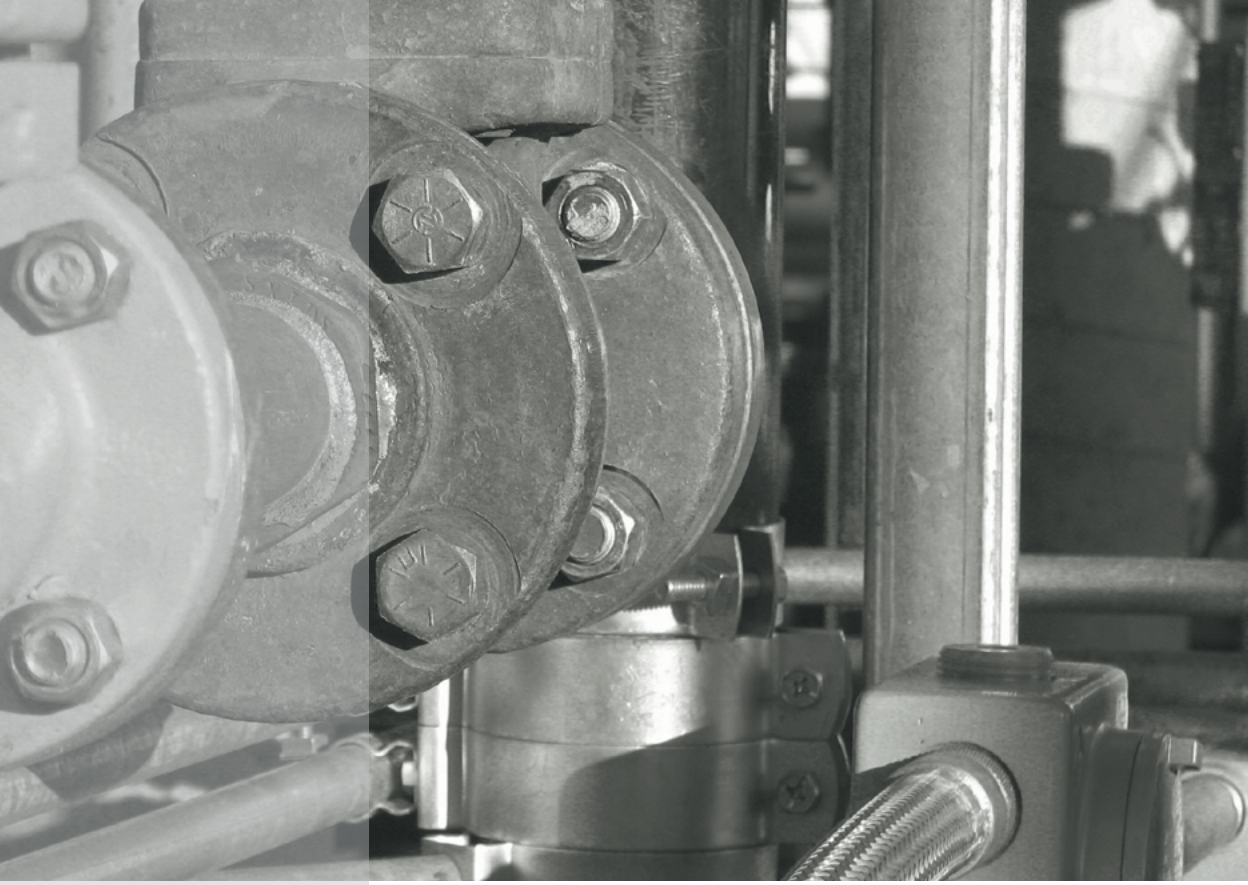

Energy security of the V4 countries. How do energy relations change in Europe

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Preface

Izabela Albrycht

The present publication, initiated and prepared by the Kosciuszko Institute together with the V4 countries' think tanks, is an attempt to deliver a comparative analysis and make the first step towards periodic monitoring of the energy situation of the EU countries. The aim of this Report is to compare selected macro and micro criteria which determine the energy security of the V4 countries with regard to the key primary energy sources – liquid fuels and crude oil as well as natural gas. The problem of energy security is a very complex one and is contingent upon numerous factors. However, given the limited scope of this publication, we shall concentrate here solely on infrastructural elements conditioning the energy security in the aforesaid two energy sectors. Having established the framework, the state of the energy security of the V4 countries has been analysed pursuant to the assessment model created by the Kosciuszko Institute which, for the purposes of this project, has been adapted to the energy portfolio of the Czech Republic, Poland, Slovakia and Hungary. Ultimately, the assessment model should be expanded to include the criteria that estimate the security in the electroenergy sector as well as economic and political criteria determining the energy security of countries.

The presented Report contains a comparative analysis of the state of the V4 countries' energy security and indicates that these countries experience similar energy-related problems which stem from being dependent on imports of resources from one direction and source, apparent diversification, illusory coal-based energy security or the need to significantly reduce CO_2 emissions.

Therefore the Czech Republic, Poland, Slovakia and Hungary are faced with identical, strategic energy challenges. Similarly, one should perceive the possibilities to increase the energy security of these countries through the building of the trans-boundary energy infrastructure, liberalisation of the energy market and, which is particularly important, the development of the unconventional gas sector in Europe. Obviously, one can also observe a number of divergent points regarding the perception of possibilities that could result in the increase of energy security such as the building of the Nord Stream pipeline. For countries like Poland, Slovakia and Hungary the project epitomises further dependence on the Russian gas whereas for Czech experts it offers the hope to secure a greater stability of gas supplies. Conversely, some Hungarian experts see a possibility of potential additional milliards of cubic meters of natural gas in the Russian project, South Stream.

