



EUROPEAN PARLIAMENT

2009 - 2014

Committee on the Environment, Public Health and Food Safety

2011/2308(INI)

11.4.2012

DRAFT REPORT

on the environmental impacts of shale gas and shale oil extraction activities
(2011/2308(INI))

Committee on the Environment, Public Health and Food Safety

Rapporteur: Bogusław Sonik

CONTENTS

	Page
MOTION FOR A EUROPEAN PARLIAMENT RESOLUTION	3
EXPLANATORY STATEMENT.....	8

MOTION FOR A EUROPEAN PARLIAMENT RESOLUTION

on the environmental impacts of shale gas and shale oil extraction activities (2011/2308(INI))

The European Parliament,

- having regard to Directive 94/22/EC of the European Parliament and of the Council of 30 May 1994 on the conditions for granting and using authorisations for the prospection, exploration and production of hydrocarbons¹,
- having regard to Council Directive 92/91/EEC of 3 November 1992 concerning the minimum requirements for improving the safety and health protection of workers in the mineral-extracting industries through drilling²,
- having regard to Directive 2006/21/EC of the European Parliament and of the Council of 15 March 2006 on the management of waste from extractive industries (Mining Waste Directive) and amending Directive 2004/35/EC³,
- having regard to Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives⁴,
- having regard to Directive 2011/92/EU of the European Parliament and of the Council of 13 December 2011 on the assessment of the effects of certain public and private projects on the environment⁵,
- having regard to Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora (Habitats Directive)⁶,
- having regard to Directive 2008/1/EC of the European Parliament and of the Council of 15 January 2008 concerning integrated pollution prevention and control (IPPC Directive)⁷,
- having regard to Directive 2004/35/EC of the European Parliament and of the Council of 21 April 2004 on environmental liability with regard to the prevention and remedying of environmental damage (Environmental Liability Directive, or ELD)⁸,
- having regard to Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (Water Framework Directive)⁹,

¹ OJ L 164, 30.6.1994, p. 3.

² OJ L 348, 28.11.1992, p. 9.

³ OJ L 102, 11.4.2006, p. 15.

⁴ OJ L 312, 22.11.2008, p. 3.

⁵ OJ L 26, 28.1.2012, p. 1.

⁶ OJ L 206, 22.7.1992, p. 7.

⁷ OJ L 24, 29.1.2008, p. 8.

⁸ OJ L 143, 30.4.2004, p. 56.

⁹ OJ L 327, 22.12.2000, p. 1.

- having regard to Directive 2006/118/EC of the European Parliament and of the Council of 12 December 2006 on the protection of groundwater against pollution and deterioration (Groundwater Directive)¹,
- having regard to Regulation (EC) No 1907/2006 of the European Parliament and of the Council of 18 December 2006 concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH), establishing a European Chemicals Agency, amending Directive 1999/45/EC and repealing Council Regulation (EEC) No 793/93 and Commission Regulation (EC) No 1488/94 as well as Council Directive 76/769/EEC and Commission Directives 91/155/EEC, 93/67/EEC, 93/105/EC and 2000/21/EC (REACH Regulation)²,
- having regard to Directive 98/8/EC of the European Parliament and of the Council of 16 February 1998 concerning the placing of biocidal products on the market (Biocidal Products Directive)³,
- having regard to Council Directive 96/82/EC of 9 December 1996 on the control of major-accident hazards involving dangerous substances (Seveso II Directive)⁴,
- having regard to its resolution of 13 September 2011 on facing the challenges of the safety of offshore oil and gas activities⁵,
- having regard to the report on unconventional gas in Europe, of 8 November 2011, commissioned by the Directorate-General for Energy of the Commission⁶,
- having regard to the transmission note of 26 January 2012 from the Commission's Directorate-General for the Environment to Members of the European Parliament on the EU environmental legal framework applicable to shale gas projects,
- having regard to the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions, entitled 'Energy Roadmap 2050' (COM(2011)0885),
- having regard to Articles 11, 191 and 194 of the Treaty on the Functioning of European Union,
- having regard to Rule 48 of its Rules of Procedure,
- having regard to the report of the Committee on the Environment, Public Health and Food Safety and the opinions of the Committee on Development and the Committee on Legal Affairs (A7-0000/2012),

A. whereas recent technological advancements have already spurred a rapid, commercial-

¹ OJ L 372, 27.12.2006, p. 12.

