



European Association of Mining Industries, Metal Ores & Industrial Minerals

European Shale Gas and Oil via Hydraulic Fracturing

Euromines Position Paper

July 15, 2013

Key messages

1. Mining is a key industry in the EU and a very energy-intensive one, utilising coal, gas and oil as well as electricity...
2. ...and so do its customers: metallurgy, manufacturing, refractories, pulp & paper and other industrial and agricultural sectors.
3. Largely due to the shale boom, the EU is losing competitiveness in energy prices especially vs. the USA that is enjoying an industrial revival, to the point that Saudi Arabia is investing in new petrochemicals capacity in the US. Like with minerals, Europe needs to have access to its own energy resources, including shale oil and gas.
4. Shale oil/gas can address many of the EU's current economic and geopolitical problems: rising energy costs, deteriorating balance of payments and limiting choices on only some source of energy supply.
5. In the context of global warming, natural gas is a possible 'transition fuel', especially after some recent setbacks of renewables and of nuclear, the successful use of hydraulic fracturing technology enhances the role of gas and may significantly lower CO2 emission in Europe.
6. EU land use and water are two issues to be dealt with. In particular the issue of competition for land-use needs to be addressed by the Member States.
7. Close collaboration with government and local communities should allow for sustainable development of the EU hydrocarbons industry.
8. Proppants and other products produced by Euromines members e.g. barytes, bentonite, silica sand, frac sand, magnesium chloride, bentonite are of considerable interest to the extractive industry and can offer a distinct pole of development. Similarly, fracking could be useful for deep mining.
9. For the European extractive industry, the benefits from shale oil and gas exploitation outweigh any potentially negative consequences that can and should be monitored and controlled thus enabling the profound change in fracking technology from medium to low risk
10. Currently, each EU Member State decides alone on its energy policy. However, EU environmental legislation, e.g. the Environmental Liability Directive, the Environmental Impact Assessment Directive etc., can have a considerable impact on the potential of development and could eventually hinder Member States who wish to proceed with this technology. This needs to be reconsidered.

1. About Euromines

Euromines is the recognized representative of the European industry mining metals and minerals, an relatively energy-intensive endeavour. The association's main objective is to promote the industry and to maintain its relations with European institutions at all levels. Euromines provides services to its members with regard to EU policy and serves as a network for cooperation and for the exchange of information throughout the sector within Europe. Euromines also fosters contacts with the mining community throughout the world.

The association represents large and small companies and subsidiaries in Europe and in other parts of the world which provide jobs to more than 350,000 people. Through the activities and operations of these members, more than 42 different metals and minerals are produced. For some metals and minerals, Europe is the world's leading producer.

Euromines provides a formal platform in which the members evaluate the impact of European and International policies and legislation on the industry and define common positions and actions.

2. Hydraulic fracturing – An introduction

Hydraulic fracturing or “fracking” or “fracing”, is a well-stimulation process used to maximize the extraction of underground resources -- including oil, natural gas [conventional or unconventional], geothermal energy, and even water.

The fracking process requires a mixture of water, chemicals and a “proppant” to be pumped into a well at high pressures to fracture rock and allow natural gas to escape. These proppants can be natural e.g. silica sand; synthetic; ceramic, e.g. sintered bauxite, kaolin, alumina; or resin-coated.

The oil and gas industry, starting from the USA, is using hydraulic fracturing together with horizontal drilling to enhance subsurface fracture systems that were previously out-of-reach so that oil or natural gas move more freely from the rock pores to production wells that bring the oil or gas to the surface.

Over the last few years shale gas/oil has become a viable energy source thanks to this technology.

3. The EIA Study of June '13 -- key points

This study deals with reserves, supply and demand for unconventional oil and gas and offers the following insight:

1. Shale adds 47% to global gas reserves, 11% to global oil
2. Shale oil and shale gas resources are –abundantll around the globe, according to a recent study conducted by Advanced Resources International Inc. under contract to the US Energy Information Administration. Russia is ranked first for technically recoverable shale oil resources with 75 billion bbl. China, with 1,115 tcf, is ranked first for technically recoverable shale gas resources. The US is ranked second after Russia for shale oil resources and fourth after Algeria for shale gas resources.