Despite these differences, the V4 countries' leaders declare that the Group faces a very ambitious challenge, namely enhancing the energy security of Central-Eastern Europe. The cooperation within the V4 group should therefore serve as a platform for negotiating common stances and forming coalitions in order to accomplish common interests on the EU forum. The coming Polish and Slovakian presidencies of the EU Council should also serve to address the energy-related problems of this part of Europe. The Czech Republic and Hungary have set a good example to be followed by the other Member States during their presidencies.

The prospective aim of the Kosciuszko Institute in the coming years is to carry out research on the energy security of all the EU countries and the EU *en bloc* which, by means of policy communitisation, market liberalisation and the development of the trans-boundary energy infrastructure, aims at creating a common EU energy market and a common energy policy. The findings of such periodically conducted research will allow us to assess whether the current political decisions made by the EU leaders and the investments of energy concerns lead to either the increase or decrease of the energy security of the individual Member States. The idea of European integration requires that the process of communitisation of the energy policy should take into account the interests of all the EU Member States, including the state and factors determining the condition of their energy system, quantitative resources and the type of available natural resources, as well as a long-term strategy of building the energy portfolio. Currently, we can observe a situation where the voice and interests of individual EU countries are not always equally important. To illustrate this tendency, we could take as an example the current political debate on unconventional gas that is taking place on the EU forum. Through unconventional gas, Poland and a number of other EU countries would be able to cope with the challenge posed by the reduction of CO_2 emissions as well as to enhance the competitiveness of their economies and achieve energy security. Not all the countries, however, share this view on unconventional gas, which poses a real threat to the potential development of this energy sector. The extraction of unconventional gas on an industrial scale in Poland and other EU countries and its export within the framework of the common EU gas market can contribute to a decrease of gas prices charged to European end-users as well as energy diversification, the strengthening of energy security in Europe along with the reduction of CO_2 emissions. It is therefore valid to say that the development of the unconventional gas sector should be supported by the Polish presidency in the EU and by the other V4 countries so that it is neither discredited nor discriminated against in Europe.

The Report not only identifies the possibilities and threats facing the V4 countries regarding energy security, but also indicates other areas where the EU policy shows an inconsistent approach to the energy problems, challenges and possibilities of Poland, the Czech Republic, Slovakia and Hungary. Therefore, we strongly believe that it will become an important point of reference for politicians, decision-makers and experts who participate in the debate on Europe's energy future.

I would like to thank our experts and partners for their contribution to the Report and invite you to familiarise yourselves with its contents.

Executive summary

The Kosciuszko Institute

Energy policy and especially energy security are undoubtedly of utmost importance for all of the V4 countries. Despite the differences in Poland's, Hungary's, Slovakia's and the Czech Republic's energy portfolio there still is a number of challenges the countries share in the context of energy supplies. The Ukraine – Russia crisis made the countries' common weaknesses and the general problems with energy security in the region clearly visible.

The V4's vulnerability consists in that the countries largely depend on energy supplies from one source and lack an integrated energy market. The 2009 crisis demonstrated, especially in Slovakia, that modernisation and development projects in the field of energy infrastructure require less effort and money than losses incurred by the interruptions in energy supply.

Research done by experts for this publication shows that the V4 is far better organised in terms of crude oil and liquid fuels supplies than in managing issues connected with natural gas. Natural gas constitutes the biggest part of the imported energy sources. What is more, 92% of the gas is imported from one supplier i.e. from Russia. Initiatives which aim at changing the situation should now constitute the priority in common efforts of the V4 countries.

The North-South Gas Corridor is one of the flagship initiatives in the field and stands a very good chance of improving energy security of the V4 countries. The overall objective of the project is to provide access to alternative gas sources of supply for the region and to create a system of interconnected networks of transmission and reception of gas, which would allow the flow of raw material not only from East to West, but also from North to South (two-way flow networks). Construction of the Corridor, a component which may effectively strengthen the region's energy market, should be financed from the EU funds and should involve cooperation and closer relationships in the energy sector with Bulgaria, Romania and Croatia.

The fact that countries from the V4 group – Hungary and now Poland – have been holding the presidencies of the Council of the European Union offers them a perfect opportunity to attract attention to the energy issues at the EU level. During the Hungarian presidency one of the main aims was to develop the internal energy market and Poland should quite naturally

continue the initiative and aim at consolidating the internal level of the European energy market. Moreover, the V4 countries should pursue policy based on two pillars: the development of common stand on EU initiatives and the creation and implementation of projects of regional scope. The V4 coalition of interests seems capable of exerting influence on decision-making processes of the whole of the EU.

Another very important energy challenge, felt particularly strongly by Poland and the Czech Republic, comes from the rising costs of greenhouse gas emissions which may prove very destabilizing to coal-based economies. In fact, the V4 governments performance in this context may seriously impinge on the countries' whole economy in the future.

1. Security of gas supply – a regional dimension

Pál Kovács

Energy security issues are of great importance both for Hungary and Poland and a number of decisions relating to it will be taken during these countries' presidencies of the European Council. Hence the presidencies create a great opportunity for facilitating the debate on the European level. In particular, there is a need to answer questions regarding sustainability, security of supply and improving competitiveness by tariffs or other legislation. Gas dependence constitutes crucial problems for Poland and, to an even greater extent, Hungary. After the Polish presidency up to 2020, no major change is expected. From this point of view, it puts a lot of responsibility on both presidencies to facilitate the debate at the European level.

