the World Cultural and Natural Heritage 1037 UNTS 151.

<sup>141</sup> Ancient Monuments and Archaeological Areas Act 1979, c 46.

<sup>142</sup> Countryside and Rights of Way Act 2000, c 37.

<sup>143</sup> If the proposed site is located near a river or flood/sea defence operators must obtain permission to conduct work from the Environment Agency. See Government, ‘Permission to do work on or near a river, flood or sea defences (England)’ <<https://www.gov.uk/flood-defence-consent-england-wales>> accessed 27.01.2015.

<sup>144</sup> See UK response to the Commission, above n. 59.

protection zones, if they result in an unacceptable impact on groundwater.<sup>145</sup> Because the Agency nevertheless assesses each application on a case-by-case basis, it may grant an environmental permit in areas where boreholes pass through a groundwater area, if no unacceptable impact exists on the drinking water supply.<sup>146</sup> No particular restrictions exist on activities in seismic-prone areas because natural seismicity in the UK is low and no zones of particular seismic sensitivity have been identified for regulatory purposes.<sup>147</sup> Instead, the risk of induced seismicity is mitigated through control protocols requiring prior analysis of seismic risk, seismic monitoring and a requirement to suspend operations at predefined activity levels.<sup>148</sup> Similarly, no regulatory minimum distance exists between residential areas and shale gas developments, but each planning application is determined on a case-by-case basis.

## 5.2. OPPORTUNITIES FOR PUBLIC PARTICIPATION

In England, the public is consulted at each stage of shale gas development, from assessment of exploration prospects<sup>149</sup> to development of infrastructure and production of hydrocarbons.<sup>150</sup> The planning process provides an opportunity for the public to express their views on individual project proposals, including any EIA,<sup>151</sup> and their comments are taken into account by the planning authorities.<sup>152</sup> Additionally, the Environment Agency consults the public before the issuance of environmental permits.<sup>153</sup> Further, the Government encourages pre-application consultation with local communities<sup>154</sup> and appropriate regulatory agencies to address issues such as noise, ecology, archaeology, site access and visual impact and to define arrangements for permits.<sup>155</sup> Other key

<sup>145</sup> Environment Agency, 'Groundwater Protection: Principles and Practice' (August 2013), pp. 26 and 66 <[www.environment-agency.gov.uk/research/library/publications/144346.aspx](http://www.environment-agency.gov.uk/research/library/publications/144346.aspx)> accessed 30.01.2015.

<sup>146</sup> *Ibid.*, p. 66. See also DECC Guidance, above n. 67, p. 7; UK response to the Commission, above n. 59.

<sup>147</sup> See UK response to the Commission, above n. 59.

<sup>148</sup> *Ibid.*

<sup>149</sup> This involves the use of extended well tests and additional drilling to determine the economical feasibility of the project. See DECC Guidance, above n. 67, p. 9.

<sup>150</sup> *Ibid.*

<sup>151</sup> See *ibid.* See also UK response to the Commission, above n. 59.

<sup>152</sup> See DECC Guidance, above n. 67, p. 9.

<sup>153</sup> *Ibid.*

<sup>154</sup> In accordance with planning authorities' community involvement requirement for mineral developers. *Ibid.* As a matter of best practice industry has established its own standards for community engagement. See also UK Onshore Operators Group, 'Community Engagement Charter' <<http://www.ukoog.org.uk/images/ukoog/pdfs/communityengagementcharterversion6.pdf>> accessed 20.01.2015.

<sup>155</sup> DECC Guidance, above n. 67, p. 17.

consultees at this stage may include local water and power suppliers.<sup>156</sup> Lastly, the strategic environmental assessment, which is conducted under the terms of Directive 2001/42/EC<sup>157</sup> in the licence areas before the launch of licensing rounds, is subject to public consultation.<sup>158</sup>

## 6. MEASURES ON FLUID MIGRATION, SURFACE SPILLS, SEISMICITY AND MONITORING

Points 5, 7, 9 and 11 of the Commission Questionnaire concern the role of environmental risk assessment<sup>159</sup> in the process of selecting suitable shale deposits, structural soundness of wells and installations (well integrity, design, construction and testing),<sup>160</sup> measures for well suspension in case of incidents or accidents, response and remedial action,<sup>161</sup> and continuous monitoring.<sup>162</sup> All these measures have been designed with a view to eliminating and mitigating the risk of environmental pollution, specifically groundwater contamination and induced seismicity.

