

**Committee/Council: ECOSOC**

**Issue: The Question of Fracking**

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## Introduction

Fracking or Hydraulic Fracturing is a well-stimulation technique aiming at the extraction of gas. The technique of Hydraulic Fracturing has been known since 1947 whereas the first commercially successful application was in 1950 but it is in the past decade that the technique was intensively practiced especially in the United States as over one million out of 2.5 million 'frac jobs' worldwide were in the US. This is due to the fact that many of the conventional natural gas and oil sources in America as well as in Europe have been depleted which led to the implementation and use of fracking. Although the method used is a more expensive and complicated method of extraction nowadays almost 60 % of all new natural gas sources are used via fracking.

Hydraulic fracturing is used to increase the rate at which mineral resources, such as petroleum or natural gas can be recovered from subterranean natural reservoirs such as porous sandstone, limestone or dolomite rocks as well as "unconventional reservoirs" like shale rock or coal beds where fracking is necessary. Hydraulic fracturing allows the extraction of natural gas and oil from rock formations deep below the earth's surface (generally 2,000–6,000 m), which is greatly below typical groundwater reservoir levels. Permeability and reservoir pressure at such depths are too low to enable a flow of natural gas at a high economic return desired, therefore creating fractures in the naturally impermeable shale reservoirs is vital in order to allow the gas to stream out at the before mentioned economic gain. Permeability is measured in the microdarcy to nanodarcy range. The so-called "super fracking," creates cracks in even deeper layers of the rock formation to release more oil and gas in order to increase efficiency.

Natural Gas has been proven to be one of the less harmful sources of energy and most importantly less burdensome for the environment than coal and is therefore a good alternative. On the other hand the use of Hydraulic fracking ends up having a greater impact on earth and our atmosphere as almost 3% per cent of the gas gets lost during the extraction which is fateful as natural gas contains a lot of methane which has a four times greater impact on the atmosphere than carbon dioxide. In addition to that the chemicals included in the 'fracking fluid' are highly toxic and

dangerous which would not be a problem if the fluid was extracted but instead it is pumped back into deep underground layers and sealed where it contains the risk of contaminating potable water sources. This process is fateful as already the 'fracking fluid' consumes a huge amount of drinking water as the fluid itself includes a huge amount potable water (on average 8 million liters) which is polluted and not reusable and the then sealed fluid contaminates even more fresh water in the ground. Most municipal treatment plants are not sufficiently equipped in order to face the high contamination caused by fracking and even if the process of upgrading those treatment plants would cause extremely high costs. In addition to that the use of even more chemicals needed to clean the contaminated water would not only diminish the economic advantage of fracking but the environmental advantage of natural gas as it is less harmful than coal would also be lost

Fracking overall is a technique which needs to be closely monitored and regulated resulting in a enormously beneficial use of natural gas sources. This needs to be promoted through studies and research as previously mentioned the advantages of natural gas are not exploited properly due to the loosely controlled way fracking is practiced.

## **Definition of Key-Terms”**

### 'Fracking Fluid'

The fracturing fluid is the fluid used to create the cracks the method relies on. The fluid varies depending on the desired fracturing type, the conditions of specific wells fractured and water characteristics. The fluid can be gel, foam, or slickwater. A typical fracture treatment uses between 3 and 12 different chemicals. Although the exact list of chemicals used is kept secret from the public (Halliburton Loophole) some of the 'ingredients' are known, such as but not limited to Methanol, Hydrochloric Acid, Sulfuric Acid, Benzyl Chloride and Hydrofluoric Acid. This chemical cocktail results in the contamination of fresh water, which is not treatable in ordinary municipal treatment plants.

### Halliburton Loophole

The Halliburton Loophole is an exception to the Clean Water Act approved by the US Congress which allows fracking companies to keep the ingredients of the dangerously harmful “fracking fluid” secret.

## **Background Information**

### The procedure of Hydraulic Fracturing

The process of Hydraulic Fracturing is different from the ordinary way of extracting natural gas and the first step is to drill a shaft several hundred meters into the ground and then horizontally into the gas-bearing layer of rock where the fracking fluid is then pumped in using high-performance pumps. The fluid, which on average consists of 8 million liters of water, sand and chemicals, penetrates the rock and creates innumerable tiny cracks. These are prevented from closing by the sand whereas the chemicals fulfill several tasks such as but not limited to condensing the water, killing and dissolving bacteria. The fluid is then pumped out and the natural gas can then be recovered. As soon as the source is exhausted the drill hole is sealed. During that process one of the disadvantages is that gas often leaks and very harmful methane is released into the atmosphere.