Guaranteeing security of supply

There are a number of important aspects regarding the preparation of current policies at the European level. One is an issue of infrastructure development in ensuring security of supplies. Europe's gas dependence is already high and is expected to grow. According to the Commission's estimations**,** imports will reach about 73-79% of gas consumption by 2020 and even 81-89% by 2030. Ensuring a secure supply of natural gas requires diversified imports, substantial development of the already existing cross-border connections and facilitation of the free cross-border movement of natural gas. Since Hungary is highly dependent on gas from one gas supplier – Russia – it serves as a good illustration of the significance of the aforementioned issues. Currently, a great emphasis is put on the development of interconnectors, one between Hungary and Croatia and one between Hungary and Romania. There is also an agreement with Slovakia for the construction of a Hungarian-Slovakian interconnector, which will be part of the North-South Gas Corridor. However, even if these goals are achieved, Hungary will still remain dependent on Russian gas. This proves that the EU energy policy should aim at creating a properly interconnected single market which can guarantee security of supply.

Tackling challenges on the EU-level

Some measures to tackle the existing challenges have been already taken on the European level. During the Belgian presidency, the European Commission has concluded two directives: *Energy 2020* and *Energy Infrastructure priorities for 2020 and beyond*. These were discussed during the first High Level Summit held by the Hungarian presidency on 4th February in Brussels. The Summit was dedicated only to energy, innovation and the conclusions have confirmed the importance of the energy infrastructure development.

North-South Energy Interconnections in Central-Eastern Europe

Regarding the Central-Eastern Europe (CEE) region, the North-South Interconnections are one of the new priorities identified by the EU. This issue was included in the aforementioned *Energy Infrastructure priorities for 2020 and beyond*. The package proposes development of an interconnection which would serve the Baltic energy market and the CEE region. In order to create the North-South Energy Interconnection linking the Baltic Sea, the Adriatic Sea and the Black Sea, a High Level Expert Group with the participation of Poland, the Czech Republic, Slovakia Republic, Hungary, Romania, Bulgaria and Croatia (as an observer) has been set up. The Group is expected to deliver an action plan regarding the development of interconnections of gas, electricity and oil sectors by the end of 2011. On 3rd February 2011**,** the Heads of Governments of the interested states and the European Commission President Jose Manuel Barroso officially launched the project.

Regional cooperation in the CEE area – V4 initiative

With regards to the regional cooperation in CEE and within the V4 initiative, it is crucial to emphasize the importance of the V4 collaboration during the Hungarian and the Polish presidencies. Adding the V4+ countries (Slovenia, Croatia, Romania and Bulgaria) might be crucial in order to connect the North-South Energy Corridor with the new legs. Given the European project plan Nabucco, this could support interconnection to the North-South Corridor and as well the LNG leg from the West-South direction throughout Croatia or Slovenia or Italy.The key problem is ensuring financing for these projects. Hungary stresses the importance of European financial contribution to improve the security of supply to the region. It has already started cooperation within the framework of the V4 initiative. In the *Memorandum of Understanding* signed in February 2010, all the V4 countries agreed *inter alia* to support the promotion of the North-South Interconnection, and the Nabucco pipeline. During the fourth meeting of the High Level Energy Working Group (including Croatia as the observer) on 29th June 2010 it was agreed that an *ad hoc* Expert Working Group would work on the concept of the North-South Gas Corridor. The Group would deal with the issues concerning the LNG terminals. It was also agreed that Energy Supply Crisis Working Group would be created – a solidarity mechanism for gas, oil and electricity supply in the region. In January 2011 Energy Ministers made a Declaration in Bratislava to ensure a common standpoint of the V4 countries on the EU issues.

The North-South Gas Corridor

Because of the single source dependency and fragmented national markets the CEE region is particularly vulnerable regarding the security of gas supply. The transmission system serves mainly the East–West direction of flow. The North-South Gas Corridor is supposed to deal with this situation as it would enable free gas flow within the region. Connection of the supply routes between the Baltic, Adriatic and the Black Seas would provide an overall flexibility for the entire CEE region. A well-functioning internal market would be created. Nevertheless, some issues require actions at the European level, e.g. decisions on the external dimensions of the EU energy policy and on the issue of project financing. Such discussion will take place during the Polish presidency.

2. Energy security in the context of the Polish presidency

Krzysztof Szczerski

The coordination of Polish and Hungarian presidencies

Energy issues are one the Polish presidency priority concerns and appear in the context of external energy security which constitutes the element of energy policy of the EU. This standpoint should complement the Hungarian presidency which focused on establishing an internal energy market within the EU. The Polish presidency should therefore focus on mechanisms that would secure this market against any external shocks, especially the interruption of energy imports due to political factors. The potential of a half-year rotating presidency of the Council should not, however, be overestimated, as it is uncommon for subsequent leaders to succeed in arriving at any breakthrough project on any substantial matter. What we can expect from the Polish presidency is a move forward with regards to energy politics of the EU**,** with a strengthened emphasis on the consistency of the European stand on energy issues with its external partners. Currently the dominant strategy is the practice of using competitive advantage in the access to the markets and sources of energy found in third countries and some Member States take advantage of their "exclusive access", thus promoting the strategy of "share and govern" which benefits external powers.