### 6.1. SUITABILITY OF GEOLOGICAL FORMATIONS FOR HYDRAULIC FRACTURING

To address the issues relating to the suitability of geological formations for hydraulic fracturing, under the terms of a production licence operators are required to submit a hydraulic fracturing plan which demonstrates a full understanding of the risks involved.<sup>163</sup> Additionally, the plan must evaluate the historical and background seismicity in the licence area, describe any existing faulting in the proposed drilling area, and identify the risks of activating existing faults throughout the development.<sup>164</sup> The requirement to assess the geological strata and formations is outlined in the Offshore Installations and

---

<sup>156</sup> Because obtaining a water abstraction licence for more than 20m<sup>3</sup> of water per day under section 24 of the Water Resources Act 1991 is thought to be difficult in practice, the Environment Agency encourages operators to plan their water needs in advance and consider alternative sources of water. See EA Guidance Note, above n. 9, p. 1. See also J. PHILLIPS and S. SANDILANDS, above n. 62.

<sup>157</sup> Council Directive 2001/42/EC, above n. 122.

<sup>158</sup> UK response to the Commission, above n. 59.

<sup>159</sup> E.g. induced seismicity, fluid migration, surface leaks, and spills to soil, water and air. Commission Questionnaire, above n. 57, points 5.1–5.2.

<sup>160</sup> *Ibid.*, points 7 and 9.

<sup>161</sup> *Ibid.*, points 9.1–9.2.

<sup>162</sup> *Ibid.*, points 11.1, 11.3 and 11.4.

<sup>163</sup> Economic Impact Report, above n. 13, para. 195.

<sup>164</sup> *Ibid.*

Wells Regulations 1996.<sup>165</sup> Despite their name these Regulations apply equally to onshore shale gas operations throughout the well's life cycle<sup>166</sup> and stipulate that suitable well control equipment must be used during drilling, fracturing and flow-back operations.<sup>167</sup> Further, Schedule 2(7) to the Borehole Sites and Operations Regulations 1995<sup>168</sup> provides detailed guidance on suitable surface well control equipment which is aimed at providing protection against blowouts during fracturing and flow-back operations.<sup>169</sup>

The existing legislation concerning well design and construction aims to prevent possible surface leaks and contamination caused by spills of fluids from wells and reservoirs. Any hazards identified in the assessment of geological strata and target formations must be taken into account in the well design and construction phases.<sup>170</sup> The 1996 Regulations stipulate that to the extent that is reasonably practicable, well design and construction should enable safe well suspension and abandonment, with the view to avoiding accidental spills.<sup>171</sup> Furthermore, operators should use appropriate well construction materials which are suitable for ensuring that the risks arising from their operations are as low as reasonably practicable.<sup>172</sup>

#### 6.1.1. *Environmental Risk Assessment*

As a condition for obtaining exploration licences, operators are required to conduct an environmental risk assessment (ERA).<sup>173</sup> However, rather than being a statutory requirement, an ERA is conducted as a matter of good practice.<sup>174</sup> Operators are encouraged to develop and apply specific management systems to all operations and they should operate in accordance with an environmental management system that conforms to the principles in ISO 14001.<sup>175</sup> An ERA should provide an overview of risks to human health and the environment, covering the full life cycle of the proposed activities, from initial stages to well abandonment, and include waste disposal and risk of induced seismicity.<sup>176</sup>

<sup>165</sup> Offshore Installations and Wells Regulations 1996 (SI 1996/913).

<sup>166</sup> Including construction and production. See Economic Impact Report, above n. 13, paras. 207 and 228.

<sup>167</sup> Offshore Installations and Wells Regulations 1996, reg. 9 and Schedule 2(7).

<sup>168</sup> Borehole Sites and Operations Regulations 1995 (SI 1995/2038).

<sup>169</sup> Health and Safety Executive (HSE), 'A guide to the Borehole Sites and Operations Regulations 1995 Guidance on Regulations' (HSE 2008), pp. 46–47.