### Environmental Impact

The technique of Fracking is often criticized for the great impact it has on the environment although a big part of that can be avoided by efficient legislation and monitoring. Long-term effects of hydraulic fracturing include greenhouse gas emissions resulting in climate change as well as high water consumption and water contamination. The enormous amount of water used for the production of fracking fluid and fresh water resources contaminated through it additionally burden the environment and local population. One of the most dangerous consequences of fracking is the increased risk of earthquakes resulting out of the perforated ground. In addition to that further repercussion of the technique are noise pollution and negative health effects on humans. The previously mentioned air emissions are primarily methane, which is accidentally liberated, along with industrial emissions from equipment used in the extraction process. The escape of methane is a big problem in older wells whereas in newer wells constructed under latest UK and EU regulations, which require zero emissions of methane, the accidental release of methane which is a potent greenhouse gas with an impact on the ozone layer four times higher than carbon dioxide has been eliminated.

Another handicap is the contamination of surface water through spillage or improperly built and maintained waste pits. Ground water contamination can occur when fluids escape the formation being fractured or by the returning fluids. Returning fluids are leftovers of the fracking fluid used which are pumped back up and are then reused. Unfortunately this process often fails in reinforcing all the fluid used and leaves the ground contaminated as well as the accidental spillage of such fluids is extremely hazardous. The fluids also contain dissolved constituents such as minerals and brine waters which is then managed by underground injection, municipal and commercial wastewater treatment or self-contained systems at well sites or fields recycling fluid for future drills.

Those treatments typically result in less than half of the produced water used to fracture the formation being recovered.

The building land needed for fracking also has a great impact on the environment as typically about 3.6 hectares of land are needed per drill pad for surface installations, which has an immensely negative impact on wildlife and the whole biosphere. Thus the flora and fauna of the region is negatively affected as well as the noise pollution on site, which is on average 800 to 2,500 days of noisy activity which additionally pressures wildlife and locals. Nowadays research on the issue is being conducted in order to evaluate if human health is affected by air and water pollution. Detractors and critics support that it is foreseeable that the effects of fracking have an impact on human health and on the environment and therefore demand close monitoring and efficient regulations reducing risk for human and the environment.

The perforation of the ground performed during hydraulic fracturing sometimes causes induced seismicity resulting in minor earthquakes, which are usually too small to be detected at the surface although it has occurred that convulsions were strong enough to cause property damage and possibly injuries. Although those convulsions are infrequent the previously mentioned minor earthquakes raise the risk of potentially bigger earthquakes. In that aspect the better understanding of the geology of the area being fracked can help lowering the risk of seismic events.

### Health Risks

The chemicals and the unfortunately loosely controlled use of those in fracking causes health risks. Especially in the US where fracking has been practiced at a high rate in the last couple of years the concerns over the possible health implications, fracking might have, have been discussed extensively. "with increasing numbers of drilling sites, more people are at risk from accidents and exposure to harmful substances used at fractured wells" was one of the conclusions of a 2013 review whereas a hazard assessment recommended already in 2011 full disclosure of chemicals used for hydraulic fracturing (Halliburton Loophole) as the chemicals included in the fracking fluid are considered to have immediate health effects, and may have long-term health effects.

In the course of that discussion Public Health England published a review (June 2014) of the "potential public health impacts of exposures to chemical and radioactive pollutants" as a result of shale gas extraction in the UK. The review was based on the examination of data from countries where hydraulic fracturing is already practiced.

"An assessment of the currently available evidence indicates that the potential risks to public health from exposure to the emissions associated with shale gas extraction will be low if the operations are properly run and regulated. Most evidence suggests that contamination of groundwater, if it occurs, is most likely to be caused by leakage through the vertical borehole. Contamination of groundwater from the

underground hydraulic fracturing process itself (i.e. the fracturing of the shale) is unlikely. However, surface spills of hydraulic fracturing fluids or wastewater may affect groundwater, and emissions to air also have the potential to impact on health. Where potential risks have been identified in the literature, the reported problems are typically a result of operational failure and a poor regulatory environment.“

### Economic Aspects

Hydraulic fracturing is one of the key methods of exploiting unconventional oil and gas resources which, according to the International Energy Agency, hold an estimated amount of 208 trillion cubic metres (208,000 km<sup>3</sup>) shale gas, 47 trillion cubic metres (47,000 km<sup>3</sup>) of coalbed methane and up to 76 trillion cubic meters (76,000 km<sup>3</sup>) of tight gas. The low permeability of these formations requires depending on the geological characteristics specific high-tech techniques such as but not limited to hydraulic fracturing. Although other conventional methods (conventional drilling or horizontal drilling) of extraction also allow the exploitation of such resources, fracking is the only technique that enables an economically viable use of those resources. This technique has facilitated the extraction of shale gas and light tight oil in the United States and is believed to achieve equivalent results in other countries possessing unconventional natural gas sources.