It should be remembered that the presidency is to remain a neutral and unbiased negotiator of the interests of the Member States. It is therefore advised that any unambiguous lobbying for national interests should be avoided. Still, a well-designed leadership gives the opportunity for interests to be presented in the programme rather than during the presidency itself. A well prepared presidency should therefore be run according to our interests in a somewhat "self--acting" way, without the need for any ferocious political interventions to correct it. This is why there is a need to coordinate the two presidencies' aims and priorities. Thanks to such a coordination Hungarians during their own presidency can listen to the Polish voice and promote our interest as the mutual interest and afterwards the Polish presidency can promote its interests.

It is true that every presidency inherits the circumstances from the previous one. Hence the Polish presidency could continue to work on the results of the Hungarian presidency. There is even more need for cooperation between these two presidencies. However, it is worth mentioning here that there exists one substantial formal obstacle to this. The coordination

of actions could be to some extent disrupted by the fact that Hungarians are finishing the previous trio (18-month presidency of Spain, Belgium, Hungary), and Poland is beginning the next one (with Denmark and Cyprus). It is the coordination within the trio which is the primary duty of the presidencies. The year 2011 is the period of "breakthrough" between the 18-month presidencies of the two trios, therefore a coordination slightly against the drift stated in the common law will be necessary.

Energy security in the context of the EU's new Financial Perspective

Another important issue worth considering here is the fact that most probably during the Polish presidency a debate on a fundamental matter for the politics of the EU is the debate over the EU's new Financial Perspective. This issue is likely to have much influence on the presidency and later constitute a basis for its assessment. It is obvious that the discussion is not going to be resolved during the Polish presidency or that it is going to reach a cumulative point – it will be continued during the Danish and Cyprian presidencies. The Polish presidency will be however responsible for preparing the guidelines for the debate, which will eventually conclude the future EU finance over the next 7 years. This should happen so long as the view that the Financial Perspective should be shortened to five year is not implemented; voices in favour of the shorter Financial Framework are being raised, arguing that nowadays in the fast-paced world prone to crises it is impossible to maintain anachronic concepts of such long decision-making periods. It is a substantial task because the future course of the debate depends on it.

The debate on EU finances is fundamental also from the point of view of energy security. An important matter within its framework will be the extent of the EU's cohesion policy: firstly, whether at all cohesion policy be pursued; secondly, if yes, what shape should it take; thirdly, it is important whether the cohesion policy is going to undermine that of competitiveness, which is included in the aims of *Europe 2020* strategy. Should this happen, it is significant in which "basket" the questions on energy security will be placed. If these are going to be in the cohesion policy framework, then finance will be directed to the projects which are among others in the interest of Poland, that is: establishing a consistent energy strategy within Europe; maintaining own, endogenic energy potential of each of the states. Finance of such projects, can, however, also come from the funds given for competitiveness enhancement. If that is the case, it may occur that even though the funds will be given for energy infrastructure, they will eventually be directed to investments much less attractive for Poland e.g. for the construction of corridors that transport energy from the renewable sources of energy such as the North-South, which transports green energy from Scandinavia to the South of Europe. The "green market of competitive energy" understood in such a way means that Poland will become an energy importer rather than its supplier.

A very substantial issue is where the finance for investments in energy infrastructure will come from. The European Commission and a group of influential politicians of the EU have taken a stand on that matter. They claim a creation of a new source of the EU's income should be considered: a type of "tax on carbon dioxide's emissions", gains from which would be directed to investments in energy security. The discussion about a new shape of the Financial Perspective can therefore evolve in such a way that a condition for the availability of funds for energy investments will be subject to a political agreement on the new income of the EU budget. Otherwise the budget will not be able to take the burden of such investments. As a result, the money for investments in energy infrastructure in the new budget might not support the establishment of Polish potential.

These are strategic choices, because when discussing if we would like to invest in infrastructure within the framework of energy security or creating energy corridors, we all agree. Nevertheless, it is the details which are going to determine whether or not these would serve the interest of our part of the EU: Poland and Hungary.

Creation of new alliances as a method to achieve established aims

Given the above, it is possible that we will achieve our aim of obtaining money for investments in energy infrastructure from the new EU budget and that we will get assurance that the postulate on European energy security will be put in action. What will be happening in practice will not however facilitate the creation of our potential or realization of our substantive interests. Therefore a very crucial aim of the presidency is to establish alliances that would enable us to realize our priorities *via* "the mission of mutually beneficial services". These alliances are necessary since presidency as a neutral broker needs someone who will represent a similar strategy and hence support the presidency's vision. V4 group is a natural example of such an alliance, however, cooperation with other countries should not be neglected**.**

It is important to be well-prepared for the negotiations on various aspects, such as energy security or the Finance Perspective for the future years. A crucial problem is the fact that different countries have different views on energy security and give differential status to such matters. Because of this, the aim of the Polish presidency will be to create an "umbrella" of common energy policy above the individual nations' interests, in such a way that they would not be rivals. Taking into consideration the divergence of interests of the individual nations and energy companies is going to be a difficult task for the Polish presidency.

Conclusions

We already know that the Polish presidency will not result in a "breakthrough". Nevertheless, we expect it will establish a solid ground for discussing the budget for the coming years in such a way that would be directed to our interests. In order to achieve this aim, we need to find allies as well as fully understand the economic interests, because even identically formed documents may imply different results concerning the status and positions of countries in the energy market.