3. Prices and OPEC: Because markets for natural gas are much less globally integrated than world oil markets, the rapid growth in shale gas production since 2006 has significantly lowered natural gas prices in the United States and Canada compared to prices elsewhere and to prices that would likely have prevailed absent the shale boom.

Turning to oil prices, it is important to distinguish between short-term and long-term effects. The increase in U.S. crude oil production in 2012 of 847,000 barrels per day over 2011 was largely attributable to increased production from shales and other tight resources. That increase is likely to have had an effect on prices in 2012. Even with that increase, global spare production capacity was low in 2012 relative to recent historical standards – without it, global spare capacity would have been considerably lower, raising the specter of significantly higher oil prices.

However, the situation is somewhat different in a longer-run setting, in which both global supply and demand forces are likely to substantially reduce the sensitivity of world oil market prices to a rise in production from any particular country or resource outside of OPEC. Undoubtedly, significant volumes of oil production from shale resources that are economically recoverable at prices below those desired by OPEC decision-makers would add to the challenge facing OPEC as it seeks to manage oil prices.

OPEC itself is likely to lose a degree of global leverage as a result of the unconventional oil and gas boom. The Arab uprisings have generated a high level of concerns in key oil producing countries about domestic stability. A number of OPEC's member governments have increased domestic spending substantially to quell those concerns, but this, in turn, compels these governments to keep oil prices high to underwrite growing consumption. This is having the unintended effect of opening opportunities throughout the world to unleash the potential of unconventional oil and gas as well as LNG which become competitively priced when oil prices are high.

4. Gas/oil from shale – Macroeconomics

Production of gas or oil from shale potentially offers many advantages to the European Union. Shale gas development could create tens of thousands of jobs, reduce imports, generate significant tax revenue and support manufacturing. As an example, North Dakota made its first appearance in America's Top Five States for Business. The move was largely a result of the state's oil- and gas- driven dizzying economic growth bigger than China's growth rate.

At the same time, this technology could bring down fuel prices and increase energy independence, while also directly helping meet the targets of a multitude of other EU policies such as the ones on

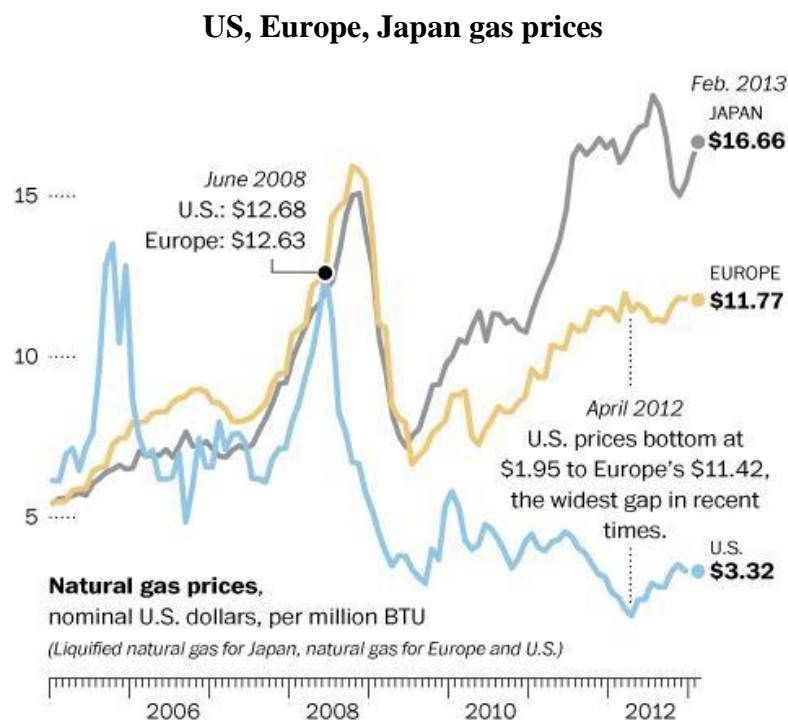
- Energy and Climate Change as per the Green Paper "A 2030 framework for climate and energy policies", but also
- Competitiveness and Technology with the flagship initiative of the 'Europe 2020 strategy' and the State of the Innovation Union Report 2012'

