

# FRACKING BUSINESS [AS USUAL]

ANALYSIS OF THE FAILING EC RECOMMENDATION ON SHALE GAS

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the Earth  
Europe

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**Friends of the Earth Europe** is the largest grassroots environmental network in Europe, uniting more than 30 national organisations with thousands of local groups. We are the European arm of Friends of the Earth International which unites 74 national member organisations, some 5,000 local activist groups, and over two million supporters around the world. We campaign on today's most urgent environmental and social issues. We challenge the current model of economic and corporate globalization, and promote solutions that will help to create environmentally sustainable and socially just societies. We promote environmentally sustainable societies on the local, national, regional and global levels. We seek to increase public participation and democratic decision-making. Greater democracy is both an end in itself and is vital to the protection of the environment and the sound management of natural resources. We work towards environmental, social, economic and political justice and equal access to resources and opportunities on the local, national, regional and international levels.

**Food & Water Europe** is the European programme of Food & Water Watch, a nonprofit consumer organisation based in the United States. Food & Water Europe champions healthy food and clean water for all. We stand up to corporations that put profits before people and advocate for a democracy that improves people's lives and protects our environment.

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# EXECUTIVE SUMMARY

In January 2014, the European Commission asked member states to implement the principles outlined in the shale gas Recommendation within six months of publication and committed to review the effectiveness of the Recommendation after 18 months. This review is now due.

Drawing together evidence from across EU member states, alongside analysis of the Commission's own survey of member states' actions, this report finds that the Recommendation has had practically no (positive) impact (1) on the way EU member states regulate shale gas exploration and production and (2) on the measures they take to protect their citizens and the environment against potential negative impacts of shale gas. Member states seem to be exploiting the weaknesses in the Commission's Recommendation on addressing the environmental aspects of shale gas exploration and production, and failing to take adequate precautionary steps against the potential risks to the environment and people's health.

## Weak and non-binding

Despite the Commission's declared intention to create a "common basis" for shale gas activities, the principles outlined in the Recommendation are non-binding, poorly defined, and create legal uncertainty about the relevance of existing EU regulations and therefore provide a very limited safeguard for the general public.

The Recommendation is also limited in its application, restricting its relevance to a narrow selection of shale gas activities – excluding tight gas and coal bed methane projects, and fails to address some of the key risks created by fracking, despite urging full consideration of environmental risks in line with public expectations.

No guidance is provided for example on how member states should deal with contaminated waste water, what measures should be taken to ensure companies provide full details of the toxic chemicals being used, how seismic risks could be considered or how member states should account for climate change emissions.

Instead the principles rely primarily on self-regulation by the shale gas industry, allowing operators to decide how best to prevent environmental and health impacts, how best to monitor the installation, and how best to protect the public.

As a result, regulatory measures across the EU remain fragmented and ill-suited to the specific risks created by fracking. And while several member states are failing to implement the guidance, the Recommendation has also undermined the existing legal framework of directives related to water, waste and chemicals.

## The EU's scoreboard

Evidence presented in the Commission's own survey of member state responses (the "scoreboard") reveals that only four states have taken legislative or other steps following the introduction of the Recommendation, and that these measures do not fulfil the principles set out in the Recommendation.

But the responses also reveal the limited value of the Commission scoreboard survey, which relied on voluntary responses from member states. For example, 17 states told the Commission that the Recommendation was not relevant as they had not issued or did not intend to issue licenses for fracking. Yet four of these countries are known to have already issued licenses.

Five states acknowledged plans to allow fracking, with a further six states responding that they may allow fracking. Analysis of their responses, combined with evidence from these countries, suggest that the environmental protection measures in place are piecemeal and inadequate to deal with the environmental risks.

## Industry defines risks

The Recommendation's approach to risk also seems ill-considered. While member states are encouraged to ensure that potential shale gas sites are fully assessed to identify potential risks, these risks are not clearly identified. Instead, the Recommendation suggests that these will be determined by dialogue between member states and industry.

Member states are also encouraged to ensure operators use the best available techniques and practices, but again no definition is provided. Instead the Commission is planning to establish an expert group to determine what counts as best practice. Recent experience has shown that other groups set up to advise on shale issues are dominated by industry representatives and individuals with financial links to the fracking industry.

## Inadequate implementation

Risk assessments, monitoring and enforcement are recommended as essential in minimising risk and preventing environmental damage, but the responses submitted to the Commission, combined with evidence from our research suggest widely differing approaches by member states.

The Recommendation advises member states to complete a Strategic Environmental Assessment (SEA) before issuing both exploration and extraction licenses, but member states' responses show that at least five countries have already issued licences for shale gas without carrying out an SEA. An SEA carried out in the UK did not consider the specific risks created by shale gas activities.

The legal requirements to carry out an Environmental Impact Assessment (EIA) appear to vary between countries, with ambiguity at the EU level. Countries like Poland have even violated this regulation. The EU's EIA Directive does not consider shale gas and a call to update the directive to include shale gas was overturned.

Measures to ensure good quality of drinking water and proper treatment of waste water are not in place, and nor are there measures to prevent venting and flaring of gas. Protection of sensitive areas is very limited. Minimum distance limits are poorly defined and as a consequence, member states have failed to implement them adequately. There are no measures to hold companies liable for costs in case of damage (during or after operation).

Measures to restrict shale gas exploration in sensitive or seismic-prone areas also vary between member states, with measures providing only limited protection in some countries (eg Germany), and no protection at all in others (Spain). Evidence from the UK suggests that although some measures are in place, they are not being enforced.

Analysis of member state capacity for monitoring proposed shale gas developments suggests that many of the member states considering shale gas exploration lack adequate capacity, while in some cases, the regulatory authorities appear to have conflicts of interest in relation to shale gas (eg UK, Poland, Germany).

As a consequence, citizens are found to be poorly informed and inadequately consulted before decisions which could affect their daily life and their environment are taken. Most of the time, information about fracking, wells, planned projects and locations is not publicly available or hard to find.

## Regulatory cost

The non-binding nature of the Commission's Recommendation, and the reluctance of member states to regulate shale gas exploration and extraction appear in part to be a response to industry lobbying about the costs of complying with regulation. Yet analysis by the International Energy Agency suggest that the costs of complying with key environmental mitigation measures would in fact add just 7% to the overall cost of drilling and completing a shale gas well.

In contrast, the current inadequate levels of environmental regulation have a high cost in terms of public confidence in fracking and might lead to huge environmental and health costs, paid by the taxpayers. The Recommendation urges member states to alleviate public concerns, but the evidence suggests that European citizens are right to be concerned about the safety of fracking operations in their neighbourhoods.

From this analysis, it is obvious that the Recommendation has failed to provide this much-needed regulatory framework, exposing the public to clear risks of damage to their environment. The Commission should recognise these failings in its review of the Recommendation.

The European Commission and EU member states appear to lack the political will and ability to strictly regulate the fracking industry. With mounting evidence about the negative impacts of fracking in the US and a growing recognition of the long-term risks, we believe that the precautionary principle should be at the heart of decision-making on fracking in Europe. As the protection of citizens and the environment cannot currently be guaranteed, we believe that no shale gas, shale oil, tight gas and coal bed methane activities should proceed.

We call on all member states to suspend all ongoing activities, to abrogate permits, and to place a ban on any new projects, whether exploration or exploitation.

In the year of the Paris climate summit (COP21) and with the impacts of climate change becoming more severe by the year, the European Union must send a strong signal to the world that it is committed to keep fossil fuels in the ground, starting with its own unconventional oil and gas resources.



# INTRODUCTION

In January 2014 the European Commission presented a Recommendation to member states on ways to address the environmental aspects of shale gas exploration and production.<sup>1</sup> Member states were asked to implement these recommendations within a six month period, and the Commission committed to review the effectiveness of the Recommendation 18 months after publication.

The decision to issue a non-binding Recommendation was in itself controversial. While energy-related issues remain the exclusive competence of European member states, the EU has a role to play as the guardian of the EU Treaties which specify that “*environmental protection requirements [are] integrated into the definition and implementation of the Union’s policies and activities, in particular with a view to promoting sustainable development*” (Art.11 TFEU).<sup>2</sup>

Under the EU Treaty, the EU is also bound to apply the precautionary principle where there are unknown risks from an activity.<sup>3</sup> Evidence from the United States, where high-volume horizontal hydraulic fracturing (or fracking) for shale gas has been used widely, suggests that there are a number of associated environmental and public health risks.

The Commission has initiated a number of studies to inform its position on shale gas and other unconventional fossil fuels,<sup>4</sup> as well as completing an impact assessment to understand the risks.<sup>5</sup> A number of reports were also initiated by the European Parliament.<sup>6</sup> These have also highlighted a number of potential environmental risks, as well as highlighting the lack of legislation at the EU-level designed to deal with the specific environmental impacts of unconventional fossil fuel extraction.

Lobbyists for the shale gas industry have however been keen to persuade the Commission that shale gas represents a safe and clean energy source that could increase Europe’s energy security, bring down prices and provide an affordable transition to a low carbon economy.<sup>7</sup> This lobby pushed hard to stop the Commission from introducing new legislation for shale gas activities and their campaign appears to have been successful.

This report examines the effectiveness of the Commission’s Recommendation, drawing on research by civil society across EU member states, and on the Commission’s own survey of member states on implementation of the Recommendation (published in form of a “Scoreboard” in February 2015).<sup>8</sup> It should be noted that the information provided by member states to the Commission is very limited – although this is perhaps not surprising given the voluntary nature of the survey.

It examines the nature of the Commission’s Recommendations and the way in which these Recommendations have been implemented at member state level, before addressing broader topics around the regulation of shale gas in terms of cost and the social license to operate.

# I. WEAKNESSES IN THE RECOMMENDATION

Our research has found that since the Recommendation was published by the European Commission in January 2014, only four member states (Poland, the UK, Lithuania and Germany) have introduced or have launched legislative initiatives to introduce any form of legislation relating to fracking or other unconventional fossil fuels.

Those states that have taken legislative measures do not appear to have implemented the full set of principles in the Recommendation, but have instead cherry-picked the elements that best suited their plans. This makes it difficult to conclude that the Recommendation has been respected by member states.

This section examines the nature of the Recommendation and the response from member states.

## 1.1. A non-binding initiative

### 1.1.1. A predicted failure

The minimum principles listed in the non-binding Recommendation, published in January 2014, were presented as a way to “*ensure that [in the context of unconventional fossil fuel development] harmonized provisions for the protection of human health and the environment apply across all Member States*”.<sup>9</sup>

Because of its non-binding nature, this initiative seemed to be doomed from start, as the European Commission recognised when it published the results of its Impact Assessment on fracking regulation.

When that assessment was done, four possible actions had been under consideration:

- Option A: a non-binding Recommendation;
- Option B: a review of existing legislation;
- Option C: a Framework Directive setting overarching goals;
- Option D: a Directive setting specific requirements covering all issues identified.

The report recognised that only “*the legislative options B, C and D*” would be effective “*in providing [a] clearer and more predictable regulatory framework for investors and reassuring the public*”.<sup>10</sup> The Commission however chose Option A.

The European Commission was therefore well aware that the Recommendation would unlikely result in harmonising legislation across Europe and could not address public concerns in a proper way, but it maintained that these were the main objectives.

Had the Recommendation been introduced as a temporary

measure, as a stop-gap while legally binding provisions were discussed and introduced, it may have had some symbolic impact. This however was not the case.

### 1.1.2. Member states fail to take the Recommendation seriously

This lack of binding authority seriously jeopardised the European Commission’s ambitions. While the Recommendation does reference possible future “*legally binding provisions*”, it is a set of non-compulsory rules which member states “*who wish to carry out exploration and production of hydrocarbons using high-volume hydraulic fracturing*”<sup>11</sup> are supposed to implement if they deem it necessary.

Many member states have openly expressed their reluctance to impose additional safety and environmental rules on their oil and gas industry partners. Their failure to implement the Recommendations in full – and their limited response to the Commission’s survey on implementation (the “Scoreboard”)<sup>12</sup> is not surprising and should be perceived by the European Commission as a strong signal about the weakness of system solely based on voluntary measures.

The first question in the Commission’s survey asked whether or not member states had “*grant[ed] or plan[ned] to grant authorisations for the exploration or production of hydrocarbons that may require the use of high-volume hydraulic fracturing (in onshore and/or offshore operations)*”.

Five countries answered positively (DK, NL, UK, PL and RO), six responded “possibly” (HU, SP, LT, AU, DE, PT) while the remaining 17 member states said “no”.

Some of the countries answering “no” were surprising. France, Ireland and Sweden, for example, had previously issued exploration permits for high-volume hydraulic fracturing, although in some cases these licenses may no longer be current, or may have been temporarily suspended. France granted 64 exploration permits before banning hydraulic fracturing on French territory in July 2011.<sup>13</sup> Of these 61 permits are still valid, and could be used if there is any change in the ban on fracking; Sweden issued a three-year shale gas exploration permit to Royal Dutch Shell in 2008;<sup>14</sup> and the Irish government granted exploration option licences for shale gas to Tamboran Resources PTY Ltd and to LANGCO Ltd in the North West Carboniferous Basin, involving high-volume hydraulic fracturing<sup>15</sup> and to Enegi Oil plc in the Clare Basin in 2011, before implementing a de facto moratorium.



The Irish government chose to interpret the Commission's Recommendation as only applying to "Member States with active hydraulic fracturing industries", which due to a temporary moratorium, meant Ireland was conveniently excluded from its scope<sup>16</sup>, thereby avoiding any high level assessment under the SEA Directive.

While the Romanian authorities answered "yes", they also declared that the permits did not imply that there would be hydraulic fracturing. Yet they state that "water management permits were issued for onshore exploration of hydrocarbons that may require the use of high-volume hydraulic fracturing".<sup>17</sup>

Exploring for unconventional fossil fuels such as shale gas ultimately requires the use of some form of fracking. Any licence given for the exploration of shale gas will therefore result in some form of fracking operation at some point.

The UK, which also answered "yes", claimed that "oil and gas operators are required to carry out a hydrogeological assessment" and that "a permit for a groundwater activity may be required if there is a risk of an indirect input to groundwater". However it is unclear that there is any legally binding requirement to take these steps in the UK.

The UK also reported that thanks to the regulations in place: "there can be no unplanned release of fluids from the well" and that any fluids emerging at the surface can be adequately treated. Such promises seem overly optimistic given that scientific studies show there are inevitable impacts from waste water.<sup>18</sup>

### 1.1.3. Unclear status of non-binding EU rules

Several of the principles included in the Recommendation advise the enforcement of existing legislation such as the Strategic Environmental Assessment Directive (2001/42/EC), the Environmental Impact Assessment Directive (2011/92/EU), the REACH regulation (1907/2006) and the Environmental Liability Directive (2004/35/EC).

Given the poor enforcement of this legislation by some member states (see below), these references are a reminder of the minimum regulatory framework for the fracking industry.

This is however inadequate for two main reasons. Firstly, this creates a strange legal ambiguity where the EU's existing

legally-binding directives and regulations (known as the EU's *acquis*) appear to be only recommended or optional because of the non-binding status of the Recommendation.

Gap or potential gap	Impact	Risk associated with gap/potential gap
Gaps in legislation		
<b>Environmental Impact Assessment Directive (2011/92/EU)</b> Annex I threshold for gas production is above HVHF project production levels. Result: no compulsory EIA.	All, especially relevant to key impacts from landtake during preparation, noise during drilling, release to air during fracturing, traffic during fracturing and groundwater contamination	A decision on the exploration and production may not be based on an impact assessment. Public participation may not be guaranteed, permits may not be tailor-made to the situation Impacts may not be known and assessed. Measures to mitigate possible impacts may not be applied through consent process or permitting regime.
<b>Environmental Impact Assessment Directive (2011/92/EU)</b> Annex II no definition of deep drilling; exploration phase would not be covered under Annex II classification "Surface industrial installations for the extraction of coal, petroleum, natural gas and ores, as well as bituminous shale". Result: no compulsory EIA	All, especially relevant to key impacts from landtake during preparation, noise during drilling, release to air during fracturing, traffic during fracturing and groundwater contamination	A decision on the exploration and production may not be based on an impact assessment. Public participation may not be guaranteed, permits may not be tailor-made to the situation HVHF project involving shallow drillings not covered by EIA. For these projects, impacts may not be known and assessed. Measures to mitigate possible impacts may not be applied through consent process or permitting regime. Preventative measures may not be undertaken. Aquifers in surroundings not known, leading to unanticipated pollution.
<b>Environmental Impact Assessment Directive (2011/92/EU)</b> No explicit coverage of geomorphological and hydrogeological aspects, no obligation to assess geological features as part of the impact assessment	Especially relevant for groundwater contamination, seismicity, land impacts, release to air	No assessment of geological and hydrogeological conditions (e.g. natural and manmade faults, fissures, hydraulic connectivity, distance to aquifers, etc) in the frame of the impact assessment or screening, resulting in sub-optimal site selection and risks of subsequent pollution Monitoring of groundwater quality of aquifers in surrounding of the site may not be done and preventative measures not undertaken. Aquifers in surroundings not known, leading to unanticipated pollution.
<b>Water Framework Directive (2000/60/EC)</b> WFD programmes of measures are not required to be enforced until	Abstraction of water and impacts due to water contamination	Inadequate monitoring and measures to prevent these impacts

Summary of gaps and potential gaps in European legislation - 2012 DG Environment report

Secondly, as the Recommendation recognises: "the Union's environmental legislation was developed at a time when high-volume hydraulic fracturing was not used in Europe". This raises a question as to whether the existing legislation is able to adequately address the impacts generated by these new technologies and related activities.