² OJ L 396, 30.12.2006, p. 1.

³ OJ L 123, 24.4.1998, p. 1.

⁴ OJ L 10, 14.1.1997, p.13.

⁵ Texts adopted, P7_TA(2011)0366.

⁶ TREN/R1/350-2008 lot 1, http://ec.europa.eu/energy/studies/doc/2012_unconventional_gas_in_europe.pdf.

scale extraction of unconventional fossil fuels (UFF) in certain parts of the world, significantly increasing energy security, strengthening the overall economy and increasing employment, competitiveness and innovativeness;

- B. whereas the Energy Roadmap 2050 identifies that gas will be critical for the transformation of the energy system by helping to reduce emissions; whereas the Commission notes that shale gas and other UFF will become a very important new source of supply in or around Europe;
- C. whereas the two main techniques deployed in unleashing the UFF potential, horizontal drilling and hydraulic fracturing, have been used for decades;
- D. whereas important analysis is still ongoing and there is a growing need for further and continuous research; whereas the existence and transparency of data, sampling and tests is paramount to high-quality research in support of proper regulation;
- E. whereas any type of fossil fuel and mineral extraction involves potential risks for the environment; whereas it is essential that a precautionary principle be applied to any future development of resources in Europe in order to minimise such risks via continuous research, proper management, regulation and monitoring at all stages of the exploration and exploitation process;

General framework – regulation, implementation, monitoring and cooperation

1. Stresses that, notwithstanding the Member States' exclusive prerogative to exploit their energy resources, any development of UFF should ensure a fair and level playing field across the Union, in full compliance with relevant EU environmental protection law;
2. Believes that, given the relative novelty of UFF to the general public, a thorough assessment should be conducted on the basis of the European regulatory framework and improvement measures taken, where necessary;
3. Stresses that prevailing expert opinion indicates that the inherent risks of UFF extraction, most of which are common to conventional fossil fuel extraction, could be contained through pre-emptive measures, including proper planning, testing, use of new technologies, best practices and continuous data collection, monitoring and reporting;
4. Welcomes the Commission's preliminary assessment on the EU environmental legal framework applicable to UFF; urges the Commission to use its powers regarding proper transposition and application of key EU environmental acts in all Member States;
5. Calls on the Commission, in cooperation with Member States and the competent regulatory authorities, to introduce ongoing monitoring of developments in this area and take the necessary action during the review of EU environmental legislation;
6. Stresses that proper regulation of UFF exploration and extraction ultimately depends on the competence and resources of the relevant national authorities; calls on Member States, therefore, to ensure proper training and international exchange programmes for the staff of the competent national authorities and to establish a coordinating platform to oversee the

UFF responsibilities of the various competent authorities;

7. Notes the importance of the work undertaken by reputable institutions, notably the International Energy Agency (IEA), to prepare a comprehensive Best Available Techniques (BAT) reference document on hydraulic fracturing; calls on the Commission to cooperate with the Member States, the IEA and industry associations to this end;
8. Calls on national authorities to review existing state regulations on well construction for conventional fossil fuels and to update those provisions covering the specifics of UFF extraction;
9. Recognises that industry bears primary responsibility for reacting to accidents; welcomes the progress made by the industry in setting high environmental and safety standards; stresses the importance of monitoring the industry's compliance by means of regular inspections carried out by trained specialists;
10. Calls on the Commission to introduce opportunities for funding research projects in environmentally ameliorative UFF technologies within the framework of EU research and development (R&D) programmes such as Horizon 2020 and the European Strategic Energy Technology Plan (SET); urges EU-based undertakings and academic institutions to develop relevant cooperative R&D programmes leading to greater safety in exploration and production (E&P) operations;

