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SHALE GAS IN POLAND AND THE CZECH REPUBLIC: Regulation, Infrastructure and Perspectives of Cooperation

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Jan Osička, Dominik Smyrgała, Veronika Zapletalová**



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The authors of this study declare that they are wholly responsible for the following text, including any possible inaccuracies or mistakes.

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1. INTRODUCTION

The advent of shale gas is probably the most important event of the world energy industry in the last decade. The story of how only within the course of several of years it switched from the potentially largest import market in the world to nearly exporting producer is already notorious. A lot has been written on the implications which this originally purely domestic American phenomenon had on the global markets with natural gas, as well as with other energy commodities, and more broadly about its effects in the field of energy and climate policies set by a vast number of countries which take part in these markets. Attention is currently devoted to the matter whether it will be possible to develop the extraction of unconventional gas resources in other areas of the world as well. Europe has ideal conditions in this sense – the growing market, developed infrastructure, nearly liberalized market and the willingness to pay high prices. However, even if the geological conditions prove favourable, the development of shale gas in Europe is far from being granted. NIMBY issues, controversial environmental impact of the extraction process at the peak of its development, a number of national markets being tied by long-term contracts and/or by the protectionist tendencies, and a strong lobby of the competing branches of the energy industry or within the gas sector itself present a considerable challenge for shale gas.

This study focuses on the current development of the events associated with shale gas in the Czech Republic and Poland with regard to their possible mutual cooperation. The foundation of the research consists of the two case studies on regulatory frameworks in these countries. Given the fact that both countries are at different stages of the shale gas developing process, further attention is paid to country-specific aspects, which form the core of the current internal national debate. In the Czech Republic, the discussion is led over a two-year moratorium on exploration, which the Ministry of the Environment has proposed most likely under the influence of a strongly polarized debate over shale gas and public opposition to hydraulic fracturing. In Poland, the debate primarily addresses the burden of taxation, infrastructure requirements and, to some extent, the physical security. The reference to the regulation and internal affairs at the level of national states is then supplemented by the analysis of the current discussion on shale gas regulation at the level of the European Union.

Because of the highly competitive nature of the energy industry, researchers studying it face a series of problems. Many state bureaus and private companies are unwilling

to share precise data, making it difficult to identify the long-term strategies of individual energy players. Furthermore, available data often is not completely conclusive or credible, whether due to its providers' limited reliability or because accurate data is missing.

For that reason, we paid special attention to verifying all information by checking it against several sources. However, in some cases even very reliable and respected sources diverged considerably. In cases where data could not be fully verified, we considered the information to be unverified. We used dozens of open resources, including frequent reference of IEA materials, as well as inter-views, discussions, and fieldwork.

Data collection took place in the Czech Republic, Poland, and Brussels, from January 2012 to October 2012.

2. OVERALL METHODOLOGY

Due to the complicated and rather sensitive matters which the report covers, a special methodology had to be adopted. The shale gas exploration and production are of significant importance to business, policy and security. They are also of great vulnerability to lobbying activities and international politics. For these reasons, it proved difficult to find credible open sources of information. Most of the public and local institutions and especially companies are rather reluctant to provide any information for they deem it could potentially harm their interests. Materials and data of promotional character are being an honorable exception here.

Therefore, in order to avoid the problems related to the limited retrievability and the access to documentation (or its lack of objectivity), the methodology chosen was that of a case study based upon various sources of information. It was designed according to the principles defined by Robert K. Yin (Yin 2009).

As the case study method is largely about investigating a certain phenomenon in its context, the introductory parts of the chapters on Poland and the Czech Republic are dedicated to provide the general background for the focal factors of this research (law, infrastructure and security). These factors are deeply influenced by the international political environment, which therefore became an important part of the research. This part was largely based upon the known literature, existing analytical, statistical and legal documents and to some extent – media coverage. The general source of global statistical information was the BP Statistical Review of World Energy. The most important sources included the statistical information of companies usually obtained via their websites (Gaz-System; PGNiG – this also applies to the statistical information on infrastructure obtained from the Gas Infrastructure Europe), the reports of different think tanks, consulting companies and think tanks - Morgan Stanley, AEA, Centre for Eastern Studies, the Polish Institute of International Affairs, the International Institute of Political Science of Masaryk University, Instytut Kościuszki, Instytut Sobieskiego.

The whole picture consists of analyses of three actors – Poland, the Czech Republic and the European Union. Given the relative importance of recent developments in Poland the attention was mainly paid to her. The Polish case was thus examined by modified methodology (see chapter 3.1.1) enabling the researchers to recover more information from available data during limited time of the research. For analysis of the cases of the Czech Republic and the European Union standard case study method (Yin 2009) was employed.

3. ANALYSIS

3.1 POLAND

3.1.1. Methodology

After introducing the context of the case, hypotheses of how various factors impact the development of the shale gas production were then defined, tested, analyzed and concluded. The evidence came from the interviews sent to professionals working for some of the most important actors in the field of the shale gas exploration. The hypothetical Impact Factors to the development of the shale gas production were defined as follows:

- (1) Protectionism of local service sector especially regarding drilling firms; restrictions to foreign drilling firms to enter the Polish market (for example a requirement to operators of drilling equipment to have local permissions); long lasting procedures for importing the drilling equipment from outside the EU; the necessity to announce tenders for drilling operations (Impact Factor “Regulation”);
- (2) Uncertainty concerning the price of gas on the regulated market; complicated regulation concerning access to geological information and high price of such information; changing and unclear regulation regarding the environment protection (Impact Factor “Information”);
- (3) Capability of Polish roads and bridges to accommodate vast numbers of heavy trucks carrying equipment and material; new pipelines necessary for transportation of produced gas to existing infrastructure; available capacity in distribution pipeline network; available capacity in transit pipeline network; new distribution and transit pipelines needed for new gas marketing (Impact Factor “Infrastructure”);
- (4) Physical security of the infrastructure (Impact Factor “Security”).

In effect, the first verification of the hypothetical Impact Factors was conducted, thus becoming a theoretical model to be tested by the material gathered from the interviews. They were supposed to provide the evidence and were designed in a way allowing for the respondents who are the direct observers and participants of the shale gas development in Poland to use both their insight into the matters and construct single case study for analysis. In order to provide that, it was indispensable to reach the representatives of all the types of actors involved in the process. In the same time, their responses must remain anonymous to make sure that they are not biased with the interests of the institutions where they work, not to mention the great sensitivity of the matters. The respondents were chosen according to the following criteria:

- External auditor of one of the state-owned companies operating in the sector (Respondent A);
- Legal advisor of the board of management of a private drilling company (Respondent B);
- Advisor of the head of one of the central bodies of public administration responsible for hydrocarbons (Respondent C);
- Senior analyst at the pipeline construction company (Respondent D).

The interview consisted of the following questions:

1. Do you know any cases of the state protectionism (or other form of favoring of the Polish/foreign companies) as far as exploration or production of hydrocarbons is concerned?
2. What is your opinion of the restrictions imposed upon the companies exploring energy resources trying to access the Polish market? Are they justified?
3. Are the procedures in your institutions related to exploration and production of shale gas (e.g. importing the equipment) efficient or unnecessarily lengthy?
4. What is your opinion of the way the public tender law operates in the field of exploration and production on energy resources, especially the shale gas?
5. What is your opinion about the access to geological information and regulations related to the environment protection in the context of the shale gas exploration and future production?
6. Does the Polish road and general transport infrastructure have enough capacity to allow for an efficient heavy truck transportation related to drilling equipment?
7. Does the pipeline infrastructure have sufficient capacity to allow for an efficient transit of the shale gas, including its exports abroad?
8. What are the greatest threats (including the physical ones) to the development of the shale gas production and trade?
9. Other remarks and observations.

All of the respondents provided their responses, though the value of their answers varied, as due to their professional activities, they did not always have the access to required information. The analytical technique used to draw the conclusions was the cross-case synthesis. By adopting these measures, the weaknesses of different kind of evidence were neutralized to the highest possible extent.

3.1.2. General Background

Poland consumes approximately 14.3 bcm of natural gas per year, which represents 12.7% of its TPES. Natural gas is therefore less important than coal or oil as a source of energy in Poland. Due to the condition of the thermal power stations (and the commitment to decrease CO₂ emissions), it is nonetheless the resource

with the biggest growth potential. Poland imports 70% of its consumption, with Russia being the largest supplier. Minor volumes are imported from Russia and recently also from the Czech Republic. Despite that, Poland generally lacks significant interconnection with the neighboring states. (Černoch, et al., 2011, pp. 72-73)

Presenting the international context of the shale gas production in Poland would require a separate study of much greater volume. In general, they have been discussed in many documents before. For, for example, recent developments and network analysis of the key actors of Polish shale gas industry, see Černoch, et al., 2012. However, for the needs of this report, it was necessary to briefly define the most important events and phenomena in the global energy market and international relations taking place recently that impact the unconventional energy production in Central Eastern Europe. The most important factors identified are:

- Elements of history of the gas industry determining the pattern of trade;
- The development of unconventional resources and their impact on global market;
- The development of the LNG technology;
- Shifting balances in productions of energy resources and policy patterns;
- Safety and security concerns: Macondo, Chernobyl, Fukushima, Gasland

3.1.2.1 History of The Natural Gas Industry

The most important factor determining the dependence of the Central European states on natural gas imports from the Russian Federation was the export policy of the USSR. From the late 1970s the Soviet leadership developed the plans of building closer relations with the Western Europe in terms of energy policies. This was to be achieved by building an extensive network of gas pipelines. Thus the general East-West axis of trade was created. The shape of it, with majority of volume transited through the territory of Ukraine was the effect of the Solidarity movement and Martial Law in Poland and is reflected by the Kobryn-Uzhorod bypass. (Wyciszkievicz, 2009), (Zawisza, 2011, pp. 13-35)

With the growing demand for natural gas in the Western Europe and the disintegration of the Soviet Union, in the 1990s a new connection was constructed – the Yamal pipeline, this time passing through the territory of Poland. (Zawisza, 2011, pp. 13-35) The new pipeline did not alter the linear course of existing infrastructure and Polish domestic network remained rather isolated.

The issues related to the present state of the gas infrastructure in Poland will be further discussed further in chapter 3.1.3.

3.1.2.2 Impact of Unconventional Resources and LNG Technology

The estimated amounts of natural gas in shale rocks in Poland vary from according to different studies. (Energy Information Administration, 2011) Except the highest ones (5.3 trillion cubic meters would increase the global size of proved reserves by 2.5%), they are not significant from the global point of view (the estimates of the Polish Geological Institute would make between 0.015 and 0.9%). However they may be of huge importance at regional level, as they could cover the entire consumption of this resource in Poland or even allow for exporting it to the neighboring states.¹

As the case of the „Quiet Revolution” in the United States shows, even the geographically limited increase of supply greatly influences overall trading patterns. As the statistics show, in just two years (2010-2011), the export and import structure changed dramatically. In 2010, the US were the net importer of natural gas with the balance of -73 bcm of natural gas. In 2011 the net imports decreased to only 55.4 bcm. (BP, 2012) Just 18 bcm do not make much impression when compared with the total US consumption exceeding 600 bcm but it was enough to drive down the prices of the resource. In 2008 the Average German Import Price was 385 USD/tcm. The American Henry Hub Price was then 316 USD. In 2011 the Germans paid \$323 while the Americans \$143. (BP, 2012)

Yet, the change that the shale gas can cause is much greater than just partial shift of the import-export patterns on the regional level. There already have been published reports on possible consequences of the unconventional gas development in Central-Eastern Europe.² It is particularly important for the Russian Federation which now may encounter much more difficult trade conditions in Europe (lower prices, smaller demand), which could question the entire expansion strategy as projected in the past years. (Paszyc, 2012, pp. 45-46)

Another issue is the LNG technology developments which eventually may enable the emergence of the global natural gas market. So far, there existed several regional

¹ With the consumption of around 14 bcm yearly, even the low estimate of the Polish Geological Institute (346 bcm) greatly increases the energy security of the country by allowing for increasing the present production of ca. 5 bcm to a much higher level.

² For more details, see: Garpiel, Tarnawski, Pokrywka, & Albrycht, 2012; Černochoch, et al., 2012; Morgan Stanley, 2011, pp. 38-46.

markets usually bound to one or two suppliers by pipelines. Thus, the possibility of maritime gas trade greatly increases competition (and available supply of gas) and could foster liberalization of markets. With expected more than 40 LNG terminal to be operational before 2020, Europe will experience in the years to come a true revolution regarding that. This will also apply to Poland and the Baltic Sea region where about 10 of them should be put to operation soon. (Liuhto, 2012)

3.1.2.3 Shifting Balances and Policies

There are also external factors impacting the development of the shale gas industry. They are closely related to the trends in energy production from other resources, and in general seem to favor natural gas.

After the Fukushima disaster there is a notable wave of skepticism towards the nuclear energy. Combined with ageing nuclear power plants in France, it seriously questions the future of this kind of energy in Europe. The renewable energy resources are not fully competitive yet and presently they require rather high subsidies. (UNEP, 2012), (Wetzel, 2012) The question of energy based on coal is presented in the part of the document related to the European environmental regulations.

3.1.2.4 Security and Safety Concerns

The tensions related to changing market patterns and recent developments in other branches of energy production probably can already be seen. There is a vivid discussion taking place on possible environmental effects of the shale gas production. The growing concern about the environmental security of hydraulic fracturing will be one of the most important factors determining the shale gas production.