A peer-reviewed legal analysis of the UK legal framework found that "the government insists that current regulation for conventional oil and gas extraction is adequate to control fracking. However, these controls were designed pre-fracking and, [...] whilst current oil and gas regulations do not fail to offer any relevant controls, their application [for unconventional oil and gas extraction] leaves a number of gaps which may risk harm to human health and/or damage to the environment".<sup>19</sup>

The European Commission admits that certain environmental aspects associated with unconventional fossil fuel extraction "are not comprehensively addressed in current Union legislation". Yet these gaps, identified in EC studies<sup>20</sup> (see table ES2, above), are scarcely addressed at all in the Recommendation.

The Recommendation does recommend that "Member States should take the necessary measures to ensure that an environmental impact assessment (EIA) is carried out", yet the EIA Directive is currently phrased in such a way that unconventional fossil fuel projects are excluded from mandatory EIAs (see Chapter 2).

This illustrates how even with a strong environmental framework, the EU's existing legal framework can simply not be considered as sufficient if the legislator does not adapt it to the new realities of our modern world.

## 1.2. Vague wording

The recommendation lays down "minimum principles to be applied as a common basis for the exploration or production of hydrocarbons with high-volume hydraulic fracturing." Yet many of the principles are drafted in extremely vague terms, opening the doors to a wide range of interpretations by member states and seriously limiting the objective of harmonising rules across the EU.

### 1.2.1. Poorly defined measures

Throughout the Recommendation, crucial principles are listed but not clearly defined, leaving them open to interpretation by member states. For example, the European Commission recommends that:

- "Member States should take the necessary measures to ensure that the geological formation of a site is suitable for the exploration or production of hydrocarbons using high-volume hydraulic fracturing" (point 5.1. of the Recommendation)
- "Member States should ensure that operators carry out the high-volume fracturing process in a controlled manner and with appropriate pressure management" (point 9.2.(d))
- "Member States should promote the responsible use of water resources in high-volume hydraulic fracturing" (point 9.3. of the Recommendation)
- "Member States should ensure that using chemical substances in high-volume hydraulic fracturing is minimized" (point 10.1.(b) of the Recommendation)
- "Member States should encourage operators to

use fracturing techniques that minimise water consumption and waste streams and do not use hazardous chemical substances, wherever technically feasible and sound from a human health, environment and climate perspective" (point 10.2. of the Recommendation)

Measures to mitigate some of the known impacts of unconventional fossil fuel extraction can only be effective and efficient if they are clearly adapted to the distinctive features of the industry. Nothing is said, for instance, about how to minimise the use of "chemicals substances in high-volume hydraulic fracturing". What counts as "minimised"? How many chemicals substances are allowed? The principles become even less meaningful given how practices (including quantities of chemicals substances) vary between drilling sites because of the geological characteristics.

The oil and gas industry cannot be held accountable for its activities if the standards that have been set are not clearly defined. The minimum principles listed in the document offer countless opportunities for pro-fracking authorities and oil and gas actors to use these ambiguously-phrased principles to their own advantage.

The Recommendation is an invitation to indulge in rhetorical evasion and greenwash. As a result, member states seeking to develop unconventional fossil fuel resource can claim to follow these rules while, at the same time, adopting a business-as-usual approach and doing little to mitigate the worst impacts of fracking (see Chapter 2).

### 1.2.2. A self-regulatory approach

Many of the minimum principles listed depend on the good intentions of oil and gas companies and on their abilities to consider all the known and possible impacts of their activities. For example, the Recommendation asks member states to ensure that:

- the "operator determines the environmental status (baseline) of the installation site and its surrounding surface and underground area potentially affected by the activities";
- "operators apply an integrated approach to the development of a production area with the objective of preventing and reducing environmental and health impacts and risks, both for workers and the general public";
- "operators develop project-specific water-management plans to ensure that water is used efficiently during the entire project" (ie operators define what "efficiently" means);

# BOX 1

## EUROPEAN COMMISSION IGNORES PUBLIC FEARS

The European public is legitimately concerned about this emerging body of scientific evidence. Before allowing the fracking industry to get established in Europe, the authorities should pay attention to this evidence. Several studies and reports commissioned by different departments of the European Commission have analysed the current legal situation both at the European level and at the level of different Member States in order to assess whether and how the existing regulatory frameworks were protecting public health and environmental from the impacts generated by this industry. These reports identified a number of issues as presenting a high risk for people and the environment (e.g. impacts on air, water, land and health), particularly from a cumulative perspective,<sup>26</sup> and listed significant gaps in the current European environmental framework.<sup>27</sup> They also observed vast variation in national legislation, with the “application of different and sometimes contradictory requirements” from one member state to another.<sup>28</sup>

It is therefore perhaps not surprising that the European public has shown its clear opposition to this industry. The European

Commission's own surveys found:

- In a 2013 EuroBarometer<sup>29</sup>:
  - 74% of Europeans would be concerned if a shale gas project came to their area
  - Only 9% of Europeans think that unconventional fossil fuel production should be prioritised (in sharp contrast to 70% support for renewable energy as a priority)
- In a 2013 European Public Consultation organised by the European Commission<sup>30</sup>:
  - 64% of participants think UFF “should not be developed in Europe at all”
  - 20% of participants think UFF “should be developed in Europe only if proper health and environmental safeguards are in place”
  - Only 12% of participants think UFF “should be developed in Europe anyway”.

This deep scepticism about fracking suggests that the fracking industry has failed to secure a “social licence to operate” in Europe.

- “operators develop transport management plans to minimise air emissions” (ie operators determine which level can be considered as “minimised”);
- “operators carry out the high-volume fracturing process in a controlled manner and with appropriate pressure management” (ie they decide what is “controlled” and “appropriate”);
- “operators develop risk management plans and the measures necessary to prevent and/or mitigate the impacts, and the measures necessary for response”;
- “the operator regularly monitors the installation and the surrounding surface and underground area potentially affected by the operations” (ie there is no independent third party check);
- “operators monitor the impacts of high-volume hydraulic fracturing on the integrity of wells” (ie authorities rely on complete transparency and cooperation from operators).

There was strong resistance from a number of member states to legally binding rules, but as a consequence the Commission and member states are vulnerable to the possibility that, for economical reasons, these companies, some of which have extremely poor environmental records,<sup>21</sup> do not operate to the highest standards and as a result cause environmental damage.

Public opposition to fracking (the lack of social licence) (See Box 1) is a result of the secretive nature of this industry – which uses trade secret excuses<sup>22</sup> and gagging orders<sup>23</sup> to limit the level of information available to the general public – as well as its tendency to cut corners on environmental

standards to increase profitability, and its inability to admit the risks and impacts of its operations (in the US, the industries repeats its rhetoric on zero-contamination-case<sup>24</sup> despite mounting evidence of impacts<sup>25</sup>).

The only UK well where high-volume hydraulic fracturing has taken place at Preese Hall, Lancashire, illustrates these risks. Operations triggered earthquakes, forcing Cuadrilla to stop their activities and close the well, but Cuadrilla's experts maintained that the well had been constructed in accordance with industry standards. Documents released by the Health and Safety Executive<sup>31</sup> in 2014 however showed a number of problems, including ‘poor’ cement in the lower section and a failure to carry out crucial checks.<sup>32</sup>

Relying on proactive monitoring by the industry cannot be considered adequate regulation, especially for such a high-risk activity. Even the UK industry-funded “Task Force on Shale Gas”<sup>33</sup> found that independent monitoring of wells should be compulsory to check for potential leaks, rather than allowing companies to perform the checks.<sup>34</sup> The report concluded that the UK government had failed to implement this crucial recommendation.

### 1.2.3. Limited definition of “high-volume hydraulic fracturing”

In order to mark out the scope of the Recommendation, the European Commission gives a very specific definition of “high-volume hydraulic fracturing”, stating that “‘high-volume hydraulic fracturing’ means injecting 1,000 m<sup>3</sup> or more of water per fracturing stage or 10,000 m<sup>3</sup> or more of water during the entire fracturing process into a well.”

While this is one of the key characteristics of these operations, water consumption is not the only defining practice. The technique, which allows deep shale rock formations to be fractured up to five kilometers underground, combines four different technologies: directional drilling (wells that go down a kilometer and then extend horizontally for another kilometer), the use of millions of litres of fracturing fluids including water, proppant (such as silica sand<sup>35</sup>) and toxic chemicals; the use of gels and high fluid volumes at 100 barrels a minute to create “slick water” and multi-well pad and cluster drilling (with six to twelve wells from one platform).<sup>36</sup>

“High-volume horizontal hydraulic fracturing” is therefore a question of geology, depth, injection pressure, water intensity, chemicals and sands, but also of technology and well density. The amount of water involved significantly varies from one drilling site to another, depending on the nature and the depth of the shale layers. These specificities were already clearly presented in studies<sup>37</sup> commissioned by the European Commission but are not present in the Recommendation.

By limiting this definition to projects above a fixed threshold for water use, the European Commission has excluded a number of fracking operations from the Recommendation's scope, including a large proportion of the existing shale gas projects in Europe:

- The Cuadrilla's exploratory fracking operations for shale gas at Preese Hall in Lancashire used 8,400 m<sup>3</sup> of water in total.<sup>38</sup>
- Several exploratory wells in Poland: the Krupie-1 well run by ExxonMobil used only 2,583 m<sup>3</sup> of water, the Lebien LE-1 well run by ConocoPhillips and Lane Energy used only 1,452 m<sup>3</sup> and the Stennica-1 well run by ExxonMobil only required 2,016 m<sup>3</sup> of water.<sup>39</sup>

The threshold used by the European Commission would also exclude thousands of fracking projects in the United States. As the US EPA study assessing “the Potential Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources” stated, later confirmed by another study from the US Geological Survey<sup>40</sup>: “there is wide variation within and among states and basins in the median water volumes used per well, from more than 5 million gal (19 million L) in Arkansas, Louisiana and West Virginia to less than 1 million gal (3.8 million L) in California, New Mexico, and Utah, among others. This variation results from

several factors, including well length, formation geology, and fracturing fluid formulation”.<sup>41</sup>

The definition also excludes in many cases the extraction of tight gas, another category of unconventional fossil fuel whose production requires systematic use of high-volume hydraulic fracturing involving water, sand and chemicals.<sup>42</sup> Because of the geology where tight gas is found, extraction usually requires less water than shale gas production.<sup>43 44</sup>

Tight gas is defined by the oil and gas industry as an unconventional form of gas<sup>45</sup> which requires more effort than conventional forms of gas “to pull it from the ground because of the extremely tight formation in which it is located. [...] Without secondary production methods, gas from a tight formation would flow at very slow rates, making production uneconomical.”<sup>46</sup>

A July 2014 study from the German Federal Environment Agency (the Umweltbundesamt (UBA)) shows that the development of a 260 km<sup>2</sup> field will generate an estimated demand of up to 43.7 million m<sup>3</sup> of water to extract shale gas, while it would “only” require up to 21.8 million m<sup>3</sup> of water for tight gas extraction.<sup>47</sup> While this difference could, in many cases, exclude tight gas production from the scope of the Recommendation, this average amount would still exceed the water needs for agricultural irrigation in some regions of Lower Saxony, for example, where supplies are already considered critical.

Shale gas and tight gas operations - while targeting different kinds of impermeable rock formations - are not materially different. According to the German Chemists Society both shale gas and tight gas operations combine the multistage injection of large volumes of water and chemicals at high pressure with horizontal drilling which may exceed 2 km in length. Their report found that: “Types and volumes of fracturing fluids and chemical additives [simply vary because of] local geology”.<sup>48</sup> However, the potential impacts and risks are similar<sup>49</sup> and therefore do not justify the effective exclusion of tight projects from the scope of the Recommendation.

Similarly, coalbed methane and coal gasification<sup>50</sup> appear to be excluded from the Recommendation, although several projects are being developed in the UK and Belgium, and could soon start in other countries, including France. While these projects do not systematically require fracking, examples from Australia show that this method is regularly used to enhance production at many sites.<sup>51</sup>

Because coalbed methane, coal gasification projects are usually done at much shallower depth, the amount of water used is usually far less than for shale gas extraction and as such, is likely to fall below the thresholds used in the Recommendation. It should also be noted that many of the extractive practices used by the coalbed methane industry, with known environmental and health impacts,<sup>52</sup> are not covered in the Recommendation.

#### 1.2.4. Minimum distances and depth limitations

The Recommendation suggests “Member States should provide clear rules on [...] minimum distances between authorised operations and residential and water-protection areas. They should also establish minimum depth limitations between the area to be fractured and groundwater.” In Paragraph 5, it insists on the need for the Risk Assessment to “respect a minimum vertical separation distance between the zone to be fractured and groundwater.”

But because the Recommendation leaves the definition of these distances to member states it is likely that this will



Proximity between fracking projects and a playground - Credit Nadia Steinzor

lead to a variety of biased interpretations, rather than a set of clear rules across the EU.

Where countries have defined what these minimum distances should be, they have ended up with very different numbers.<sup>53</sup> None of these decisions appear to have been

based on scientific evidence on how large the minimum distances should be.

Recent peer-reviewed health and environmental evidence can be found:

- In February 2012, a study concluded that residents living less than ½ mile (800 meters) from wells are at greater risk for health effects from natural gas development than are residents living more than ½ mile from wells.<sup>54</sup>
- In September 2014, a further study found that people living less than 1 km far from natural-gas wells were more than twice as likely to report upper-respiratory and skin problems than those living more than 2 km far from the nearest gas well.<sup>55</sup>

Evidence around minimum depth limitations is equally troubling. There is no scientific evidence to suggest any limitations would guarantee the safety of groundwater. Studies have however concluded that the risk for groundwater contamination is not linked to the drilling depth.<sup>56</sup> Instead evidence suggests risks almost inevitably arise due to ageing, corrosion, poor cement work and/or earth tremors.<sup>57</sup>

Some countries have introduced depth limitations, despite the lack of evidence:

In the UK, the new Infrastructure bill, passed in February 2015, ensures that fracking does not take place within groundwater source protection zones at depths of less than 1,200 meters, unless the Secretary of State gives consent.<sup>58</sup> Such limits, measured from the surface and not from the location of groundwater reserves, put these reserves at great risk since they may be found at many different depths and could therefore be close to this 1,200 meters limit. The UK has not introduced a fixed “buffer zone” between oil and gas developments and residential areas, with each case to be determined by local planning authorities.

Planning permission and environmental permits have already been granted by UK authorities to undertake drilling and testing activities in a groundwater “Source Protection Zone 2” area; to undertake fracking around 300 metres from residential areas<sup>59</sup>; and in major conurbations (such as Greater Manchester).

In Poland, the government revised its legislation on environmental impact assessments and stated that exploratory drilling could be carried out without an assessment up to a depth of 5,000 metres.<sup>60</sup> The European Commission stated in February 2015 that such an exclusion from the EIA Directive was in breach of EU regulations,<sup>61</sup> although the Polish legislation is currently still in place. And despite preliminary discussions to include a 500-meter minimum distance buffer zone from homes, the final fracking legislation<sup>62</sup> did not include any reference to ensuring a safe distance from residential areas.