The National Petroleum Council has stated that in the next couple of years an estimated amount of 70% of natural gas in North America will be extracted using hydraulic fracturing. The method of fracking allows the commercially viable extraction of natural gas through the appliance of latest technology making it account for 45% of domestic natural gas and 17% of oil in the United States.

Fracking has given U.S.-based refineries a competitive edge on the market with their ability of recovering shale gas and oil relatively inexpensively. This advantage allows the US to export more refined petroleum products and more liquified petroleum gas (LP gas). LP gas consists out of hydrocarbons called natural gas liquids, released during hydraulic fracturing of petroliferous shale and relatively easy to export. The economic advantages of fracking are obvious as Propane, for example, costs \$620 a ton in the U.S. simultaneously in China more than \$1,000 per ton. The low cost LP gas in the US has also lead to japan importing gas for fuel power plants replacing nuclear power plants.

On the other hand the Institute for Sustainable Development and International Relations (IDDRI) released a study in July, 2014 refuting the so-called “shale gas revolution” which was alleged to have a significant macro-economic (Long-term effect on the economy) impact. The study argues that neither in the long-term nor in the short-run did or will the “shale gas revolution” have a great impact on economic

growth in the US, neither will it cause big advantages in competitiveness. The same report concludes that the use of fracking in Europe will have very little advantage in terms of competitiveness and energy security as for the period of 2030-2035, it is estimated that fracking will account for 3 to 10% of EU projected energy demand, which is clearly not enough to have a significant impact on energetic independence and competitiveness. The lower prices in the US, enabled by fracking, are also considered to be temporary.

Hydraulic fracturing has many economic benefits and one of those is boosting local economies near fracking wells as in the short-run research shows that employment in the oil and gas sector has doubled in the last decade, with spill-overs in the local construction and transport sector. The lower energy prices especially benefit the manufacturing sector as natural gas prices have decreased by more than 30%. The economic disadvantages of fracking are the rapidly sinking economic value of property such as but not limited to houses near fracking wells. The prices decrease even more if the house is not connected to municipal treatment plants (city water) as there is concern of ground water pollution.

## **Major Countries and Organizations Involved**

### US Environmental Protection Agency

The US Environmental Protection Agency (EPA) is responsible for the technique of fracking and in the course of the discussion, although the governmental body has published, promoted and provided research, the studies published did not influence the loose fracking policy of the US government. In addition to that the EPA is only allowed to closely monitor fracking wells when diesel is used on site. The organization has almost no authority neither the right to have the practice of fracking in the US monitored and controlled in order to provide efficient regulation.

### The United States of America

The United States plays a major role in the debate about fracking as the technique of hydraulic fracturing is mainly practiced in the US. The effect fracking has on the US economy is disputed and the loose controls are often criticized and the harm fracking in the US has already done to the environment and public health is not to be disregarded. In the US one of the biggest and most powerful lobbies is the gas and oil lobby, which is the biggest problem in promoting efficient legislation on fracking in the US.

### Europe and the UK

The European Union and the United Kingdom have begun providing legislation on fracking which might enable an almost completely risk free practice of fracking

accompanied by a new economically viable industry. Most countries in Europe still need to provide the final regulations but most governments apart from some, like France, are willing to focus on promoting a safe use of hydraulic fracturing.

## Timeline of Events

Date	Description of event
1947	Frackings firstly practiced as an experiment for the first time in history
1950	First commercially successful application
1970s	Increase in Hydraulic Fracturing driven by advance in the field of horizontal drilling
1980s	Federal financial support for research and further improvements on the technique make Fracking profitable
2000s	Energy companies actively expand in the field of fracking
2005	US Congress approves the Halliburton Loophole
2011	France is the first Country to ban fracking completely due to public pressure and concern about health risks
2012	Vermont becomes the first US state to ban fracking
	The state of New York bans fracking after an evaluation of the risks the technique poses canceling 30,000 to 90,000

## Relevant UN Treaties, Resolutions and Events

### United Nations Academic Impact (UNAI)

The United Nations Academic Impact describing itself as an organization which shares culture of intellectual social responsibility in July, 2014 hosted a public discussion in the UN headquarter which was led by Michael Levi of the Council on Foreign Relations and Elisabeth Thompson of the Secretary-General's Sustainable

Energy for All initiative, both vital in the global discussion of energy and sustainable development.

“Is fracking, by providing actual gas, giving us a cleaner energy source? The answer is yes, perhaps, if you regard natural gas as a cleaner energy source (...) However, if the methodologies used are dirty, or environmentally harmful, then some of the beneficial impacts are significantly eroded.” – Ms Thompson

This quote is vital for the debate and the resolution in the ECOSOC committee and should be taken into consideration by every delegate, which is further explained in the possible solution section.