Environmental aspects of hydraulic fracturing

11. Acknowledges that the types of rocks present in each individual region determine the design and method of extraction activities; calls for mandatory pre-authorisation preceding geological analysis of the deep and shallow geology of a prospective shale play, including reports on any past or present mining activities in the region;
12. Recognises the relatively high water volumes involved in hydraulic fracturing; points out, however, that such volumes are not as significant in comparison to the needs of other industrial activities; highlights the need for advance water provision plans based on local hydrology;
13. Believes that, given the depth (over 3km) at which hydraulic fracturing takes place, the main concern regarding groundwater contamination is well integrity and the quality of casing and cementing;
14. Stresses that effective prevention requires consistent monitoring of strict adherence to the established highest standards and practices in well-bore construction; underlines that both industry and competent authorities should ensure regular quality control for casing and cement integrity;
15. Recommends that standardised emergency response plans be prepared jointly by operators, regulators and emergency services and that specialised emergency response teams be set up;
16. Believes that on-site closed-loop water recycling, using steel storage tanks, offers the most

environmentally sound way of treating flow-back water by minimising water volumes, the potential for surface spills and costs/traffic/road damage relating to water treatment transportation;

17. Calls for strict implementation of existing waste water treatment standards and compulsory water management plans by operators, in cooperation with the competent authorities;
18. Considers that there should be a mandatory obligation to declare the chemical content of fracturing fluid; maintains that full transparency and disclosure should be required of operators;
19. Notes that multi-horizontal-well drilling pads minimise land use and landscape disturbance;

Public participation and local conditions

20. Recognises that drilling activities could temporarily worsen living conditions and calls, therefore, for all the necessary measures to be taken, in particular by the industry, to minimise the adverse consequences of such activities;
21. Believes that public participation should be ensured through adequate public information campaigns before exploration and through public consultation before the exploitation stages; calls for greater outreach and public education in UFF activities in order to ensure public understanding, acceptance and confidence in the regulation of these activities;
22. Welcomes in this regard the 2012 EU budget appropriation for such a public dialogue and encourages the Member States to make use of this funding so as to ensure that citizens living in potential UFF development areas are better informed;
23. Instructs its President to forward this resolution to the Council and Commission and the parliaments of the Member States.

EXPLANATORY STATEMENT

For the transformation of the energy system by helping to reduce emissions with existing technologies gas will be critical until at least 2030 or 2035. Shale gas and other unconventional gas sources have become potential important new sources of supply in or around Europe. It has been recorded in the Commission's Energy Roadmap 2050 (Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions – Energy Roadmap 2050, COM(2011)0885).

In that document, the Commission recognises that as conventional gas production declines. Europe will have to rely on significant gas imports in addition to domestic natural gas and potential indigenous shale gas, and that alongside internal market integration domestic shale gas will relax concerns about the EU's import dependency.

In recent years the extraction of 'unconventional' hydrocarbons, notably shale gas but also shale oil, has led to unprecedented and radical changes in global energy markets. In particular, shale gas has risen from 1.4 % of the US gas market in 2000 to some 17 % in 2011. Global gas prices and trade patterns are being re-shaped, with evident consequences for the EU.

The 'shale gas revolution' is spreading worldwide at a relatively rapid pace. According to some estimates, total shale gas reserves in place in the EU exceed 56 thousand billion cubic metres (BCM) of which some 14 thousand BCM might be technically recoverable. This compares to Norway's conventional reserves of 2,215 BCM and annual production of some 104 BCM, and the EU's annual consumption of indigenous and imported conventional gas of about 522 BCM.

While it is too early to conclude whether significant volumes might be extracted economically in the EU, a number of Member States have permitted shale gas exploration and are preparing for extraction if discoveries allow.

In addition to conventional vertical drilling and modern-computer-aided exploratory methods, two advanced technologies are key to sustainable production of shale gas and shale oil, horizontal drilling and hydraulic fracturing. Horizontal drilling encompasses the drilling of vertical wells to a depth usually greater than two kilometres, with horizontal extensions then following along geological formations for up to three kilometres or more.