Proximity between fracking projects and residential areas - credits Calvin Tillman

In Germany, the proposed legal framework<sup>63</sup> on fracking offers a more protective framework with a ban on fracking for shale and coal bed methane extraction above a depth of 3,000 meters, unless an expert panel (not yet established) decides differently.<sup>64</sup> This possible threshold<sup>65</sup> excludes tight gas production, meaning it could be extracted at any depth, including inside areas such as Natura-2000 sites.

The proposed German legal framework does not mention buffer zones between authorised operations and residential areas, or minimum vertical distances between the zone to be fractured and groundwater reserves. Depending on the depth and the structure of the targeted geological formation, and depending on the overall hydro-geological circumstances, fracking operations could potentially be conducted close to the groundwater horizon. More recently, German authorities publicly confirmed they would not consider general buffer zones and deferred possible buffer zones and minimum distances issues to federal authorities.<sup>66</sup>

### 1.3. Key impacts ignored or played down

The Recommendation emphasises the importance of “fully considering greenhouse gas emissions and management of climate and environmental risks, including to health, in line with public expectations”,<sup>67</sup> yet fails to address a number of relevant issues.

#### 1.3.1. Waste water management

One of the main headaches for the shale gas industry is finding a way to deal with the millions of litres of fracking wastewater that will result from shale gas production. In the US, most flow back water from shale gas and other unconventional operations is disposed of in deep well injection sites. In Texas alone, there are more than 8,000 disposals wells<sup>68</sup> and another 25,000 wells that accept waste fluids.<sup>69</sup> On average, companies in Texas dispose of 290 million barrels of wastewater — equivalent to about 18,500 Olympic-size swimming pools — each month.<sup>70</sup> At the start of the shale gas boom in Pennsylvania (2008-2009), at least half of the wastewater was sent to public sewage plants, which were ill-equipped to deal with the hazardous waste. Local waterways were polluted as a result.<sup>71</sup>

The Recommendation’s ‘Operational requirements’ however focus primarily on the issue of water availability. Member states are advised that operators should “develop project-specific water-management plans to ensure that water is used efficiently during the entire project”. Little to no guidance is given on how to deal with wastewater.

The Commission is reviewing the existing reference document (BREF) on extractive waste under the Mining Waste Directive, but this will not be finalised until 2017. How to make sure that, in the meantime, the management of waste from hydrocarbon exploration and production involving high volume hydraulic fracturing is “appropriately handled and treated and the risk of water, air and soil pollution is minimised” remains unclear.<sup>72</sup>

In the UK, concerns have been raised about Naturally Occurring Radioactive Materials (NORM) found in the flowback from Cuadrilla’s operations at Preese Hall. These included naturally-occurring uranium and thorium and levels of radium 90 times higher than naturally occurs in drinking water.<sup>73</sup> Cuadrilla was initially authorised to discharge this wastewater into the Manchester Ship Canal after basic treatment at a local water treatment facility.<sup>74</sup>

Germany’s Federal Environment Agency concluded that the options for environmentally-friendly treatment and disposal

of flowback and wastewater from shale gas were recycling, discharge or disposal via deep well injection<sup>75</sup>. But they added that “[a]t present, no process chain can be regarded as a state-of-the-art method in regard to the flowback and produced water treatment and disposal” and that “[s]o far, no company has been able to present a sustainable waste management concept.”<sup>76</sup>

Given the seismic risk involved in deep well injection and the lack of current sites for deep well injection (see more on this in section 2.9.), EU member states cannot guarantee to local communities in the EU that wastewater won't contaminate local surface and underground water supplies. With no EU-wide standards for treated fracking wastewater, the only protection comes from a patchwork of EU environmental laws (Mining Waste Directive, Industrial Emissions Directive and the Water Framework Directive), none of which were drawn up to deal with the specific risks posed by unconventional fossil fuels.

In the case of the Water Framework Directive, shale gas activities have been excluded from some aspects of the legislation, which is supposed to prevent the deterioration of water quality and protect, enhance and restore water bodies in Europe. A guidance note from the Commission states that Article 11 (3) (j) “does not apply to shale gas activities” but only to conventional hydrocarbon operations.<sup>77</sup> This article is designed to ensure that flowback or produced water containing pollutants is not directly discharged into geological formations containing groundwater (Article 11(3) (j) of the Water Framework Directive).<sup>78</sup>

The provisions of the Mining Waste Directive, which apply to the disposal of solid, slurry and liquid wastes resulting from extractive activities, including hydrocarbons exploration and production, do however apply to shale gas activities. The status given to these fracking wastes remain however extremely unclear. The Commission appears to think that the injection of flowback resulting from fracking operations - without any treatment - is still prohibited under the Water Framework Directive. After the flowback surfaces, the operator needs to ship the waste water to a waste facility and must be treated in line with the requirements of the Mining Waste Directive. If the flowback contains hazardous waste (NORMs, heavy metals, aromatic hydrocarbons like benzene), the flowback needs to be shipped to specialized, class A waste treatment facilities. Once treated, and the

waste water is of an “acceptable standard”, it can be re-injected into appropriate geological formations.

This poses a number of issues. Nothing in the Recommendation or in the existing legislation indicates what is an acceptable level of treatment. If there are NORMs in the waste water, is simply diluting the flowback with other waste water sufficient? At which point is flowback no longer flowback, but transforms into “injection of water containing substances resulting from the operations for exploration and extraction of hydrocarbons or mining activities” (which can be injected into geological formations under article 11(3) (j)?



Open waste water storage pond - Credits NETL.gov

Secondly, evidence suggests that the authorities at member state level do not have sufficient information about the geological and hydrogeological characteristics of potential waste facilities to make informed decisions, and need to follow a case-by-case approach. This would not be feasible if there was large-scale development of this industry requiring decisions about thousands of wells.

By failing to address crucial issues such as the status of the fracking fluids that remain underground or the quality of the treated fracking wastewater that can be discharged, the European Commission fails to properly enforce the Water Framework Directive and other more specific water-related EU legislation.

Article 6 (3) of the Groundwater Directive indicates that “Member States must ensure that the programme of measures includes all the measures necessary to prevent or limit inputs into groundwater of pollutants” which a report to the Commission noted “could in principle involve the prevention of hydraulic fracturing operations, should the latter involve the injection underground of pollutants”.<sup>79</sup>

The implications are that member states may not fulfill their legal obligations to prevent the deterioration of water quality and to protect, enhance and restore water bodies in Europe

There also remains a question as to whether there are sufficient water treatment plants in the EU's shale plays that are suitable for treating waste water from shale gas activities.

The flowback and the produced water from fracking operations are brines, i.e. water with a very high salinity. In addition, formation water can contain a number of dissolved and trace substances, such as heavy metals, aromatic hydrocarbons, dissolved gases and NORMs and biocides. This mix – which varies from one well to another - poses a real challenge for water treatment plant operators. Many cases of water contamination due to only partial treatment of fracking wastes have been documented in the US.<sup>80</sup> This issue was raised by the European Parliament in November 2012, but has not been answered.<sup>81</sup>

### 1.3.2. Chemicals

The Recommendation acknowledges that the EU's environmental legislation pre-dates fracking and therefore does not address all of the environmental aspects associated with the exploration and production of unconventional hydrocarbons. One of the areas not covered is the transparency regarding the chemicals used by the industry.

The European Commission has advised member states to “ensure that manufacturers, importers and downstream users of chemical substances used in hydraulic fracturing refer to ‘hydraulic fracturing’ when complying with their obligations under” the REACH regulation.<sup>82</sup> This puts the responsibility for ensuring transparency on the European Chemicals Agency (ECHA) but, as recognised by the European Commission, no companies have declared in the registration procedure that their products are for use in hydraulic fracturing.<sup>83</sup>

The European Commission and the ECHA have been trying to adapt the REACH framework to ensure that chemicals

for fracking are declared.<sup>84</sup> However the ECHA conceded in March 2015 that “it will not be compulsory for firms to flag that chemicals are being used for fracking” and that “no immediate action [was] planned” if firms did not disclose the information.<sup>85</sup>

European authorities therefore seem unlikely to be able to fulfill the advice in the Recommendation that member states should ensure that “the operator publicly disseminates information on the chemical substances and volumes of water that are intended to be used and are finally used for the high-volume hydraulic fracturing of each well”.

From our discussions with the European Commission and ECHA, it seems that it will take another two to three years before there will be an easily searchable REACH database that will allow European authorities and the public to identify all the chemicals that can be used and already have been used for the purpose of fracking in the EU.

In the meantime, the only transparency mechanism that exists is the International Association of Oil and Gas Producer website: <http://www.ngsfacts.org/>. This is a voluntary initiative, and so cannot be enforced, does not include some key shale gas operators in the EU (Cuadrilla, INEOS and Celtique's UK operations, and San Leon Energy and PGNiG's operations in Poland are not included); and disclosures are only made for wells “that have been hydraulically fractured” – releasing details of the chemicals used after fracking has taken place.

In the US, the Halliburton Loophole exempted “the underground injection of fluids or propping agents (other than diesel fuels) pursuant to hydraulic fracturing operations related to oil, gas, or geothermal production activities” from key pieces of American federal environmental law, such as Safe Drinking Water Act.<sup>86</sup> This left the control of the fracking boom to state authorities, which were unprepared (and/or unwilling) to apply strict controls on the fracking activities of the oil and gas industry.

By putting responsibility for providing greater transparency about the chemicals used with the operators, the Recommendation (15.1) fails to make public authorities responsible for monitoring and compliance.

One incident in May 2015 in Denmark, whereby operators of the licence holder Total failed to receive approval for some chemicals used in their drilling and fracking operations, demonstrates that public authorities - i.e. not private operators - should be closely monitoring the chemicals involved in the fracking process.<sup>87</sup>

The Recommendation should also require competent authorities to take the lead in publishing information about the number of wells, the shale gas operators, baselines studies and monitoring results, as well as “*the precise composition of the fracturing fluid used for each well*” (point 15.2). The failure to include this suggests the European Commission gave into industry pressure, essentially creating the EU’s version of the Halliburton loophole.

Despite the issue of the use of potentially toxic chemicals used in fracking fluids having been raised with the European Commission and member states in 2012,<sup>88</sup> no meaningful steps have been taken to make sure that fracking does not use chemicals with toxic, carcinogenic, mutagenic or endocrine-disrupting properties.

The Recommendation should also be more specific about when chemicals that “*are intended to be used and are finally used for the high-volume hydraulic fracturing of each well*” should be disclosed. For example, in Poland, authorities only receive this information after fracking has taken place.

Communities still have no way of knowing which chemicals are being used in their area, unless the information is disclosed voluntarily by the operators. Nor is there any evidence on the ground that member states are taking concrete steps to push “*operators to use fracturing techniques that [...] do not use hazardous chemical substances, wherever technically feasible and sound from a human health, environment and climate perspective*”, as recommended (point 10.1.(c)).

The European Commission, via the Joint Research Center (JRC), has dedicated a working group in its European Science and Technology Network on Unconventional Hydrocarbon Extraction to assessing the “*economic, environmental and climate change related pros and cons in comparison to currently used fracturing techniques*”, but this data-gathering exercise will take time.<sup>89</sup>

Keen to allay public concerns, the unconventional oil and gas industry has made public claims about its efforts to move towards chemical-free fracking. The chief executive of Tamboran Resources, Richard Moorman, announced the company’s commitment to chemical-free fracking in 2011.<sup>90</sup> Exxon has advertised that its fracking fluids will only be composed of water, sand and choline chloride and a glycol ether such as butoxyethoxy-ethanol in Germany.<sup>91</sup>

But if fracking is possible with just two chemicals, why is this not the approach used everywhere?

Using chemical-free technologies would also not eliminate all the naturally-occurring radioactive materials, volatile organic compounds and heavy metals naturally present in the ground (radium, barium, chloride, strontium, arsenic, selenium, chromium, iodide, mercury, ammonium, etc) that are reactivated during the fracking process and which come back up to the surface with the fracking fluid in the end, and which can exceed safety and quality thresholds.<sup>92</sup>

### 1.3.3. Post-operations

The Recommendation acknowledges that environmental impacts may arise at different stages of a well’s life (section 9). This suggests the need for some form of monitoring activities throughout the process.

In fact the Recommendation suggests that “*Member States should ensure that operators ensure well integrity through well design, construction and integrity tests*”. These should continue “at all stages of project development and after well closure”.

The Recommendation does not however specify how long these tests should continue, particularly after the end of the production phase and the ceiling of the well.

Up to 90% of the fracking fluid (made of millions of litres of water, and of tons of sands and toxic chemicals) injected during each fracking operation stays in the ground because it is either not technically or economically feasible to recover it with existing technologies.<sup>93</sup> These waste materials mix with substances naturally present in the ground, including heavy metals and radioactive elements, and they remain in the ground once the well has reached the end of its life. This means these substances affect underground equipment, causing corrosion, and potentially finding their way back to the surface, where they could contaminate soils, ground and surface water, or come into contact with humans.<sup>94</sup>

Checks can help identify problems with well integrity once operations have ceased, and allow operators to fix these problems where technically feasible. However, fixing a well failure is costly and technically difficult so operators may not be able to guarantee this. And the Recommendation does not specify how long these tests should run for, or whether they should be run indefinitely.

Considering the quantities of toxic waste left in the ground after operations end, wells remain a danger even post-operation. Evidence from elsewhere suggests that the time period for operator liability should be explicitly included in legislation. For example, in the state of Maryland, US, operators are required by legislation to carry a \$10 million insurance policy that extends six years beyond the drilling operation to cover future liabilities.<sup>95</sup>

There is no evidence that the risks decrease six years after the end of drilling operations and in the absence of such evidence. The best way to ensure adequate precaution against contamination and clean-up is, for monitoring, to continue indefinitely and to include in law companies’ liability for damages occurring post-operation.

### 1.4. The poor environmental records of the ‘conventional’ oil and gas industry in Europe

The poor environmental record of fracking in the US is driving the concerns of the European communities affected by fracking. However, the experience of communities living with the conventional oil and gas industry here in Europe does little to inspire confidence that the risks of oil and gas activities in densely populated areas could be adequately mitigated.

Germany provides an interesting illustration. The German legislative environmental framework is perceived to be among the most stringent, in particular regarding the protection of the quality of its drinking water reserves. However, the existing legislation has not even succeeded to mitigate the risks and impacts of “conventional” oil and gas activities in Germany, considered to have a much lower “risk-profile” than fracking operations. This has resulted in a number of environmental incidents.<sup>96</sup> Mining authorities<sup>97</sup>, grassroots groups and environmental organisations have documented numerous leaks from wastewater pipelines (connected to water and soil contamination) and earthquakes. Questions about the toxicity of old mud pits and the health impacts generated by the oil and gas extraction activities are now being raised and Germany is starting to look at possible contamination and health impacts related to the oil and gas industry.<sup>98</sup>

In the Netherlands – which also has a strong regulatory and planning decisions – the link between earthquakes and decades of gas extraction in the Groningen gas field was denied for years. Gas extraction continued, even though local communities raised the alarm over repeated seismic tremors and important damages on public and private buildings.<sup>99</sup> In early 2015, a leaked report concluded that

the safety of the local communities had not been a priority for the Dutch National Oil Company (Nationale Aardolie Maatschappij: owned by Shell and Exxon), whose mandate was focused on maximising revenues from the Dutch gas operations. The report concluded that the Dutch mining authority and the Economics Ministry failed in their duty to monitor the risks involved in gas extraction and that the links between corporate and the public interest were too close.<sup>100</sup>

### 1.5. Shale gas is unburnable carbon

Most crucially, the large-scale development of unconventional gas sources in the EU (or elsewhere) over the next two decades does not meet the scientific need for deep cuts in greenhouse gas emissions. In order to limit global warming below 2 degrees Celsius, as agreed by the global community under the UN Framework Convention on Climate Change (UNFCCC) to prevent dangerous climate change, the use of fossil fuels must be phased out as quickly as possible.

Extracting and burning fracked gas will release significantly more carbon dioxide than the world can afford. To avoid the irreversible effects of climate change, almost all of the natural gas that could be extracted by fracking must stay underground, unburned. Even if aggressive global action is taken to phase out the use of oil and coal.

It is widely accepted that no more than one-third of proven reserves of fossil fuels can be consumed prior to 2050 if the world is to have a more than 50-50 chance of avoiding 2 degrees Celsius of warming.<sup>101</sup> But this statistic understates the problem.

First, it is based on proven reserves — which do not include most of the fracked gas, fracked oil, Arctic oil and tar sands oil now being targeted by oil and gas developers. As a result almost all of this oil and gas must stay underground.