3. Energy Security Indexes for V4 countries

3.1. Introduction

The assessment of the energy security of the V4 countries, as well as its regular monitoring, should be conducted on the basis of objective and measurable criteria, which will be additionally comparable in time. The following chapter contains *Energy Security Indexes* prepared for each V4 country. Indexes have been prepared on the base of a model originally presented in the Kosciuszko Institute's publication entitled *Energy Security of Poland 2010 – Opening Report*. The publication presents a proposal for an evaluation model which consists of a set of macro and micro criteria related to the infrastructural determinants of the two energy sectors, *i.e.* of crude oil/liquid fuels and natural gas sectors, which – according to experts – should be analyzed in a research of this type. The proposed criteria were described and quantified according to the established "weights." The most important informative value of the *Index* shall result from evaluating its changes over time, in the following years, when it should be calculated according to the same methodology. At this stage of research, the team of experts decided also to focus first of all on the infrastructural criteria, without taking into consideration the economic and political criteria. The main aim of this chapter was to apply the *Index's* methodology (originally prepared for Poland) to the conditions of the Czech Republic, Hungary and Slovakia. Due to the fact that each country has a different energy mix in order to examine their state of energy security, a set of criteria had to be adjusted to their specific conditions. Therefore, the result of the work presented in this chapter will contain *Energy Security Indexes* prepared for Poland, Slovakia and the Czech Republic. In the case of Hungary, at this stage, criteria have been discussed and and adapted but not applied.

Methodology[1]

The general scope of the research is "energy security of each of the V4 countries." It is *de facto* analyzed on the basis of two sub-categories: energy security in crude oil/fuels sector and energy security in natural gas sector. The statistical characteristics that were taken into account are enumerated in the tables under the *Micro criterion* heading. A group of experts established weights for each criterion: they are presented under the heading "Criterion weight – Micro". All of them sum up to 100% but it is also possible to calculate the established weights of the macro criteria through partial addition. The above-mentioned values of the characteristics are presented in age terms and indicate to what extent the particular criteria were fulfilled. They can be found in the "Indicator for year 2009" column. These are composite indicators presenting a "positive" fulfilment of the particular criteria; thus all the characteristics are expressed as stimulants. However, at this point a significant exception from typical aggregate indicators was allowed: there is a possibility that a given criterion would be fulfilled with excess, i.e. the value of a composite indicator may exceed 1. In consequence, the aggregate indicator does not have a top limit. For the purpose of calculations, the percentages were expressed as fractions. Should the aggregate indicator come to zero, it would mean that none of the micro criteria was fulfilled even to a minimal degree. If the value of the aggregate indicator was 1, it would mean that energy security is fully satisfactory – in light of the assumed criteria. An aggregate indicator higher than 1 indicates security "with excess." The indicators for the micro criteria are consolidated into the aggregate indicator by means of additive formula, taking into account their weights. Hence, the aggregate indicator should not be treated as an assessment of the reliability of the energy system, but rather as a summary assessment of the state of energy security.

1 Sokołowski A.,„The methodology of constructing aggregate indicators", [In:] ed. Szlagowski P. *Energy Security of Poland 2010 – Opening Report 2010*, The Kosciuszko Institute, pp. 8-9.

Description of the model and the applied criteria[1]

Piotr Szlagowski, Aleksander Zawisza, Janusz Kowalski

Crude oil and liquid fuels

Macro criterion	Micro criterion	Description	Calculation method	Criterion weight		
				Macro	Micro	
Domestic production of crude oil and fuels, and crude oil import	Domestic crude oil production	The criterion is used to assess the coverage of the domestic demand for crude oil by domestic production	Ratio of domestic crude oil production to the domestic demand for crude oil	27,5%	15%	
	Coverage of the domestic demand for liquid fuels by domestic production	The criterion is used to assess the coverage of the domestic demand for liquid fuels by domestic production	The coverage is calculated by the weights of the particular fuels in the overall demand structure		10%	
	Diversification of crude oil supply	The criterion is used to assess the degree of concentration of the supply market	Herfindahl-Hirschman Index		2,5%	
Crude oil and fuel stocks	Capacity to release stocks covering crude oil consumption for 7 days	The criterion is used to assess the capacity of releasing accumulated stocks for a period of 7 days	Ratio of accumulated stocks to average annual daily consumption during a period of 7 days			5%
	Capacity to release stocks covering crude oil consumption for 30 days	The criterion is used to assess the capacity of releasing accumulated stocks for a period of 30 days	Ratio of accumulated stocks to average annual daily consumption during a period of 30 days			1,5%
	Capacity to release stocks covering crude oil consumption for 90 days	The criterion is used to assess the capacity of releasing accumulated stocks for a period of 90 days	Ratio of accumulated stocks to average annual daily consumption during a period of 90 days			0,5%
	Capacity to provide 3 refineries with crude oil supply during a short-term crisis (<21 days)	The criterion used to assess the capacity to provide supply to the major refineries during a short-term crisis	Ratio of accumulated stocks to the demand of 3 refineries during a 21-day period. The following weights were assumed: technical capacity – 90%, legal capacity – 10%		8%	1%
	Ratio of crude oil stocks to fuel stocks	The criterion is used to assess the proportions in which crude oil and fuel stocks are maintained	Ratio of fuel produced by the largest producer to the overall consumption is assumed to be optimal			5%
	Available crude oil and fuel storage capacity	The criterion is used to assess the adequacy of available storage capacity with regard to demand	Storage capacity covering the demand of the current year and the next year equals 100%. The current year weighs 80%, from which two%age points are subtracted for every%age point of offered capacity below the demand level. The next year weighs 20%, from which one%age point is subtracted for every%age point of offered capacity below the demand level.			2%
	Capacity to release stocks covering domestic fuel consumption for 7 days	The criterion is used to assess the capacity of releasing accumulated stocks for a period of 7 days	Ratio of accumulated stocks to average annual daily consumption during a period of 7 days			7%
	Capacity to release stocks covering domestic fuel consumption for 30 days	The criterion is used to assess the capacity of releasing accumulated stocks for a period of 30 days	Ratio of accumulated stocks to average annual daily consumption during a period of 30 days	24,5%	16,5%	2,5%
Capacity of fuel terminals and product pipelines	Capacity of fuel terminals	The criterion is used to assess the receiving capacity of fuel terminals	Ratio of import capacity to overall domestic consumption		15%	
	Capacity of product pipelines	The criterion is used to assess the capacity of product pipelines in a crisis situation	Ratio of import capacity to overall domestic consumption	25%	10%	
Capacity of crude oil pipelines and terminals	Capacity of crude oil terminals	The criterion is used to assess the receiving capacity of crude oil terminals	Ratio of import capacity to overall domestic consumption		4,0%	
	Capacity of crude oil pipelines	The criterion is used to assess the capacity of crude oil pipelines in a crisis situation	Ratio of import capacity to overall domestic consumption	8%	4,0%	
Railway and automotive logistics	Railway logistics	The criterion is used to assess whether the number of tank trailers is adequate in a crisis situation, during which the number of required tank trailers is higher than normally	Ratio of current number of tank trailers to the number of tank trailers required in a crisis situation		10%	
	Automotive logistics	The criterion is used to assess whether the number of tank trucks is adequate in a crisis situation, during which the number of required tank trucks is higher than normally	Ratio of current number of tank trucks to the number of tank trucks required in a crisis situation	15%	5%	