Hydraulic fracturing is an extremely seasoned and tested technology used in over of 1.2 million wells since the 1947, principally in Canada and the USA and for 30 years in Europe (latterly in Germany, Sweden, Poland, Spain, Denmark and the UK), is used in conventional hydrocarbon extraction in the EU, and is used or planned to be used on a very wide scale in numerous countries worldwide including Argentina, China, the Ukraine and India.

Besides this background, it is important to monitor worldwide regulatory regimes and practices, and to recognise and address concerns about the environmental effects of shale gas and shale oil extraction. Those focus on the potential consumption of large volumes of water, the potential chemical pollution of groundwater bodies especially of drinking water, on the treatment of waste water and risks to surface waters, on the storage of waste drill cuttings, on site-specific impacts, on

seismic effects, and the possible implications for greenhouse gas (GHG) emissions.

It is important to note that no official or other reputable sources have demonstrated any systematic connexion between shale gas and shale oil extraction and human or animal health. No official or other reputable sources worldwide have demonstrated any cases where hydraulic fracturing has led to contamination of drinking water.

However, it should be emphasised that no human activity can be wholly risk-free. The aim of regulation must be to minimise environmental impact and strike a reasonable balance in the light of science, statistical data and of a full consideration of the risks and rewards (also encompassing the alternatives). Sadly, public discourse has included wilful suppression of some data and much extrapolation from hypothetical or individual incidents to the totality of shale gas and shale oil extraction.

Accordingly, the Commission and the competent national authorities should continue to study the potential environmental effects but on a scientific and statistically-based footing, covering Member States and reputable sources worldwide. They should avoid reliance on ideologically-biased academic.

The Commission and the competent national authorities should foster maximum transparency, and the provision of information to the public based both on proven science and statistics and on a context- and comparator-based assessment of the risks and benefits.

Regulation, Implementation, Monitoring and Co-operation

Under the Treaty on the Functioning of the European Union clearly states in Article 194 (2), that Member States have sovereign rights regarding choice of energy mix, and issuing licences and other approvals for the exploration and exploitation of hydrocarbon resources is a Member State prerogative.

In the EU shale gas and shale oil extraction is governed by the same principles which apply to other types of extraction such as of coal, conventional gas and oil, of water and geothermal energy, and to underground activities such as injection of CO₂ for gas and oil recovery, storage of gas and oil reserves and storage of CO₂ for carbon capture and storage (CCS) purposes.

The Commission considers that unconventional hydrocarbon projects involving the combined use of advanced technological processes such as horizontal drilling and hydraulic fracturing are covered by EU environmental legislation from planning until cessation, 36 instruments being applicable and eight Directives being principally involved. The Commission has confirmed that existing EU and national legislation satisfactorily governs all aspects of shale gas and shale oil extraction.

Under the applicable EIA Directive (Directive 2011/92/EU on the assessment of the effects of certain public and private projects on the environment) and Mining Waste Directives public opinion has the right to be consulted. Once extraction commences, relevant EU instruments mandate reviews and, if needed, revisions of authorisations. The competent national authorities have monitoring obligations, and failing compliance, extraction can be prohibited.

It is recognised that the effectiveness of EU and Member State legislation ultimately depends on the efficiency of the competent national authorities, so Member States must have regard to strengthening their regulatory, monitoring and enforcement resources in the light of prospects for the extraction of shale gas and shale oil.

Any new EU legislation will destabilise the current adequate network of EU and national regimes, moving them away from the existing safety case approach and giving rise to the risk both of gaps and of redundancies in regulatory cover. The Commission and the competent national authorities should monitor changes in technology worldwide with a view to assessing the adequacy and efficacy at all times of existing legislation and regulatory practice.

Information is already shared within the EU and globally by the Commission, by competent national authorities, and by industry groups. Stronger efforts to share best practices and regulatory experience, including the statistical monitoring of the use and impact of evolving technologies, can lead to significant mutual benefits.