Second, this estimate of “unburnable” proven reserves derives from dated climate science, and the 2-degree threshold is itself widely considered too permissive. More recent science is clear that surpassing even 1.5 degrees of warming will lead to unacceptable impacts, particularly in the Global South.

Put simply, we cannot afford to continue down an energy path that relies on fossil fuels if we are to maintain the stability of our climate and the health of the planet. It is impossible to ignore the links between climate change and the development of new fossil fuel resources.

## II. FAILURE TO IMPLEMENT THE RECOMMENDATION

As Professor David Mackay, the UK government's former Chief Scientific Advisor on Energy and Climate Change, said: "if a country brings any additional fossil fuel reserve into production, then in the absence of strong climate policies, we believe it is likely that this production would increase cumulative emissions in the long run. This increase would work against global efforts on climate change."<sup>102</sup>

Furthermore, the methods used to extract unconventional fossil fuels have been shown to exacerbate emissions.<sup>103</sup> Yet vested interests have succeeded in convincing many governments that fracking for shale gas is a harmless "bridging fuel" in the shift to renewables.

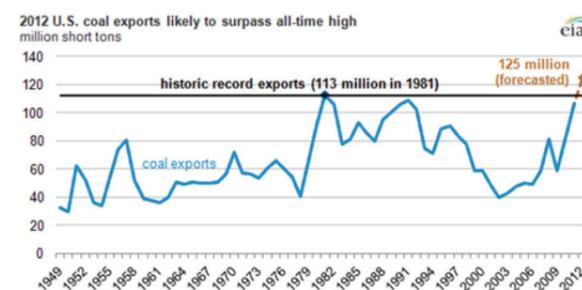
However, fugitive methane emissions throughout the natural gas lifecycle have been shown to be much higher than official estimates, calling particularly into question the climate benefits of switching from coal to gas in power generation. Studies in the US have shown substantial leakage from upstream oil and gas installations,<sup>104</sup> and at least 50% more methane escaping from drilling operations across the US than assumed by official Environment Protection Agency estimates.<sup>105</sup>

In addition, the climate impacts of methane are usually assessed over 100 years, but over a 20-year period, methane is more than twice as potent a greenhouse gas, with a global warming potential 86 times greater than carbon dioxide.<sup>106</sup> Given the urgency of climate change and the short window of opportunity to curb fossil fuel use, this knowledge further calls into question the role of natural gas as a bridging fuel.

A recent Intergovernmental Panel on Climate Change (IPCC) report found that "[greenhouse gas] emissions from energy supply can be reduced significantly by replacing current world average coal-fired power plants with modern, highly efficient natural gas combined-cycle power plants".

The shale gas industry in Europe has misconstrued this statement as support for fracking, ignoring two important caveats:

(1) This depends on an immediate switch from coal to gas. But pro-fracking governments in the US and Poland have not linked shale gas development to a phase-out of coal. Since the beginning of the shale gas boom in the US, coal



production has remained almost stable and instead, coal exports have increased (see figure 1).

(2) These climate benefits depend on "fugitive emissions associated with extraction and supply [being]... low or mitigated". Fugitive methane emissions at some sites in the US have been shown to be up to 1,000 times higher than previously estimated.<sup>107</sup> Recent academic studies have shown that shale gas production fields could leak on average some 6 to 12% of the methane<sup>108</sup> while natural gas has a higher carbon footprint than coal beyond 3.2% of methane leakage.<sup>109</sup>

Instead of focusing on shale gas and other unconventional gas resources to boost indigenous consumption, the EU and the European Commission should focus on accelerating the deployment of renewables and improving energy efficiency, so as to reduce both greenhouse gas emissions and gas consumption. Projections show that across a range of possible climate policies, abundant natural gas decreases the future use of renewable energy technologies.<sup>110</sup> Scientific findings also show that without carbon capture and storage (CCS) technologies, natural gas power plants cannot achieve the deep emissions reductions required to avoid a substantial contribution to additional global warming. Shale and renewables are not complementary.<sup>111</sup>

It is deeply concerning to see, through the Recommendation, the promotion of an industry which would delay the real transition to the decarbonised economy that we need in order to fight climate change and show the example to the rest of the world.

Despite the flaws identified in the Recommendation, it does define key procedures and practices for member states developing shale gas resources to follow. This includes the need to follow best practice, the need to undertake a proper risk assessment, including an Strategic Environmental Assessment and an Environmental Impact Assessment, and the need for member states to ensure they have adequate capacity to monitor developments and ensure these procedures and practices are being followed.

Yet, a review of the activities of member states, including the member states' responses to the Commission's survey on implementation, suggest this is not the case.

### 2.1. Fracking happening despite the absence of agreement on Best Available Techniques

Operators are advised in the Recommendation to use best available techniques (BATs) and practices (point 9.1). However, the Recommendation also states that identifying BATs will depend on "the relevant results of the information exchange between Member States, industries concerned and non-governmental organisations promoting environmental protection organised by the Commission". This process is intended to develop a new "Best Available Techniques Reference Document" (BREF).<sup>112</sup> However, this process raises concerns.



Fire on McDowell B well site near Wetzel County burned 9 days - Credits Ed Wade, provided by the FrackTracker Alliance

The recently created expert group, established by the European Commission to gather data on shale gas development in Europe, and to assess and prioritise the most attractive fracking technology for Europe, provides an interesting illustration of what could happen to the expert group in charge of developing BATs. This data expert group is predominantly made up of industry representatives. More

than 70% of members either represent fracking industry's interests or have financial links to the fracking industry. Two-thirds of academics and research organisations involved have links to the fracking industry while less than 10% of members are from civil society. The chairs of the four working group (who have been given a mandate to "summarize, harmonize and approve" the working groups' outputs<sup>113</sup>) are fracking proponents, who in some cases have even lobbied against stronger safety rules.<sup>114</sup> There are strong and serious concerns that the unbalanced composition of this group will not result in advice that will be in the best interest of potentially affected citizens and the environment but rather in the interest of the gas industry.

As mentioned in the Recommendation, the BREF "on hydrocarbon exploration and extraction is currently under development at EU level". In other words, it means that the Recommendation's rules on Best Available Techniques and on risks to be considered during impact assessment are based on discussions which have not even started yet. The only expert group currently looking at best practice is focused on the management of extractive waste, but these discussions are still ongoing, concern only one very specific aspect of the topic and will only be finalised in 2017.

Meanwhile, the 'best practice' implemented in a number of European countries reveal environmental problems. In the UK, for instance, venting for up to six months was proposed by gas at the Barton Moss site<sup>115</sup> while flaring of over 100,000 tonnes at the Cuadrilla Lancashire frack sites was permitted by the Environment Agency.

### 2.2. The need for an effective risk assessment

According to the Recommendation, the way in which the risk assessment is defined and understood is crucial. The European Commission states (5.4) that "a site should only be selected [by Member States] if the risk assessment conducted shows that the high-volume hydraulic fracturing will not result in a direct discharge of pollutants into groundwater and that no damage is caused to other activities around the installation".

The key findings on the impacts of the fracking industry documented by the scientific community over the past three to four years have confirmed the public's concerns.<sup>116</sup>

Of the 550 peer-reviewed studies, commentaries and reviews published on fracking:

- 84% of the studies on health impacts identified potential public health risks or actual observed poor public health outcomes;

- 69% of the studies on water quality showed potential, positive association, or actual incidence of water contamination associated with shale gas development;
- 88% of the studies on air quality indicated elevated levels of air pollutant emissions and/or increased atmospheric concentrations.<sup>117</sup>

These impacts can be caused by different factors, and while some could certainly be limited by better practices, others seem to be almost inevitable.

Even with best practice, human mistakes cannot be avoided. And while this is true for any industrial activity, the risks for a large-scale industry such as fracking, are magnified because of the unprecedented well density, which multiplies the risk of human mistakes and consequently makes monitoring more difficult.

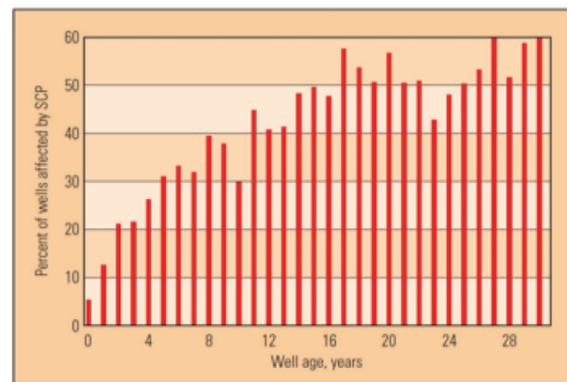
Extracting unconventional fossil fuels involves an inherent deterioration of the equipment and materials used during operations, either because of the physical demands (injection pressure, earth tremors), or as a result of ageing (corrosion from contact with chemicals and heavy concentration of salted water).

Schlumberger, the world's largest oilfield services company, suggested that these pressure and ageing effects were responsible for the failure of 6% of drilled wells during their first year, and for the fact that up to 50% of the wells failed after 15 years see Table).<sup>118</sup>

Surveys done by the Pennsylvania Department of Environmental Protection (DEP) have shown that 97 wells of the 1,609 drilled in 2010 had failed (6%), that 7% of wells failed in 2011, and 9% wells drilled in 2012 failed (8.9%).<sup>119</sup>

Well failures inevitably affect the surrounding environment. In Pennsylvania the DEP found that companies prospecting for oil or gas had contaminated private drinking water wells in 243 cases.<sup>120</sup>

A risk assessment cannot guarantee that "high-volume hydraulic fracturing will not result in a direct discharge of pollutants into groundwater and that no damage is caused to other activities around the installation" (as suggested by the Recommendation).



Wells with Sustained Casing Pressure (SCP) by age. Percentage of wells with SCP for wells in the outer continental shelf (OCS) area of the Gulf of Mexico, grouped by age of the wells.

Given the inevitable risks, it is difficult to see how the Recommendation intended risk assessments to be completed. A full assessment of the risks would inevitably highlight an unacceptable risk to ground water.

The EC Recommendation however asks authorities and companies to make sure risks are well understood and taken in consideration. However, the definition of the risks is "based on [...] the relevant results of the information exchange between Member States, industries concerned and environmental NGOs organised by the Commission". This means that, just like with the BATs, the definition of risks is subject to the interpretation of industry-captured expert groups and has not been finalised.

### 2.3. Member states monitoring capacity

Arguably, the most important part of legislation is not what is written in the text, but how it is enforced. Yet evidence suggest that even if strong and binding legislation was in place to regulate fracking, member states' lack the capacity (and the independence needed) to monitor and enforce the rules.

The European Commission recognised this in the Recommendation (chapter 13) asking member states to (1) "ensure that the competent authorities have adequate human, technical and financial resources to carry out their duties" and to (2) "prevent conflicts of interest between the regulatory function of competent authorities and their

function relating to the economic development of the resources".<sup>121</sup> Evidence from European countries suggests that these two recommendations are not being met.

#### United Kingdom:

The UK told the Commission that "competent authorities have adequate resources to carry out their duties in relation to the exploration of hydrocarbons using high volume hydraulic fracturing, which represents the current stage of development of the industry in the UK".

The main authority in charge of monitoring the implementation of these rules in the UK is the Environment Agency (EA). However there are indications that it is not fulfilling its task:

- Despite industry's plans to "drill up to 4000 laterals (horizontal wells) over an 18 year timeframe"<sup>122</sup> (which has been welcomed by a UK government)<sup>123</sup>, the EA has been cutting its staff since the beginning of 2014, threatening 1,200 jobs in total,<sup>124</sup> and budgets have been significantly curtailed. Since 2009-10, unions estimate that the EA's budget has been cut by 25%.<sup>125</sup> Yet, the UK government refuses to answer whether these cuts have affected its ability to enforce its – supposedly – "world class" regulations.

There are also a number of conflicts of interest within the EA. Its current chairman, Sir Philip Dilley, was nominated by the UK government and took up his post in September 2014. Until April 2014, he was the chairman of Arup, an engineering firm that has been employed to write environmental reports on fracking for the oil and gas company Cuadrilla.<sup>126</sup> The EA granted permits for fracking to Cuadrilla in January 2015,<sup>127</sup> the first since fracking development was put on hold after Cuadrilla's activities in Lancashire led to earthquakes in 2011.<sup>128</sup>

- In December 2014, an independent investigation revealed that the EA's pension fund, worth £2.3bn, held significant investments in companies investing in fracking, including "£50m direct investments in oil and gas companies such as Shell, BP and BG Group, as well as millions more in indirect oil and gas funds".<sup>129</sup>

These obvious conflicts of interest suggest the UK cannot guarantee the independence of its monitoring authority.

The UK authorities told the European Commission that they "have strict controls in place to ensure on-site safety".<sup>130</sup> Yet Lancashire County Council's Director of Public Health reported that there were "no specific occupational health standards for onshore oil and gas extraction" and that

Cuadrilla had to put forward its own framework for operation in Lancashire.<sup>131</sup> Serious questions exist as to whether the authorities involved have the capacity or the expertise required.

This fear was confirmed by the independent (but industry-funded) Task Force on Shale Gas which stated the importance when monitoring of it "not to rely solely on self-monitoring and self-reporting by the operator, but must include regular (and sometimes random) visit and inspections by the regulators. This does happen to an extent at present, but should be more actively pursued in future".<sup>132</sup>

#### Poland:

The Polish authorities also told the European Commission that their national authorities were meeting the standards recommended, although they provided no details to support their answers.

However in 2014 the Polish Supreme Audit Office (NIK) published a report evaluating the activities of both the public administration and private entrepreneurs searching for shale gas deposits in Poland.<sup>133</sup> As part of this analysis, NIK highlighted a number of irregularities:

- "No government representative for hydrocarbons extraction development was appointed. That person was supposed among others to develop economic, legal and strategic concepts as well as initiate, coordinate and monitor actions related to the search, identification and extraction of shale gas"; and
- "Despite declarations, the Ministry of Environment did not treat the issue of shale gas search as a priority. For instance, in 2007-2012 there were only three persons responsible for the issue of licences for shale gas search. The Minister of Environment issued administrative decisions related to the licences for shale gas search and (or) identification with significant delays (132 days on average where the law required 30 days). Applicants were treated unequally. Some applications were reviewed despite being incomplete or unreliable. Such practices could point to high corruption risk."

The previous year, in August 2013, Polish prosecutors indicted seven people, including three officials from the environment ministry, an employee of the Polish Geological Institute and three gas company representatives, with 11 charges of active and passive corruption in connection with licenses to explore and exploit shale gas deposits in

Poland.<sup>134</sup> The Environment Ministry and State Geological Institute officials accepted bribes ranging from 13,000 zlotys (\$4,100) to 55,000 zlotys for helping companies win shale gas concessions.<sup>135</sup>

The relationship between the Geological Institute and the fracking industry came under scrutiny when Grzegorz Pierkowski, a prominent member of the Polish Geological Institute and Chair of an EC expert group on shale gas, said that *“the environmental risks associated with hydraulic fracturing presented on social media is greatly exaggerated or even completely off the mark”* and that he was willing group *“to demonstrate the absence of environmental risks greater than those that appear in the case of conventional hydrocarbon exploitation”*.<sup>136</sup>

The most active oil and gas operators in Poland are state-owned companies including PGNiG, PKN Orlen, and Grupa Lotos. These companies have directly benefited from government investment in the sector,<sup>137</sup> while some have also been found guilty of illegal market practices.<sup>138</sup>

Given that the Polish environmental minister was also replaced to fast track the development of this industry,<sup>139</sup> it is difficult to see how *“conflicts of interest between the regulatory function of competent authorities and their function relating to the economic development of the resources”* can be prevented.