Natural gas

Macro criterion	Micro criterion		Description	Calculation method	Criterion weight	
					Macro	Micro
Domestic natural gas production			The criterion is used to assess the share of domestic natural gas production in the annual demand	Ratio of domestic production to the overall demand	25%	
Import infrastructure	Capacity of import infrastructure	Pipelines	The criterion is used to assess a potential share of import infrastructure of a given type in the overall import	Ratio of pipelines' capacity to the overall import		6,50%
		Terminals		Ratio of terminals' capacity to the overall import		8,50%
	Capacity of import infrastructure in respect of import directions		The criterion is used to assess the diversification potential of import infrastructure	Herfindahl-Hirschman Index	25%	10%
Import structure	Import diversification	Supply directions	The criterion is used to assess the degree of import diversification in respect of supply directions and countries of origin of the raw material	Herfindahl-Hirschman Index		15%
		Countries of origin				10%
	Import contracts time structure		The criterion is used to assess the share of gas contracted on a short-term basis in the overall time structure of import contracts	Ratio of gas volume imported on the basis of short-term contracts to the overall volume of imported gas	30%	5%
Gas storage capacity	Working capacity of underground gas storage facilities		The criterion is used to assess the overall capacity of underground gas storage facilities	Ratio of working capacity to average quarterly domestic demand		8%
	Maximum withdrawal rate of underground gas storage facilities		The criterion is used to assess the maximum withdrawal rate during peak demand	Ratio of maximum withdrawal rate to maximum daily demand	15%	7%
Market structure	Competitiveness in importers market		The criteria are used to assess the levels of competitiveness in various segments of the natural gas market	Herfindahl-Hirschman Index	5%	1,5%
	Competitiveness in production market					1,5%
	Competitiveness in wholesale market					1%
	Competitiveness in retail market					1%

1 Szlagowski P., Zawisza A., Kowalski J., "Description of the model and the applied criteria" [in:] ed. Szlagowski P. *Energy Security of Poland 2010 – Opening Report* The Kosciuszko Institute, pp. 10-13.

Crude oil and liquid fuels (Aleksander Zawisza)[2]

Macro criterion	Micro criterion	Criterion weight			Indicator for year 2009	Value used for aggregate indicator	
		Macro	Micro				
Domestic production of crude oil and fuels, and crude oil import	Domestic crude oil production		15%		3%	0,0045	
	Coverage of the domestic demand for liquid fuels by domestic production		10%		73,2%	0,0732	
	Diversification of crude oil supply	27,5%	2,5%		0%	0,0000	0,7770
Crude oil and fuel stocks	Capacity to release stocks covering crude oil consumption for 7 days			5%	100%	0,0500	
	Capacity to release stocks covering crude oil consumption for 30 days			1,5%	100%	0,0150	
	Capacity to release stocks covering crude oil consumption for 90 days			0,5%	78,9%	0,0039	
	Capacity to provide 3 refineries with crude oil supply during a short-term crisis (<21 days)		8%	1%	90%	0,0090	
	Ratio of crude oil stocks to fuel stocks			5%	65%	0,0325	
	Available crude oil and fuel storage capacity			2%	100%	0,0200	
	Capacity to release stocks covering domestic fuel consumption for 7 days			7%	100%	0,0700	
	Capacity to release stocks covering domestic fuel consumption for 30 days	24,5%	16,5%	2,5%	94,3%	0,0236	0,2590
Capacity of fuel terminals and product pipelines	Capacity of fuel terminals		15%		100%	0,1500	0,2107
	Capacity of product pipelines	25%	10,0%		61%	0,0607	
Capacity of crude oil pipelines and terminals	Capacity of crude oil terminals		4,0%		89%	0,0358	0,0753
	Capacity of crude oil pipelines	8%	4,0%		99%	0,0395	
Railway and automotive logistics	Railway logistics		10%		74%	0,0740	
	Automotive logistics	15%	5%		100%	0,0500	0,1240
Aggregate indicator of energy security for crude oil and liquid fuels sector for year 2009							**0,7117**

Natural gas (Janusz Kowalski)[3]