However, when considering large investments in energy infrastructure, one cannot disregard physical security, regardless of political situation. Energy infrastructure is a part of critical infrastructure therefore requires special protection means. This issue is directly regulated by the EU law, and was also implemented to the Polish legal system. It will be further discussed below. (European Council)

The cases of Fukushima and Macondo oil spill clearly show how single cases of breakdowns can seriously influence entire branch of energy industry. When public opinion turns away from a certain industry, the decision makers can be forced to seriously shift their policies. With the present level of preoccupations

for environmental security of the shale gas production in society, it could be assumed that a single serious accident may jeopardize whole industry development. (Demmer, 2007), (Lavelle, 2012), (Reuters, 2012)

Also, the growing number of attacks on energy infrastructure raises the question of properly securing them. In the recent years, these kinds of events took place with growing frequency, and they should be considered an always more important element of the energy geoeconomics. (Wyciszkiewicz, 2009), (Smyrgała, 2011), (Associated Press, 2012) All of these issues should be carefully taken under consideration while planning the investments in energy markets.

3.1.3 The Legal Basis of Hydrocarbon Production in Poland

3.1.3.1 Concessions and Mining Usufruct³

Exploration and production licenses are granted to oil and gas companies by the Minister of Environment. The both types of licenses are a kind of permit for carrying out mining activities and are ruled by the public law.

Only a license holder may enter into a contract on mining usufruct. This contract, entered into by the State and a license holder, grants a legal title, called “mining usufruct” to the license holder. This legal title is in theory subordinated to the ownership of reservoirs that only the State can enjoy. Ownership title to the oil or gas passes to the operator once these hydrocarbons when extracted.

A novelty enacted by virtue of the provisions of the new geological and mining law of 2011 are restrictions as to the farm-out agreements. Under the Polish mining laws farm-out agreements were treated as mining usufruct sharing arrangements. Since under the new law only a license holder may be granted with the right of mining usufruct as well as with shares in this right, farm-out arrangements may be entered into only between license holders. Of course, nothing prevents operators from entering into arrangements deviating from a typical farm-out contract by virtue of which companies who do not enjoy licenses can participate in the outlays and profits from hydrocarbon operations. Such contracts nevertheless can pass neither the legal title nor shares in the legal title to a given reservoir. This change in the legal environment is seen by the industry as step backward and an unforeseen disadvantage of the Polish legislation.

³ The following two subchapters are the discussion of the Geological and Mining Law. For details see: (Ustawa z dnia 9 czerwca 2011 roku – Prawo geologiczne i górnicze, Dz.U. nr 163, poz. 981). English translation available at: http://www.mos.gov.pl/g2/big/2012_06/e1fd8f256cbc5ceb421364232bf09dc.pdf.

3.1.3.2 Personnel Qualification

The Polish legal tradition of the mining industry shares with Austrian and German legislation a specific approach to the mining operations, namely compulsory certification of the staff employed in these operations. The law differentiates the following categories of mining personnel:

- Mining operations managers and their deputies;
- Mining division managers and their deputies;
- Higher rank supervisors;
- Middle rank supervisors;
- Lower rank supervisors;
- Certified specialists (e.g. pumping unit operators or mining electricians).

From them only the middle and lower rank supervisors can be certified internally, i.e. by the license holder and the rest must be granted with their certificates by the State mining authorities. It would be advantageous if the Polish legislator decided to allow also services companies to certify their lower and middle rank supervisors. Unfortunately, this certifications were left to the sole discretion of the license holders. It is expected that with enactment of a larger legislative package devoted to so called “deregulation of certain professions” at least certification of pumping unit operators will be abandoned. This step will be welcome by the industry since operators of pumping units are key personnel in the hydraulic fracturing treatments. It is rather impossible that a service company would allow inexperienced members of its crew to operate the units. At this moment operators of such machinery like: fracturing pumps, blenders, hydration units, chemical blenders and sand conveyors are seen by the Higher Mining Office as subject to certification and required to have 12 months experience in mining operations and to pass the State exam. Then they are conferred with certificate of “operator of cementing units, tanks and equipment for well stimulation” by the District Mining Authority.

3.1.3.3 Tax Scheme

In the end of October the government released its vision of the new legislation concerning hydrocarbon production and its tax treatment. Under the new scheme the State company named “NOKE” (Narodowy Operator Kopalin Energetycznych National Operator for Energy Fossils) would participate in the licenses (mining usufruct rights) up to 10%. This would enable State control of production. (Ministerstwo Środowiska, 2012)

License holders would still retain their status as regular corporate tax payers. On the other hand they would also be taxed with a cash flow tax (at rate of 25% of the positive cash flows) with regard to their gains on sales of extracted hydrocarbons. Besides this, production would also be levied with a royalty of 5% on gas and 10% of crude physically extracted (paid on well-head). According to the analysis presented by the Ministry of Government effective tax rate (cumulated burden of the corporate tax and the new cash flow tax) would not exceed globally 40% of the profits of the industry treated as the whole. The proposed scheme has been welcomed by the industry. Some reservation can arise from the fact details of the new legislation has not been released and the package is said to be still in first drafting phase. (Ministerstwo Środowiska, 2012)

3.1.3.4 Geological Information

Majority of discussions in the media and literature on the unconventional gas production are focused on technological, environmental or political issues. The often omitted question is the problem of protection of geological information that can be crucial to an undisrupted operating the shale gas deposits.

3.1.3.4.1 Complementarity of Protection

The Polish Geological and Mining Law distinguishes two kinds of geological information. It depends on their level of aggregation:

- geological data – are the results of direct observations and measurements obtained in the course of geological works (Article 6 Position 1);
- geological information – data and geological samples together with the results of their processing and interpretation, particularly given in the geological documentation and recorded on data carriers (Article 6 Position 2).

Although this division is justified from the point of view of methodology, it should not be of any practical significance. In the age of the developed techniques and analytical tools even the very basic data yield a highly specialized and detailed results. (Liedel, Piasecka, & Aleksandrowicz, 2012) What is more, these not-very-precise definitions can impact the proper identification and interpretation of the possessed information. It is a crucial problem, as only the processed geological information is a subject of protection (Article 98 Position 1).

However, the most important element determining the access to information is the fact that only the organs of geological administrations are obliged to protect

the geological information (Article 98 Position 1). They include:

- Minister responsible for environment;
- Chief National Geologist;
- Voivodship Marshals (marszałek województwa);
- Voivodship geologists (geologowie wojewódzcy);
- Governors (starostowie powiatowi);
- County geologists (geologowie powiatowi), with the units subordinate to them (Article 156).

This means that no other institutions, in particular – private companies, are bound to protect the geological information. The Polish Geological Survey has some special tasks related to the protection of geological information too. According to the Article 162, it is obliged to:

- Initiate, coordinate and carry out research to improve the understanding of the geology of the country, including areas of primary importance for the national economy, in particular discovering new mineral deposits, estimating mineral resources and reserves, and protecting the environment;
- Manage the Central Geological Archive;
- Gather, provide access to, process and store geological data;
- Manage geological databases;
- Prepare the balance of mineral resources in Poland;
- Prepare materials for auctions of hydrocarbon exploration and prospecting as well as for hydrocarbon production licenses;
- Coordinate and carry out geological mapping as well as pilot projects in that field;
- Manage the Register of Mining Areas;
- Coordinate actions taken to conserve geodiversity and to coordinate environmental geology projects;
- Investigate and monitor geological hazards.

This is another place where the discrepancy in the data-information division can be found. Although the Article 162 uses the word „data”, in reality most likely it refers to the collections of highly aggregated and processed analytical information.

The problem of the unclear distinction between the geological data and information arises also when defining the scope of protection. The provisions of Article 98 Position 2 state that minister responsible for the environment shall specify, by the way of ordinance, the manner and the procedure of gathering and sharing

of the geological information, the organization and the method of its storing, and the scope of its protection. Again, the issues of geological data are omitted which questions the efficiency of the entire system of protection. What is more, by the ordinance mentioned the minister responsible for the environment should be guided by the needs of protection of mineral deposits, the meaning of the geological information, including samples, for researches and recognition of the geological structure of the country as well as will take into consideration the differences in requirements for storing and sharing of the geological information, depending on the type and form of the geological information and its legal status. (Article 98 Position 3).

The ordinance itself (Rozporządzenie Ministra Środowiska z dnia 15 grudnia 2011 roku w sprawie gromadzenia i udostępniania informacji geologicznej, Dz.U. nr 282, poz. 1657) does not meet the requirements defined by the Geological and Mining Law. It only indicates that the organs of geological administration are bound to protect the collected documents and databases from damaging, destruction or loss, as well as uncontrolled disclosure to unauthorized persons (§ 8). It does not define the means by which they should be protected. What is more, contrary to the above, it uses the term „data”.

To sum up, it is difficult to describe the system of protection of geological information related to strategic minerals as even having a basic functionality. However, the problem does not lie in missing the basic security rules for this kind of secrets but in no clear indication what actually should be protected: the data, information, or both.

3.1.3.4.2 Geological Information As A State Secret

Bearing all the doubts in mind, and also remembering the key meaning of information on strategic resources for the state's security, one could consider including it into the system of protection of classified information. (Ustawa z dnia 5 sierpnia 2010 roku o ochronie informacji niejawnych, Dz.U. 2010 nr 182, poz. 1228)

Under the provisions of the present regulations, the geological information related to the shale gas deposits fulfills the criteria of classified information. Its unauthorized disclosure could harm the interests of the Republic of Poland (Article 1). Moreover, such a consideration would allow to scale the levels of protection – from top secret to restricted, depending on the level of importance to the state's security. This would create a general and equal obligation to protect and distribute the particularly important geological information in a controlled way. (Iwaszko, 2012)

However, subordinating all the geological data and information to the regime reserved for the state secrets is both unnecessary and difficult. On the other hand, the regulations related to the access to the geological information need to be defined more precisely. Additional legislative effort is required.

3.1.4 Critical Infrastructure

The EC Directive 2008/114/EC defines the critical infrastructure as „an asset, system or part thereof located in Member States which is essential for the maintenance of vital societal functions, health, safety, security, economic or social well-being of people, and the disruption or destruction of which would have a significant impact in a Member State as a result of the failure to maintain those functions” (Article 2 letter a). Then it defines its protection as „all activities aimed at ensuring the functionality, continuity and integrity of critical infrastructures in order to deter, mitigate and neutralize a threat, risk or vulnerability (Article 2 letter e). This means by definition that the gas production, transmission and distribution infrastructure should be granted special protection. If in the future a large-scale Polish-Czech cooperation in the shale gas trade was established, probably it would be necessary to consider such an infrastructure as „European Critical Infrastructure”. The Directive considers the ECI to be „critical infrastructure located in Member States the disruption or destruction of which would have a significant impact on at least two Member States. The significance of the impact shall be assessed in terms of cross-cutting criteria. This includes effects resulting from cross-sector dependencies on other types of infrastructure” (Article 2 letter b). According to Article 3 Position 2 letter b, there is no doubt that the would-be Polish-Czech gas transmission system would become a part of that, as the economic effects criterion is defined as „assessed in terms of the significance of economic loss and/or degradation of products or services; including potential environmental effects”. Therefore if both states seriously plan to cooperate in that field, they should think of designating it as ECI and include it in their Operator Security Plans (Articles 4 and 5).

Although in Poland there is no single legal act on critical infrastructure, these provisions were implemented. The regulation of the Council of Ministers created the legal framework for the National Program of Critical Infrastructure Protection, and it was an executory act to the Law on Crisis Management which expressively defines energy infrastructure as critical (Article 3, Position 2, letter a). (Ustawa z dnia 26 kwietnia 2007 roku o zarządzaniu kryzysowym, Dz.U. 2007, nr 89 poz. 590 with further changes), (Rozporządzenie Rady Ministrów z dnia 20 kwietnia 2010 roku w sprawie Narodowego Programu Ochrony Infrastruktury