One big consequence of the financial crisis is that manufacturing has leapt up the political agenda in Europe with governments clamoring to proclaim themselves “pro-manufacturing”. The European Commission wants to re-industrialize Europe and aims by 2020 to raise industry’s share of EU gross domestic product from 15.6 per cent to 20 per cent, by improving skills and access to finance. However, owing to high energy prices in the EU, many investors representing the European industry in the steel and chemical sectors consider investing in the USA.

4.1 Fuel prices, inflation

EU government leaders vowed in May to ensure affordable energy costs for households and companies in order to preserve Europe’s competitiveness.

One of the reasons was that gas prices in the US have fallen to about a quarter of the level in Europe. In fact, fracking has seen US natural gas prices to fall to as low as \$2/mmBtu, currently hovering around \$4. This drop is partly due to the difficulties faced by the US in exporting gas, but nevertheless the price differences with Europe and Japan are vast. The following graph shows this comparative evolution.



4.2 Balance-of-payments

The development of domestic hydrocarbon sources the balance of payments of the EU as a whole, and specific countries in particular, will benefit from substitution of gas and oil currently imported

4.3 Effect on budgets: Value Adding and Tax Revenues

As production of shale natural gas grows, so too will its value-added contribution to the **GDP** and to central, regional and local **tax revenues**.

According to a study in 2010 shale gas production contributed \$18.6 billion in federal, state and local government tax and federal royalty revenues. Also, the shale gas contribution to GDP has been more than \$76 billion in 2010 were supported by the shale gas industry. Elsewhere it is estimated that by 2035, shale gas could add more than \$231 billion to the US national GDP and contribute more than \$57 billion in taxes.

An analogous European estimate comes from the UK: 'Shale gas production, with tax rates of up to 62%, could generate significant tax revenue, helping to offset a predicted future tax gap of 1.25% of GDP from lower Fuel Duty and North Sea receipts'.

An indirect effect of the development of shale oil/gas is the possibility of **reduction in government subsidies** for renewables [RES]. U.S. states with laws requiring utilities to buy energy from RES are considering ways to pare back those mandates after the plunge in natural gas prices that shale brought on. Other states with RES portfolio standards are considering legislation that would reduce the need for RES. Such reductions should be welcome in a Europe whose citizens are living in an age of austerity as governments across the region try to eliminate unsustainable budget deficits.

4.4 Job Creating

Shale natural gas amounted to 27% of the overall U.S. natural gas production in 2010, and supported more than 600,000 direct, indirect and induced jobs. As the share of shale gas production increases to 43% in 2015 and 60% in 2035, development of this resource will support more than 800,000 and 1.6 million jobs, respectively. Unconventional oil and natural gas activity created 9 percent of new U.S. jobs in 2011 and now supports over 1.7 million jobs. That is projected to grow to 3 million jobs by the end of the decade. In the US, shale gas could lead to 1 million new manufacturing jobs being created over the next decade.

The study Ohio's Natural Gas and Crude Oil Exploration and Production Industry and the Emerging Utica Gas Formation - Economic Impact Study, published in September 2011, highlighted the economic contribution and benefits of the natural gas and crude oil industry to the State of Ohio. It included an estimate of the economic impacts of planned industry spending for the development of the Utica shale gas formation. One of the findings was, that -more than 204,000 jobs will be created or supported by 2015 due to exploration, leasing, drilling and connector pipeline construction for the Utica Shale reserve."

4.5 Technology

Specific regions in the EU, starting from the UK, Poland, Lithuania, Spain and elsewhere [including the Ukraine, Turkey and Russia itself outside the EU], could develop into centers of expertise and excellence for European shale gas.

The UK government overseer position was recently created within the Department of Energy and Climate Change _to promote the safe, responsible and environmentally sound recovery of the UK's unconventional reserves of gas and oil.' Operators, politicians and scientists underlined the importance of fostering know-how in the industry not only to take advantage of the North West regions' shale gas reserves, but also to minimize any potential risk of environmental impacts.