The Commission and competent national authorities should have particular regard to the experience, covering many decades, of exemplary North American regulators such as the British Columbia Oil and Gas Commission and the Energy Resources Conservation Board of Alberta. Initiatives such as that of the Canadian Association of Petroleum Producers in defining best practice on hydraulic fracturing, and of the International Energy Agency to define best practice in shale gas and oil, are to be welcomed.

The competent national authorities should collate and share incident reporting, with due regard for commercial sensitivities, so that lessons can be promptly learned and conclusions drawn. The Commission should assess the efficacy of the various existing information flows among the competent national authorities, with regard for the ensuing administrative burden.

Environmental Aspects of Hydraulic Fracturing

Water Resources

Water is the principal component of fracturing fluid, and the abstraction and consumption of large amounts of water resources might locally affect the ecological and quantitative status of surface and groundwater sources, and that reduction in water quantity and flow may affect water quality and the associated ecosystems.

Shale gas is among the most water-efficient sources of energy. Contrary to some broadcast impressions, the volumes of water required for extraction are minimal compared to other requirements. Authoritative estimates of water needed in the UK to produce 9 BCM of shale gas annually (some 10% of the UK's current annual gas consumption) are 1.25-1.65 million m³, this being 0.14-0.18 % of current annual abstraction for industry (905 million m³, excluding electricity generation).

Nevertheless, the Commission and the competent national authorities should monitor the potential use of water resources for extraction in their respective national economies, in the context of other and alternative usages. Producers ought further to reduce water use in fracturing, to continue the search for solutions avoiding the use of fresh water, and to maximise re-usage. The competent

national authorities should continue to have regard in regulatory practice to the effects on the availability and quality of water resources.

Possible hazardous substances

There is a need to address some concerns in the EU regarding any potential leakages of hydrocarbons, fracturing fluids and other substances into aquifers and into the atmosphere.

Hydraulic fracturing takes place at depths of some two kilometres, and the upward migration of hydrocarbons and fracturing fluids from such levels is practically impossible. Again, no official or other reputable sources worldwide have demonstrated any cases where hydraulic fracturing has led to contamination of drinking water.

The chemicals which are some 0.5 % of fracturing fluids in current practice are made up of additives found in households, and there is a tendency among individual producers and industry groups voluntarily to propose, and for authorities to mandate, full disclosure of the composition of fracturing fluids. Operators are adopting the elimination of any potentially hazardous additives.

Nevertheless, effective water management and ultimate disposal is clearly critical, notably of the flow back water which can contain high concentrations of salts. Competent national authorities should carefully monitor the application of regulatory practices on the casing and cementing of wells.

The Commission should propose best practices, and the competent national authorities should mandate, elimination of potentially hazardous components and full disclosure via publicly-accessible electronic means of fracturing fluid compositions and volumes used.

Public participation and local conditions

Extraction may give rise to a variety of impacts over time, such as the in early phases by diesel- or natural gas-fuelled engines powering drilling equipment and pumps, and in extraction by pumps and compressors. For instance, an 8-well pad may require some 4-6 thousand truck trips over some six months pre-extraction. A typical multi-outlet retail complex generates 15-25 thousand truck trips per annum indefinitely. As with other environmental effects, the context and comparators must be borne in mind.

Disturbances are reduced to a minimum once extraction commences, a producing well's surface equipment covering a few square metres and production being silent. In contrast to most other extractive and industrial processes decommissioned shale gas and shale oil wells typically leave no trace on the surface landscape. Such potential disturbances are to be considered by the competent national authorities in their regulatory activities and specifically in the application of the EIA Directive.

Public participation should be provided by information campaigns before exploration and public consultation on the early stages before exploitation. It is necessary to take greater outreach and public education in unconventional fossil fuels activities to enable public understanding, acceptance and confidence of these activities. It is important to stress that extraction of UFF can be also a great opportunity to strengthen economy, increase employment and development in certain EU regions.