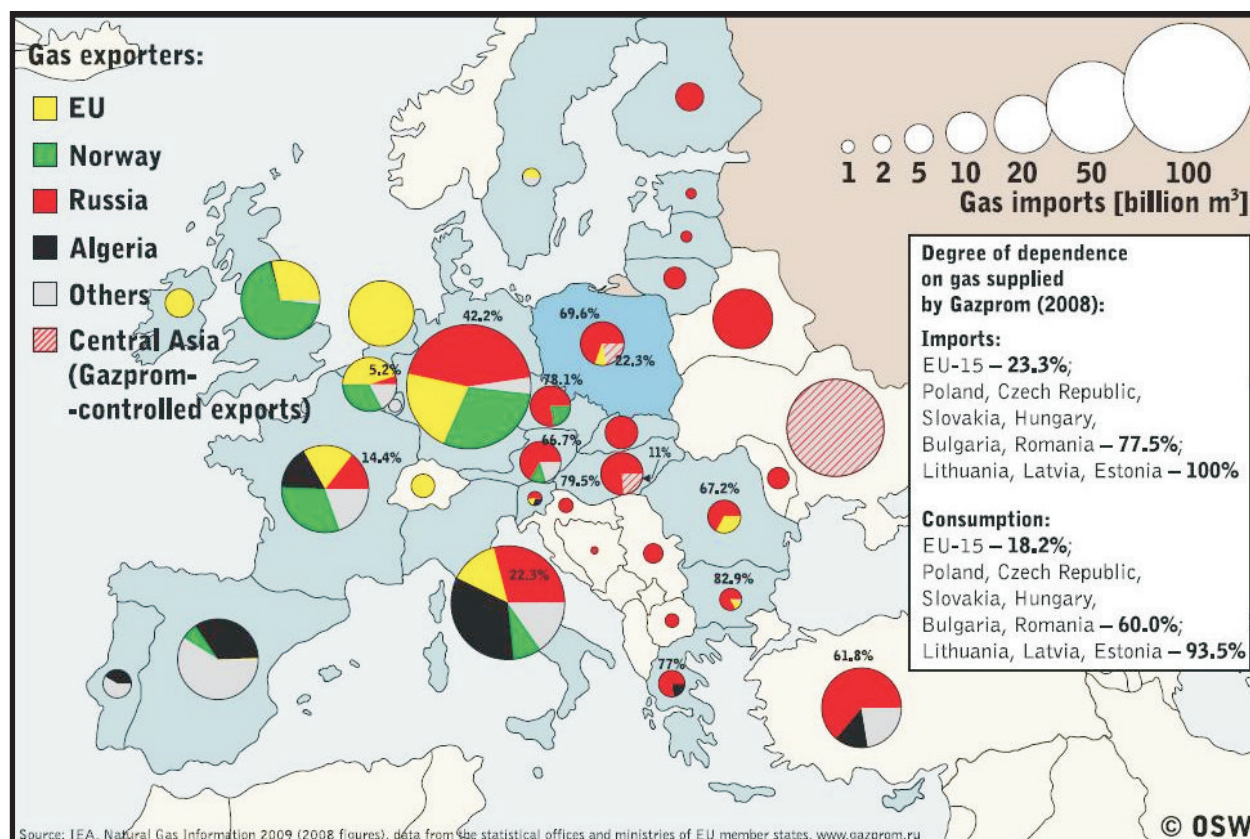
Krytycznej, Dz. U. nr 83, poz. 541) The gas sector companies (PGNiG and Gaz System) are also included on the list of companies particularly important to the state's defense and economy. (Rozporządzenie Rady Ministrów z dnia 4 października 2010 r. w sprawie wykazu przedsiębiorców o szczególnym znaczeniu gospodarczo-obronnym, Dz. U. 2010, nr 198, poz. 1314)

As it can be seen, from the point of view of legal basis of the critical infrastructure protection, the entire natural sector is defined as crucial to the state, although probably with the new companies entering the market, some changes on the list should be expected. Moreover, apart from the deliberations on critical infrastructure, it has to be remembered that the minister of Treasury is authorized to override some of the decisions made by the companies of the energy sector if they can harm the interests of the state. (Ustawa z dnia 18 marca 2010 r. o szczególnych uprawnieniach ministra właściwego do spraw Skarbu Państwa (...), Dz. U. 2010 nr 65, poz. 404)

3.1.4.1 The Existing Natural Gas Infrastructure

The gas infrastructure in Poland and the Czech Republic is a part of a broader Central European context. So far, the network of pipelines was the Cold War legacy. The transmission system was designed only to operate in one way – to send the Russian gas from the East to the West of Europe. The V4 states are a very good example of the lack of alternatives to that. As a consequence, the integration of the gas pipeline systems of the Central European states (no cross-border connections, except some local ones) is very poor. This results in a very high dependence on one gas supplier. There are no significant connections with Western Europe, and the transportation of natural gas in the axis North-South is impossible due to the non-existent infrastructure. (Łoskot-Strachota, 2009, p. 9)

Fig. 1: Structure of European Gas Imports



Source: Łoskot-Strachota A. (2009).

However, in years to come this situation is going to change significantly. The already finished, being constructed and planned new investments will change the existing pathways and directions of gas supplies. Partially owing to the 3rd Energy Package, this will change the relations between the most important players on the gas market. The change particularly applies to the operators of pipelines. The external projects that are going to change the situation in Poland and the Czech Republic include:

- The Nord Stream (expected to be fully operational in November 2012) together with two branches (OPAL and NEL);
- The planned South Stream, Nabucco and/or its variations (e.g. Nabucco West combined with TANAP project).

3.1.4.1.1 Polish Pipeline System: The Present

The present Polish transmission system of natural gas in Poland consists of above 9800 km of gas pipelines with 14 compressor stations. The overall volume of transported gas is ca. 15 bcm. The total capacity at the entry points of the national system is about 18.3 bcm (see following map). As of today, there are only two entry points available for imports with the total capacity of 1.5 bcm (slightly above the 10%

of yearly capacity): Lasów and Cieszyn.

The eastern entry points to the system are Drozdowice (capacity: 5.7 bcm/y), Vysokoye (5.5), Teterovka (0.2). The western entry point is Lasów (1.0), and the southern one is Cieszyn (0.5). Apart from that, there exist two entry points directly from the Yamal pipeline (Włocławek with the capacity of 3.1 bcm and Lwówek with 2.4 bcm respectively).

Fig. 2: Entry Points to the Polish Pipeline System. Present Day.



Source: Gas Infrastructure Europe and Author's own calculations.

3.1.4.1.2 The Polish Pipeline System: The Future

However, in the next two years this is going to change, as a very big investment program will have ended. Its value tops almost 1.5 billion EUR and it is conducted by the Polish TSO Gaz-System S.A. Within its framework, it is planned to build 1000 kilometers of new gas pipelines within the country, some new cross-border connections and the LNG terminal in winouj cie. (Gaz-System, 2012) Following picture presents the expected changes.

Fig. 3: Entry Points to the Polish Pipeline System in 2014.



Source: Gas Infrastructure Europe and Author's own calculations.

The last year was crucial for the new infrastructure investments in Poland. In 2011 the Polish TSO finished the construction of the gas pipelines Włocławek-Gdynia, Taczalin-Radałowice-Gałów and two new compression stations in Goleniów and Jarosław. The interconnectors in Lasów and Cieszyn were made operational. The last one is particularly important from the point of view of the project, as although its initial capacity is only 0,5 bcm, it could easily be increased. The diameter of pipelines on both sides is the same, so by increasing the pressure (right now it is 6.3 MPa), the overall volume would grow too. (Gaz-System, 2012)

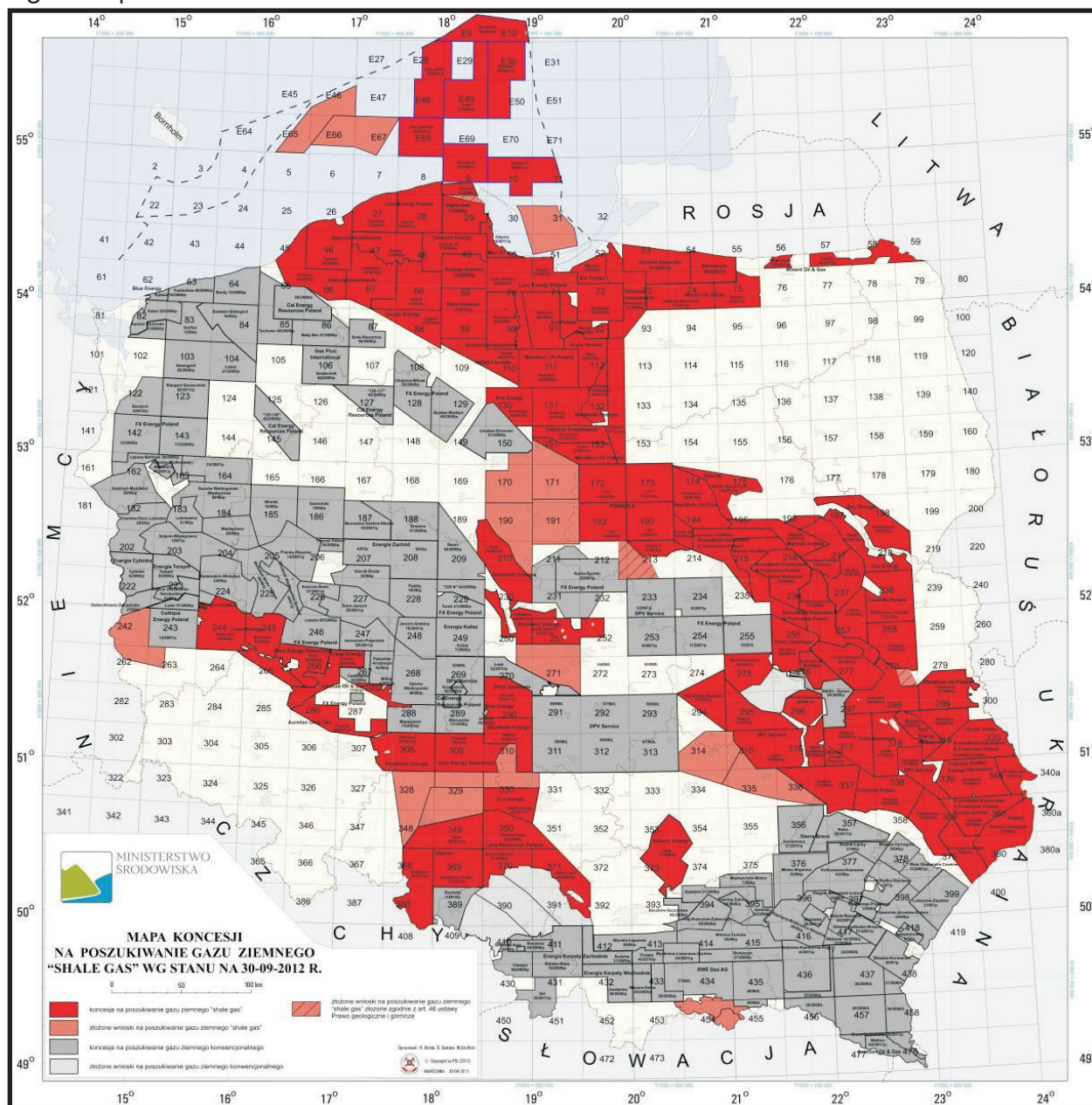
Another important event was launching the virtual reverse on the Yamal pipeline, with technical capacity of 3.3 bcm. By 2014 the remaining infrastructural investments will have been finished (the pipelines winouj cie-Szczecin, Szczecin-Gdańsk, Szczecin-Lwówek, Gustorzyn-Odolanów, Rembelszczyzna-Gustorzyn) as well as the LNG regasification terminal in winouj cie with the initial capacity of 5.0 bcm (with a possibility of increasing it to 7.5 bcm). (Gaz-System, 2012)

All these investments mentioned will allow to increase the technical capabilities of gas imports to the level of 24.8 bcm by 2014. The construction of transit pipelines is indispensable to optimize the distribution from the LNG terminal. Launching these investments will lead to a partial change of the way the gas pipelines system operate now. The dominating east-west direction will now be challenged by the north-western entry to the system. Moreover, one of the features of the Polish system is the local consumption of the gas volume getting into the market through entry points, without sending it any further. From that point of view, the present state of the pipeline network is not flexible. Therefore, the perspectives of the shale gas production (e.g. the projected volumes of 5 to 50 bcm) require a large scale modernization and enlargement, otherwise the exports to other pipeline systems abroad will not be possible.

3.1.4.2 The Pipeline System and The Shale Gas Production

The part of Poland covered the densest with the pipeline network is the area where now the conventional gas deposits are exploited. This is the Sub-Carpathian region (Przemyśl, Husów, Sanok), Wielkopolska (Odolanów, Międzybóże) and Lubuskie (Drezdenko) (the grey color on the following map). Unfortunately, this area is almost entirely away from the territory where the shale gas exploration licenses have been granted. The supposed shale deposits are located in the northwest-southeast axis (red color) through the middle of Poland. They form the so called Baltic, Lublin and Podlasie basins (North, South and East, respectively). Therefore, as for now, the transportation infrastructure that could deliver the shale gas to the market does not exist. The situation is even worse with regards to potential exports.

Fig. 4: Exploration License Areas in Poland



Note: The map displays licenses for both conventional (grey) and unconventional (red) gas exploration.

