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signed by Mr Jordi AYET PUIGARNAU, Director

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Communication from the Commission to the European Parliament, the
Council, the European Economic and Social Committee and the Committee
of the Regions
Exploration and production of hydrocarbons (such as shale gas) using high
volume hydraulic fracturing in the EU

Delegations will find attached document SWD(2014) 22 final.

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COMMISSION STAFF WORKING DOCUMENT
EXECUTIVE SUMMARY OF THE IMPACT ASSESSMENT

Accompanying the document

**COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN
PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL
COMMITTEE AND THE COMMITTEE OF THE REGIONS**

**Exploration and production of hydrocarbons (such as shale gas) using high volume
hydraulic fracturing in the EU**

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I. Context

In the past decade, the United States has seen a very rapid development of unconventional sources of gas and oil. The term ‘unconventional’ refers primarily to the characteristics of the geological reservoirs or rock formations containing the hydrocarbons, which differ from conventional reservoirs. These unconventional formations often stretch over very large areas, are characterised by low energy content per rock volume and by low or very low permeability. The main types of unconventional fossil fuels are: tight gas, shale gas, coal bed methane, methane hydrates, tight oil, shale oil, oil shale and oil sands. Shale gas appears to be the unconventional hydrocarbon with the greatest potential for development in Europe, with exploration activities already underway in some Member States.

The growth in US shale gas production has led to a consequential drop in US domestic gas prices and to positive economic impacts on the US economy. These changes in the US economy have also had implications for international energy markets. For example, greater liquefied natural gas (LNG) supplies have become available at the global level, indirectly influencing EU gas prices¹ as well as resulting in increased exports of coal to the EU.

In the EU, a number of Member States are in the process of granting or have granted concessions and/or prospection/exploration licences over the past three years: Denmark, Germany, Hungary, Netherlands, Poland, Portugal, Romania, Spain, Sweden and the United Kingdom². However, not all license holders have started concrete prospection or exploration activities. Currently, such activities (at prospection or exploration stages) have taken place or are ongoing in Denmark, Germany, Poland, Romania, Sweden and the UK. As yet, there is no commercial production of shale gas in Europe, although a few pilot production tests have already been conducted, for instance in Poland. Commercial production could start in 2015-17 in certain Member States (e.g. Poland, UK).

II. Need for action

1. What is the problem being addressed?

A number of environmental impacts and risks related to shale gas development result from the techniques used of High Volume Hydraulic Fracturing combined with directional Drilling through rock formations. So far, there is very limited experience of these techniques in the EU. Existing legislation in Europe is not fully equipped to tackle the resulting environmental impacts and risks (e.g. surface and groundwater contamination, air emissions including greenhouse gas emissions). Legal clarity and predictability of the regulatory environment is essential to enable investments in this domain and also to reassure the public that the impacts and risks of such activities are prevented, or if this is not practicable, at least mitigated or properly managed. Without action to address them, these problems are expected to endure. The most affected stakeholders are: businesses wishing to invest in shale gas exploration and extraction; water-related sectors wishing to ensure that water quality is safeguarded; responsible authorities in Member States and EU citizens.

¹ JRC IET report ‘Unconventional Gas: Potential Energy Market Impacts in the EU’, Sept. 2012.

² Licences granted by Bulgaria and France were subsequently revoked by laws banning hydraulic fracturing.

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).

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

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

2. What is this initiative expected to achieve?

The general objective is to ensure that unconventional fossil fuel developments, in particular shale gas, are carried out with proper climate and environmental safeguards in place and under the maximum legal clarity and predictability for responsible authorities, citizens and operators, thus enabling the development of the sector. The first specific objective is to ensure that environmental impacts and risks arising from the techniques used for exploration and exploitation activities, both as regards individual projects and cumulative developments, are adequately identified and managed. The second specific objective is to clarify the EU legal framework, so that investments in shale gas developments across the EU can take place within a predictable setting.

3. What is the added value of action at the EU level?

Geological estimates show that several shale gas plays spread across the borders of Member States. Moreover, environmental impacts and risks do not respect national borders: impacts in one country can give rise to, or worsen, pollution problems in other countries. This is in particular true for surface waters and groundwater, for air quality and for greenhouse gas emissions. Action at EU level is therefore justified. In addition, the European Parliament, the Committee of the Regions, a majority of respondents to the public consultation and several Member States have asked for action at EU level.

III. Solutions

1. What legislative and non-legislative policy options have been considered? Is there a preferred choice or not? Why?

Apart from the baseline, four options have been analysed in detail.

Option A consists of a Recommendation to Member States on ways to address environmental aspects of shale gas exploration and production. It also provides for

guidance on the interpretation of environmental legislation (such as water and waste). Moreover it encourages voluntary commitments by the sector's operators.

Option B proposes amendments to some existing EU environmental legislation to clarify the applicable rules for the sector (combined with elements of option A).

Option C is a framework directive proposing a set of overarching goals, including the disclosure of chemicals used and dealing with cumulative impacts, while amending the existing environmental legislation as in option B;

Option D is a directive setting specific requirements covering all issues identified.

No single preferred option is put forward as trade-offs exist between the different impacts: the aim of the impact assessment is to provide evidence for a political decision.