#### Germany:

In 2012 the German Federal Environment Agency (the Umweltbundesamt (UBA)) concluded that the data used to assess fracking fluids in Germany was *“inadequate”*.<sup>140</sup> The agency found: *“For only 28 of the fracking fluids used in Germany between 1983 and 2011 was it possible to determine the additives used”*. This represents only around a quarter of the approximately 300 fracking measures carried out in Germany in that period.<sup>141</sup> An expert group from the German Chemical Society currently stressed that *“even if HF additives were fully declared, additional research is needed to characterize subsurface transformation products, geogenic substances, and their overall toxicity which all are site-specific.”*<sup>142</sup>

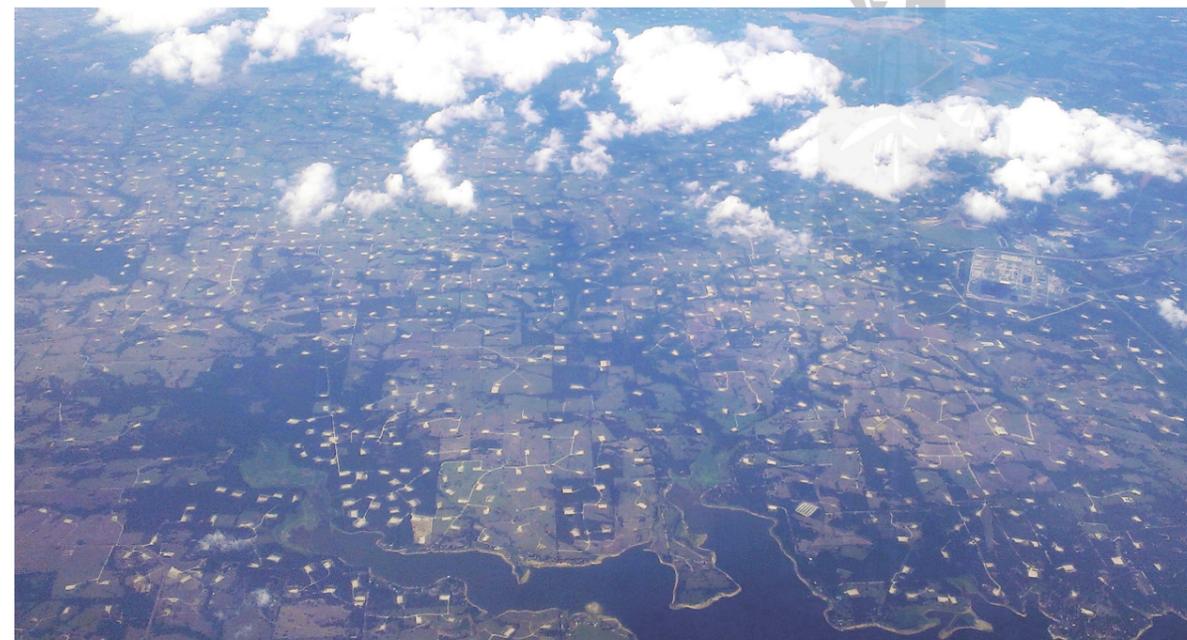
The German proposal to regulate the fracking industry currently being discussed does not however really seem

to meet the most crucial Recommendation’s requirements such as those related to administrative capacities. Germany has proposed establishing an expert panel to decide whether or not research projects and in future commercial projects can be carried out in areas/zones where fracking operations are otherwise banned (shale gas and coal bed methane projects). However, some of the representatives who will make up the panel come from organisations that have already declared their support for unconventional gas development by signing the Hanover Declaration (eg the Helmholtz-Zentrum für Umweltforschung and the Federal Institute for Geosciences and Natural Resources).<sup>143</sup>

Dr. Hans-Joachim Kümpel, the director of the Federal Institute for Geosciences and Natural Resources (BGR), said in September 2014 that *“often dangers are evoked that simply do not exist. The use of fracking for natural gas production arouses widespread fear amongst the population, fear that from a geological perspective is largely unfounded”*.<sup>144</sup>

Such position from an institution which could, in a close future, decide on whether fracking projects could be authorised in areas where fracking should normally be banned raises serious questions about the neutrality and objectivity of this expert panel. Furthermore, the BGR shares a common administration and infrastructure with Lower Saxony’s mining authority.<sup>145</sup> If this body is eventually kept in the final version of the text, Germany would clearly not fulfil its duty to avoid conflicts of interest from certain competent authorities.

There are also concerns about Germany’s *“human, technical and financial”* capacity. The German government has transferred responsibility for the baseline studies and monitoring processes to either the mentioned expert panel or to federal level mining and water authorities. The biggest mining authority in Germany, for example, is the Landesamt für Bergbau, Energie & Geologie in Lower Saxony<sup>146</sup>, which has approximately 300 employees who are responsible for all mining activities in Lower Saxony, Hamburg, Bremen and Schleswig-Holstein. The agency is already considered to be understaffed, but will see its workload increase with added responsibilities for shale and tight gas development.



Aerial view of cumulative impacts of fracking in Texas - Credits Amy Youngs

#### Romania:

The lack of *“adequate technical expertise”* is also a problem in Romania. Confronted with the need to carry out an environmental assessment for four drilling wells in the Barlad region (Pungesti, Bacessti, Gagesti and Puiesti), the local environmental authority asked for national authority help. According to the national regulations, when environmental agencies lack expertise in certain areas they may hire specialist advisors – but this did not happen in the Barlad region..

#### Denmark:

In the Scoreboard, Denmark acknowledges that its human, technical and financial resources will have to *“be evaluated in case of commercial production. A production phase requires further human, technical and financial resources in the state administration.”*<sup>147</sup> This shows that the Danish authorities are allowing the fracking industry to proceed<sup>148</sup> while they have only very limited in-house expertise on the issue.

#### Spain:

The Spanish response shown in the Scoreboard raise a further question as to whether the information given is meaningful. The Spanish authorities said that thanks to

the environmental impact assessment (EIA) process, *“measures [were] in place to ensure that operators regularly monitor the installation and the surrounding surface and underground area potentially affected by the operations”* during the exploration and production phases. But the EIA process cannot guarantee that installations will be properly monitored during and after the operations.

Such a guarantee can only be made through adequate legislation requiring monitoring, and not by adapting legislation without acknowledging the specificities of the fracking industry, or by relying on an uncertain case-by-case approach (See more details below in the EIA sub-chapter).

#### 2.4. Dealing with the cumulative environmental impacts of shale gas

The International Energy Agency (IEA) has recommended countries to *“Think Big”* when it came to regulation, as *“the scale of the industrial operation required for a given volume of unconventional output is much larger than for conventional production. This means that drilling and production activities can be considerably more invasive, involving a generally larger footprint.”*<sup>149</sup>

## BOX 2 THE POLISH GOVERNMENT'S 'ALIBI STUDY' ON THE "ASSESSMENT OF HAZARDS TO THE ENVIRONMENT RESULTING FROM THE EXPLORATION AND PRODUCTION OF HYDROCARBONS FROM UNCONVENTIONAL DEPOSITS"

In April 2015, the Polish Environment Ministry announced that shale gas exploration had "not significantly affected the state of the environment".<sup>156</sup> Polish authorities claimed that their research - based on measurements from seven shale gas wells - provided proof that the environmental impacts of fracking in Poland were manageable. Michał Kielsznia, Director General for Environmental Protection, said:

*"In recent years, the mass media have speculated about potential environmental effects of entrepreneurs' gas extraction operations. These conjectures or speculations were made in the absence of unbiased reliable information and related studies. The purpose of the project was obvious - to meet public expectations by providing a unique source of data from tests made in the field."*<sup>157</sup>

Did this research project deliver on its ambition to reassure the public about the not very 'significant' environmental impacts of fracking? There appears to be a lack of coherence between the study's 14 general conclusions (announced to the public) and the data inside the report.

For instance, the report authors raise questions about the complex structure of the Lublin shale basin and suggest that the different faults there should be studied separately. They also highlight a lack of data. Yet, the report draws the conclusion that there is sufficient distance and an impermeable cap rock between the groundwater and the shale layers.

Examining the details of the study it becomes clear that the seven sites have not been analysed using the same methodology. Baseline data from the very start was only gathered at two of the seven sites. Elsewhere data was only gathered after drilling had already started, or, in one case, while hydraulic fracturing was already taking place. Without comparable data, it is difficult to assess what the impacts were.

The study also fails to acknowledge the cumulative impacts of fracking at multiple wells in any one location. The wells studied were at some distance from each other. The long-term impacts of fracking were also not assessed, as none of the sites included a study of the post-abandonment phase. On all the sites, except one, research was finalised before the site was abandoned. Researchers returned to just one site to measure impacts 2.5 years after drilling had stopped.

There are also questions about the independence of the research. The four institutions involved in the study<sup>158</sup> have all advocated in favour of shale gas exploitation. The Directorate-General for Environmental Protection works for an openly pro-shale government. The Polish Geological Institute and its employees have made public statements supporting the 'sustainability of shale gas operations'.<sup>159</sup> The Mining institute in Krakow and the Gdansk Institute of Technology (focused on engineering, chemistry, etc ...), clearly share this pro-shale bias.<sup>160</sup>

This is why one of the IEA's "Seven Golden Rules" calls for public authorities to conduct "early strategic assessments and timely interventions".

The Recommendation also makes clear that any member state wanting to develop shale gas, "should prepare a strategic environmental impact assessment [...] on the basis of the requirements for Directive 2001/42/EC" (point 3.1) and that a Strategic Environmental Assessments (SEA) should be prepared "[b]efore granting licenses for exploration and/or production of hydrocarbons which may lead to the use of high-volume hydraulic fracturing".

### 2.4.1. A necessary reminder

Strategic Environmental Assessments (SEAs) involve preparing "an environmental report in which the likely significant effects on the environment and the reasonable alternatives of the proposed plan or programme are identified. The public and the environmental authorities are informed and consulted on the draft plan or programme and the environmental report prepared."<sup>150</sup>

SEAs are required both for the exploration and the extraction phase, and should therefore be conducted before the beginning of the exploration stage. Given the possible

scale of the industry (hundreds to thousands of wells once production starts), environmental assessments should be based on the possibility of large-scale development and not just on the few wells drilled in the exploration phase. Serious impacts can occur during the exploration phase (building the drill site, seismicity tests, preliminary drillings, etc), and these should be considered as part of the SEA.

An SEA should also be prepared before any licences are granted and whenever high volume hydraulic fracturing "may" be used. The Recommendation clearly indicates that an SEA should have been carried out before any shale gas exploration licences are issued. And while the Recommendation is not binding, the SEA Directive is part of the EU acquis, and as such any plans and programmes "which are likely to have significant environmental effects" are required to have an SEA. And there can be no doubt that shale gas exploration is likely to have significant environmental impacts.

The SEA Directive also states that member states should conduct an SEA if any of the following criteria are met:

- the relevance of the plan or programme for the implementation of Community legislation on the

environment (e.g. plans and programmes linked to waste-management or water protection);

- cumulative nature of the effects;
- risks to human health or the environment (e.g. due to accidents);
- magnitude and spatial extent of the effects (geographical area and size of the population likely to be affected)

Given these criteria and the "invasive" nature of fracking, any member state planning to offer fracking licences should implement an SEA before allowing exploration to proceed.

2.4.2. Failure to implement the directive  
Despite clear requirements that SEAs should be carried out before exploration proceeds, most member states seem to have adopted a 'wait-and-see' policy regarding the environmental impacts of fracking, violating EU law.

#### United Kingdom:

The UK Department of Energy & Climate Change (DECC) is responsible for granting licences in "rounds" to "explore for and get petroleum" under the Petroleum Act 1998. However it failed to undertake an SEA of the 13th licensing round in relation to shale gas at all. The licences granted under the round include Cuadrilla's licence in Lancashire (PEDL 165), and its licence for the Balcombe site in West Sussex. No strategic level assessment of the impacts of the first round of onshore unconventional oil and gas exploration or production in the UK has therefore been undertaken, in breach both of Directive (2001/42) and the Recommendation (3.1.).

#### Poland:

In Poland, the first shale gas exploration licences were issued in 2007.<sup>151</sup> In 2009, Poland issued a further 113 licences, but no SEA was carried out. Poland argues that these licenses cannot be considered to be "plans and programmes [...] which are likely to have significant environmental effects". Rather, they are "an administrative decision".<sup>152</sup>

In 2012, the Polish environment agency was asked to assess "hazards to the environment" resulting from fracking. The results were published in April 2015 (see box below). Eight years after the first licences were awarded, communities in Poland's shale plays are still waiting for an SEA to be implemented.

Poland has told the Commission that regulation of the shale gas industry will happen later in 2015, when "the Ministry of

the Environment will publish guidelines on environmental monitoring, environmental impact reports and environmental impact assessments"<sup>153</sup>. The government argues that no SEA is required, as "there are still no applicable production licenses in Poland related to the activity referred to in the Recommendation". No SEA will be conducted in Poland therefore until commercial shale gas production is about to start, in what appears to be a clear breach of EU laws. So far in Poland, licences have been handed out for exploration in nature protection zones, fertile agricultural land, and tourist areas, without any conditions or restrictions. The Polish government has disregarded the impacts of these exploration activities on the wider area. The "Zwierzyniec" permit given to Chevron covers an area of Natura 2000 sites,<sup>154</sup> and the Roztocze National Park, which is an Unesco 'biosphere reserve'.<sup>155</sup>

#### Germany:

At the current time, there is no further clarification with regard to the requirement for a mandatory SEA in German legislation, or in the proposed "fracking legal framework". A planning approval procedure shall be established for all unconventional fossil fuel projects, but nothing guarantees that the cumulative impacts across an area will be fully analysed.

The German Government reported to the Commission that the need for an SEA has been already implemented into German law.<sup>161</sup> The German Government has therefore concluded that no further action was needed.<sup>162</sup>

Two of the mining authorities responsible for issuing licenses (the Landesamt für Bergbau, Energie und Geologie, Lower Saxony and the Bezirksregierung Arnsberg, Abteilung Bergbau und Energie, North-Rhine Westphalia) have announced they have not conducted SEAs before licenses are granted for exploration and/or production.<sup>163</sup> These decisions were motivated by the specific licensing process operating in Germany, which requires different permits for each operator,<sup>164</sup> and appear to disregard the Recommendation. The mining authorities argued that an SEA was not needed as only "general exploration permits" (Aufsuchungserlaubnis)<sup>165</sup> had been granted and not the permits needed to build drilling sites and run drilling operations (Betriebsplanzulassung). However, the responsible planning authorities at the federal level do not also see the need to conduct SEA systematically.<sup>166</sup>

This legal interpretation raises three important points:

- This appears to ignore the spirit of the SEA

Directive. Granting general exploration permits, even if drilling operations have not yet been officially accepted, involves the possibility that larger-scale development may follow. This decision should require a full assessment of the possible cumulative impacts, and include consultation with the local population as included in an SEA. Such an assessment must be conducted before the beginning of the project and allowing operators conduct preliminary research without an SEA could be in breach of obligations under the SEA Directive.

- The German authorities appear to have chosen to ignore the Commission's Recommendation which asks member states to prepare SEAs "before granting licences for exploration and/or production of hydrocarbons which may lead to the use of HVHF". The Recommendation doesn't make any distinction for specific permits of any type.



Exploration pit in Wise County, Texas - Credits Earthworks

#### Denmark:

Denmark told the European Commission that no SEA was carried out before granting two licenses to Total for exploration and/or production of shale gas. However, the Danish authorities claimed that the public concerned did have "early and effective opportunities to participate in the strategic environmental assessment and the environmental impact assessment processes".<sup>167</sup>

The Danish response is clearly contradictory – how can people have participated if no SEA was done. In fact neither "fracking" nor "shale gas" were mentioned in the 2010 resolution which granted one of the permits. It appears that the climate minister at the time, Lykke Friis, chose to omit these two terms from her briefing about the license,<sup>168</sup> leaving MPs under the impression that they were granting a permit for less controversial conventional fossil fuel extraction.<sup>169</sup>

The public and local authorities have been presented with a fait accompli, leading to a complaint to the European Commission in June 2015 from the municipality of Hjørring close to one of the two areas where Total has received the authorisation to search for shale gas.<sup>170</sup> The complaint states that the municipality was not involved, consulted or even contacted during the authorisation process, despite its legal responsibility for local and municipal planning, approval of environmental impact assessments and other permits for water recovery, discharge, well monitoring, and the discharge of wastewater to treatment plants. The complaint also raises the unavoidable visual impacts on the landscape from the developments, and warns that the consequences for the tourism sector have not been evaluated.

#### Spain:

Spain also openly rejected the European Commission's recommendation to implement an SEA, arguing that since "all the territory unawarded and not pending an award is available for being requested, [...] applications for exploration licenses/concessions (*permisos de investigación*) are not considered plans or programs in the sense of the Directive 2001/42/EC."<sup>171</sup>

If an area was offered by "the Council of Ministers, or, where applicable, the Autonomous Regional Governments" such licences could "be considered plans or programs in the sense of the Directive 2001/42/EC and subsequently subject to strategic environmental assessment". This has not been the case so far.

