THE ECONOMIC CONSEQUENCES OF SHALE GAS DEVELOPMENT IN CENTRAL AND EASTERN EUROPE IN REGIONAL CONTEXT

CONSECINŢELE ECONOMICE ALE DEZVOLTĂRII GAZELOR DE SIST ÎN EUROPA CENTRALĂ ŞI DE EST ÎN CONTEXT REGIONAL

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Abstract
Shale gas is considered a very important subject for European Union global gas markets. Shale gas has become a common discussion topic in the industry as nobody wants to miss the opportunities that are related to the exploitation of gas from these resources. Therefore, policymakers in many countries with shale gas resources are seeking to replicate the success of shale gas in the US.
Shale gas offers the hope of cheaper gas prices, and hence a way to prevent energy-intensive industry. It promises to weaken Russia's ability to impose high, oil-indexed prices for its gas in many European markets, especially in Central and Eastern Europe, where countries have little or no other source of supply. And, for these price-related reasons, the shale gas will have an important contribution in gaze industry from Central and Eastern Europe. In short, its proponents argue that shale gas would allow Europeans to become masters of their own destiny.

***Keywords*:** shale gas resources, economic development, renewable energy, policymakers

JEL CODES: G28, J08, O13, P28, P48, Q42

Rezumat
Gazele de şist au devenit un subiect tot mai important pentru piaţa globală de gaze naturale din Uniunea Europeană. Discuţiile despre gazele de şist reprezintă o topică tot mai des întâlnită din industria gazelor, deoarece nimeni nu vrea să rateze oportunităţile care sunt legate de extragerea acestor resurse. Factorii de decizie politică din mai multe ţări care beneficiază de gaze de şist doresc să repete succesul din Statele Unite ale Americii.
Gazele de şist oferă speranţa unui preţ mai ieftin al gazului şi prin urmare o modalitate de a preveni industria consumatoare de energie intensivă. Aceasta promite să slăbească abilitatea Rusiei de a impune preţuri ridicate pentru petrol şi gaze pe mai multe pieţe europene şi în special în Europa Centrală şi de Est, unde ţările componente au puţine modalităţi de substituţie sau nu au altă sursă de aprovizionare. Din aceste motive legate de preţuri, producţia de gaze de şist ar deţine o contribuţie importantă în industria gazelor din ţările din Europa Centrală şi de Est. Cu alte cuvinte, gazele de şist le vor permite ţărilor europene care le deţin să devină stăpânii propriului destin.

Cuvinte cheie: gaze de şist, dezvoltare economică, energie regenerabilă, factori de decizie politici

1. INTRODUCTION

Natural gas is produced from different types of gas accumulations. These accumulations are classified into conventional and unconventional gas resources. The conventional ones can be either associated gas (gas produced along with oil), gas cap gas (a gas column in direct communication with an oil column below) or non-associated gas (gas reservoir by itself). The unconventional gas is non-associated gas and it comes from different hydrocarbon bearing formations that are classified as tight gas, coal bed methane, shale gas or gas hydrates. The first two types were produced for more than three decades, though shale gas only started to be exploited about ten years ago.

2. THE ECONOMIC IMPACT OF DEVELOPING THE SHALE GAS INDUSTRY

Shale Gas is natural gas that is present in shale rocks. Throughout the world, different types of sedimentary rock contain natural gas deposits, for example sandstones, limestones or shales. Sandstone rocks often have high permeability, which means that the tiny pores within the rock are well connected and gas can flow easily through the rock. In contrast, shale rocks usually have very low permeability, making gas production more complex and costly.