Source: (Ministerstwo Środowiska)

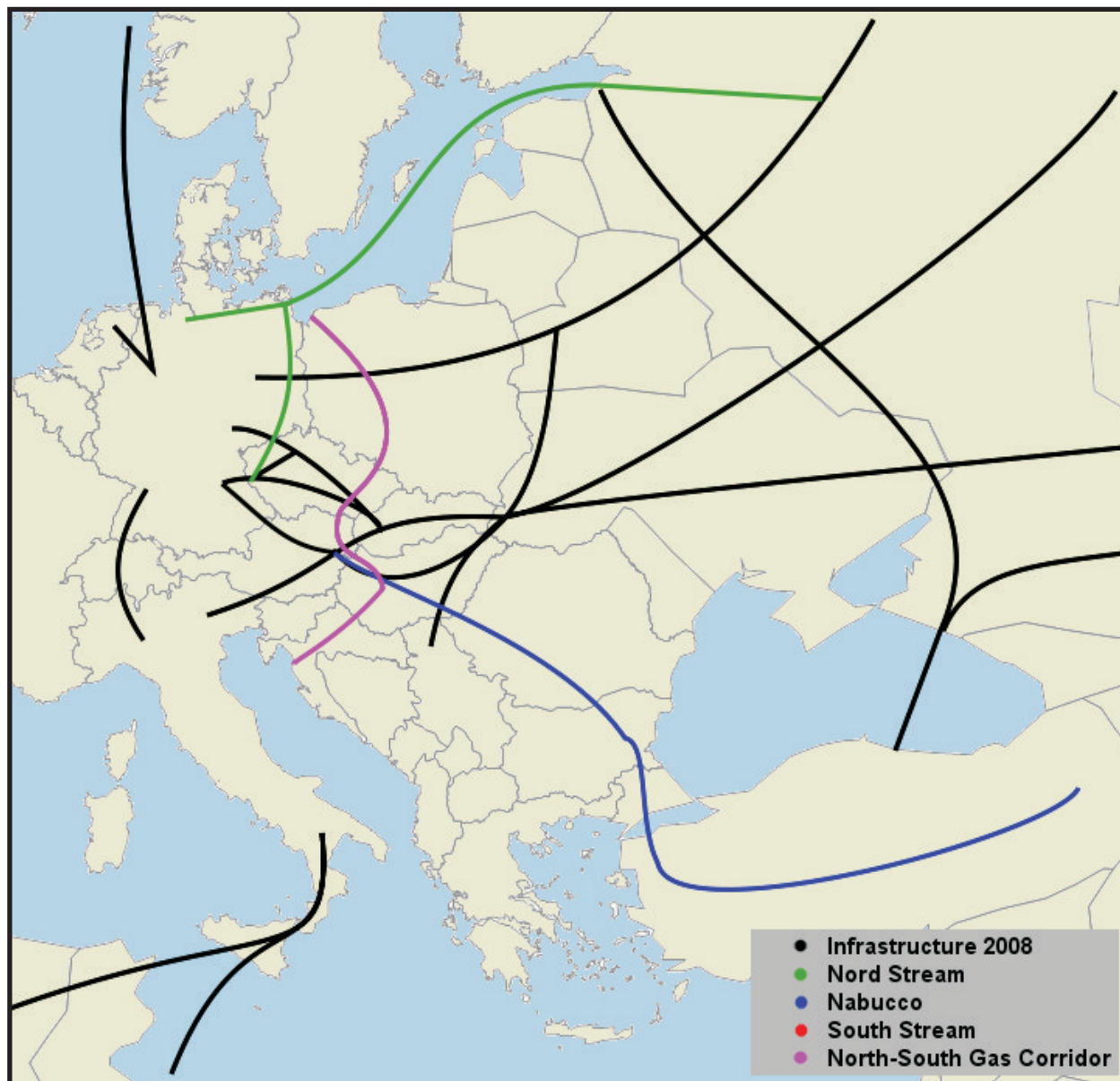
To summarize, the existing infrastructure in Poland is insufficient to handle the possible shale gas production. The investments conducted now are necessary to improve the present performance of the system but do not guarantee good perspectives for potential shale gas exports in the future. Therefore the new ideas and concepts of developing and modernizing the Polish system are indispensable. Its flexibility in terms of gas transports direction, potential exports and upgrading the entry points should be their main goals. (Tarnawski, Boyfield, Ruszel, Szlagowski, & Albrycht, 2011, pp. 153-166)

These solutions should take under consideration:

- Predicted increase of the domestic gas consumption;
- Conducted and planned new projects in electricity generation and heating;
- Infrastructure projects in the international environment;
- Chances of breaking the linear character of the existing regional network.

The concept of the North-South Gas Corridor blends the most into this landscape (see following map). It would connect the LNG terminals in Świnoujście with the Croatian one on the island of Krk, passing through the Czech Republic, Slovakia and Hungary. Additionally, this would allow for linking with Nabucco (or one of its versions), thus helping with supplying the Azeri natural gas to Europe. The greatest advantage of this concept is the possibility of using it regardless of the successful shale gas development in Poland due to the independent sources of supply. The capacity of the LNG terminal in winou cie is to reach 5.0 bm with possible expansion to 7.5 bcm. The projected capacity of the Adria LNG terminal is even greater – between 10 and 15 bcm. (Gaz-System, 2012) Possible success of the shale gas in Poland would provide additional support for the project.

Fig. 5: North-South Gas Corridor



Source: (Authors)

3.1.5 Impact Factors

3.1.5.1 Initial Verification

The context material presented above allows for an initial and brief definition of the Impact Factors as determined in the methodological part. Below they are briefly recapitulated in the order adopted before.

Regulation

The regulations related to the hydrocarbon production are strict, related to the past mining regimes, and generally limiting the competition (licenses and requirements). They may be a serious obstacle to the development of the shale gas production in Poland.

Information

The economic information on the shale gas is still to be determined, as the tax regime has not achieved its final form yet. Similarly, the regulations on geological information are flawed as the definitions of geological data and geological information are not precise and they are used interchangeably. Moreover, there is no homogenous system of protection and only some institutions are included into it.

Infrastructure

The gas pipeline infrastructure is insufficient for shale gas production development, not to mention exports to the neighboring countries. Significant modernization and investment efforts will be required in that field. At this level, there are no retrievable documents for determining whether the road infrastructure is sufficient.

Security

Although there seems to be no direct threat to infrastructure (e.g. terrorist activities), the sensitivity of the safety of energy industry should bring special attention of the decision makers. All the investments and project should meet the highest standards of security, as any accident could possible harm the entire branch. It is advisable to include the possible Polish-Czech transmission system in the framework of the European Critical Infrastructure.

3.1.5.2 The Interview

The responses to the questions are presented below each question. The respondents are listed in the same order as in the methodological part (external auditor, legal advisor at a drilling company, advisor at public administration, senior analyst at pipeline construction company).

Question 1: Are you aware of any cases of the state protectionism (or other form of favorizing of the Polish/foreign companies) as far as exploration or production of hydrocarbons is concerned?

Respondent A: *No.*

Respondent B: *The conditions of participation in public procurements defined in terms of reference for services related to hydrocarbon (e.g. geophysics, drilling, services related to drilling) base their criteria upon the experience of the contractors on the Polish market. Usually the requirement is the number of activities in the last five years. This results with a strong preference of companies that have been already present in the Polish market which is a barrier for the new ones. This favors strongly*

the companies from the PGNiG capital group.

Respondent C: Yes, the Polish subjects are favored, although for the last three-four years to a lesser degree than before.

Respondent D: No.

Question 2: What is your opinion of the restrictions imposed upon the companies exploring energy resources trying to access the Polish market? Are they justified?

Respondent A: Each company that wants to enter the Polish market has to fulfill certain requirements. Pursuing such project is possible only accordingly with the appropriate procedures, EU directives and provisions of law. Therefore it is fair to require certain standards to be guaranteed in order to protect the environment, general safety, high quality of services and provisions of law. However, in my opinion, the mining licenses from mother countries are recognized in Poland without any problems. Also the access to the Polish market was facilitated e.g. by certain changes in the geological and mining law.

Respondent B: The Polish legislature partially equals some of the mining privileges obtained in other EU states. The same applies to the experience gained in other EU states. Such an attitude is highly preferential for the European engineers who cannot present the expertise and know-how in research, development and production of unconventional hydrocarbons similar to the American and Canadian ones. There is no justification for creating this kind of barriers in terms of education and professional experience by acknowledging the qualifications of the supervisory mining personnel, and heads of intermediate mining supervision. They are highly discriminatory for people educated in the American and Canadian Universities or those who gained experience working in the American or Canadian mining companies.

Respondent C: As far as the environmental issues are concerned, they are good. In some other fields the restrictions are not always applied rationally: in some aspects they could be heavier, in some – lighter.

Respondent D: I do not think that the foreign companies are subjects of any harder restrictions than the Polish companies working in the energy sector.

Question 3: Are the procedures in your institutions related to exploration and production of shale gas (e.g. importing the equipment) efficient?

Respondent B: The procedures are inefficient. The requirement of presenting all the certificates of the equipment at the time of its import from the customs to the destination port in Poland is a misunderstanding. Usually such an equipment is incomplete, and then it is assembled in Poland. Only then it should be certified (e.g. by the Office of Technical Inspection). From the point of view of the public safety, it is indifferent where the final user of given equipment will store its parts. Nor it matters if it is marked with the CE marks required by the directives on machinery. Only the start of operations should be preceded by compilation of all the required certificates, declarations of conformity and other safety and security documents. Moreover, the services related to verification of conformity of machinery with the requirements of the EU regulations could be provided by the Polish institutions in the country. So far, they are procured by the foreign ones before it is imported to Poland.

Respondent C: No, they are efficient.

Respondent D: They are efficient, no reservations.

Question 4: What is your opinion of the way the public procurement law operates in the field of exploration and production of energy resources, especially the shale gas?

Respondent A: The public procurement law in general is too complicated, regardless of the field of activity.

Respondent B: The law on public procurement is an exceptionally and too formalized regulation. It is one of the worst implementations of the public procurement directive in the entire European Union. As far as the geological and mining works and services are considered, it is even more burdensome and inconvenient, as there are too many requirements regulating the personnel and human resources in the mining and drilling industry. The crews should be completed from persons equipped with specific qualifications (wiremen, operators, etc.) and supervisory mining personnel certificates at all levels. Then it often turns out that the actual crew carrying out the order is different from the one presented at the pre-qualification stage. Moreover, it is the maintenance manager (usually working for the external service company instead of the licensee) who is responsible for admitting employees with proper competences to work. A written commitment to assembly a crew equipped with certain qualifications should be required, instead of verification at the pre-qualification stage.

Respondent C: In case of unconventional hydrocarbons (equally to other spheres of public activity), the public procurement law should observe the EU+0 principle

(in other words, it should follow the implemented EU procedures with no additional principles). Most of the EU provisions cannot be disregarded however there are some fields which are not so strictly regulated and it is possible to facilitate them.

Respondent D: The public procurement law is too complicated, and its construction strongly prefers the cheapest solutions instead of the most effective ones.

Question 5: What is your opinion about the access to geological information and regulations related to the environment protection in the context of the shale gas exploration and future production?

Respondent A: The geological information and the results of exploration are regulated by the license requirements, and the companies observe them accurately. The same applies to the environmental regulations (generally very restrictive and appropriately protecting the environment), many times they even exceed the requirements. However, although the geological information is restricted, it leaks too often to the media and foreign companies.

Respondent B: The access to geological information does not pose any major problems.

Respondent C: Contrary to the environmental regulations (considered to be among the most restrictive in the EU), the access to geological information is one of the most liberal in the world.

Respondent D: The access is efficient, there are no controversies here. However, some problems result from the limited amount of geological data.

Question 6: Does the Polish road and general transport infrastructure have enough capacity to allow for an efficient heavy truck transportation related to drilling equipment?

Respondent A: The road transport of the drilling equipment does not have a significant impact upon the heavy truck traffic on the roads. A heavy piece of equipment requires moving about 100 truck loads for two weeks every 3-4 months; the drilling rig service requires 4-5 loads a day. Only rarely there are any problems with passability (mostly in the spring due to heavy rainfall). However, frequent limitations to heavy traffic may sometimes become a problem.

Respondent B: Local roads can pose problems resulting from their quality, maintenance and renovation needs once the production is started.

For now it is not a big problem, as actually only a few drilling rigs operate in Poland now.

Respondent C: No, they do not have enough capacity in terms of their maximum authorized axle load. Probably the shale gas production in Poland will require some major modernization of the local road networks after the construction phase is ended.

Respondent D: Definitely not. The present condition of the main and local roads does not provide for a safe and efficient transportation.

Question 7: Does the pipeline infrastructure have sufficient capacity to allow for an efficient transit of the shale gas, including its exports abroad?

Respondent A: First, the actual size of the reserves and viability of production have to be determined. If the infrastructure is not efficient enough, it should be modernized. Some parts of it should be built from the scratch, especially in the north of the country.

Respondent B: Neither the transmission nor distribution pipelines have sufficient capacity to secure the reception of the predicted volumes of unconventional natural gas to be produced in Poland.

Respondent C: As of today, the export is impossible. However, small scale transmissions up to the total volume of 2-3 billion cubic meters is possible in the Pomeranian Voivodship.

Respondent D: As of today, the infrastructure is insufficient and without its expansion the transmission of the shale gas will be technically infeasible.

Question 8: What are the greatest threats (including the physical ones) to the development of the shale gas production and trade?

Respondent A: Indolence and incompetence of the state authorities and weakness of the PGNiG S.A. An example of that is a complete ignoring of the threats resulting from the fact that Poland can effectively become self-sufficient from the point of view of energy security and independent from the present monopolists in terms of supply.

Respondent B: Lack of sufficient distribution infrastructure for the newly-built rigs.

Respondent C: The EU regulations, inertia of the Polish administration and lack of regulations on linear investments. Right now the Polish law requires obtaining the necessary permissions and decisions in every community in which a section of a linear investment (e.g. a gas pipeline or electrical grid) is to be constructed.

Such a solution greatly slows down the progress of any big infrastructural investments. Although so far the local authorities and populations rather support the development of the shale gas production, there are known cases of paralyzing the strategic investments in other industries (e.g. lignite mining, nuclear power plants) by them.

Respondent D: The Russian lobby in the European Union and the activities of the environmental NGOs.

Question 9: Other remarks and observations.

Respondent A: There is not enough reliable information available at the local level related to the kind of work and tests conducted, risks related to drilling, safety, security and environmental protection. In the political discourse the aspects of physical security of wells and pipelines are ignored. Besides that, some players on the market display suspicious practices. For example, some auditors require the companies to provide detailed personal data of their employees (which should be protected), including their salaries and financial situation. This can be considered a threat to future activities of such a company, as if such information leaks out, potential competitors may take over its employees or impose pressure on selected employees to work against its interests.

Respondent B: Many sources discuss the viability of the shale gas production basing upon different estimates and statistics. However, it is very important to say that at this moment it is impossible to precisely determine the volume of the reserves of the shale gas in Poland. With so few drills so far (around 30), there is not enough material to give even an approximate value.