Macro criterion	Micro criterion		Criterion weight		Indicator for year 2009	Value used for aggregate indicator	
			Macro	Micro			
Domestic natural gas production			25%		31,0%	0,0775	
Import infrastructure	Capacity of import infrastructure	Pipelines		6,50%	195,6%	0,1271	
		Terminals		8,50%	0%	0	
	Capacity of import infrastructure in respect of import directions		25%	10%	0%	0	0,1271
Import structure	Import diversification	Supply directions		15%	0%	0	
		Countries of origin		10%	0%	0	
	Import contracts time structure		30%	5%	9%	0,0045	0,0045
Gas storage capacity	Working capacity of underground gas storage facilities			8%	50%	0,0400	
	Maximum withdrawal rate of underground gas storage facilities		15%	7%	62,9%	0,0440	0,0840
Market structure	Competitiveness in importers market			1,5%	0%	0	
	Competitiveness in production market			1,5%	0%	0	
	Competitiveness in wholesale market			1%	0%	0	
	Competitiveness in retail market		5%	1%	0%	0	0
Aggregate indicator of energy security for natural gas sector for year 2009							**0,2931**

2 Zawisza A., "Energy Security Index – Poland. Crude oil and liquid fuels" [in:] ed. Szlagowski P. *Energy Security of Poland 2010 – Opening Report* The Kosciuszko Institute, pp. 13-14.

3 Kowalski J., "Energy Security Index – Poland. Natural gas" [in:] ed. Szlagowski P. *Energy Security of Poland 2010 – Opening Report* The Kosciuszko Institute, p. 14.

Polish energy policy in the light of the Energy Security Index[4]

Crude oil and liquid fuels

1. As for fuel stocks and the possibility of organizing supplies in case of a crisis, Poland is relatively safe. The aggregate indicator of energy security for this sector for 2009 came to 0,7117.

2. Crude oil and liquid fuel stocks exceed the required minimum levels of 90 days by 10% to almost 50% (depending on the calculation method: differences between the EU and International Energy Agency – IEA).

3. There is no problem with an adequately quick access to the intervention stocks for 55 days of a crisis (during this time the amount and release rate of intervention stocks cover the demand of Polish refineries), later, due to the limitation of the withdrawal rate of crude oil and fuels from the cavern storages of IKS Solino (too little brine), the demand would be covered in 45%. Therefore, it is necessary to undertake actions aiming at ensuring access to the intervention stocks for 90 days.

4. The capacity of fuel bases and inland terminals is adequate to possible needs during a crisis.

5. The capacity of marine terminals is insufficient, both in case of crude oil and fuels; therefore, there is a need to build at least one more terminal in the vicinity of Gdańsk, Gdynia and Sopot.

6. Similarly insufficient is the crude oil receiving capacity through Naftoport; it should be increased to at least 45 Mt per year.

7. In case of a crisis situation resulting in the necessity to receive much larger volumes of fuels by sea, all the drawbacks of the railway transport, in comparison to the pipeline transport, shall be revealed: duration of transport, transport volumes, price.

8. There are not enough tank trailers in order to cope with a crisis situation.

9. Ensuring greater capacity of fuel terminals and product pipelines is a better solution when it comes to enhancing supply security than accumulating compulsory stocks over the required minimum level. It would be advisable for government to decrease (sell) the interventions stocks and use the produced revenue for buying shares in the construction of fuel infrastructure (construction of a terminal in Gdańsk and a product pipeline between Płock and Gdańsk) and ensuring adequate reserve capacity in this infrastructure.

10. There are not enough storage facilities for propane and butane (LPG), if we take into consideration the fact that they would be used for storing both intervention and commercial stocks. Poland should have storage facilities ensuring capacity of 400 000 cubic meters. It would be advisable to realize the strategy of PKN Orlen from March 2007, which envisioned the construction of underground cavern storage facilities for propane and butane in IKS Solino.

Natural Gas

1. The energy security of Poland with respect to natural gas is relatively low. The aggregate indicator of energy security for this sector for 2009 came to 0,2931.

2. Domestic production of natural gas amounted to 4,1 bcm, which covered 31% of the domestic demand for this raw material in last year. The level of domestic production of natural gas has not changed for a few years.

3. Almost 91% of gas imported to Poland comes from the East. It would be advisable to diversify Polish import basket by natural gas supplies from other import directions. An essential role in this aspect could be played by the construction of the LNG terminal in Świnoujście.

4. As of January 2009, the import of natural gas to Poland was to be realized entirely on the basis of the binding long-term contracts. However, due to the lack of supply from RusUkrEnergo the share of short-term contracts (measured by the size of the volumes) in Polish import basket came to ca. 9%.

5. The working capacity of underground gas storage facilities amounts to ca. 12,5% of the annual gas consumption and thus it is insufficient. The maximum withdrawal rate, which reaches 34,6 million cubic meters (mcm) per day, is also too low. In consequence, the gas system is not ready to cover peak demand in time of a crisis and its expansion is desirable.

