Informal meeting of Environment Ministers
Working lunch 16th July 2013
- Environmental aspects of shale gas -

Background

The informal meeting of Energy Ministers of April 2013 discussed the possible effects of unconventional oil and gas extraction in the EU on energy supply, prices and competitiveness. The May 2013 European Council adopted conclusions on energy issues, stressing the need to "intensify the diversification of Europe's energy supply and develop indigenous energy resources", with a view to their "safe, sustainable and cost-effective exploitation while respecting Member's States choices of energy mix".

Shale gas developments have been a game changer in the US, leading to a significant reduction in gas prices. The effects have been felt in the EU: greater supplies of Liquefied Natural Gas (LNG) have become available, indirectly influencing EU gas prices as well as stimulating cheaper exports of coal to the EU.

While North America is the only region globally where large-scale commercial production of shale gas is taking place, in Europe, the opportunities shale gas may offer in terms of energy security and economic gains have attracted many interested players. Several Member States have granted or consider granting prospecting and/or exploration licenses for unconventional hydrocarbons such as shale gas. Production could start already in 2015 in certain Member States.

Beyond economic and energy security benefits, public attention has also focused on environmental and climate challenges that may arise from the use of high volume hydraulic fracturing[1] combined with horizontal drilling, at a scale and intensity for which there is very limited experience in the EU. Due to public concerns, certain Member States have put in place bans or moratoria[2].

While the majority of natural gas produced in the EU is currently extracted offshore, such developments would essentially take place on-shore, thus possibly closer to populated areas. In addition, a number of shale gas plays spread across national borders with possible transboundary environmental effects.

The general public is looking for reassurance that the possible environmental risks and impacts are properly tackled. The industry has been calling for a clear and predictable regulatory framework to address public acceptability issues, as well as to provide a level playing field, thus enabling further investments in the sector.

Environmental challenges and other related issues

Most experts consider that the key environmental impacts and risks associated with shale gas projects relate essentially to the use and pollution of water, air emissions (including volatile organic compounds and methane – a highly potent greenhouse gas) and community impacts (e.g. land use, biodiversity, noise, traffic).

[1] Hydraulic fracturing is the process by which a mixture consisting primarily of water (typically some 15 000 m3 per well), sand and chemical substances are injected under high pressure into a geological formation that contains natural gas so as to break the rock and enable gas to be extracted.
[2] [e.g BG; FR; NL; North Rhine Westphalia in DE; Cantabria in ES]

The main causes for such impacts and risks have been identified as:

- Activities on very large areas
- Geological conditions (e.g. possible faults, abandoned wells, deep aquifers favouring pollution pathways or induced seismicity)
- Cumulative effects of multiple wells
- Use of typically hazardous chemicals
- Large use of freshwater, part of which is not recovered
- Waste volumes and characteristics
- Use of venting and flaring during well completion

The combined practice of horizontal drilling with high volume hydraulic fracturing has evolved since its first commercial application in the United States[3] a decade ago. Industry has reported some innovations, notably to reduce the use of water, chemicals and land impacts[4]. Alternatives to slickwater[5] fracturing techniques are being explored and/or tested[6]. Yet according to available information, these technological developments are not likely to profoundly alter the conditions for shale gas extraction in the next decade. High volume hydraulic fracturing is expected to remain the dominant practice for the next few years for shale gas extraction.

While shale gas is considered by some as a possible transition fuel towards decarbonisation (should it replace coal), others fear this may divert investments away from renewable energy sources and energy efficiency.

Furthermore, a majority of respondents to the public consultation[7] recently conducted by the Commission highlighted a need for transparency and public information. The question of a possible lack of capacity of public authorities to supervise projects featured among additional issues raised, in particular at local and regional level. The appropriateness of existing liability and financial guarantee provisions was also questioned notably by the European Parliament[8].

Addressing the identified challenges

Based notably on experience in the United States and Canada (which have been recently revising their respective regulatory frameworks) and the work of the International Energy Agency[9], most experts and stakeholders agree on a number of issues that need to be addressed.

Among technical measures aimed at preventing and reducing environmental risks and impacts, feature the need to conduct proper underground risk characterisation prior to the start of operations, minimise and control

[3] The first economical horizontal well in the Marcellus Shale, Pennsylvania was drilled in 2003 (Harper 2008 PR ; Montgomery 2010 PR ; Givens 2005 NPR) as mentioned in AEA 2012.
[4] Although the low productivity of shale gas wells compared to conventional gas wells and the very fast production decline curve will typically require more wells to achieve a similar amount of production. AEA study 2012 estimated that approximately 50 shale gas wells might be needed to give a similar gas yield as one North Sea gas well.
[5] In the late 1990s, North American operators developed a technology known as “slickwater fracturing” (also known as high volume hydraulic fracturing) to develop shale formations, primarily by increasing the amount and proportion of water used, reducing the use of gelling agents and adding friction reducers (New York State DEC 2011 PR p5-39; quoted in AEA 2012).
[6] E.g. use of propane as an alternative fracking fluid in a limited number of wells in North America; research on other alternatives such as fracturing based on helium, methanol and diesel; bacteria; electrical, mechanical and thermal fracturing
[7] A presentation of the results of the public consultation are available here:
http://ec.europa.eu/environment/integration/energy/uff_event_7june2013_en.htm
[8] European Parliament resolution on environmental aspects of shale gas, 21 Nov. 2012
[9] "Golden Rules" IEA Special report on unconventional gas, World Energy outlook 2012

the use of chemicals, maintain adequate well integrity, manage carefully water and waste, and control air emissions.

Horizontal measures have also been highlighted, such as the need for planning at the level of the shale gas play (to optimise site selection and anticipate cumulative environmental impacts), systematic monitoring prior, during and after operations, as well as providing for an adequate liability regime and financial security.

Capacity building and public disclosure of information, in particular chemicals used for hydraulic fracturing, could help further reassuring the general public and addressing the request for increased transparency.

The existing EU environmental legislation as well as national regulatory frameworks applicable to hydrocarbons apply to shale gas activities[10]. Questions have however been raised whether these are adequate to address the identified specific challenges. Moreover there are divergent interpretations at national level as to the applicability of a number of EU legal provisions to hydraulic fracturing and associated practices (notably provisions on environmental impact assessments, water, waste and industrial emissions). A number of Member States have reviewed or are currently reviewing their applicable legislation and/or developing specific national provisions.

Key considerations for discussion

Various broad policy options are currently being examined by the Commission to address the identified environmental challenges, building on existing EU and national frameworks. They range broadly from no action at EU level to the development of guidelines, best practices, amendments of existing EU legislation, a stand-alone instrument or a combination of any of these options. In order to contribute to this reflection and focus the lunch discussion, the Presidency is seeking the views of Ministers on the following questions:

1. Under which conditions could unconventional hydrocarbons (e.g. shale gas) contribute to EU commitments towards a highly resource and energy efficient low carbon economy?

2. What type of EU action, if at all, would be needed to ensure a safe, secure and cost-effective extraction of unconventional hydrocarbons (e.g. shale gas) in the EU?

[10] 2011 EC note on the environmental legislation applicable to shale gas practices: http://ec.europa.eu/environment/integration/energy/pdf/legal_assessment.pdf