Respondent C: None.

Respondent D: None.

3.2 THE CZECH REPUBLIC

3.2.1 General Information and Recent Developments

The Czech Republic consumes approximately 8.7 bcm of natural gas per year, which stands for 16% TPES. The volume of domestic conventional production is insignificant; the consumption amounts to roughly 2%, while the remaining 98% is imported. 78% of imports come from Russia based on the contract valid until 2035, while the remaining amount is imported from Norway (until 2017). (Černocho, et al., 2011, p. 27)

Domestic reserves and extraction are as follows: up to 2010, a total of 94 natural gas deposits were registered, 52 of which were extracted. Total reserves amount to 28.9 bcm, whereas 8.4 bcm of that amount represent proven reserves.⁴ (Starý, Sitenský, & Hodková, 2010) Most of the exploitable reserves, almost 88%, consist of reserves of coalbed methane, obtained by extraction from already closed underground mines. Natural gas obtained in this manner partakes with almost 23% of the total production. Coal beds are concentrated in the Upper Silesian Basin, where the gas from specific localities is supplied for consumption to local customers, such as Mittal Steel, by using more than 100 km long pipeline network. (Slivka, 2011) The development program of coalbed methane reserves was launched in 1993 and terminated in 2000. During this period, 24 exploration wells at depths ranging from 300 to 1460 meters below the surface of the ground were carried out over the territory of 800 km. The minimum of prognostic reserves⁵ of coalbed methane in the basin amounts to more than 100 bcm. (Đurica, et al., 2006)

Currently, however, the center of attention is shifted to the gas in shale formations. Given the early stage of research and the lack of accurate data, it is not possible to estimate neither total nor recoverable reserves. On the territory of the Czech Republic, the companies which applied for exploration licenses are the BasGas Energia Czech s.r.o. and Cuadrilla Morava s.r.o., the subsidiaries of British companies Hutton Energy (Hutton Energy) and Cuadrilla Resource Holdings Ltd. (Cuadrilla Resources). The Hutton Energy was founded in June 2011 for purposes of acquisition of the Australian company BasGas Pty Ltd of Australia, while the mother company

⁴ Proven reserves are reserves that are extractable with current technology and prices. Those are the extractable stocks suitable for industrial use.

⁵ Prognostic reserves are still unexplored reserves, estimated on the bases of genesis and arrangement patterns of mineral deposits and research discovering the geological structure and history of the geological development of areas under assessment.

was moved to London. The company is a private property and 75% of its owners come from Australia. In Europe, the company is oriented towards the search for regions suitable for shale gas extraction. The company is currently engaged in Ukraine, Spain, the Netherlands and Poland, where it owns, through the agency of Strzelecki Energia, six concessions with 1.3 million acres of total area. (Hutton Energy, 2012) Cuadrilla Resource Holdings was founded in 2010 as a company uniting 16 additional branches. Outside the Czech Republic and Great Britain, it also works in the Netherlands, Germany, Austria, Spain and Poland; the company holds exploration licenses in the Great Britain, the Netherlands and Poland. (Organizacja Polskiego Przemysłu Poszukiwawczo-Wydobywczego) In addition to the two companies, the company Moravské naftové doly (MND) or, more precisely, its branch MND Drilling & Services, is also active in the unconventional resources sector, which conducted several exploration wells in Poland (for Orlen Upstream, Lane Energy and ExxonMobil companies) and in Hungary for ExxonMobil company. (Moravské naftové doly) The exploration in the Mikulovsko and Hodonínsko regions is currently under consideration.

Regarding the potential shale gas basins, there have been three applications for exploration licenses; all requests are still at the processing stage. In the case of the Basgas company, it is the exploration areas under consideration are "Trutnovsko" ranging 777 km² (area Trutnovsko, Náchodsko and Broumovsko) and "Berounka" ranging 946 km². (Hutton Energy) The applications were filed in January 2011. In the cases of the companies Cuadrilla, it is the site between Přerov, Vsetín and Kopřivnice (exploration area "Meziříčí"); the application was submitted in September 2010. As far as the "Trutnovsko" and "Meziříčí" areas are concerned, the Ministry of Environment issued a positive decision on December 9, 2011; the decision regarding the "Berounka" area has not been released so far.

Fig. 6: Areas under Consideration for Exploration Works



Source: (Česká televize, 2012)

The municipalities which did not agree with the approval of exploration area stood against both decisions ("Trutnovsko" and "Meziříčí"). Accordingly, protests were organized in Náchod, Broumov, Teplice nad Metují, Adršpach and Meziměstí, among other places. The Beroun city hall also assumed a negative stance. (Město Beroun) The representatives of local authorities and residents are primarily concerned with groundwater contamination, destruction of the landscapes and negative impact on tourism. (Česká Televize) The representatives of regional authorities had a negative stance as well. (Deník Referendum, 2012) The exploratory work is further rejected by the administration of the PLA (Polická pánev) and a number of NGOs and civic associations, which in January 2012 formed an overarching civil association Coalition STOP HF, collecting signatures for a petition to ban the use of hydraulic fracturing in the Czech Republic and also preparing a petition to the European Parliament for ban on hydraulic fracturing in the EU. Up to October 14, more than 30,000 people signed the petition. (Stop HF) Other regular objections against extraction by hydraulic fracturing means were also brought up (water consumption, seismic quakes, increased transportation, etc.) The membership of the Scientific Council STOP HF is predominantly composed of experts in the field of geology and related disciplines. (Stop HF) The decisively negative position on exploratory activities, this time in the "Berounka" area, came from twenty-two scientists drawing attention primarily to the specific geological structure of the territory which "disqualifies the successful use of the so-called hydraulic fracturing method." The same pronouncement also warned that this is the area in which the PLA Český

kras and two national natural reservations are located. (Ústav geologie a paleontologie, PřF UK) In relation to these events, on April 10, 2012, the Minister of the Environment, Tomáš Chalupa, announced the cancellation of the original decision on exploration permits in the "Trutnovsko" region because of "insufficient engagement with remarks addressed by affected subjects" (municipalities, for example) and in general for procedural matters and insufficient consideration of the public interest. (Ministry of Environment, 2012)

On May 4, 2012, the Ministry announced that it was preparing a proposal on a moratorium of shale gas exploration. The Ministry justifies this decision by referring to the flaws of laws on EIA and, in particular, of the Mining Act (44/1988) and the Geological Act (62/1988), because due to their obsolescence the Czech Republic could face arbitrage in the future. In addition, the Ministry also mentions the requirement to "take into account the basic public interest of protecting the drinking water resources, as well as the nature and landscape." (Ministry of Environment, 2012)

On September 3, 2012, the moratorium (Government's draft resolution) was sent to an interdepartmental comment procedure, while the government should be dealing with it during October 2012. Main reasons for the suspension of exploration area approval introduced by the Ministry were "technological similarity between exploration and extraction, high consumption of water per well, risk of groundwater pollution under conditions of technological lack of restraint, or accidents and landscape degradation as well as deterioration of air quality." The moratorium is expected to stop permitting new explorations of shale gas basins up to June 30, 2014. Meanwhile, the analysis of the impact of exploration methods should be completed (March 31, 2013) and changing the corresponding laws will be taking place from June 30, 2013. (Chalupa, 2012)

In parallel with the moratorium of the Ministry of the Environment, Senator Petr Pakosta, among others, proposes a law, which would prohibit hydraulic fracturing in rocks.⁶ The proposal defines hydraulic fracturing as follows:

Methods of hydraulic fracturing in rocks refer to all technical methods based on fracking fluid installed under pressure greater than 1 MPa and below the ground surface in order to fracture in rocks, usually by the means of vertical

⁶ The complete title The Proposal for the Senate Bill by Petr Pakosta et al., which prohibits the usage of hydraulic fracturing in rocks during the geological and mining works, and involves the change of other associated laws.

and the subsequent horizontal or other wells reaching below the cultural layer of soil, including the methods generally named the technology of hydraulic impact and technology of hydraulic destruction, or in some cases the other similar technical methods generally considered as methods of hydraulic fracturing in rocks which stand at odds to the purpose of this Act.

The fracking fluid refers to any mixture of water or other effective liquid substances or gels with other chemicals, in particular sand or other mechanical or organic fillers. (§ 3, paragraph 1.2 of the Senate Bill 364/8)

In this version, however, the law will not affect just potential shale gas extraction that the Czech Republic is not experienced with, but will also have some impact on the performance of the current conventional oil industry. Various forms of hydraulic fracturing have been used here since the 1960s – for example, during the construction of underground gas storage facilities as well as in many conventional wells in order to achieve greater extractability.

3.2.2 Licensing Process

The licensing process is guided mainly by The Geological Act (62/1988 Coll.), Law on Mining Activity (61/1988 Coll.) and The Mining Act (44/1988 Coll.). The license should be, like in Poland, obtained separately for exploration and extraction works, whereas obtaining the exploration license does not guarantee gaining the extraction one.⁷

3.2.2.1 Exploration

According to the current legislation, natural gas is, regardless of the nature of the deposits in which it is stored, classified as an exclusive mineral. (§ 3, paragraph 1 b) of the 44/1988 Act) Being part of the mineral wealth, it is therefore a state property. (§ 5, paragraph 2 of the 44/1988 Act) Exploration, evaluation and displaying the development and composition of geological structure of the area and its patterns, as well as searching and exploring mineral deposits, verifying their reserves and generating geological foundations for their use and protection (i.e. what we mean by the term exploration) is what law denotes as "geological work." (§ 2, paragraph 1 a), b) of the 62/1988 Act)

⁷However, if a decision is to be made on the extraction license for a given area, priority is given to the organization that carried the exploration out.

Depending on concrete composition of geological work, the law distinguishes between geological research, aimed to offer basic comprehension of the formation and performance of geological processes and geological structure of the area, and geological exploration, which includes geological works focused on specific targets, which examine the area at points exceeding geological research. (§ 2, 2, 3 of the 62/1988 Act)

According to the purpose of geological work, geological exploration is divided into several types. Gas industry is mainly interested in deposit exploration (search and assessment of reserves) and exploration for specific interventions in the Earth crust, a term which, among other things, covers the construction of underground gas storage facilities.

The deposit exploration is then further divided into several stages: a) search in order to assess the potential of the area in terms of the presence, discovery and estimation of mineral reserves; b) exploration performed in already familiar and proven deposit, which has not yet been granted the status of the mining area (extraction license), set to calculate the explored reserves and demonstrate their exploitability, as well as to resolve the clash of interests regarding the mining of the deposit under consideration and c) extraction exploration in an area approved for mining within the range, carried out in painstaking detail required for efficient extraction of the deposit. (§ 2, paragraph 4 of the 62/1988 Act)

The licensing process starts once the subject ("the applicant") submits the exploration claim to the Ministry of Environment. Parties of the proceedings are the applicant, the municipality in charge and, in some cases, other subjects.⁸ The Ministry notifies the receipt of the application in the Official Journal of the European Union, in which it also specifies a deadline for submitting the competitive applications. This period is set to a minimum of 90 days and the administrative procedure will not be initiated until the expiration of the due date. In the event of two or more applications, the Ministry makes a decision based on their assessment and by taking into account the technical and financial capacity of the applicants, the proposed method of exploration or search in the area that is the subject of the application, as well as which application assures to obtain more comprehensive geological information and better protection of legally protected interests. (§ 4d, paragraph 1-3 of the 62/1988 Act)

⁸For example, civic associations according to the § 70 of the 114/1992 Act

If the affected area has at least one direct border with a territory which has been already approved for exploration, the Ministry notifies the receipt of the application in the official commercial journal (with a 30-day deadline for submitting competitive applications, a period usual for all exclusive minerals, excluding oil and flammable natural gas) and accordingly invites the contracting party (i.e. the person who was the successful applicant for the adjoining exploration area) to declare his stance on the submitted application or to file in a competitive application within an adequate period of time set by the Ministry. If a competitive application is submitted, the Ministry will decide on approving the exploration area based on its assessment as to which of the applicants is able to ensure that it will obtain the most complete geological information and better protection of legally protected interests. (§ 4d, paragraph 4 of the 62/1988 Act)

Upon receiving the application and documentation proving applicant's qualification to carry out the geological work⁹ and the expiration of the aforementioned 30-day or 90-day deadline for submitting competitive applications, the Ministry makes the decision on the exploration area approval within 60 days. Some of the reasons for having the exploration area rejected are, for example, applicant's failure to demonstrate the technical and financial capability to examine oil or natural gas deposits (§ 4, paragraph 5 d) of the 62/1988 Act), or the clash between the survey and state policies on raw materials, state environmental policy, or if other public interest outweighs the interest in further exploration and subsequent use of the reserved deposit. (§ 4, paragraph 6, the 62/1988 Act) The disapproving stance of other parties (affected municipalities and persons whose participating status is granted by law) does not come under the causes for rejecting the exploration area. At this stage of the licensing process, their voice, as well as the voice of other subjects, is only an advisory one, whose judgment the Ministry may request, if found applicable. These parties are, for example, regional offices, health resorts and relevant departments of the Ministry. The administrative procedure presumes that participants' remarks must be taken into account and the Ministry has to deal with potential objections by, for example, setting the conditions for considering these objections during the exploration execution.