<sup>170</sup> Offshore Installations and Wells Regulations 1996, reg. 14(1)–(2).

<sup>171</sup> *Ibid.*, reg. 15(1).

<sup>172</sup> *Ibid.*, reg. 16.

<sup>173</sup> UK response to the Commission, above n. 59. See also DECC Guidance, above n. 67, p. 7.

<sup>174</sup> Under a licensing agreement, the operator agrees to follow good oilfield practice. See DECC Guidance, above n. 67, p. 9.

<sup>175</sup> *Ibid.*, p. 15.

<sup>176</sup> *Ibid.*

It should also involve the participation of key stakeholders, including local communities<sup>177</sup> as early as practicable in the development of proposals. Additionally, an ERA can subsequently inform other assessments, such as the EIA, if one is required. In its 2012 report, the Royal Society of Engineering recommended a mandatory ERA for all shale gas operations due to its central role in the approval process.<sup>178</sup> To reflect the current stage of development of the industry in the UK, the ERA focuses on the exploration phase and covers baseline monitoring;<sup>179</sup> water acquisition; chemical mixing; well integrity; injection of fluids underground; management of gas; management, off-site disposal or reuse of flow-back fluids; and well abandonment.<sup>180</sup> Further, if exploration is likely to have a significant adverse impact on any habitats or species of wildlife and plants protected under EU law,<sup>181</sup> an appropriate assessment may be required in accordance with the Conservation of Habitats and Species Regulations 2010.<sup>182</sup>

### 6.1.2. *Monitoring*

Before the commencement of drilling operations, the Health and Safety Executive (HSE) must be satisfied with the operator's well design and integrity as well as operational plans.<sup>183</sup> This involves examination of the safety of operational sites, with a view to avoiding groundwater contamination.<sup>184</sup> Further, the HSE monitors progress on the well through weekly reporting requirements during well construction and throughout the well abandonment processes.<sup>185</sup> The HSE must also be notified of any accidents and near misses,<sup>186</sup> and if necessary the HSE may inspect on-site operations.<sup>187</sup> Continuous monitoring of geological

<sup>177</sup> *Ibid.*, p. 16. See also Economic Impact Report, above n. 13, para. 195.

<sup>178</sup> Royal Society Report, above n. 65, p. 5.

<sup>179</sup> Relatively little information about baseline monitoring is publically available. In principle, the Government requires any facility regulated under the Environmental Permitting Regulations 2010 to prepare a report describing the condition of the land and groundwater before operations begin in cases 'where there may be a significant risk to land or groundwater including where one is necessary to satisfy requirements of the Industrial Emissions Directive'. See Environment Agency, 'Environmental Permitting Regulations: Site condition report guidance and templates' (April 2013), pp. 3–4 <[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/298106/LIT\\_8001\\_38258e.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/298106/LIT_8001_38258e.pdf)> accessed 05.06.2015.

<sup>180</sup> Environment Agency, 'An Environmental Risk Assessment for Shale Gas Exploratory Operations in England' (2013), p. 4 <[http://a0768b4a8a31e106d8b0-50dc802554eb38a24458b98ff72d550b.r19.cf3.rackcdn.com/LIT\\_8474\\_fbb1d4.pdf](http://a0768b4a8a31e106d8b0-50dc802554eb38a24458b98ff72d550b.r19.cf3.rackcdn.com/LIT_8474_fbb1d4.pdf)> accessed 27.01.2015.

<sup>181</sup> Council Directive 92/43/EEC, above n. 134.

<sup>182</sup> Conservation of Habitats and Species Regulations 2010 (SI 2010/490).

<sup>183</sup> Economic Impact Report, above n. 13, para. 207.

<sup>184</sup> See DECC Guidance, above n. 67, p. 7.

<sup>185</sup> UK response to the Commission, above n. 59.

<sup>186</sup> E.g., spills of fluids from the well or the use of blow-out prevention equipment.