Progress in hydraulic fracturing technologies could also pave the way for development of other mining methods eg. in situ mining to extract metals from deep-laying [below 2000 m] European deposits.

5. Gas/oil from shale – Strengthening the Industrial Base

European manufacturing has shed about 3.5m jobs since the global financial crisis hit in 2008. European industrial production remains 10 per cent below pre-2008 levels.

However, Europe remains [and should continue to do so] **a world leader** in areas from car and truck manufacturing to aerospace and chemicals, and its focus on high-tech niches – which are less subject to low-cost competition – is also a source of strength. Shale gas/oil are among the key factors that can support manufacturing, in three critical areas:

- as a source of direct combustion energy
- as fuel for electricity production and
- as feed for petrochemicals

Many domestic industries, including steel, cement, chemicals, fertilizers, glass, refractories and petrochemicals, rely on natural gas as a feedstock, energy source - or both. Low and stable energy prices due to the introduction of this resource in Europe, could mean that industrial groups will increase their use of this product spurring greater investment and job creation. *Note:* In the US it has been estimated that this also leads to increased competitiveness of domestic manufacturers and will result in 3% and 4.7% growth in industrial production by 2017 and 2035, respectively. 2012 gas prices in the US were about four times lower than in Europe.

As for the use of shale gas as **feedstock for petrochemicals**, the recent example of Saudi new multibillion USD investment by the Saudi state in the US shows the significance of low-priced naphtha feed.

Regarding **power generation**, it is characteristic that electricity prices were last year about twice as high as in the US.

Lastly, the steel industry is benefiting from the shale revolution, especially in steel tubes for the oil and gas industry, as evidenced i.a. by the new \$1.05 bn Vallourec Star pipe mill in eastern Ohio.

Impact of Shale on the Mining/Metals Industry

The EU extractive industry is a vital subsector of EU. It provides raw materials and products that are indispensable to a vast array of uses, including construction, metallurgy, defense, human nutrition, pharmaceuticals, fertilisers, animal feed, environmental protection and restoration, and a wealth of other industrial applications.

By its nature, the sector is a heavy user of energy, especially in the phases of ore hauling, metallurgical processing and some electricity-intensive processes such as smelting and pyrolysis.

Furthermore, the European mining industry could prove a future producer and supplier of proppants and has a strong interest in the development of such products in an efficient and environmentally friendly.

6. Geopolitical issues

Energy independence

EU bans and moratoria could delay the replacement of much of the high-priced Russian and North African gas with cheaper domestic production, although the EU could benefit from cheap imports of Liquefied Natural Gas (LNG) from the US. Lack of support on development of domestic European shale gas technologies will deepen European reliance on gas from Norway and Russia which, together with a new rush to hard coal burning, may be the unintended yet inevitable consequences. Just as the German phase-out of nuclear energy production has resulted in Germany's increased imports of French and Czech nuclear energy, Europe's blockage of shale exploration is providing Russia with a good reason to intensify extraction from its own conventional but also shale resources.

In Europe, population density, environmental concerns, politics and some technical difficulties are holding back shale gas exploration and the continent remains reliant on more expensive Russian and Norwegian gas.

According to the U.S. EIA Annual Energy Outlook 2012, the United States possesses 482 trillion cubic feet [Tcf] of shale gas. At the 2010 rate of U.S. consumption, this represents supply for 20 years of use. Shale gas in 2010 made up 23 % of total U.S. natural gas production and could constitute 49 % of U.S. total natural gas production in 2035, as projected in the EIA Annual Energy Outlook 2012 [early release].

The European situation could end up being even more positive, even if recent statements by BP prove over-optimistic: "We tend to forget that we are extremely lucky in Europe that we have got such a resource—1 trillion cubic meters of gas. We are far from having an issue of supply or security of supply around Europe...We are surrounded by natural gas and it is secure...Taking unconventional gas into account, Europe had 2-3 centuries of resource available".