The exploration area is granted in the range and for the period necessary for execution of the geological work. The decision on approving the exploration area can set conditions for purposes such as, for example, public health protection,

⁹The competence requirements for the contractor's geological work are given in § 3, paragraph 4 of the 62/1988 Act.

transportation safety, environmental protection, including the protection of natural resources, protection of oil or flammable natural gas and their rational usage. (§ 4e, paragraph 2 c), d), e), h) of the 62/1988 Act)

The geological works are carried out according to the approved project of geological works, which mainly denotes the objective which the geological works pursue and defines the process of their professional, efficient and safe performance. Projecting the geological works is based on the evaluation of results and information acquired in earlier geological works. It is simultaneously checked whether the geological works interfere with interests protected by special regulations.¹⁰ For exploration work, it is furthermore essential that the organization is obliged to prepare the project of geological works and its changes, which include mechanical drilling at depths of more than 30 m or machine drilling whose total length exceeds 100 m, and send it at least 30 days before the initiation of works to the regional office in whose administrative district the works affecting the land are about to be carried out. Judging from the standpoint of interests protected by the specific legislation, the regional office gives its opinion regarding the project within 30 days. In reasonable cases, it may impose on the contractor the measures of expert assessment by the Czech Geological Survey, biological evaluation or other professional judgment. In such case, the initiation of the works is postponed for a certain period of time. (§ 6, paragraph 1-3 of the 62/1988 Act)

Fees for the execution of geological works in a determined area within the first year reach the figure of CZK 2000 (€80) per each started year and each started km² of the exploration area. This fee gets increased each year by CZK 1000 per km². These fees are distributed proportionally among the municipalities on whose territory the exploration area is located. (§ 4b, paragraph 1, 3 of the 62/1988 Act)

When carrying out the geological works, the organization is required to submit to the Ministry the report on discovering the restricted deposit and indicate the amount of its stock, and to do so within 30 days, or alternatively make a notice about geofactors which endanger the environment to the extent set by the special decree. (§ 9, paragraph 1, 2 of the 62/1988 Act.)

For accessing the land which gained the status of exploration area, the client is obliged to arrange with the owner or with the lessee a permission to execute the geological work, to organize the workplace, access roads, water and energy supply,

¹⁰For example, The Building Act, Water Act, the protection of agricultural land resources.

or perhaps do the necessary modifications of soil and vegetation. If the parties do not reach an agreement, the regional office imposes an obligation to the owner (lessee) to put up with those works. If not standing at odds with public policy on raw materials, the authorities will issue such decision only in case of its public interest, to the extent which is required, for a definite period and for compensation. (§ 14, paragraph 1.2 of the 62/1988 Act) Geological works are further connected with general provisions on damage compensation by enforcing restoration to the original state. If this is not feasible or functional, the client compensates the damage with money payment. (§ 16, paragraph 2.3 of the 62/1988 Act)

Within two months after the completion or approval of geological works, the contractor is obliged to deliver the results voluntarily to the Czech Geological Survey. The Survey then sends them forward to the state administration which needs it for executing its own activities. The contractor may reserve the right for seven years that these results will not be available to other legal entities or natural persons, or alternatively limiting the access by entailing the contractual agreement between the contractor and the concrete person. After seven years, the results of geological works become accessible without restriction, yet the governmental, business and economic privacy has to be maintained. (§ 12, Paragraph 1-3 of the 62/1988 Act)

If natural gas is found during exploration in quantity and quality which gives sufficient reason to expect its accumulation, the Ministry issues a so-called Reserved Deposit Certificate. (§ 6, paragraph 1 of the 44/1988 Act) If the deposit is depreciated due to, for example, insufficient economic usefulness of extraction (§ 14a of the 44/1988 Act), the Ministry sets a reserved deposit as "Protected Deposit Area". This protection has a local planning character and it primarily stands against building the structures and facilities not related to the deposit exploitation and the objects which might make the extraction potentially difficult or impossible.

During the exploration, it is necessary to ditch a certain amount of natural gas. By monitoring the gas flow and pressure drop, we can calculate the magnitude of reserves, as well as estimate the extractability of the deposit and potential extraction profitability. During this "long term test"¹¹, which can go on for days or weeks, usually 5 to 10% of reserves get extracted.¹² When smaller deposits are involved, the drained gas is usually combusted. In case of the larger ones, which are,

¹¹Worldwide it is mostly known as „early production.“

¹²If the assumption of the presence of reserves proves false, the extracted share can reach 30-100 %.

in addition, located in areas with access to the infrastructure, the gas is supplied to the grids and is being sold. In the case of the latter, the organization is required to pay a royalty fee for the extracted mineral (see below). (§ 32a, paragraph 10 of the 44/1988 Act)

3.2.2.2 Production

The mining license is known in the Czech legal system as the "right to the extraction of the exclusive deposits" which will result in approving the claim for mining area. This authorization is granted by the District Mining Authority after releasing the consent of the Ministry of Environment in consultation with the Ministry of Industry and Trade. Priority in obtaining the approval of the Ministry is given to the contractor or, if the contractor does not claim his right, to the organization which had a financial contribution to the research. (§ 24, paragraph 1-3 of the 44/1988 Act) In cases when this procedure is not applicable (the contractor does not have the capacity for mining the deposit) and with exclusive reference to the deposits of oil or natural gas, the procedure is different: like in the exploratory phase, the Ministry announces its intention to approve the mining area in the Official Journal of the EU. What follows is a 90-day deadline for submitting competitive applications, one of which gets selected by the Ministry. In doing so, the Ministry takes into account the financial and technical capacity of applicants and whether the proposal ensures better utilization of the reserved deposit and the protection of legally protected interests. The decision may include conditions for purposes such as, for example, public health or environmental protection, including the protection of natural resources. (§ 24 of the 44/1988 Act)

In addition to the applicant and the municipality Ministries, parties of the procedure regarding the approval of the mining space are the landowners and, in some cases, also the adjacent landowners and all other subjects who feel affected by the decision (proposal for the mining claim must include a list of natural persons and legal entities considered for parties of the procedure and known to the proposer).

The decision on the mining claim is issued by the District Mining Authority in cooperation with relevant authorities, in particular, in agreement with the environmental authorities and local planning and building authorities. The organization submits the proposal, based on which the mining area gets approved, modified or rejected, or the proceedings alternatively start from the initiative of the District Mining Authority. This proposal must be enclosed with the following documents:

- a) Decision on the establishment of a protected deposit area;
- b) Prior approval of the Ministry of Environment issued in accordance to § 24 paragraph 2 of the 44/1988 Act;
- c) Documentation confirming that the organization can perform mining activities;
- d) Certificates and documentation set by the corresponding execution regulations or special regulations. District Mining Authority may demand submission of additional documents necessary for a reliable assessment of the proposal, particularly in terms of protection and rational use of the exclusive deposit, consequences of its mining, as well as in terms of its impact on the legally protected general interests;
- e) A list of natural persons and legal entities concerned as parties and known to the proposer;
- f) If the organization applies simultaneously for the mining area approval and the mining permit, then it also applies for opening, preparation and mining permission.

If the proposal for approving (or modifying) the mining area affects the interests protected by special regulations, organization which will extract the deposit is obliged to discuss the conditions of the mining approval with the authorities or persons whose interests are protected by these regulations - for example, the Law on Health Protection, the Law on State Nature Protection, the Water Act or the Forest Act.

During the proceedings on the mining approval, the District Mining Authority puts the stances of relevant administrative organs under protection and assesses the remarks and suggestions of the participants. Municipalities which take part in the proceedings may on reasonable bases object to the mining claim, which the authorities must take into account. In its decision to approve the mining claim, the District Mining Authority specifies the space and sets the probations, thus securing legal protection of general interests in the area, and makes decisions considering the objections of the proceeding parties. (§ 28, paragraph 7, 8 of the 44/1988 Act)

The District Mining Authority may also take initiative to modify already granted mining area, if there are serious reasons from the standpoint of legally protected public interest. (§ 27 of the 44/1988 Act)

3.2.2.2.1 Land Access

Boundaries of the mining area on the surface may not correspond with the boundaries of the space under the surface. It is also possible to determine the boundaries of the space vertically. Mining one deposit from several mining areas on the surface is, therefore, not an exceptional situation. If the land which was granted the status of the mining area is a state property, the organization has the right to rent this land. In case it is a private property, the access depends on the owner's approval.

3.2.2.2.2 Technology

When mining the exclusive deposits, law permits only those mining methods which, among other things, ensure economical extraction and pollution within the permissible limits. As far as new mining methods are concerned, organization has to test and evaluate them, and they can be integrated into the mining technology only with the consent of the District Mining Authority. (§ 10, paragraph 3 of the 61/1988 Act)

3.2.2.2.3 Royalties

Royalties are sent to the account of the corresponding District Mining Authority. They consist of two components. (1) The annual payment from the mining area for every initiated hectare of the area on the surface, in the range 100 to 1000 CZK/ha (4-40 €/ha) depending on the degree of environmental protection, nature of the activity and its impact on the environment. The Government sets the specific amount by decree. The District Mining Authority transfers the annual payment in its full amount to the municipality in whose territory the mining area is located, or, alternatively, splits it proportionally between several municipalities. (2) Payment out of extracted minerals which is also performed on annual bases and in amount equal to 10% of the profit from the sale¹³ of natural gas, in this specific case. The District Mining Authority divides this payment in a 3:1 ratio among relevant municipalities and the Treasury, which determines the release of these financial means for remedying the environmental damage caused by mining. (§ 32a, paragraph 1,2,4 of the 44/1988 Act)

3.2.2.2.4 Protection of the Environment

Protection of the environment is explicitly mentioned in all relevant regulations in every step of the licensing process. If the environmental safety is in jeopardy,

the authorities in charge may limit or even reject the claim on exploration area, the mining permission, the claim on protected deposit area, the activities carried out by mining and the claim on mining area. In addition to other specific provisions treating environmental protection (Water Act, the Act to Protect Agricultural Land), in the Czech Republic, as the EU member state, the Law on Environmental Impact Assessment (EIA) is in force.

EIA consists of two steps: (1) Investigatory Proceedings which preliminarily evaluate the proposal of the structure, operations and technology (listed in Annex 1 of the Act No. 100/2001) and determines whether the implementation of the EIA is required. (2) EIA itself, i.e. the judgment of the impact on public health and the environment specified in detail in § 2 of the Act No. 100/2001.

The crucial part of the EIA is preparation of the documentation and report. The announcer (a person who intends to realize the project) arranges the documentation and its submission to the competent administrative authority. Materials which are necessary to enclose consist of the announcement, statement of the affected subjects (in state administration, in autonomous units and in the public) and the conclusions resulting from the Investigative Proceedings. Documentation must, among other things, include information on goals, condition of the environment in the affected area, a comprehensive characterization and assessment of impacts of the project on the population and the environment.

As is the case with the announcement, an integral part of the documentation is a generally comprehensible summary of non-technical features. This section serves mainly to the part of the public which does not have an adequate expert knowledge, and would, therefore, have slim chances of getting familiar with the contents of the documentation. Working the documentation out is arranged by the announcer who then has this documentation delivered to the corresponding office. It is entirely up to the announcer to whom the processing of the documentation will be assigned. In the EIA process, the announcer is still held responsible for the documentation completeness and accuracy of the data within. If the documentation meets legal requirements, relevant authorities publish it on the Internet and send it to relevant state authorities and autonomous units in expectation of their commentary. Everyone can make a statement on the documentation in a written form within 30 days. When the documentation is prepared properly, the corresponding authority delivers it for the expert assessment. (Svoboda, 2001)

¹³Based on the average annual price.

The assessment plays the role of the independent expertise which focuses primarily on judging the completeness and accuracy of the documentation and the plan of project realization with respect to its impact on the environment. Independence of the expertise is guaranteed by the fact that the evaluation is assigned by relevant authorities, whereas the announcer covers the costs. When the report is done, the authorities send it to the announcer, corresponding administrative authorities and autonomous units, and also post it on the Internet. Everyone can make observations about the report in a written form. (Svoboda, 2001) If relevant administrative authorities receive a disapproving opinion on the documentation or report, they have to arrange their public discussion with the presence of the announcer, persons who prepared and assessed documentation, the representatives of affected administrative authorities and autonomous units. (§ 17 of Act 100 / 2001)

Publication of the opinion is the final stage of the evaluation process. The opinion is issued by the competent administrative authority on the basis of documents or notifications, the report which includes the opinion layout, and its public discussion and commentaries addressed to the abovementioned documents. Administrative decisions cannot be issued until the assessment is completed and the opinion released. Negative stance or the restraining probations stemming from it are not, in such proceedings, unconditionally binding for the administrative authority. Administrative office estimates the opinion as a piece of professional material along with other documents which it obtains during the proceedings, and if it concludes that it is more appropriate to carry the project out in a way different from the one recommended in the EIA opinion, it can approve a plan which incorporates those differences. However, when deciding, it must justify the option it chose, as well as to address potential deviations from the EIA. (Svoboda, 2001)

Realization of the EIA is necessary if the expected gas extraction from the deposit will exceed 50,000 cubic meters per day. In this case, the authority relevant for assessing the documentation and report is the Ministry of Environment. In case that the project assumes a lower level extraction, the announcer submits the announcement to the Ministry. The Ministry then decides within 15 days whether the project is subject to the investigatory process and accordingly posts that announcement on the Internet. (§ 6, paragraph 2.3 of the 100/2001 Act)

3.3 THE CURRENT DEBATE ON THE EXTRACTION OF SHALE GAS AT THE EU LEVEL

This chapter outlines the current status of the debate regarding the shale gas extraction at the level of the European Union. The power industry in general is integrated into the European Union framework as a section in the field of so-called shared competences, meaning that both EU and its member states are entitled to adopt legislative acts. In practice this means that member states can exercise their powers at points when the EU does not have or has decided not to exercise its jurisdiction (see Article 4 TFEU). Simultaneously, however, we cannot understate the fact that the power industry (including the issue of shale gas) also crosses into the area of environmental protection and internal market performance. Development of projects associated with the extraction of unconventional natural gas is in that manner affected by a myriad of complex rules at the EU level. In short – the EU formulates and runs a basic legislative and functional system within which member states operate independently.