The argument that exploration permits cannot be considered as plans, especially given the scale of development in the exploitation phase, ignores the specific requirement to complete an SEA at the exploration stage.

An SEA "before granting licences for exploration and/or production of hydrocarbons" is needed as part of a broader analysis that takes into consideration the implication of large-scale expansion following exploration. The Spanish interpretation is therefore not acceptable.

#### Romania:

Romania's response to the Commission admits that: "For existing oil agreement/license issued until now has not applied the provisions of Directive 2001/42/EC. But, on the future [sic], as follow of Recommendation 2014/70/UE requirement, the competent authority for management of national resources is obliged [sic] to take into consideration the provisions of Directive 2001/42/EC in order to granting of oil agreement/license, according to the national procedure [sic]".<sup>172</sup>

Romania's position appears to be that no SEA is required for shale gas exploration, as long as there is no fracking, and only "usual drilling". However, while Romania argues that there are currently no high-volume hydraulic fracturing activities/wells in the country, several licences for shale gas exploration have already been granted, which inevitably involve the use of some forms of fracking in the process.

#### Lithuania:

Lithuania has started an SEA to analyse the impacts of shale gas activities. However, local anti-fracking groups found that the SEA, conducted before the tender for shale gas licences was launched, was in fact based on conventional hydrocarbons exploration. Unconventional oil and gas were mentioned, but the specificities of fracking (water issues, cumulative impacts, traffic, etc) were not addressed.<sup>173</sup>

In early 2013, Chevron won the tender for shale gas exploration, but withdrew its support due to "[s]ignificant changes to the fiscal, legislative and regulatory climate".<sup>174</sup> If Chevron had gone ahead with exploration activities, the local groups concerned about the environmental impacts of fracking, were ready to challenge this 'conventional' SEA in the local courts.

#### 2.5. "Ensure that an environmental impact assessment is carried out"

The Recommendation advises that "Member States should take the necessary measures to ensure that an environmental impact assessment [EIA] is carried out on the basis of the requirements of Directive 2011/92/EU". Such assessments, in the form of planning approval proceedings, are crucial as they determine whether a particular development project

can be authorised. While this minimum principle seems obvious, it has been subject to multiple interpretations.

#### 2.5.1. Shortcomings in the existing legislation

The Commission's Recommendation points out that "the Union's environmental legislation was developed at a time when high-volume hydraulic fracturing was not used in Europe. Therefore, certain environmental aspects associated with the exploration and production of hydrocarbons involving this practice are not comprehensively addressed in current Union legislation".

The EIA Directive,<sup>175</sup> for example, does not consider the factors that make unconventional fossil fuel extraction so specific, including the rapid decline in production of each well, the limited amount of gas produced per well compared to conventional production, the high number of wells needed, and its cumulative impacts from the exploration phase onwards.<sup>176</sup>

Gas extraction projects are included in the list of activities subjected to a mandatory EIA, but this only applies to projects that produce at least 500,000m<sup>3</sup> of gas per day.<sup>177</sup> This fixed threshold excludes many unconventional fossil fuel projects, where initial production rates are often lower and decline rapidly.<sup>178</sup>

The European Parliament made a clear call "for the inclusion of projects including hydraulic fracturing in Annex I of the Environmental Impact Assessment Directive"<sup>179</sup>



ConocoPhillips flaring - credits Earthworks

(which lists the activities requiring a mandatory EIA), but this was rejected by the European Commission and the European Council when the EIA Directive was reviewed in 2013 and 2014.<sup>180</sup> Leaked information showed that an amendment put forward by the Parliament was blocked in dialogue by the actions of the UK, Poland, Hungary, the Czech Republic, Slovenia, Romania and Bulgaria. The European Commission chose to remain silent.<sup>181</sup>

The decision to conduct an EIA for fracking projects therefore depends entirely on whether or not national authorities choose to take the specific nature of fracking into consideration and whether they then balance the interests of the operator (backed by industry lobbying) and public or private interests which might be affected by the development project.

### 2.5.2. Poor implementation and direct violations

The European Court of Justice (ECJ) recently ruled on a case where Austrian authorities had allowed a gas company to explore for unconventional gas without evaluating the possible environmental impacts.<sup>182</sup> The ECJ found that exploration should be part of this evaluation and that cumulative impacts (assessed by considering similar activities in the area) should be considered. This case shows that it is not enough for member states to apply “the requirements of Directive 2011/92/EU” because of the gaps in the text.

This lack of legal certainty in the Recommendation is being interpreted in different ways by member states, ranging from mandatory requirements for an EIA, to mandatory beyond some thresholds, not mandatory but considered best practice, to not being required at all.

#### Poland:

The Polish government amended its national legislation in 2013 to allow unconventional fossil fuel extraction at depths of up to 5,000 meters without a prior environmental impact assessment.<sup>183</sup> As none of the wells which have been fracked so far have been below 5,000 meters, none of the exploratory drilling so far has had to comply with an EIA.<sup>184</sup>

This violates the spirit of the EU legislation, particularly given that there is no scientific evidence to suggest that

fracking more than 5,000 meters below the surface would pose any more or less of a risk of water contamination for aquifers. Poor well integrity can lead to a situation where the borehole provides a conduit between the fractured shale and aquifers, no matter the depth of the operation. Similarly, contamination may occur when there are faults or natural fractures in the cap rock that separates the zone of fracture from the groundwater. Poland is ignoring the Recommendation (5) to implement “a characterisation and risk assessment of the potential site and surrounding surface and underground area” in order to properly assess “the risk of leakage or migration of drilling fluids, hydraulic fracturing fluids, naturally occurring material, hydrocarbons and gases from the well or target formation as well as of induced seismicity”.

Since the new Geology and Mining Law entered into force on January 1, 2015, the licence holder only needs to submit a “project of geological works”, which focuses on the geology, the plans and the techniques to be used. The only exception, where the licence holder needs to report more broadly on the environmental impacts of fracking, is when drilling activities are likely to have an impact on Natura 2000 sites (§ 1. 1., aléa 5c).

Even if an EIA was required for shale gas operations in Poland, there are concerns that the process would lead to a poor quality EIA. The EIA procedure must be finalised within a record time of 60 days, with the local authority or Regional Directorate for Environmental Protection required to pay the central government a fine for every day that the decision is delayed. If an EIA cannot be delivered within the deadline, shale gas operators can assume that consent has been given.

Environmental impacts from shale gas activities only need to be taken into account within 500 meters of the well pad. Any infrastructure associated with oil and gas production, such as pipelines, compressor stations and other installations, is exempt from spatial planning requirements.

The European Commission has already warned the Polish government that it is failing to properly implement the EIA Directive, and is now threatening to take action in the European Court of Justice to force it to enforce the legislation.<sup>185</sup>



Proximity between homes and fracking projects in Wilson County, Eagle Ford shale basin - credits Earthworks

#### United Kingdom:

The UK has told the European Commission that it is complying with the EIA Directive, but this statement is questionable, particularly as developers are allowed to make their own assessments as to whether an EIA is required.

Although the industry has committed to carrying out EIAs voluntarily for fracking sites in the UK, they have not agreed to carry out an EIA for other activities which fall short of fracking but still create environmental risks and are part of shale gas projects eg: drilling, drill and core, testing (including Diagnostic Fracture Injection Test or DFIT and “mini fall off tests” - which raise pressure but not to the same extent as for fracking),<sup>186</sup> flaring, accumulation and disposal of hazardous waste, decommissioning and abandonment of wells.

The UK industry has also been by-passing its duty to carry out EIAs by changing the way the directive is

transposed nationally. Under Annex II of the Directive, member states can operate their discretion as to whether to subject applications for ‘deep drilling’ to assessment. UK implementing regulations<sup>187</sup> impose a threshold of one hectare above which screening is required (provided the development is likely to have significant environmental effects). Yet several of the early sites proposed by Cuadrilla in Lancashire (for example at Singleton and Becconsall) were sized at 0.99 hectares, bringing them under this threshold.

In terms of a baseline assessment, some issues are addressed through the EIA. However, the recently reviewed Infrastructure Act only requires monitoring of methane in groundwater (before operations begin) and the monitoring of methane emissions to air. Monitoring of other pollutants which may be used or arise in connection with fracking (such as arsenic and lead<sup>188</sup>), as well as other pollutants which may be emitted to air such as volatile organic compounds is not required.

The UK has also introduced Environmental Risk Assessments (or ERAs) for use in the early stages of operational planning. The value of these is disputable. They do not appear to be as in depth as EIAs and cannot be seen as a substitute or equivalent. There is no binding requirement to carry out an ERA. According to the UK response, full EIAs are required 'where applicable', which seems rather vague. It seems this is most likely mean for the short period when fracking actually takes place. This would mean all other steps in the process can be carried out without an EIA, and significant environmental risks can be ignored.

#### Spain:

The Spanish authorities have repeatedly stated that "according to Law 21/2013, *annexe I, environmental impact assessment is compulsory in exploration or exploitation wells using hydraulic fracturing*".<sup>189</sup>

However, despite the guarantees given by Spanish authorities, no EIA has been officially finalised for any fracking project so far. Two are currently being conducted around Burgos, in Northern Spain and final conclusions are expected by the end of 2015. As such, the nature of the Spanish process remains unknown, even though it is presented by the authorities as a magic tool to address every concern associated with the fracking industry.

Spain is apparently the first member state to include a reference to fracking in its legislation.<sup>190</sup> The Spanish government reviewed its EIA legislation in 2013 to ensure that fracking projects would systematically require an EIA before operations could start.<sup>191</sup> However, this review seems more akin to a greenwashing measure than a real attempt to regulate this industry. While the word fracking is now included in the list of projects subject to a mandatory EIA, no definition is provided in the Spanish legislation and no reference is made to the specific and cumulative impacts associated with this industry.<sup>192</sup>

While Spain appears to be strictly complying with the Recommendation, the evidence suggests that the Spanish authorities have been quick to facilitate shale gas development, approving new projects, rather than ensuring that the letter of the legislation was enacted on the ground. Experiences of EIAs in Spain raise important questions about the efficiency of the process. The Castor project (a large underground gas storage plant off the coast of

Valencia), for example, had to be halted after it triggered 220 mini earthquakes in 2013.<sup>193</sup> The EIA had not sufficiently considered the seismic risks associated with gas injection, suggesting that the EIA process may have been inadequate.<sup>194</sup>

A review of other projects generating environmental risks in Spain shows that this is not an isolated event, but an example of a widespread trend (eg. earthquakes in Lorca, flooding incidents around nuclear power plants, draining and forest fires in the Tablas de Daimiel, etc).<sup>195</sup> One of the main reasons for these failings is that the authorities responsible for EIAs are put under considerable economic and political pressure. The Spanish legislation also doesn't require the distinct impacts (on health, on safety or on the environment) to be assessed. A review of the legislation in 2013 exacerbated this situation by weakening the consultation process (operators no longer must consult on the content and scope of EIAs, and can ignore recommendations from the civil society and/or scientists) under the pretext of saving time.<sup>196</sup>

As a result the EIAs currently underway for the BNK Petroleum fracking projects have raised concerns as many risks are being ignored or not fully considered. These include: weak geological and seismic studies, no reference to possible impacts on a nearby nuclear plant and commercial explosives factory, an incomplete and inaccurate hydro-geological study, poor definition of the fracking chemicals, of their toxicity and their possible impacts on human health, etc.<sup>197</sup> Yet the Spanish authorities rely on the EIA to justify the absence of others measures put forward in the Recommendation. Their response to the Commission indicates that all concerns about possible impacts or restricted areas are dealt with by the EIA. There are no regulations on restricted areas, on minimum distances, on depth limitations, on public consultation, on risk assessments, on best available techniques, on information disclosure, etc... because, the response states: "they depend on the specific environmental impact assessment of each project."

The Spanish authorities do acknowledge that measures are only "partially" in place for issues such as efficient water use, transport plans, gas capture, flaring & venting or well integrity. However, "partially" is effectively "not at all" if EIAs appear to be just a formality for oil and gas operators who are allowed to determine risks and safety measures.

This case-by-case approach, based on confidence in industry good practice ("*principles, technical procedures and standards recognized in the oil industry and regulations*") does not provide any legal certainty to the standards or level of environmental protection. It is also questionable as to whether such an approach can be considered to comply with the Recommendation.

#### 2.6. Public consultation: a 'tick-the-box' exercise

Clearer rules and greater transparency may go some way to addressing local populations' concerns about the risks of fracking. The proposal in the Commission's Recommendation (3.4) to "*provide the public concerned with early and effective opportunities to participate*" in developing an SEA or in carrying out an EIA may be another way.

Most Member States said that local communities do have: "*early and effective opportunities to participate in the strategic environmental assessment and the environmental impact assessment processes*".

The SEA Directive (article 3.1) requires an SEA to not only assess "*the likely significant effects on the environment of implementing the plan or programme*", but also to consider "*reasonable alternatives taking into account the objectives and the geographical scope of the plan or programme*".

However, practice suggests this process is skewed so as to ensure the pre-existing objective is achieved, enabling shale gas exploration to move ahead. Alternatives are not put forward for consultation.

The final report from the industry-funded Task Force on Shale Gas argues:

When the public enters into a consultation process they want to believe that they are being given a chance to influence a final decision. Often it appears they are being asked to give a reason why 'not' to go ahead with a decision that has already been made, or that they are being given a chance to record objections, but without any collective or individual power to influence the outcome in reality.<sup>198</sup>

#### United Kingdom:

In the UK, inadequate time has been provided for public participation in the EIA process in relation to fracking applications (contrary to Article 6 of the EIA Directive). Lancashire County Council initially proposed a three-week consultation on 9,000 pages of environmental statements submitted by Cuadrilla in respect of its applications to frack at Roseacre and Preston New Road in Lancashire.<sup>199</sup> (This was extended following a legal intervention by Friends of the Earth). West Sussex County Council appears not to have consulted on Cuadrilla's application to drill and test for shale oil at Balcombe.<sup>200</sup>



Anti-fracking protester in front of the Berlaymont building, Brussels - Credits Friends of the Earth Europe

Some authorities in the UK appear to be attempting to undermine public participation in environmental regulation, in particular as regards permits granted under the Mining Waste Directive (2006/21). The Environment Agency has introduced 'standard rules permits' for certain aspects of unconventional gas and oil exploration (such as managing and disposing of waste) for England and recently consulted on a second set of rules concerning various kinds of testing for shale gas, managing waste and decommissioning wells.<sup>201</sup> It is clear that there will be no consultation on standard permits at site level, save in cases of "high public interest".

This means local people will have little or no opportunity to respond to proposals to undertake risky activities which impact on them. The Mining Waste Directive (article 8) lays down clear duties to ensure public participation in permitting and it is unclear how the proposals comply with these duties. The Environment Agency has also proposed standard permits for the handling and storage of oil, which may potentially breach Article 24 of the Industrial Emissions Directive (2010/75).

There was also no consultation on the adoption of minerals planning guidance in 2014,<sup>202</sup> despite the critical role of the planning authority in ensuring compliance with the EIA Directive and taking account of environmental and other impacts when deciding whether to give planning permission for fracking.

The UK government took further measures in August 2015 aimed at fast-tracking shale gas development. Ministers are now authorised to override local authorities' responsibilities whenever their decisions on shale drilling applications are found to be "slow and confused".<sup>203</sup> Councils currently have 16 weeks to decide on such applications, and this rule will remain in place. But if they delay rulings or repeatedly knock back drilling applications that ministers deem "reasonable", the government can step in to overrule them. This is likely to have a knock-on effect on the period for local communities to be appropriately consulted, heard and considered.

#### Poland:

Poland responded that it ensured meaningful public participation in public consultations on fracking, without offering any details. However, local groups report that the

government has made sure that civil society participation will be de facto eliminated or at least made very difficult, in particular for environmental groups.

Following a recent change in the way Poland implements the EIA directive, environmental groups have to prove a 'legal interest' in order to allow for its participation. This will be evaluated by the administrative body in charge of the procedure. The local court is required to make decisions within a 60 days period, or face a fine. If no decision is made within 60 days, it is assumed that the administrative body gave implicit consent for the project. In a case where an environmental group's objections are rejected, it can appeal to a local appeal court. But the appeal does not stop the project from moving forward.