An example for a particular EU country is the UK, where it has been estimated that shale gas could supply a third of UK needs.

Cold War politics over EU shale gas?

There are two big incentives for the US to encourage European countries to move towards natural gas extraction. Most of the big oil and gas companies are American - Chevron, for example, is exploring over 3 million acres of land in Poland and Romania for its natural gas potential. Also, every kilowatt produced by European natural gas reduces their reliance on Russian energy giant Gazprom.

Another issue that is, for the moment, being overlooked is the effect on Europe when China develops its own shale potential as the EU will be faced with its two biggest trading partners, the US and China, acquiring a powerful competitive advantage.

Moreover, before developing its own sources, China through Sinopec Corp invested \$2.5 billion investment in a third of Devon Energy's five shale gas assets in the US.

Interestingly, Saudi Arabia has officially welcomed the boom in US shale production because 'it will reassure consumers about the reliability of oil supplies'. The CEO of Saudi Aramco, told the FT that the shale revolution had helped ease fears about excessive reliance on the Middle East, and encouraged governments to be more pragmatic and rational' about energy policy.

Two other very characteristic developments took place. First, the topic was the subject of a March 11, '13 report by the NATO Parliamentary Assembly, Economics and Security Committee, that focused on the economic and strategic implications of the unconventional oil and gas revolution, and second OPEC raised a committee to 'study the likely impacts of the discovery on the international oil prices and the likely economic impacts on the oil-producing countries'.

7. Recent policy developments

The EU, DG Energy, the Directorate-General for Energy, European Commission, has invited proposals by public authorities in EU member states in relation to organizing public debates and information campaigns on shale gas in the region.

The European Parliament Committee on Industry, Research & Energy issued a "Draft Report On Industrial, Energy And Other Aspects Of Shale Gas And Oil", 2012. This is a Motion for a European Parliament Resolution on industrial, energy and other aspects of shale gas and oil.

A study has been then undertaken by the Joint Research Centre, the European Commission's in-house science service, titled 'Unconventional Gas: Potential Energy Market Impacts in the European Union', JRC Scientific and Policy Reports, European Commission'. The report emphasises -aiming at zero harmful emissions and the lowest possible environmental footprint; aiming at 50% cost reductions for large-scale drilling campaigns; investing in research and development, as well as human resource capacity and establishing and building the required technology in Europe; supporting large-scale field developments with several hundreds of rigs operating in Europe for many decades, and developing and building the required infrastructure.

Political support mechanisms for fracking are currently being considered in the UK, Ukraine, Lithuania, Poland, Romania and Germany and large companies such as Royal Dutch Shell, Chevron Corp., Cuadrilla and IGas have begun to move in to take advantage of this support.

Anne Glover, Chief Scientific Adviser to the EU opined that shale gas extraction should be permitted across Europe'. The EU executive launched a green paper on 27 March, 2013, setting out Europe's energy and climate aims for 2030, with Energy Commissioner

Günther Oettinger has taken a favourable position on shale gas. Climate Commissioner Connie Hedegaard has adopted a less favourable tone, believing its extraction in Europe bears little comparison with the US. António Fernando Correia de Campos, the Portuguese MEP who chairs the Parliament's science and technology options assessment panel, also endorsed shale during the debate.

All three Commissioners are looking at shale gas together within the European Commission, and whatever will be done will be a proposal at the level of the College of Commissioners.

The British Government is working to **streamline the process to obtain permissions for exploratory shale wells**, said Duarte Figueira, Head of the Office for Unconventional Gas and Oil [OUGO]. "We want to streamline, simplify, but also to make sure that we don't miss anything", said Figueira at the conference "Shale Gas – Lancashire's next industrial revolution?" organized by the employer group Institute of Directors in Preston, Lancashire earlier this year. Energy Secretary Ed Davey said that gas would play a key role in the UK's energy mix over the next two decades, with unconventional gas making a difference'.