<sup>187</sup> See also DECC Guidance, above n. 67, p. 7.



strata and formations should be ensured during all activities so far as reasonably practicable<sup>188</sup> to mitigate risks to groundwater.<sup>189</sup> Should any changes be observed, well design, construction or any procedures should be revised to ensure safe suspension and abandonment of wells.<sup>190</sup>

## 7. ENVIRONMENTAL LIABILITY AND WELL ABANDONMENT

Point 12 of the Commission Questionnaire concerns the issue whether the provisions of the Environmental Liability Directive are applied to all activities at installation sites, including activities that do not currently fall under the scope of the Directive.<sup>191</sup> Additionally, the Commission investigates whether operators are required to provide a financial guarantee, covering the permit provisions or potential liabilities for environmental damage before the development commences.<sup>192</sup> In this context, it is also helpful to discuss well abandonment<sup>193</sup> which has emerged as critical in managing the adverse impacts of shale gas development because wells are rarely monitored post-abandonment.<sup>194</sup>

As part of the initial licensing process, the DECC assesses the operator's safety management systems, well examination schemes, technical competence and financial capability.<sup>195</sup> Operators are required to demonstrate that they have sufficient funds to cover expected costs and appropriate insurance coverage at drilling and production stages. Additionally, operators must submit their well abandonment plans to the DECC.<sup>196</sup> Operational competency is also scrutinised in the context of environmental permits.<sup>197</sup> Since the responsibility for the restoration and aftercare of wells, including financial responsibility, lies with the operators, they can be required to remedy or prevent further environmental damage.<sup>198</sup> Under the Environmental Permitting Regulations 2010 financial

<sup>188</sup> Offshore Installations and Wells Regulations 1996, reg. 14(3).

<sup>189</sup> DECC Guidance, above n. 67, p. 8.

<sup>190</sup> Offshore Installations and Wells Regulations 1996, reg. 14(3).

<sup>191</sup> Commission Questionnaire, above n. 57, point 12.1.

<sup>192</sup> *Ibid.*, point 12.2.

<sup>193</sup> *Ibid.*, point 14.

<sup>194</sup> See R.J. DAVIES et al., 'Oil and gas wells and their integrity: Implications for shale and unconventional resource exploitation' (2014) 56 *Marine and Petroleum Geology* 239, 252.

<sup>195</sup> See e.g., Economic Impact Report, above n. 13, para. 194; UK response to the Commission, above n. 59; UK Onshore Operators Group, 'Fact Sheet: Onshore Oil and Gas Regulation' (October 2013) <<http://www.ukoog.org.uk/images/ukoog/pdfs/fact%20sheets/regulation.pdf>> accessed 30.01.2015.

<sup>196</sup> Economic Impact Report, above n. 13, para. 238.

<sup>197</sup> UK response to the Commission, above n. 59.

<sup>198</sup> Economic Impact Report, above n. 13, para. 236.

guarantee is required from any operator producing extractive waste in accordance with the Mining Waste Directive.<sup>199</sup>

The main risk in relation to well abandonment is considered to arise from inappropriately sealed wells which may enable methane or other contaminants to enter the atmosphere, soil or groundwater.<sup>200</sup> Therefore, it has been suggested that appropriate financial mechanisms and monitoring processes should be introduced to ensure that operators rectify any environmental damage arising post-abandonment.<sup>201</sup> As part of the environmental permitting process operators are required to develop a closure and rehabilitation plan which forms part of their waste management plan under Articles 5(3)(f) and 12 of the Mining Waste Directive.<sup>202</sup> The restoration and aftercare must have been satisfactorily completed before operators surrender their environmental permits to the Environment Agency. Planning authorities may also impose aftercare conditions at the time of granting planning permission and specify detailed steps to be taken.<sup>203</sup>

When an operator abandons a well it must notify the HSE and submit weekly reports to it. The abandonment process is also subject to review by an independent well examiner.<sup>204</sup> Although in some cases operators may be required to continue monitoring after the closure of a facility, or until it no longer poses a risk to the environment or human health,<sup>205</sup> abandoned wells are not generally monitored unless unusual developments occur during the abandonment process.<sup>206</sup> Disagreement exists over whether the monitoring by the HSE is sufficient because of scarcely available data on the monitoring of active and abandoned wells.<sup>207</sup> Therefore, it has been suggested that continuous ground gas monitoring arrangements and aquifer sampling should be developed to detect possible well failure post-abandonment.<sup>208</sup> This could be required less frequently than currently is required before and during operations.<sup>209</sup> Additionally, it has been suggested that a common liability fund should be created to ensure that funds

<sup>199</sup> Mining Waste Directive 2006/21/EC, above n. 10.