#### Romania:

Romania also claims that EIA procedures ensure information is publicly available, including through public debates, which enabled the public to effectively participate "through comments, proposals, observations". Such claims stand in sharp contrast to the experiences of the local population whose protests have met with police violence in some cases.<sup>204</sup>

#### 2.7. Ill-defined restricted areas

The Recommendation suggests that member states "provide clear rules on possible restrictions of activities, for example in protected, flood-prone or seismic-prone areas". However, very little appears to have been done at member state level, and what little has been done raises doubts about the level of protection provided.

#### United Kingdom:

In their response to the Commission, the UK authorities say that "relevant national planning policies and guidance set out strong planning protections for environmentally sensitive areas such as National Parks, Areas of Outstanding Natural Beauty, World Heritage Sites, Sites of Special Scientific Interest and European Sites". However, this assertion is not backed up by the UK National Planning Policy Framework which recommends that local planning authorities "give great weight to the benefits of the mineral extraction, including to the economy".<sup>205</sup>

In February 2015, a review of the Infrastructure Bill provided an opportunity for fracking opponents to include

an amendment ruling out fracking for shale gas in national parks, areas of outstanding natural beauty, sites of special scientific interest or in groundwater source protection zones. The UK government however later clarified that these restrictions would be unnecessary as they would "needlessly damage the potential development of the shale industry".<sup>206</sup> Oil and gas companies will be therefore allowed to drill horizontally under national parks and other protected areas if the wells start just outside their boundaries.<sup>207</sup>

UK authorities have also guaranteed that "the environmental regulator will not allow exploration or production of oil and gas within a drinking water protection zone". However, there is already evidence to suggest this is not the case: Rathlin Energy has been given permission to drill at Crawberry Hill in East Yorkshire in a drinking water Source Protection Zone 2 (normally protected under the Water Framework Directive).<sup>208</sup>

The UK authorities' response states that impacts from high volume hydraulic fracturing on groundwater will be "assessed on a case-by-case basis". However, this vague framework based on unsystematic action, vague criteria ("unacceptable effect", "unacceptable adverse impacts", etc) and case-by-case assessments raises questions about the level of protection provided for protected areas, particularly if "great weight to the benefits of the mineral extraction, including to the economy" are to be given.

#### Germany:

In Germany, the proposed legal framework on fracking would ban fracking and fracking waste disposal in or under some designated water protection areas, areas with water bodies linking to natural lakes or dams which serve for public water supply and areas with wells for the production of beverages/drinks, or which fall under the water security law.

However, the details of the proposal reveal a number of cracks. Just as in the UK, nature protection zones and national parks appear to be protected. However this protection only applies to the construction of facilities related to fracking projects. It does not prohibit drilling projects from being authorised just outside the protected areas, allowing operators to drill horizontally under them.

The proposal also includes a ban on fracking within Natura-2000 areas, but this only covers the construction of facilities related to shale gas and coal bed methane projects. In other words, other kinds of tight gas/oil development involving the use of fracking would be allowed.

These proposals, which have not yet been finally approved, have been put forward by the German government despite the Federal Council of the German States (Bundesrat) voting on 8 May 2015 for a comprehensive ban on fracking and disposal of waste water "in and under" nature protection areas, national parks and Natura-2000-sites, regardless of the targeted geological formation.<sup>209 210</sup>

The German proposal does not indicate any restrictions in flood-prone, seismic-prone or other sensitive areas (settlement, agriculture, forestry, world heritage sites, and leisure/tourism areas).

#### Spain:

While no authorisation has been granted for the exploration or exploitation of non conventional hydrocarbons projects so far, Spanish authorities acknowledged in their response to the Commission that there were "some hydrocarbon exploration licenses/concessions (permisos de investigación) that could imply the use of hydraulic fracturing, following the authorisation of the projects".<sup>211</sup>

The areas covered by these exploration permits do not seem to consider protection for restricted areas with many of the exploration areas overlapping with Natura 2000 areas and zones with strategic groundwater reserves.<sup>212</sup>

#### 2.8. Fracking chemicals: unknown

Given the ECHA's slow action to adapt the REACH regulation to meet the requirements of fracking at the EU level, the Recommendation suggests member states should be responsible for the chemicals used during fracking operations. However, evidence on the ground suggests that EU member states have not succeeded in forcing operators to disclose details of the chemicals they intend to use on a well-by-well basis.

##### 2.8.1. EIA disclosure

Some member states, including Spain and Germany, claim that the fracking chemicals will be disclosed during a mandatory EIA.

#### Spain:

There is currently no evidence that chemicals are being disclosed at the EIA stage in Spain, even though 50 to 60 licences for hydrocarbon exploration have already been given. Given that operators always claim that the chemicals used for fracking vary depending on the geology of the site, it seems unlikely that operators will be able to give details of the chemicals they will be using and the quantities at the EIA stage.

**Germany:**

In Germany, the EIA will require the disclosure of data on the identity, quantity and percentage share of all substances being used, re-used or disposed of. The Bundesrat had demanded that the Federal Environment Agency establish a publicly accessible comprehensive and mandatory register for chemicals, but this demand was refused.<sup>213</sup> Moreover, the ministry for economy of Lower Saxony recently stated that no check on the mandatory REACH registration of the used chemicals had been done during the approval procedure.<sup>214</sup>

**2.8.2. No information****United Kingdom:**

The UK's response to the Commission's survey, states that chemicals will be permitted if "the environmental regulator considers them acceptable for use". The criteria used to determine acceptability is not specified, but the UK government added: "[t]he environmental regulator has the power to restrict or prohibit the use of any substances where they would pose an environmental risk" and "has the power to demand disclosure of the composition of fracking fluids, including disclosure of the chemicals operators propose to use and maximum concentrations of each".

This suggests that while the regulator has the power to act, there is no legally binding requirement for it to do so. This leaves scope for interpretation / discretion. What happens for instance if the UK Environment Agency decides not to exercise this power? In the absence of binding legislation, it would not be possible to use the courts to compel them to do so.

The UK response also states that "operators will not be allowed to use chemicals in high volume hydraulic fracturing unless the environmental regulator considers them acceptable for use. Conditions within the environmental permit can be used to minimise the use of chemicals". It is unclear whether, for example, petroleum distillates like kerosene (CAS #64742-47-8) would be deemed 'acceptable'. These have been used in Poland as a friction reducer<sup>215</sup> and are also widely used for fracking in the US, but are widely recognised as toxic chemical and the UK Health Protection Agency recommends that they are not to "release into the environment".<sup>216</sup>

This discretion to act is repeated at several points in the UK's response but risks environmental harm and arguably does not meet the standards set out in the Recommendation or the principles set out in EU law.



H2S Warning Signs - Credits Linda Krop, Environmental Defense Center, provided by The FracTracker Alliance

**Poland:**

The Polish reply states that three Polish laws ensure that the chemicals in the fracking fluids cannot be considered to be commercially confidential. Operators, represented by the Polish Exploration and Production Industry Organisation (OPPPW), are required to disclose the chemicals they use for fracking online.<sup>217</sup> Operators are required to disclose "a technical design of special operations contains the composition of the applied fluid and the terms of its use that ensure environmental safety and lack of a negative impact on the environment; no later than 7 days before the launch of hydraulic fracturing".

However, a number of the fracking chemicals disclosed by OPPPW (e.g. for Wisent Oil & Gas's Babiak-1H well, and eni polska's Stare Miasto-1k well) are labelled as "proprietary" and full details, such as the Chemical Abstracts Service (CAS) numbers, are not given. Poland appears not to be following the Recommendation (15.1), which explicitly demands that full details, including the CAS numbers and safety data sheets, are provided.

**2.9. Poor assessment of seismic risks**

One of the key risks associated with fracking has been an increase in seismic activity. Yet this risk appears to be down-played by member states in their responses to the Commission.

**United Kingdom:**

In the UK, seismic activity directly linked to fracking led to a two-year moratorium on fracking, yet the UK authorities' response states that "natural seismicity in the UK is low compared to many other areas of the world and no zones of particular seismic sensitivity have been identified for regulatory purposes. As such, this part of the question is not relevant in the UK context".

Although "natural seismicity" may be limited, the risk of induced seismicity due to fracking is real. In the first half of 2011, there were two earthquakes linked to Cuadrilla's operations at Preese Hall in Lancashire.<sup>218</sup> While relatively small (one measured up to 2.3 on the Richter scale), they were enough to lead to deformation of the well casings.<sup>219</sup> This led to a build-up in pressure between the well casings, indicating that the well was leaking and might have failed.<sup>220</sup> Such problems can cause gas or fracking fluids – water and chemicals – to leak outside the wellbore.<sup>221</sup>

Cuadrilla has received further licences to drill and frack in the same rock strata - the Bowland basin - in Lancashire. The Bowland shale play is one of the biggest (if not the biggest) potential shale resource in the UK. The UK government has put in place "new control protocols requiring prior analysis of seismic risk, systematic monitoring and a "traffic light" system to halt operations at predefined levels of activity". Yet, despite this, the UK still believes that no area should be considered as a seismic-prone area. This approach would appear to go against the precautionary principle and clearly exposes the local population to a risk of serious damage.

**Poland:**

The Polish government similarly states that "The current scientific knowledge on the seismic activity of Poland allows us to determine that exploration works in relation to shale gas deposits are carried out in areas where the risk of earthquakes is negligible".

A 2011 study by the Polish Geological Institute of a single well in the Baltic basin in north-west Poland found that quakes felt by people were extremely rare in areas of exploitation

of shale gas resources, and that a direct connection with fracking could not be confirmed unequivocally.<sup>222</sup> It seems however difficult to generalise the conclusion of an analysis done at a single well. That is why it should be mentioned that the report admits that seismicity depends on local geological conditions.

The General Directorate for Environmental Protection of Poland found seismic activity at level 2 on the Richter scale recorded near the Syczyn well pad in eastern Poland, operated by Orlen UpStream. Given the very small sample size and the selective presentation of the results, the general conclusion of the Polish government on this issue appears premature.

More importantly, the Polish and UK governments take a very limited view in addressing the link between seismic activity and fracking. They only consider the short period when water, sand and chemicals are injected in the shale formation at high pressure, and do not look at the key issue of what will happen when wastewater from fracking operations is re-injected in deep well injection sites (standard practice in both the conventional and unconventional oil and gas sector).<sup>223</sup>

In the US, the pumping of large amounts of fluids underground by the oil and gas industry is largely considered as being to blame for the significantly increased frequency of earthquakes in the US. Fracking operations or wastewater injections can lead to induced seismicity. A series of recent peer-reviewed studies documents how the previously seismically inactive State of Oklahoma has become the most earthquake-prone State in US. These studies show a link between wastewater reinjection activities and the explosion of earth tremors.<sup>224</sup> Earthquake activity in the US has increased about fivefold from an annual average of 21 earthquakes above a 3.0 magnitude between 1967 and 2000, to more than 300 earthquakes over three years from 2010 to 2012.<sup>225</sup>

**2.10. Limited measures to avoid venting and flaring****2.10.1. Venting**

Methane venting and leakage are serious issues (see section 1.4) which have the potential to turn large-scale shale gas development into a climate time bomb, particularly in the absence of measures to limit the amount of fugitive methane.

In the US, new rules are currently being introduced to cut methane emissions from oil and gas facilities (through a process known as “green completions”<sup>226</sup>), a key part of a broader strategy to cut methane emissions in the sector by 40 to 45 percent below 2012 levels.<sup>227</sup>

In contrast, the EU’s Recommendation only includes a non-binding request to “put in place measures to ensure that air emissions at the exploration and production stage are mitigated by capturing gas and its subsequent use” and limiting the practice of venting “to the most exceptional operational circumstances for safety reasons”.

Within the EU, no industry best practice on limiting fugitive methane has been agreed or is known to be in development. Evidence from the national levels also suggests that no steps are being developed.

Poland reports that “at the current stage emissions induced by the activity of operators are minor and are usually dispersed, which makes their monitoring difficult”. This raises a question as to how Poland will monitor thousands of shale gas wells in full production if it cannot measure emissions at this stage?

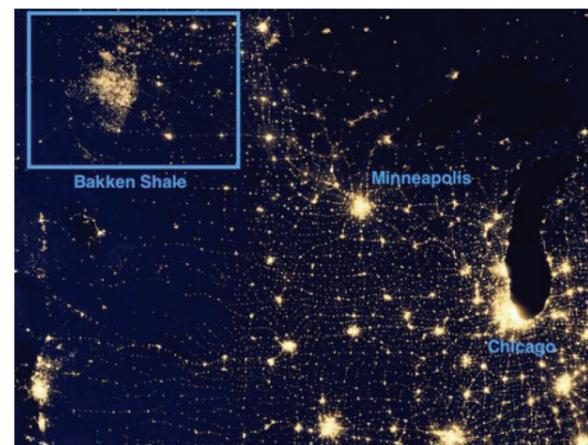
The UK government admits that “[g]reen completions have been shown to be very effective at reducing greenhouse gas emissions from shale gas operations in the United States”, but has not made this practice mandatory in the UK. Instead, it only goes as far as to say it expects “green completion technology to develop and become even more effective as the industry develops”. If there are federal environmental standards on reduced completions for the thousands of well being drilled in the US, why is the UK government still reluctant to make this mandatory?

The proposed German legal framework on fracking also does not require measures to capture gases, minimise flaring or avoid venting. The operator is required to use “state of art measuring techniques” in order to record data about methane emissions. Furthermore, the German Government refers to existing legislation and the responsibility of federal authorities to regulate methane emissions.<sup>228</sup>

### 2.10.2. Flaring

One of the iconic images of fracking is the picture from space, depicting North Dakota’s Bakken play at night.<sup>229</sup>

Shale oil operators there are allowed to flare up to 30% of all the natural gas produced, simply because it is not profitable to build the pipelines and compression stations to make use of this gas.



Natural gas flaring in North Dakota’s Bakken Shale is visible in this NASA satellite image - Credits NASA

This results in natural gas being wasted based on ‘economic evaluation criteria’. In some oil-producing areas like North Dakota and Western Siberia, the distance from consumers makes the building of pipelines or other means of transporting the gas economically unfeasible. In Europe the widespread gas transmission network and the proximity of population centres to potential shale plays make this less of a problem. So the Recommendation (8b) asks member states to require operators to take steps to capture the gas:

*“If an installation’s primary purpose is producing oil using high-volume hydraulic fracturing, specific infrastructure that captures and transports associated natural gas should be installed”.*

This could be a generator that uses the associated natural gas to produce electricity or a compressor that can turn the natural gas into a liquid to be used as a fuel or to be transported to a processing facility.

Most member states appear to have ignored this Recommendation. The UK, for example, does not require operators to install the “adequate infrastructure” to



Flaring in Eagle Ford Shale - Credits Earthworks

capture all the gas that would be produced from fracking operations. Instead, they are allowed to use ‘economic valuation criteria’: “Where cost-effective routes for economic use of the gas are available, these must be used. The environmental regulator can regulate flaring through environmental permits”.

In practice, this leads to situation where e.g. a shale gas operator such as Cuadrilla can propose 12 months of flaring at each of the fracking sites in Lancashire. If the UK shale plays are ‘wet plays’ with lots of crude oil and natural gas liquids and if they cannot be easily linked to the UK’s gas transmission network, considerable levels of flaring could result. This is therefore not surprising to find UK authorities answering the Commission that “an operator may find gas that is not economic to recover, in which case they will flare it”.<sup>230</sup>

Similarly, Poland’s states that “natural gas extracted from boreholes during [...] the production of oil is to be used”, but adds that “[i]f there are no conditions to use the natural gas, it is admissible to burn it” ... as long as the requirements of the 2001 Environmental Protection Law are met. No details are given regarding the “conditions” that could allow flaring

or of any limits in terms of volume or time the Environmental Protection Law would impose.

### 2.11. Lack of accountability

The Recommendation (12.2) advises member states to make sure that “the operator provides a financial guarantee or equivalent covering the permit provisions and potential liabilities for environmental damage prior to the start of operations involving high volume hydraulic fracturing”. No guidance is given on the level for this “financial guarantee”, but given the lack of clarity as to what should be considered a risk (see section 2.2), this is perhaps inevitable. Member states have dealt with this issue in a range of ways, providing very few or no details on how it will be implemented.

#### United Kingdom:

The UK’s answer states that “[s]hould pollution of groundwater occur, the regulator can take enforcement action to prevent or remedy pollution of groundwater caused by the actions of operators”. However, the UK government emphasises that the decision lies with the regulator. There is no legally binding obligation to make sure that operators clean up their act in case of environmental damage.