At the EU level, the current debate on shale gas extraction takes place primarily within the triangle Council of Ministers/European Council - European Commission - European Parliament. While the European Parliament is certainly the loudest player in the discussion and positions on shale gas extraction (frequently very emotional) arrive from both sides of the spectrum, the European Commission is, by its nature and role, rather restrained and has been for a long period of time calling to postpone the thorough screening of the existing legislation. The Council of Ministers/European Council represents the arena in which individual member states tend to clarify their positions on shale gas and simultaneously obtain coalitional support for their views. All these institutions are, by the nature of the political system, cooperating partners and are at once influenced by other actors, such as non-governmental organization (NGO) representatives, professional associations, institutions of the EU, and others.¹⁴

In terms of legislative sanction UNG, attention is primarily devoted to environmental impacts, while member states reflect another possible view, that of economic security. In the field of environmental protection, UNG is related to the following legislative acts:

- Environmental Impact Assessment (EIA)

¹⁴ For relevant actors/institutions and specified playground regarding the UNG issue at the EU level, see (Černoč, et al., 2012, pp. 38-53).

- REACH
- NATURA 2000
- The EU Water Framework Directive
- Mining Waste Directives¹⁵

These are the acts which have not yet caused the UNG boom effect. Response from the EU (i.e. primarily by the European Commission), after the initiation/consideration of projects associated with UNG, rested in an effort to answer the following questions:

- Is the existing legislation applicable to UNG?
- Are there some blind spots in the of shale gas extraction chain which are not covered?
- Is further regulation of shale gas extraction necessary at the EU level?

The discussion at the EU level proceeds in manner implied by these three questions practically since 2010, while it reached its peak mainly in 2011 and has been proceeding in the same spirit up to date. The EU tries to address these questions in its traditional manner by publishing various expert reports/proposals and by setting off an ideal debate inclusive of a whole of society. The following passages will be, therefore, devoted to a closer insight into the nature and level of discussion within the Union's institutional triangle, especially with regard to the documents of the European Commission and the European Parliament which saw the light of day in 2012.

3.3.1 The European Commission

On January 27, 2012, the European Commission published a study (Report on unconventional Gas in Europe), prepared by the law firm Philippe & Partners, which dealt with the licensing and permitting procedures associated with the extraction of shale gas. It was a document designed for consultation and based on a sample of four member countries, namely France, Germany, Poland and Sweden. Its aim was to verify the compatibility of the EU legislative framework with activities related to shale gas. The conclusion is the standpoint that, in this respect, there are no major gaps in the current system of the Union. On the other hand, at the national level, the study identified limited public participation within the permitting process. As far as the application Environmental Impact Assessment is concerned, the study notes that it should not be applied to the production of gas only, but to the entire

¹⁵ For contents of these legislations and their relation to the UNG, see Černoč, et al., 2012, pp. 53-60.

life-cycle of UNG. The investors would then run the regulation (both at the EU and national level) in a manner which would ensure legal certainty. (Philippe & Partners, 2011) Seven months later, i.e. on September 7, 2012, the Commission published the three long-awaited studies focusing on unconventional fossil fuels, and in particular on the issue of shale gas extraction. Each of the studies observes the problem from a different perspective. Namely, the objects of assessment were as follows:

(1) The possible impact which the development of these fuels could have on the energy market (Unconventional Gas: Potential Energy Market Impacts), discussed in the study issued by the Joint Research Centre of the European Commission, commissioned by DG Energy. The study is based on the knowledge stemming from the development of similar projects in the United States of America. In relation to the market it notes that, after the initiation of a quiet revolution in the USA, a great amount of LNG was released to the world market, which had an indirect impact on the prices at the European Union level. However, not even the development of UNG will save Europe and afford it self-sufficiency in gas – like the proponents of this type of extraction often suggest. Nevertheless, at the point when the EU, as the study suggests, would manage to accomplish the scenario, that is to develop UNG (of course, with all environmental and other risks taken into account), it would be possible to reduce the share of its dependence on external imports within the TPES by roughly 60%. However, the study warns of the fact that, unlike the USA, the Union will be faced with an uncertainty arising from recoverable volumes, deficient technical foundation, problematic public opinion and other land-property arrangements. (JRC, 2012)

(2) The potential impact of the shale gas production on protection and climate change concerns (Climate impact of potential shale gas production in the EU), addressed in the study issued by the AEA, commissioned by DG Climate Action. The study arrives with an opinion that shale gas produced in the EU would cause more greenhouse gas emissions than gas that is conventionally extracted in the Union territory. Quite the contrary, its emission rates should be less than the rates of remotely imported gas from outside the EU. (AEA, 2012)

(3) The possible risks of shale gas extraction development and with it associated hydraulic fracturing in its effects on human health and the environment (Support to the Identification of Potential Risks for the Environment and Human Health Arising from Hydrocarbons Operations Involving Hydraulic Fracturing in Europe) which was assessed again by the AEA office for DG Environment.

The central part of the study is a comparison of environmental impacts of conventional and unconventional extraction, whereas this comparison puts UNG into a disadvantaged position. The goal set in the study is to describe and analyze the key environmental and health risks associated with the development and growth of high-volume hydraulic fracturing in Europe by going beyond the rates already known from the conventional extraction. The aim of the study is, therefore, to describe the risks during the entire extraction cycle, i.e.:

- 1) Well pad site identification and preparation;
- 2) Well design, drilling, casing and cementing;
- 3) Technical hydraulic fracturing stage;
- 4) Well completion;
- 5) Well production;
- 6) Well abandonment.

The study then devoted only to direct impacts of hydraulic fracturing and activities related to it (for example, transportation, wastewater management, etc.)

The report identified a high risk for most environmental aspects examined in the case of the cumulative impact of multiple installations: groundwater contamination, surface water contamination, water resources, air emission, land take, risk to the biodiversity, noise impacts, traffic. The risk was classified moderate for the visual impact and low for seismicity.

According to the study, the EU may learn in many ways from the example of the USA and should make a strategic overview of potential risks. Therefore, the real problem of the current situation is, according to the report, the existence of a large number of "white" spots in the EU legislation and a lack of information concerning the actual fracturing activity. In order to eliminate the mentioned risks efficiently, all ambiguities/deficiencies should be set straight as soon as possible. (AEA, 2012)

A summary of these three reports has given a somewhat schizophrenic outcome to the Commission despite the fact that their final form did not evade raising certain doubts (for example, previous AEA ties to the Russian Gazprom were criticized). Simply put - on the one hand, there are findings that shale gas extraction could substitute the decline of conventional gas extraction in the EU area and, therefore, decrease Europe's dependence on imports. However, on the other hand, the findings from the environmental report indicate that the risks of negative environmental impacts caused by extraction are high and that it is necessary to establish/consistently control mechanisms for suppressing them.

Reports have likewise revealed definite legislative weak points at the EU level which will, with respect to the accelerating shale projects, have to be “healed” as soon as possible. The Commission will, therefore, in the nearest future seek a unified framework which would capture the entire shale gas issue, doing so without undermining in any way the member states' right to determine their own energy mix. The reports thus set off a discussion period, which, in addition, took place on several levels. DG Energy and DG Environment are currently discussing the extent to which the regulation of shale gas is required. In parallel with this, member states and the Commission are having a discussion of their own, since stricter regulation will certainly mean costlier extraction, which, for example, does not work for Poland since it has big plans with shale. These two levels are then complemented by public consultations, a format typical of the EU. Possible legislative changes can be, therefore, expected in 2013.

3.3.2 The European Parliament

As far as the European Parliament is concerned, it is hard to unequivocally determine the institutional position per se, like in the case of the European Commission. This is due to the scheme of EP, MEPs bonds with member states, ideological affiliations, etc. Within the bounds of the current discussion, the events involving the Energy and Environmental Committee deserve particular attention.

Dialogue and the non-binding resolution¹⁶ approved on September 19, 2012, at the Committee on the Environment, Public Health and Food Safety (ENVI) deal primarily with the impact of shale gas extraction on the environment and its potential impact on residents' health. The Committee bases this resolution arrives in the stance previously released by the European Commission. It indicated that the existing EU provisions adequately cover licensing, early exploration and shale gas production. However, because of the potential expansion of mining, the Environmental Committee considers it necessary to undertake a thorough analysis of the European Union regulation on unconventional fossil fuels extraction.

According to the Committee, member states should in the meantime be cautious in developing their shale gas extraction projects. In geologically sensitive areas, extraction should be forbidden. The Committee favours the option that fracturing activities should involve all interested parties, which would prepare special plans for treating the water usage and maximize the proportion of water which gets

¹⁶ The resolution was approved at the Environmental Committee with 63 votes for and one vote against, while one MEP was absent. The correspondent of the resolution is Bogusław Sonik.

recycled after the usage. The Committee also demands that there should be a binding obligation for companies to disclose the composition of fracturing mixtures. Simultaneously, as a sign of transparency affiliations, the contracts related to the extraction of shale gas should be made public. (European Parliament, 2012) The funds allocated to the fracturing research, according to the Committee, should be highly projected for security purposes. Increasing the extraction security thus became one of the main ideas of the resolution, including the early warning, crisis prevention, etc. of course under conditions of the "polluter pays" principle.

Dialogue and non-binding resolution¹⁷ was approved on September 18, 2012, at the Committee on Industry, Research and Energy (ITRE). This resolution focused mainly on the increasing consumption of natural gas in the EU member states and related assumption of the Union's growing dependence on supplies from the outside. Extraction of shale gas is in this regard considered as a means of diversification. The Committee primarily points out the experience of the United States in this sense and the impact which shale gas has in terms of the dynamics of the gas market and the price.

On the other hand, it warns about the fact that, unlike the USA, the EU setting has so far not reached a sufficient level of related services and equipment. For this reason, it is important to keep a realistic view when setting the date for possible extraction launch. At the same time, however, further enlargement of renewables' share and growth of the EU energy efficiency must be supported. The principal role in the licensing process stems from the member states' right to determine the form of their energy policy and in that manner also decide whether to extract shale gas or not. However, there is the approach that it would be appropriate to introduce a regulatory framework for the initial research at the EU level. (European Parliament, 2012) According to the Commission, robust regulation of extraction undoubtedly has its own place, but it should be applied primarily at the national level.

Both resolutions will be presented at the plenary session of the European Parliament in October 2012. What previous lines demonstrate is that while the Environmental Committee calls for stricter/more profound regulation of shale gas extraction, the Committee on Energy supports the right of member states to decide whether they will or will not develop projects for the extraction of shale gas.

¹⁷ The resolution was approved at the Committee by 32 votes, 23 MEPs were against, one MEP was absent. The correspondent of the resolution is Niki Tzavela.

Nevertheless, what needs to be noted at this point is the fact that whether either of the resolutions will be passed at the plenary session or not, it will not be binding. Their importance lies elsewhere. These proposals represent a sort of indicator of parliamentary attitude towards the regulation of shale gas, especially with regard of French announcement to forbid controversial fracturing methods on its territory at the beginning of September 2012.

Debate at the level of the European Parliament is, therefore, quite intense. For example, the MEP Bas Eickhout (Greens, Denmark) proposes that a moratorium of the shale gas extraction should be imposed on the whole of Europe. In contrast, for example, MEP Konrad Szymański (European Conservatives, Poland) emphasizes "the enormous potential in terms of economic profits and reduction of dependence on Russia," which the shale gas extraction, according to him, might have at the EU level. Szymański went even further in his observations by stating that he would unwillingly impose the "unworkable" rules (where he also included the proposal of the Environmental Committee) to the EU, which in turn could "kill off what could become a major industry for Poland". (Euractiv, 2012) In relation to the current resolutions, the one issued by the ITRE Committee is reached by criticism both because it was approved by a small number of MEPs, but mainly due to the fact that it meets the interests of the companies involved to a great extent. That the rhetoric regarding shale gas gets rather escalatory in the European Parliament can be supported by the fact that in April 2012, the group Food & Water Europe accused the correspondent of the Environmental Committee Sonik for using the threat of increasing dependence on Russia to help the development of shale gas extraction in Europe. (Euractiv, 2012)

The debate in the European Parliament is, therefore, best captured by Antoine Simon from Friends of the Earth Europe. He said - "It's like yin and yang - two radically different points of view on the issue it won't make any sense to have two different reports from Parliament saying two radically different things. It sends a contradictory message to member states who want to know what to do with this thing". (EuropeanVoice, 2012)

4. INTERPRETATION

4.1 POLAND

Generally, none of the sources replied to all the questions to the same degree of accuracy. The respondents focused mainly on their own spheres of activity. Some limitations resulted from the anonymous character of the interview. The material was analyzed according to the hypotheses presented in the methodological part of the document. The questions and answers in interview from which information was taken are referred to a Q.X, R.X (e.g. Q.1, R.C stands for question 1, respondent C).