A complicated planning and permitting regime is the biggest barrier to the development of onshore shale gas. A UK report assesses barriers in five major areas: infrastructure and equipment; skills and the supply chain; finance and tax; regulation; and reputation. It concludes that gas transportation and gathering pipelines, water supply and the availability of drilling and pressure pumping equipment are unlikely to pose serious obstacles to large-scale exploitation of Britain's shale formations...The tax regime for onshore shale gas will not be a major barrier after the government made a series of concessions in the 2013 budget, which aim to balance the need to raise substantial tax revenue with the need to encourage development of the resource.

Although the recognition by national politicians, operators claim that the regulatory framework is still confusing. For example, Corin Taylor of the UK Institute of Directors addressed this point on May 23, 2013, suggesting that the first barrier to shale gas explorations is the planning and permitting process. The four agencies involved are the Department of Energy and Climate Change, the Environmental Agency, the Health and Safety Executive and the Local Mineral Planning Authority [e.g. Lancashire County Council].

Italian Industry Minister Flavio Zanonato said at a hearing at the Senate on June 5, '13 that shale gas is a true revolution which, however, risks putting Italy's industry at additional disadvantage. Italy risks losing entire production chains and it cannot afford to have energy at even higher costs than the current ones which are already 20-30% above the average of its competitors...Italy must speed up the adoption of measures to bridge the gap in terms of energy costs'.

For its part, China issued its 12th Five-Year Plan [2011-2015] and a shale and other unconventional gas strategy covering the same period. Furthermore, China National Petroleum Corporation and China Petrochemical Corporation [Sinopec Group] dominate shale gas exploration and development in the mainland market, in addition to planning to

experiment with carbon trading schemes during the next three years as it seeks to cut emissions by 40 per cent relative to economic output by 2020, from 2005 levels.

The European Commission's Directorate for Energy and Japan's Ministry of Economy, Trade and Industry have started cooperation to assess how they can support the creation of liquid and flexible global natural gas markets. The EU is considering ways to lower energy prices as the shale-gas revolution widens the cost gap between Europe and the U.S., its largest trading partner. During the exchange between the EU and Japan, experts will discuss the impact of the shale-gas revolution in North America, rising gas demand in Asia and divergence in gas prices in regional markets, the Commission said June 6, 2013.

8. Concluding remarks

General

Europe lags behind in industrial competitiveness, partly due to the cost of being European and this becomes much more important in today's dire financial and social conditions in Europe. Energy is a big factor for mining/metallurgy, steel, cement, glass, refractories, transport which are all very energy-intensive industries.

EU leaders, desperate to give growth a boost, target energy policy May 22, 2013 amid concerns a US-led revolution in shale oil and gas development will reshape the global economy and leave Europe far behind and urged faster integration of the bloc's power and natural-gas markets to lower energy prices as the U.S. shale-gas revolution widens the EU's cost gap with its largest trading partner.

The summit initiative came after a record drop in private investment in Europe and the biggest-ever slump in the EU carbon market, designed to cut pollution and stimulate a shift to cleaner fuels.

Shale-gas production has contributed to a widening gap between U.S. and EU industrial prices for energy, according to a commission report prepared for the summit. In 2012, industry gas prices were more than four times lower in the U.S. than in Europe, the report said.

According to the conclusions of the European Council based on the meeting of May 22, 2013 it remains crucial to further intensify the diversification of Europe's energy supply and develop indigenous energy resources to ensure security of supply, reduce the EU's external energy dependency and stimulate economic growth. To that end: the Commission intends to assess a more systematic recourse to on-shore and off-shore indigenous sources of energy with a view to their safe, sustainable and cost-effective exploitation while respecting Member States' choices of energy mix;

European nuclear power, due to public perception of nuclear safety, is experiencing serious setback in Germany. The EU ETS is problematic because not only market-wise, mostly due to the recession, but also politically -- it is highly likely the recent EP vote has taken US fracking into account.

In parallel with fracking itself, there is a need to develop a European frac sands and synthetic proppants industry: efforts have been made in the UK and in Poland which will be producing ceramic proppants by 2014 in order to reduce their imports from the US and China.