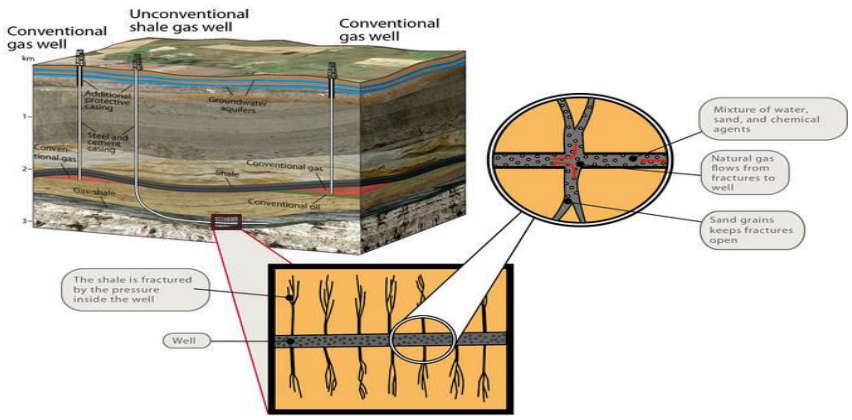

FIGURE 1: SHALE GAS POSITION IN THE EARTH'S CRUST
Source: http://www.shale-gas-information-platform.org/what-is-shale-gas.html

Shale gas is considered a so-called "unconventional gas", together with "tight gas" from sandstones or limestones with low permeability and "coal bed methane" (CBM). While both conventional and unconventional deposits do host natural gas, it's the more elaborate production methods that distinguish unconventional from conventional deposits; hydraulic fracturing is often applied to unconventional natural gas deposits.

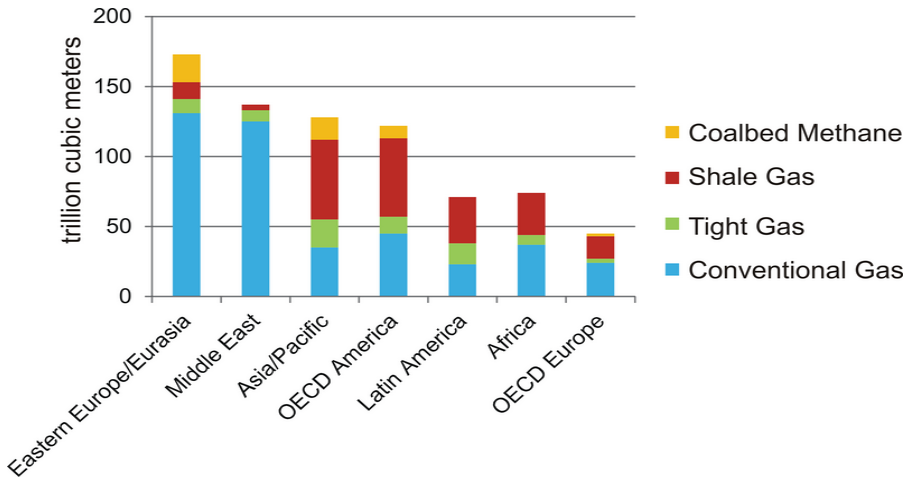

FIGURE 2: DISTRIBUTION OF DIFFERENT GAS RESOURCES OVER THE WORLD
Source: Golden Rules for a Golden Age of Gas, IEA, 2012

Like oil and coal, natural gas in shales has, essentially, formed from the remains of plants, animals, and micro-organisms that lived millions of years ago. Though there are different theories on the origins of fossil fuels, the most widely accepted is that they are formed when organic matter (such as the remains of a plant or animal) is buried, compressed and heated in the earth´s crust for long time. In the case of natural gas, this is referred to as thermogenic methane generation. Though the basic principles of shale gas formation are fairly well understood, generation of the gas within individual shales may differ significantly (Belkin, 2013). Better knowledge is needed e.g. on basin modeling, petrophysical characterization, or gas flow in shales for an improved understanding of unconventional reservoirs.