However the conclusion reached in the discussion was that fracking is a justifiable option to gain fossil fuel and therefore energy, but it needs to be closely monitored harshly regulated, otherwise most of its benefits in the long-run are eliminated through environmental pollution and the induction of public health problems. Also the regulations and legislation in the US were found to be far too mild and need to be altered in order to protect the environment and the population.

#### Environment and Human Rights advisory

The Environment and Human Rights Advisory (EHRA) states in its conclusion that “As noted in a recent United Nations General Assembly document, the environmental damage caused by hydraulic fracturing for natural gas poses “a new threat to human rights;” 31 and a recent United Nations Resolution makes clear that “environmental damage can have negative implications, both direct and indirect, for the effective enjoyment of human rights.”32 This report, in light of the principles expressed in those documents, provides the New York State Department of Environmental Conservation and Earthworks' Oil and Gas Accountability Project a list of formal human rights norms of concern associated with high volume hydraulic fracturing operations, outlines DEC's potential liabilities and describes measures that DEC can take to reduce those liabilities.”

This conclusion shows that fracking is truly a risky method which needs to be controlled but research implies that fully functioning and perfectly maintained wells as well as those using latest technology pose a minimal threat to the environment or public health. Therefore a complete ban of the technique is unnecessary but in the case of New York, California or Colorado and many other US states which banned fracking the ban is comprehensible as the loose regulations and controls in the US allow companies to practice fracking ruthlessly towards the environment and the population. The potential of gaining energy through fracking without harming the environment or the population is not exploited.



## Previous Attempts to solve the Issue

Fracking nowadays unfortunately still is a technique that has a lack of research on comprehensive studies on the concrete effects on human health. In addition overall data on the negative effects of fracking are very limited. This has caused countries to consider the use of hydraulic fracturing cautiously and their acting is based on a precautionary principle, for example in France in 2011 as well as in many US States, fracking was banned often due to public pressure which mainly aroused by the previously mentioned lack of data; that's why fracking can unfortunately not be reliably evaluated and assessed. This has been solved by the EU with legislation providing close monitoring and strict regulations which are necessary in order to control the high usage of toxic chemicals which put an enormous risk to the environment .

The Scottish government faced the issue with a postponement of fracking due to public opposition as well as public health concerns. This also gives time to fund research and promote advance in technology thus possibly making fracking safer.

The UK and South Africa currently lifted their bans and now focus on adequate regulations, which is what Germany announced as well. The German government has set the goal to provide legislation that allows fracking but debar environmental pollution through measures such as but not limited to the ban of hydraulic fracturing in wetland areas.

Another attempt to deal with fracking has been made in the US by the Ground Water Protection Council which launched a website ([fracfluids.org](http://fracfluids.org)) for the voluntary disclosure of fracking fluids funded by the U.S. Department of Energy as well as gas and oil trade groups.

Hydraulic fracturing is excluded from the Safe Drinking Water Act's underground injection control's regulation, except when diesel fuel is used. The EPA is responsible for surveillance of the issuance of drilling permits when diesel fuel is employed.

In 2012, Vermont became the first state in the United States to ban hydraulic fracturing. On December 17, 2014, New York was the second state issue a complete ban on any hydraulic fracturing due to potential risks to human health and the environment.

## Possible Solutions

The method of Hydraulic Fracturing is an opportunity to provide energy at lower cost and simultaneously a source of energy less harmful for the environment than conventional fossil fuels. The risks of contamination and environmental pollution as well as the endangerment of human health are high due to a lack of close monitoring and efficient legislation. Research on possible threats to human health is vital and needs to be promoted in order to provide legislation capable of exploiting the

method to its fullest economic benefit as well as protecting the environment and humans.

In order to control fracking sites international and national organizations should be established and funded as well as their cooperation in order to promote not only security but advance in technology and also in the interest of protecting wildlife and the local population.

Another step towards handling fracking could be the global phasing of regulations in order to avoid advantages or disadvantages for industries in specific countries where regulations are more severe or mild. Here it is to decide whether to follow the looser control practiced in the US or the close monitoring taking place in the EU and the UK. Although research shows that the regulations in the EU and the UK are more efficient in protecting the environment and the population countries should also consider avoiding unnecessarily harsh controls and bureaucracy in order to experience the full dimension of economic growth fracking can provide.

In the end Hydraulic fracturing provides a cleaner source of energy but this is not due to the method itself but the natural gas, which still is a fossil fuel and harms the environment and further expedites the destruction of the ozone layer but is less harmful than oil or coal. Governments should therefore while proposing solutions for this topic take into consideration that natural gas is not a solution it's just the lesser evil. Also the high usage of chemicals is to be condemned, as the production of those often goes hand in hand with further environmental pollution and the exploitation of natural resources.

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