Environmental benefits and risks

Natural gas has significant **environmental benefits** compared with any other fossil fuel. Since 2007, energy-related CO₂ emissions in the USA have decreased more than 10 percent, to their lowest levels in nearly two decades, due in large part to the substitution of natural gas for coal in electricity generation. In the EU CO₂ emissions have also decreased due to the economic crisis, the exodus of a number of energy intensive industries and the EU's ETS scheme that has tried to implement a cap on CO₂ emissions.

EU-produced shale gas could reduce carbon emissions by replacing gas imports. A recent report for the EC found that emissions from well-regulated shale gas production are up to 10 per cent lower than from gas imported by pipeline or liquefied natural gas from outside Europe. The UK Committee on Climate Change concluded in May 2013 that UK shale gas development is consistent with our emissions targets.

There are still open questions on the life-cycle climate impact advantage for shale gas, as increased greenhouse gas emissions during production do occur. More research is needed on this topic as most studies explicitly state large uncertainty in some, or many, of their assumptions.

Using natural gas in place of diesel and petrol in road transport, where this is technically feasible and economically possible improves environmental and health conditions. In the US, natural gas now powers nearly one in five buses, and the chief executive of FedEx has predicted that up to 30 per cent of US long-distance trucking will be fuelled by compressed or liquefied natural gas within a decade. Gas as a transport fuel can complement the development of hybrid and electric vehicles, helping to reduce the estimated 5,000 premature deaths each year from road pollution.

There is a need to assess, control and mitigate **environmental risks** from possibly adverse phenomena associated with shale and fracking, including impacts on landscape from truck transport and waste water ponds. Careful design and operating & maintenance practices are already reducing these emissions.

With respect to water, chemical, physical, and toxicological properties can be used to aid identification of potential exposure pathways and chemicals of concern related to hydraulic fracturing wastewaters to avoid spills and leaks.

EU vs. national policies?

In May '13 the EU Climate Action Commissioner Connie Hedegaard opined that shale gas prices in Europe won't reach US low...gas extraction in Europe would not be as cost-effective as in the US due to geographical and geological reasons...it is more difficult

geologically in Europe, many more people living in different spots – so for these reasons – the experts say – we will not have prices as low as in United States...if a European Union Member State – Lithuania or any other country – wants to produce shale gas, the Commission will not object, yet each country should first assess environmental impact.

Macroeconomics vs. local land-owners' interests

In contrast to the United States, where minerals are owned privately and landowners receive royalties, in many EU countries oil and gas are state property and royalties are paid to the national treasury. Thus, neither local landowners nor local planning authorities stand to gain much from the development of shale resources in their areas.

Public Consultation on Unconventional Fossil Fuels: Europeans Want Developments, June 12, '13.

The majority of respondents to the public consultation about unconventional fossil fuels in Europe were in favor of developments in the Old Continent, with more than 30% thinking that shale gas should be developed in Europe also without health and environmental safeguards.

According to the results released June 7 by the European Commission, Poland and Norway are the two most shale enthusiastic countries, while France and Spain are amongst the most skeptical. Avoiding an increase of the EU's energy import dependency and strengthening the negotiation position towards external energy suppliers were the two main reasons for respondents to back developments of unconventional fossil fuels. According to the respondents, the main potential benefits are related to EU economy and industry.

The major challenges underlined by respondents are the lack of transparency and public information, an inadequate legislation applicable to these projects and a lack of public acceptance. A large majority of respondents agree on the lack of adequate legislation, the need for public information and the lack of public acceptance of unconventional fossil fuels, reads the presentation.

Environment Committee of the European Parliament

On July 11, '13 the Environment Committee of the European Parliament has voted in favour of imposing mandatory Environmental Impact Assessments [EIA's] for all shale gas drilling activities in the European Union.

Geopolitics

Russia's geopolitical influence can only be mitigated with cheap, domestic gas & oil in Europe. Europe is now importing coal from the US but is Europe also [implicitly] counting on imports of fracking-derived LNG/oil from the US? If so, that is reminiscent of the post-WW II period, with the US and [recently] China taking all the risks while Europeans enjoy their lifestyle...and end-up complaining about US "imperialism" and Chinese dumping'!

Full references are available on request.