4.1.1 Impact Factor: Regulation

Opinions varied in that respect, although generally the protectionist practices favoring the Polish companies can be noticed (Q.1 R.B, R.C). What gives this answer special value is the fact that the representative of public administration confirms that. As the representative of a private drilling company stated, these practices particularly applies to the non-EU entities, mostly the American and Canadian ones and is related to acknowledging the competences and experience (Q.1 R.B; Q.2, R.B). Another problem mentioned is related to import procedures that significantly slow down completion of equipment (Q.3 R.B).

Environmental regulations are not considered to be a problem, and generally foreign companies are not discriminated.

All the respondents agreed that the public procurement law due to its complexity, overregulation and ill construction and wrong implementation of the EU directives (Q.4, all answers).

In general, the regulatory issues were the ones that were considered to be the greatest threat to the development of the shale gas production in Poland (Q.8, R.A, R.C). Namely, the respondents accused the public administration and the management of the big state companies of ignorance and indolence which partially results from their monopolist (or very strong) positions in the system. And important case can be that of the linear investments. Presently, there is no single legal act allowing for a smooth and quick construction of pipelines, which eventually may become a serious problem when constructing required infrastructure.

The question of the possible future shape of the EU regulations was also raised – as a possible limitation to the shale gas development in Europe (Q.8, R.C and R.D).

4.1.2 Impact Factor: Information

The question of estimates of economic viability of the shale gas production in Poland still remains open as there is not enough data to determine that. This is mostly due to the insufficient number of drills performed (Q.7, R.A and R.B). The access to geological information is open and there are no problems with obtaining it (Q.5, all answers). The respondents indicated some potential problems related to too wide access to it (Q.5, R.A and R.C), and limited amount of it (Q.5, R.D).

However, one of the respondents noticed that some problem results from the lack of proper information policies. The communication about shale gas with communities related to risks and security is insufficient, thus raising fears and concerns about the process. It can be assumed that Q.8, R.D (environmental NGOs indicated as a possible threat) also refer to that, as they may be influential in local societies and at the decision-making level.

Another issue of such policies was a case of an audit, where the auditor asked one of the companies in the market for information that went way too far that required for conducting the analysis (Q.9, R.A). According to our respondent, providing this kind of information could seriously harm the interests of that company or endanger it with infiltration.

4.1.3 Impact Factor: Infrastructure

The answers to the question about the capacity of the Polish roads gave mixed responses. The main difference was different approach to the problem. In general, one respondent did not see any problem here (Q.6, R.A), the second one - not presently (due to the limited number of the drilling rigs in Poland) but possibly in the future (Q.6, R.B). The third respondent saw the problem not in the capacity of roads understood as a number of trucks passing daily but in their quality, especially on the local level (Q.6, R.C). The answer of the fourth respondent was very strict though not going much into details, resulting from the general experience in business.

All the respondents agreed that the capacity of the existing gas transmission and distribution infrastructure is insufficient and it requires large modernization and expansion (Q.7, all answers). However, three respondents pointed out at different aspects of the issue. One of them was the necessity to actually prove the reserves of the shale gas in Poland (Q.7 R.A and R.B). According to one response, there were regional capacities in Northern Poland to run a small-scale transmission

and distribution of shale gas (Q7 R.C). Insufficient infrastructure was also considered by one of the respondents the greatest threat to the development of the shale industry in Poland (Q8 R.B).

4.1.4 Impact Factor: Security

Except one, none of the respondents raised the issue of physical security of infrastructure (Q9, R.A), although the answer makes a strong point of the issue being largely ignored in the discourse.

4.2 THE CZECH REPUBLIC

The current Czech legislation allows the authorities in charge to assess during each step of the licensing process whether geological works, mining activities, or other activities related to the exploration and production of natural gas present a risk to the public health or environment. The decision of the District Mining Authority is always subject to the approval of the Ministry and property-owners. For a production licence municipalities' approval is also required. If it is however not granted, the dismissive standpoint may be reviewed by the Ministry. Licensing process provides sufficient information about the plans in preparation (including summary in non-technical language) and allows participation to all interested individuals and organizations so as to actively intervene in the process during its key steps. The District Mining Authority decision is in matters of environmental protection supplemented by the 100/2001 Act on the EIA, which argues that the Ministry of the Environment is another organ which can approve or ask to modify the extraction objectives based on independent evaluation of the impact of natural gas extraction.

During the mining phase, natural gas wells in the Czech conditions do not reach the flows which would imply a priori requirement of EIA. It can be assumed that it would not be any different with shale gas in case of which wells generally reach lower flows. Nevertheless, even then the objective must be reported and it can be assumed that, given the controversies which hydraulic fracturing causes in the Czech Republic, the Ministry would prescribe the screening procedures and EIA as necessary.

The key question, therefore, might as well not be whether the current regulatory framework gives the authorities enough power to enforce the use of the best practices in the most environmentally sound manner, but whether these authorities are able and willing to use this power in this way.

Moratorium of the exploration proposed by the Ministry is, in the context of publicly available sources, relatively weakly justified. The Ministry basically points out three reasons: (1) according to the current legislation, the implementation of EIA is not required in the exploratory stage, (2) current legislation is outdated and does not reflect the technological development in the last 20 years, and (3) the fact that extraction practically takes place in the final stages of successful exploration.

In the first instance, these arguments appear rather groundless. Regarding the EIA, the question is whether the two-year moratorium is an appropriate solution for the lack of conditions necessary for the EIA procedure and exploration works. As for the outdated regulatory framework, the key laws treating the exploration and production of natural gas – The Geological Act (62/1988), The Mining Act (44/1988) and The Law on Mining Activity (61/1988), are nearly a quarter of century old, which nevertheless does not mean that there are being applied in their original form: The Geological Act has been amended fifteen times, The Mining Act twenty times and The Act on Mining Activity even twenty nine times, with the last novelizations of each of them taking place in 2012. The fact that the actual production occurs during the last phase of the exploration is what conventional and unconventional extraction have in common - by monitoring the flow of released gas reserves, the size and extractability estimations of the deposit are established. The Czech legal system treats this condition in § 32a, paragraph 10 of the 44/1988 Law. The linking point between the Ministry's arguments is, of course, the method of hydraulic fracturing. This method has been, however, utilized in the Czech (Czechoslovak) context in various forms since the 1960s in order to increase the extractability of conventional oil and natural gas basins – the company Karotáž a cementace, for example, offers this service under the term "intensification". (Karotáž a cementace)

However, this does not necessarily mean that imposing the moratorium is a mistake, for following reasons:

(1) It enables a cultivation of the public debate regarding shale gas. Today, the debate is highly polarized and largely composed of a mixture of rather one-sided arguments and emotional stances. The list of locations mentioned in connection with deposits of shale gas contributes to this discussion to a great extent: (a) Náchodsko, the region which hosts a protected area which is also rich in valuable supplies of drinking water. The region lacks previous experience with (coal) mining of a greater volume and with comparatively less invasive extraction of oil or natural gas. For local residents it is therefore quite difficult to imagine the real impact of mining on their daily lives, whether it is negative (risk of surface contamination, ground water, intensified traffic, noise pollution), or the positive one (not insignificant income from royalties). (b) Berounka, which includes two national nature reservations and numerous cultural monuments, including the Karlštejn castle, which is in its importance comparable to the Prague Castle. (c) Valašsko, in which the designated territory partially overlaps the largest protected area in the Czech Republic (Beskydy). Although the region has a long experience with coal mining, over the recent years this activity

has been practically limited in order to resist a possible breach of territorial boundaries and new mining. Although it is very hard to draw the comparison of these phenomena, it cannot be expected that the local community would strongly oppose to the new coal mining and tolerate gas extraction. The only area which is mentioned in relation to shale gas and whose representatives would not potentially be strictly against mining is (d) Hodonínsko and Mikulovsko, which have a long-term experience with conventional oil and gas extraction. However, the approval for exploration area in this region was not under request.

(2) Further administrative moves regarding the issue will be enabled to learn from the experience which Poland will have acquired in the meantime. The initial phase of the survey (the licensing process and non-invasive exploration techniques) is almost at its end in Poland. The first exploratory wells are being currently carried out, whereas their number could increase even up to a hundred in the next two years. This could provide the Czech authorities with at least a general idea of the risks of such exploration in a socio-culturally similar milieu, with addition of the aspects of the process which could require further attention.

(3) During the two-year period, the responsible officials will have the opportunity to be thoroughly introduced with the latest studies mainly mapping the environmental impacts of shale gas, such as: *Unconventional Gas: Potential Energy Market Impacts* (Joint Research Centre, 2012); *Climate impact of potential shale gas production in the EU* (AEA); *Study of Hydraulic Fracturing and Its Potential Impact on Drinking Water Resources* (EPA, the draft will be at disposal already in 2012, then the final version in 2014); as well as recommendations, including best practices, which the IEA issued in May 2012. (*Golden Rules for a Golden Age of Gas*).

4.3 EUROPEAN UNION

The debate at the EU level is being carried in a different spirit than it did in the United States, mainly owing to the fact that there is a significant discrepancy between the EU member states in terms of their positions on shale gas. Thus it becomes apparent that great effort to obtain facts and verify the impact of shale gas extraction will be invested till the very end of 2012. Unlike in the USA, the principal topic of the Union debates primarily amounts to the environmental and technical feasibility of the process. Part of the expert community expected that, after publishing the aforementioned studies of the Commission, passionate discussions might be settled down. Nevertheless, the opposite is true. The current situation is unpredictable in many respects and these reports, meant to assess the situation objectively, are being questioned on both sides of the opinion spectrum. As far as the initiator of the EU legislation, the European Commission, is concerned, there is a standard consultation procedure of general sort running at the moment, assessing the necessity/sufficiency of further EU regulation in this field. The EC itself (unlike the noisy opinion groups in the EP) is fairly cautious when speaking about shale gas. The result, as of the early fall of 2012, is very vague and reflects directly the fragmentation of views among the Union member states. What will therefore follow in the immediate future is continuation of intense debates and negotiations. The first legislative acts (if any) are expected during 2013.

5. RECOMMENDATIONS

5.1 OVERALL RECOMMENDATIONS

(1) Exchange of experiences

The fact that both countries are involved in diverse internal national debates and stand at different stages of shale gas development process is not an obstacle but an incentive for cooperation. Both parties, sharing the same effort to obtain the cheaper alternative to the Russian supplies, can benefit from cooperation. For the Czech Republic, it offers the opportunity to observe the Polish experience and avoid potential errors in for example setting the regulatory framework of the tax burden or environmental protection. The Czech (municipal) authorities should regularly visit Poland to see on their very eyes the performance of the exploration or mining and in what stages and in what manner the public interest (for example environmental protection) is most endangered. In return, the Czech Republic can provide Poland with experience of a polarized debate and its possible moderations in order to achieve a compromise between the public interest in the utilization of mineral resources and protecting the environment.

(2) Forming the public agenda

Further recommendation is a proactive approach in moderating the public debate on the use of (not only) this energy source. State authorities are the only players who have sufficient information, resources and credibility for spreading the unbiased and relevant information.

(3) Cooperation in other sectors of the gas industry

While shale gas currently presents the most visible opportunity for mutual cooperation, both countries have other projects of strategic importance, from which the North-South Gas Corridor stands as the most important one. The decision makers should consider including the possible transmission infrastructure between Poland and the Czech Republic in the European Critical Infrastructure system.

5.2 RECOMMENDATIONS TO THE DECISION MAKERS OF POLAND

(1) To continue and foster the dialogue between the main actors

There is probably a certain insufficiency of communication between the most important actors (state administration, state companies, private companies). It could be expected that communication will be established to some extent, but the responses to the questions in the interview manifested sometimes entirely different perceptions of the same issues. Also, the system of public communication, starting at the level of local communities and ending up at the stage of lobbying in the EU institutions, should be created in order to involve the public in the debate and counterbalance the influence of the competing sectors at the EU level.

(2) To reduce unnecessary obstacles and focus on markets

All the respondents agreed (and the background research also confirmed) that one of the most sensitive areas in the field of shale gas is overregulation. In this respect, the legal provisions limiting the competition and protecting Polish companies (public procurement law, import provisions, personnel qualification requirements, some issues related to the licensing) should be carefully reformed. Also, a stable tax regime on hydrocarbon production should be rapidly introduced since it proves indispensable for business planning.

(3) To prepare the infrastructure

It is indispensable to prepare plans for modernization and expansion of both domestic and cross-border infrastructure in order to provide transmission, distribution and marketing for the shale gas. The lack of law on linear investments represents a particular obstacle here. The situation is similar with the road system. It will require renovations and modernizations, both before the drilling operations start and after they are over, which should also be planned in advance.

(4) To enhance security

Setting the system of efficient protection of geological information appears necessary. All the actors should be bound to oblige its regulations, while the problem of „data-information” duality should be solved as it causes plenty of confusion. All the sensitive information, both at the company and state level, should be carefully protected in response to the cases of suspicious practices in that area. Despite the protection of sensitive data being the most urgent security issue at the moment, it should not be understated that physical security nowadays becomes a progressively greater problem and that the potential losses

in the event of a major accident in the energy sector can greatly exceed the costs of protection. With this related, the EU Directive on critical infrastructure requires the governments to pay special attention to this issue.

5.3 RECOMMENDATIONS TO THE DECISION MAKERS OF THE CZECH REPUBLIC

(1) To monitor the development in Poland and in a goal-oriented manner search for positive and negative aspects of the shale gas development which could be either stimulated or, on contrary, suppressed by the appropriate regulatory measures.

(2) To study thoroughly the recommendations and best practices published in the IEA report Golden Rules for a Golden Age of Gas. When proposing the new regulation, to take into account both the Polish experience and the information provided by IEA.

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