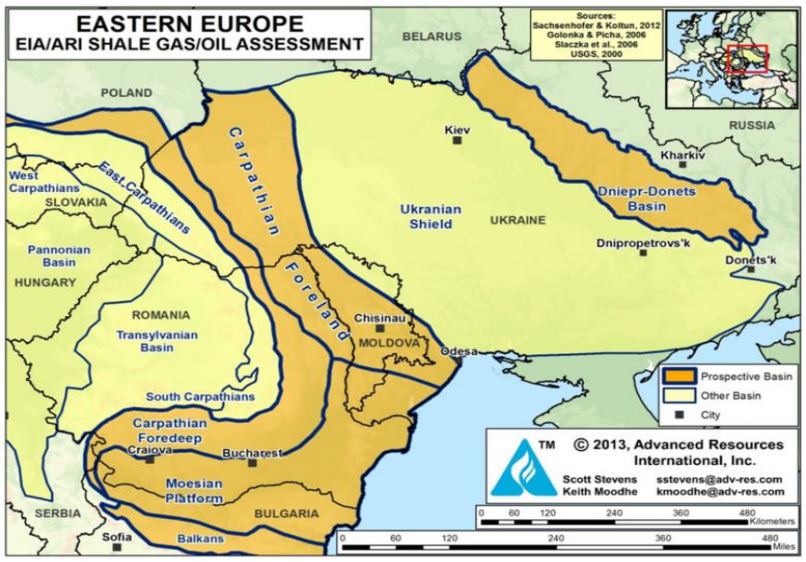

FIGURE 3: DISTRIBUTION OF SHALE GAS IN CENTRAL AND EASTERN EUROPES (CEE)
Source: http://openeuropeblog.blogspot.ro/2014/03/could-ukrainian-shale-gas-break.html

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For European gas shales this research is conducted within GASH, the first European interdisciplinary shale gas research initiative. GASH integrates available knowledge on European shales and conducts research projects in order to predict shale gas formation and occurrence in time and space.

According to the EIA report from 2013, the United States possesses 567 trillion cubic feet (Tcf) of technically recoverable shale gas. At the 2012 rate of U.S. gas consumption, this represents enough supply for 22 years of use. In 2011, 34 % of all U.S. natural gas produced was shale gas, and this could rise to 50 % of U.S. total natural gas production in 2040, as projected in the EIA's Annual Energy Outlook.

Shale gas resource estimates for some European countries are shown in above, indicating very large shale gas resources for some countries: Poland 12-27 (possibly up to 67) Tcf (Polish National Geological Service; March, 2012); Germany 25-81 Tcf (German Federal Institute for Geosciences and Natural Resources; May, 2012), United Kingdom 822-2281 Tcf (British Geological Survey; July 2013). This could serve to secure long-term natural gas needs from a domestic source, since currently most European countries rely strongly on imports (only The Netherlands, Denmark and Norway are natural gas exporters).

Positive economic impact - several reports have concluded that the shale gas industry in the U.S. has created a large number of jobs and has had a profound, positive economic impact, such as reducing consumer costs of natural gas and electricity, stimulating economic growth and increasing federal, state and local tax revenue. Globally, 32 % of the total estimated natural gas resources are in shale formations (EIA, 2013). Due to its proven quick production in large volumes at a relatively low cost, extraction of shale gas resources has revolutionized the U.S. natural gas industry, providing 40 % of total U.S. natural gas production in 2012 (BP Statistical Review of World Energy 2013).

Much of the European debate has been framed in terms of opting for cheaper US-style shale gas instead of expensive renewable energy. (Belkin 2013). The divergence between high energy prices in the EU and lower ones in the US is undoubtedly a worry. As the Commission notes with alarm in its March 2013 green paper on the future of energy and climate policy, in 2012 industry gas prices were more than four times lower in the US than in Europe. It cites IEA data which show that, for the 2005-12 period, electricity prices charged to industry rose by an average of 38 per cent in real terms in west European countries, while in the US they decreased by 4 per cent, mostly because of lower gas generation costs.

Like much of European industry, the Commission's response to this growing transatlantic divergence in energy prices has been to urge development of shale gas. But a divergence in prices is not an

automatic reason to jettison Europe's climate and clean energy policies. The green paper says that "it is clear that higher ETS [Emission Trading Scheme] prices and policies to expand renewables generation capacity by providing support or preferential treatment to bring them to the market could increase electricity prices". So far, it is not clear that this is case. The cost of ETS allowances is too low to have much of an impact on electricity prices. And research in the UK shows that increases in domestic electricity and gas bills in recent years (2000-11) have been primarily driven by the rising cost of energy commodities rather than energy policies.
Moreover, before panicking over price divergences with the US, it is worth remembering that competing on the basis of cheap energy is not always self-evidently sensible.