The UK authorities state that “operators must satisfy the environmental regulator that fractures will remain in the target formation, there is no risk of connectivity with groundwater”. This presumes that the applications for the first permits already granted by the national authorities provided guarantees that no groundwater contamination could result of these operations.

Based on the North American experience, where there have been a number of well-documented cases of water contamination,<sup>231</sup> it seems unlikely that operators can guarantee that no contamination will take place.

Where groundwater pollution does occur, it can be very difficult and expensive to remedy. It is highly unlikely that the financial guarantee provided in the Mining Waste Directive (as implemented by the UK) would be able to cover the clean-up costs. The UK’s reply states that there are discussions with the UK shale gas industry about “the development of a mutual industry scheme that would, where necessary, step in and pay for necessary remedial action in the event that the liable company was unable to do so”. Little progress on the scheme seems to have been made.

#### Poland:

Poland’s response states that any shale gas exploration or production licence “may by [sic] granted subject to the provision of a financial guarantee covering possible claims that may arise during the activities envisaged by the license”. It is unclear whether this is optional or legally binding. But Poland adds that such a guarantee may only be demanded “if it is justified by overriding reasons of state or public interest related in particular to environmental protection.” This suggests that it will be very difficult for local communities and residents to hold shale gas operators accountable.

#### Germany:

In Germany, the industry fund (Bergschadensausfallkasse) for mining damages provides coverage for up to €7.5 million for members and €1.5 million for non-members.<sup>232</sup> Companies don’t have to provide any kind of liability insurance prior to the granting of licenses. Considering the number and seriousness of the various possible impacts associated with fracking operations, such measures do not

seem to be in line with “a financial guarantee or equivalent covering the permit provisions and potential liabilities for environmental damage prior to the start of operations involving high-volume hydraulic fracturing.”

#### 2.12. Lack of publicly available information

The fracking industry’s lack of transparency and the authorities’ laissez-faire approach have contributed to the distrust about fracking. In the US, local communities, suffering from the negative impacts of fracking, have struggled to prove a causal link between shale gas extraction and water or air contamination because the baseline data was not available. Similarly they could not find out what chemicals were being used. Moreover, numerous sealed agreements have helped oil and gas operators keep documented contamination claims silent.<sup>233</sup>

The European Commission has urged greater transparency and access to information in the Recommendation (15). In that sense, member states are advised to:

- Ensure that operators “disseminate information on chemical substances and volumes of water” used for each well
- Publish “on a publicly-accessible internet site”:
  - “The number of wells completed and planned projects involving high-volume hydraulic fracturing”;
  - “The number of permits granted, the names of operators”;
  - “The baseline study and monitoring results”;
  - “Incidents and accidents”;
  - “Results of inspections, non-compliance and sanctions”.

This can only have an impact if it is implemented, but several countries appear to be ignoring the Commission’s advice.<sup>234</sup>

#### Romania:

Romanian authorities told the Commission that exploration licences for shale gas had been granted, but that “according to national legislation on oil and gas fields, Law no. 238/2004 has issued oil license, but this information are confidential”.<sup>235</sup>

It is known that Chevron obtained several exploration licences in the Barlad and in the Dobrogea region. However, the details of these licences (contracts, number

of wells, chemicals substances, volumes of water, etc.) have been kept confidential. The only information obtained so far has come from legal actions by NGOs. The three contracts associated with the three licences in the Dobrogea region were partially unclassified during one legal proceeding, allowing the NGOs to see that permits had been given for conventional and unconventional oil and gas activities, even though Romania’s response to the Commission states that these licences were “for classical oil and gas exploration”.<sup>235</sup>

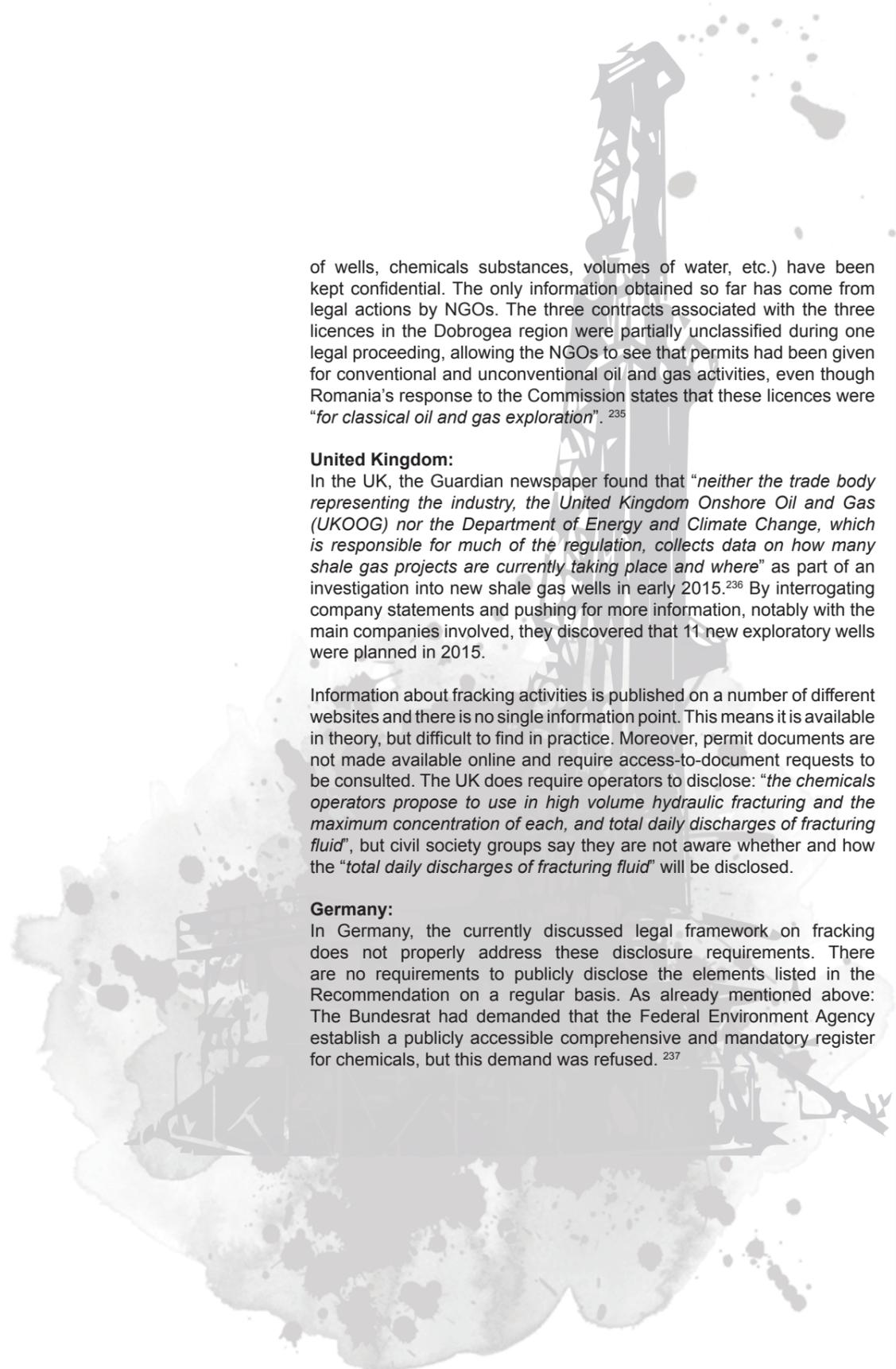
#### United Kingdom:

In the UK, the Guardian newspaper found that “neither the trade body representing the industry, the United Kingdom Onshore Oil and Gas (UKOOG) nor the Department of Energy and Climate Change, which is responsible for much of the regulation, collects data on how many shale gas projects are currently taking place and where” as part of an investigation into new shale gas wells in early 2015.<sup>236</sup> By interrogating company statements and pushing for more information, notably with the main companies involved, they discovered that 11 new exploratory wells were planned in 2015.

Information about fracking activities is published on a number of different websites and there is no single information point. This means it is available in theory, but difficult to find in practice. Moreover, permit documents are not made available online and require access-to-document requests to be consulted. The UK does require operators to disclose: “the chemicals operators propose to use in high volume hydraulic fracturing and the maximum concentration of each, and total daily discharges of fracturing fluid”, but civil society groups say they are not aware whether and how the “total daily discharges of fracturing fluid” will be disclosed.

#### Germany:

In Germany, the currently discussed legal framework on fracking does not properly address these disclosure requirements. There are no requirements to publicly disclose the elements listed in the Recommendation on a regular basis. As already mentioned above: The Bundesrat had demanded that the Federal Environment Agency establish a publicly accessible comprehensive and mandatory register for chemicals, but this demand was refused.<sup>237</sup>



# III. COST OF REGULATION “WILL DELAY INVESTMENT”

The oil and gas industry have told member states with potential shale and unconventional hydrocarbon resources how much they would benefit from allowing the industry to develop, with promises of jobs, energy security and cheap energy. Industry frequently warns that any delay to investment as a result of “new EU legislation” will put these benefits at risk.<sup>238</sup> Some member states appear to be prepared to ignore legitimate concerns, backed by scientific evidence, as a result of this pressure from industry, with some states also prepared to put forward the argument that new rules would be a problem due to “*the lengthy timeframes and significant uncertainty involved*”.<sup>239</sup>

## 3.1. Industry vs. regulation

According to the Commission, the official objective of the Recommendation was to “*level the playing field for operators and improve investors’ confidence*”. It was the weakest possible legal response to the need for “*a Union-wide risk management framework for the exploration and extraction of unconventional fossil fuels*”, as called for by the European Parliament in November 2012.<sup>240</sup> This was mainly a result of pressure from several member states, advised and backed by the oil and gas industry.<sup>241</sup>

A comparison with the situation in the United States before the shale gas boom really started is revealing. The pivotal moment which allowed fracking operations to get underway was the passage of the Energy Policy Act in 2005, which, thanks to the efforts of Vice President Dick Cheney, former CEO of Halliburton, exempted the fracking industry from most federal environmental legislation (including the Clean Air Act, the Resource Conservation and Recovery Act, and the Emergency Planning and Community Right to Know Act).<sup>242</sup> Without the “constraint” of complying with basic federal environmental legislation, industry had a green light to develop according to the most convenient self-determined standards.

Investors and operators may be hoping for a similar *carte blanche* in Europe: whatever measures put forward at the European level, industry will seek to block them. Rather than seeking legislative harmonisation to bring more certainty and greater confidence for investors, as they claim, they want to see the sector unregulated as far as possible. Legal certainty would have been achieved through a legally-binding regulation.

## 3.2. The “cost” argument

The financial costs of having to comply with more stringent EU rules on fracking is one of the arguments put forward against stronger legislation, with industry suggesting it would undermine the economic viability of shale gas.

While more stringent environmental rules may have an additional cost for operators, estimates by the International Energy Agency (IEA) and by the European Commission show that such fears tend to be overblown:

- The IEA estimated that complying with key environmental risk mitigation measures (a.k.a. the “golden rules”) would add some 7% to the overall cost of drilling and completing a shale gas well.<sup>243</sup>
- The European Commission estimated that the Recommendation would add between 0 and 7% “*to the absolute costs of the operations*” while a binding “*directive setting specific requirements covering all issues identified*” would only add 8% to the overall costs.<sup>244</sup>

It is unlikely that an additional 7 or 8% on the drilling costs would really be a game changer for the nascent European fracking industry, especially when compared to the additional costs of adapting the fracking technology to European geology.

Early exploration efforts have demonstrated that the main obstacle for the commercial viability of shale gas seems to be the difficult geological conditions.

In 2011, Schlumberger, the world’s largest oilfield services company, admitted that the costs of drilling in Poland would be three times the cost of drilling an average well in the US.<sup>245</sup> This was backed up by a later study ran by KPMG which observed that because of higher population density and because “*known reserves of shale gas in Europe are located 1.5 times deeper on average than similar formations in the US*”, the cost of production in Poland would be far higher, with further extra costs for water which can be up to 10 times more expensive in Europe.<sup>246 247</sup>

The cost of fracking in Poland has been found to be even higher than these initial estimates, with the Pomerania regional council revealing in 2013 that “*each exploratory well costs between \$30 and \$35 million*”<sup>248</sup> (double the amount predicted by KPMG). ConocoPhillips announced in

June 2015 that their subsidiary, Lane Energy Poland, had invested around \$220 million in drilling seven exploratory wells in Poland since 2009, equal to €28 million per well.<sup>249</sup>

The impact of the geology on the overall production costs seems to play a much greater game-changer effect on the viability of this industry than the costs of complying with legislation. This was illustrated by the decision of a series of operators to stop their operations in Europe. In May 2015, Total announced that it had abandoned its shale gas licence for Nordsjaelland in Denmark, as “*this area does not demonstrate the pre-requisite sub-surface characteristics for viable shale gas production*”.<sup>250</sup> Marathon Oil said in 2013 that its six exploratory wells in Poland had been unsuccessful in finding commercial levels of hydrocarbons.<sup>251</sup> Other companies (Exxon<sup>252</sup>, Eni<sup>253</sup>, Talisman<sup>254</sup>) have come to similar conclusions.

All of these companies pulled out of Polish shale gas, before the launch of the Commission’s Recommendation.

These companies were also operating against the backdrop of political and public support – and so did not have to face the extra costs of overcoming public opposition.

In 2015, it is blatantly obvious that fears about excessive environmental rules as the death knell of European shale gas are greatly exaggerated. Difficult geology, industry

bottlenecks (limited know-how, pipeline infrastructures and drilling rigs) and oil prices (currently too low to allow profitable shale gas development) are far more decisive for the success of exploration efforts from an economic point of view.

Moreover, benefits of environmental rules would have to be counted as well. These can range from less accidents and damage (often paid from tax payers money) to prevention of higher health costs due to pollution of water, exposure to chemicals and accidents.

## 3.3. Profitability vs. Public health and safety

Arguing against environmental and public safety legislation to allow increased profitability raises fundamental ethical questions. Health and environmental protection should not be weighed against an industry’s potential profits. Profitability should be determined on the basis of the necessary legislation. Allowing such concerns to interfere in a system intended to represent the public interest is damaging interference in the democratic process.

The idea of harmonising the regulatory framework across Europe to bring more legal certainty for investors seems sensible. However, oil and gas industry lobbyists appear to have made such a goal look like wishful thinking, or at least a compromise that is to the detriment of health and environmental protection.



# CONCLUSIONS

This report clearly outlines the problems with the European Commission's soft-touch approach to the incipient fracking industry in Europe, as evidenced through its non-binding and loosely worded Recommendation on the use of fracking.

The Recommendation lacks the necessary teeth to force EU member states to make even minimal changes to their regulatory approach to shale gas, failing, for example, to even persuade some member states on the need for a Strategic Environmental Impact Assessment to assess the cumulative impacts of shale gas activities. The Recommendation also relies too heavily on the oil and gas industry's definition of best practice and on self-monitoring to mitigate the worst impacts of fracking.

We believe that self-regulation and self-monitoring is inadequate and does little to establish a social licence to operate for this industry. Major questions remain unanswered about the treatment of fracking waste water, which chemicals are used (and which chemicals are permitted) and the liability for abandoned oil and gas wells.

While the weak wording in the European Commission's Recommendation is to blame for its poor implementation at national level, we see little evidence that member states are using the Recommendation as a basis to build more stringent rules for fracking. In fact member states and their national regulatory frameworks appear to be ill-equipped to deal with the specific challenges of fracking. Insufficient attention is paid to what monitoring capacity will be required to keep track of this complex industry. EU governments appear to be in denial about the real impacts of potentially allowing large-scale fracking in Europe, preferring to adopt a wait-and-see policy during the exploration phase. The government of Poland in particular has gone to great lengths in downplaying the risks involved in fracking.

Local communities, who face the realities of fracking projects, are only offered token forms of public consultation, while information about drilling and fracking proposals is often made unnecessarily complicated. Under these circumstances, we can already expect that many of the mistakes seen in the American fracking boom will be repeated here in the European Union.

More generally, shale gas is and remains in our view unburnable carbon and will only accelerate climate change. Shale gas is inappropriate to facilitate a transition to a zero-carbon society and is more a distraction than a solution in implementing this challenging transition. Focusing the EU's efforts on an energy policy that combines renewables and energy efficiency will be a more effective strategy than promoting the high-carbon fracking industry.

We call for a ban on fracking and an immediate halt to all unconventional fossil fuel projects in the EU.



Anti-fracking protest in front of Total's office, Brussels - credits Food & Water Europe

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