2. Who supports which option?

The majority of EU citizens are in favour of harmonised and consistent approaches at EU level, according to Eurobarometer surveys. Views of individual respondents to the public consultation are split when responses are considered unweighted. However, when responses are weighted to reflect a country's population (five countries made up more than 90% of the individual responses), a strong majority is in favour of a comprehensive framework at EU level. Environmental NGOs favour a regulatory approach to strengthen environmental safeguards. The oil and gas industry tends to prefer soft measures although it could envisage amendments to existing EU legislation. Certain non-oil and gas operators and service companies have expressed interest in comprehensive and specific EU legislation. Based on informal indications, one Member State would prefer to rely only on national provisions, while a number of Member States see a need for EU action, ranging from guidance to amendments to existing EU legislation up to a stand-alone regulatory approach. The European Parliament called for 'harmonised provisions for the protection of human health and the environment' and stressed the need for the 'highest safety and environmental standards'. The Committee of the Regions called for a 'clear and legally binding regulatory framework of the EU, preferably in the form of a directive'.

IV. Impacts of the options

1. What are the benefits of the main options?

All options A-D aim at tackling environmental risks and impacts of shale gas operations (although to varying degrees), providing enhanced legal certainty and clarity, and addressing public concerns and this represents the main benefit of this initiative. Health impacts addressed by this initiative are direct impacts in terms of air emissions and indirect impacts in terms of potential water pollution by chemicals, some of which are recognised as carcinogens. The baseline is not effective in addressing environmental risks and impacts, nor in providing legal clarity / certainty nor allaying public concerns. Options B, C and D are increasingly effective in addressing the identified impacts and risks, while providing a clearer and more predictable regulatory framework for investors and reassuring the public. Option A, with its non-binding character, is the least effective of the policy options analysed. Clarification of the legal requirements for shale gas operations would provide a more secure environment for

investment and therefore enable shale gas developments. The regulatory options (B, C and D), by enabling EU shale gas production, could lead to a limited gas price decrease – or an avoided increase – thereby benefiting the EU economy in the short to medium term. However, given the uncertainty on the estimated levels of shale gas resources in Europe and the many variables at stake in gas price setting, effects are uncertain. Moreover, the competitive advantage of the United States in terms of lower gas prices would remain. Shale gas development in EU would at best replace declining conventional gas capacities. It would not alter the EU's current gas import dependency but it could potentially improve the EU's negotiation position towards external energy suppliers.

2. What are the costs of the main options?

For shale gas operators, annualised compliance costs for policy options B, C and D amount to 1.4-1.6% of expected annual revenues, with option D (the most costly) adding about 8% to the absolute costs of operations. The costs for operators of option A will depend on whether they implement voluntary measures or not.

3. How will businesses, SMEs and micro-enterprises be affected?

Owing to the level of investment needed to conduct shale gas exploration and exploitation, operators are generally large companies. SMEs and micro-enterprises are only expected to be affected indirectly, through related increased activities (e.g. equipment, catering, and transport) and if EU shale gas operations lead to impacts on energy prices. However, given the uncertainty on the estimated levels of shale gas resources in Europe, and the many variables at stake in gas price setting, effects are uncertain.

4. Will there be significant impacts on national budgets and administrations?

Options B, C and D represent different degrees of change to existing environmental legislation; option A does not change it. National administrations would be expected to adapt to that. Some elements of the changes – for instance the provision of an integrated framework or requirements suggested under options C and D – could lead to a lower administrative burden compared to today. Otherwise no significant impacts on public authorities are expected to result from this initiative.

5. Will there be other significant impacts?

There might be impacts on competitiveness, especially for energy-intensive industries using gas or possible by-products as a feedstock, should the option chosen lead to a significant shale gas production in the EU. In this case, this could influence EU gas prices and potentially partially reduce the gas price gap with the US. This is, however, uncertain since gas prices depend on a wide set of variables. Even in a best case scenario, the EU gas price is expected to remain twice as high as that of the US in 2035.

Economic impacts for Member States and regions will depend on several factors, including the perspective of shale gas development; their current energy mix and import dependency;

the stage of development of their gas infrastructure; their economy's level of energy efficiency; and their administrative situation.

V. Comparing the Options

Options	Effectiveness in			Economic costs in EUR (broad estimates)	Economic benefits	Efficiency (effectiveness / costs)	Social impacts	Timeliness of implementation	Easiness to enforce	Consistency with relevant EU goals	Overall score
	reducing environmental impacts and risks	providing legal clarity/certainty	addressing public concerns								
Baseline	0	0	0	0	0	0	0	0	0	0	0
A	+	+	+	0 to 595 000	+	+	0	++++	n/a	+	+
B	+++	++/+++	+++	595 000	++	++	+	+/++	++	++	++
C	++++	++++	++++	595 000 to 643 000	++	+++	+	++	+++	+++	+++
D	+++++	+++++	+++++	643 000	++	++++	+	+++	++++	++++	++++/++++

VI. Follow-up

Within an appropriate period after the preferred option is put into effect, the Commission would report on the initiative's implementation and effectiveness. The duration of the appropriate period for reporting will vary depending on the preferred option: longer in the case of legislative options (to leave time for transposition) and shorter for non-legislative ones. Data collection for a number of indicators is suggested to ensure monitoring of the implementation of the initiative.