<sup>200</sup> Economic Impact Report, above n. 13, para. 237.

<sup>201</sup> R.J. DAVIES et al., above n. 194.

<sup>202</sup> Environmental permit guidance, above n. 96, section 2.2.11.

<sup>203</sup> Department for Communities and Local Government, 'Planning Practice Guidance: Minerals' (06.03.2014) <<http://planningguidance.planningportal.gov.uk/blog/guidance/minerals/restoration-and-aftercare-of-minerals-sites/aftercare-conditions/>> accessed 28.01.2015.

<sup>204</sup> Para. 236.

<sup>205</sup> The closure and rehabilitation plan should follow the Environment Agency good practice for decommissioning boreholes and wells. See UK response to the Commission, above n. 59; Environmental permit guidance, above n. 86, section 3.4.

<sup>206</sup> Economic Impact Report, above n. 13, para. 238.

<sup>207</sup> R.J. DAVIES et al., 'Reply: "Oil and gas wells and their integrity: Implications for shale and unconventional resource exploitation"' (2015) 59 *Marine and Petroleum Geology* 674.

<sup>208</sup> Royal Society Report, above n. 65.

<sup>209</sup> *Ibid.*

are available to respond to well failure in cases where an operator can no longer be identified.<sup>210</sup>

## 8. DISSEMINATION OF INFORMATION AND TRANSPARENCY

Point 15 of the Commission Questionnaire relates to dissemination of information to the public. Under point 15(b) competent authorities should publish specific information concerning shale gas development online. This is in line with the requirement for full transparency which is a critical element of a well-functioning shale gas regime in order to gain the ‘social licence to operate’,<sup>211</sup> considering that the public is very critical of the unconventional gas industry. Transparency is also vital due to the rapid dissemination of information, whether accurate or inaccurate, through social media. Therefore, the industry and governments must be open to the calls for transparency. However, although various government agencies in the UK already release various pieces of information on shale gas development, this information appears not to be organised on one easily accessible website which is likely to assuage the public of the Government’s commitment to reinforce the existing regime to ensure that the industry will be made responsible for any potential environmental damage.

## 9. CONCLUSION

Because the UK legislative framework on shale gas sets a high environmental threshold it has a great deal of potential to inform any EU-wide minimum standards, or even legally binding measures should further EU-level regulation be considered necessary. However, whether a legally binding measure is the best way forward is not entirely certain. Although the Commission’s stated aim is to ensure provision of an ‘enabling framework’ for those Member States which wish to develop their shale resources by ‘eradicating obstacles’ to unconventional energy and ‘to establish similar conditions for companies operating across the market in Europe’,<sup>212</sup> there is a risk that unconventional gas legislation will be harmonised through the back door on the grounds that differing national measures create obstacles to trade.<sup>213</sup> In fact, a Commission representative

<sup>210</sup> Economic Impact Report, above n. 13, para. 239.

<sup>211</sup> Golden Rules, above n. 19, p. 17.

<sup>212</sup> Economic Impact Report, above n. 13, para. 465.

<sup>213</sup> See e.g., C-583/11 *P Inuit Tapiriit Kanatami and Others v. Parliament and Council* (2013) ECLI:EU:C:2013:625.

has explicitly acknowledged before the House of Lords that certain areas of unconventional gas exploration and production are not currently covered by EU legislation, indicating that the existing legal framework is likely to be supplemented by a range of legislative options on which Member States are naturally consulted in due course.

Although the existing UK legislation appears to incorporate virtually all the requirements of several EU Directives in the field of environmental law, including those specifically highlighted in Recommendation 2014/70/EU, the UK's fledgling shale gas regime needs to accommodate evolving scientific knowledge concerning the impacts of unconventional sources of energy on human health and the environment. Considering that only a handful of EU Member States are likely to permit hydraulic fracturing, the UK experience, regardless of whether it is currently capable of enabling operators to proceed or not, is likely to inform the content of any future minimum standards, or indeed harmonising measures, on unconventional gas at the EU level. Additionally, the UK legislative framework may set a best practice example which could benefit other Member States looking to proceed with exploration and production of unconventional sources of energy.