During the post-war period, Europe and Japan successfully competed with the US in cars and all sorts of energy-using appliances; it was Detroit that needed a government bail-out, not the European car industry. Higher prices have driven efficiency in products that sell around the world. Countries can adjust to higher energy prices by shedding jobs in energy-intensive sectors (in which energy is a significant cost in the manufacture, not the use, of a product) and gaining jobs in sectors providing energy-efficient appliances and services.

At the same time, it is true that the availability of affordable energy has driven growth and industrialization over the past two or three centuries. (Buchan, 2013). At present, Europe's energy-intensive industries – that is, sectors such as chemicals, petrochemicals and aluminum – all worry that they will lose jobs and market share to US companies. Industry associations such as Eurofer for steel, and Cefic for chemicals, see salvation in shale gas in Europe. They point out, for instance, that gas accounts for 35 per cent of energy used by Europe's chemical industry, while for fertilizer makers, gas represents 60-80 per cent of the total cost of the product. Nowhere is the clamour about competitiveness louder than in Germany. And this matters politically, because Germany currently exercises the greatest influence on Europe's decisions (or indecisions). Significantly, when the president of the European Commission, José Manuel Barroso, addressed an EU summit in May on the topic of energy, he chose to highlight the issue of competitiveness by using a chart that showed energy input costs for German industry only.

Europe could usefully learn from US experience and mistakes. One lesson from the US, already noted, is to take an earlier view of the cumulative effects of shale development by, for instance, planning infrastructure. This is necessary, even though consideration of the cumulative effects of a shale gas project may lead to a local community rejecting it. Another lesson would be to avoid what might be called the factory approach of mass drilling of wells in the US, which is the result of relatively lax

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regulation and, as already noted, of the pattern of individuals owning the gas as well as the land. A more selective approach, which took more time to identify the best targets, would obviously be better suited to a more densely populated region such as Europe.

In general, policy-makers and regulators should judiciously weigh up the risks and rewards. As the IEA puts it, "in designing an appropriate regulatory framework, policy-makers need to set the highest reasonable social and environmental standards, assessing the cost of any residual risk against the cost of still higher standards (which could include the abandonment of resource exploitation)" (Awerbuch, 2004).

Development of shale gas could moderate the increase in Europe's dependence on imported gas, as shown in the IEA projection. However, this rising share of unconventional gas in European gas production (which would approach 50 per cent by 2035) assumes that every EU member state with shale gas potential exploits it. This would mean countries with shale gas potential, such as France and Bulgaria, reversing their bans on fracking – and that would entail designing a European model for shale gas development that was attractive enough to encourage Paris and Sofia to do so.

Europe's indigenous shale gas could well undercut the price of Russia's oil-indexed gas shipments to Europe, and it might even match the cost of LNG coming to Europe from places like Qatar and Nigeria. But it seems unlikely that European shale gas will be cheap enough to match the price of US gas. It is unlikely, therefore, to replicate the effect it has had in the US, of squeezing coal's share in power generation and so reducing emissions – unless shale gas was given specific policy support. Some countries might do this; the UK government, for example, has promised tax benefits for shale developers. But European opinion on shale gas is too divided for such support to be repeated at EU level. So even with the best will and rules in the world, shale gas does not look like a game-changer for Europe in terms of either security of supply or emissions reduction.

CONCLUSIONS

There is no reason why EU countries should not try to exploit shale gas, if they choose to do so, provided they are clear-eyed about its limitations and difficulties. The US experience appears to be that the pollution risks are avoidable, but that some environmental disruption and disturbance is unavoidable. Whether that is tolerable should be for member-states and their local communities to decide. However, there is one big caveat. Shale gas exploitation must not be sold to the European public on a bogus prospectus that it will be cheap or easy or an alternative to renewable energy. To set

shale gas in a false antithesis to renewable energy would undermine Europe's transition to a low carbon economy.

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