6. The natural gas market in Poland is monopolized in all sections of the supply chain.

4 Ibidem.

3.3. Energy Security Index – the Czech Republic

Petr Binhack and Jakub Jaroš

Oil and liquid fuels

Macro criterion	Micro criterion	Criterion weight			Indicator for 2009	Value to aggregate indicator	
		Macro	Micro			Micro	Macro
Domestic production of oil and fuels, and oil import	Domestic oil production		15%		2%	0,0030	
	Cover of domestic demand for liquid fuels by domestic production		10%		100%[1]	0,1000	
	Diversification of oil supplies	27,5%	2,5%		0%[2]	0,0000	0,1030
Oil and fuels reserves	Capacity to withdraw reserves covering oil consumption during 7 days			5%	100%	0,0500	
	Capacity to withdraw reserves covering oil consumption during 30 days			1,5%	100%	0,0150	
	Capacity to withdraw reserves covering oil consumption during 90 days			0,5%	100%	0,0050	
	Capacity to provide 3 refineries with oil supply during short term supply interruption (< 21 day)		8%	1%	100%	0,0100	
	Proportion of oil reserves to fuel reserves		16,5%	5%	56%[3]	0,0280	
	Available oil and fuels storage capacity			2%	100%	0,0200	
	Capacity to withdraw reserves covering fuels consumption during 7 days			7%	100%	0,0700	
	Capacity to withdraw reserves covering fuels consumption during 30 days	24,5%		2,5%	100%	0,0250	0,2130
Capacity of fuel pipelines and terminals	Capacity of fuel terminals[4]		15%		0%	0	
	Capacity of fuel pipelines[5]	25%	10%		0%	0	0
Capacities of oil pipelines and terminals	Capacity of oil terminals		4%		0%	0	
	Capacity of oil pipelines	8%	4%		237%	0,0948	0,0948
Railway and automotive logistics[6]	Railway logistics		10%		0%	0	
	Automotive logistics	15%	5%		0%	0	0
Aggregate indicator of energy security for oil and liquid fuels sector in 2009							**0,4108**

Natural gas

Macro criterion	Micro criterion		Criterion weight		Indicator 2009	Value to aggregate indicator	
			Macro	Micro		Micro	Macro
Domestic natural gas production			25%		1,3%	0,0032	
Import infrastructure	Capacity of import infrastructure	Pipelines[7]		6,5%	411%	0,2671	
		Terminals		8,5%	0%	0	
	Capacity of import infrastructure in respect of import directions		25%	10%	0%	0	0,2671
Import structure	Import diversification	Supply directions		15%	0%	0	
		Countries of origin	30%	10%	0%	0	
	Import contracts time structure[8]			5%	0%	0	0
Gas storage capacities	Technical capacity of gas storage facilities		15%	8%	120%	0,0960	
	Peak withdrawal capacity of gas storage facilities			7%	100%	0,0700	0,1660
Market structure	Competitiveness in importers market			1,5%	0%[9]	0	
	Competitiveness in production market			1,5%	0%	0	
	Competitiveness in wholesale market			1%	0%[10]	0	
	Competitiveness retail market		5%	1%	100[11]	0,0100	0,0100
Aggregate indicator of energy security for natural gas sector in 2009							**0,4690**

1 In cumulative weight.
2 HHI=4830. Russia 64%, Azerbaijan 26%, Kazakhstan 7,3%, Iran 2,1%, Algeria 0,6%.
3 1014,534 thous. ton of oil; 1816,897 thous. ton of products.
4 The Czech Republic doesn´t have any sea terminals.
5 Not available.
6 This question is not considered in strategic documents and Ministry of Industry has no calculations for this scenario so there are no available data.
7 Only utilized gas pipeline capacity included.
8 The Czech Republic has only long-term contract with Russia and Norway.
9 RWE has 77,45% share in importers market. Remaining 22,55% is divided between 14 companies.
10 RWE has 62% share in the market.
11 HHI=1154. There are 17 companies on retail market, so the market is very competitive with only 3 companies having share of more than 10%. However, RWE group has 54% share in the market when you consider ownership of different distribution companies.

3.4. Energy Security Index – Slovakia

Peter Ševce

Oil and liquid fuels

Macro criterion	Micro criterion		Comments	Criterion weight Macro	Micro		Indicator for 2009 (%)	Value to aggregated indicator	
Domestic production of oil and fuels, and oil import	Domestic oil production		Domestic annual oil demand – 5,7 mil.t. Domestic production less than 1%.		15,00%		0,00	0,0000	
	Cover of domestic demand for liquid fuels by domestic production		Annual domestic production of liquid fuels in 2009 – 5,1 mil. tonnes. Annual domestic demand for liquid fuels in 2009 – 2,2 mil. tonnes (including petrol, diesel, light and heavy fuel oils and LPG)		10,00%		231,82	0,2318	
	Diversification of oil supply	Friendship (Druzhba) pipeline only	During normal supply situation only Friendship pipeline is used. Adria pipeline serves as a back-up source in case of supply disruption only.				0,00	0,0000	
		Equal combination of Friendship and Adria pipelines	Alternative scenario for *Energy Security Index* calculation – equal combination of oil supply from both pipelines – Friendship and Adria to cover the full Slovnaft capacity of 6,1 mil.tones. Impact on the indicator only plus 0,0125.	27,50%	2,50%		50,02	0,0125	0,2318
Oil and fuel reserves	Capacity to withdraw reserves covering oil consumption during 7 days		Emergency stock covers oil and oil products demand in Slovakia for 95 days. 60% of the stock is oil and therefore 57 days of averaged Slovak demand can be covered from the emergency reserves. 57 days is only in case when Slovnaft covers domestic demand. During supply crisis we do not expect release of emergency stock for Slovnaft and later export of products.			5,00%	100,00	0,0500	
	Capacity to withdraw reserves covering oil consumption during 30 days		Emergency stock covers oil and oil products demand in Slovakia for 95 days. 60% of the stock is oil and therefore 57 days of averaged Slovak demand can be covered from the emergency reserves.			1,50%	100,00	0,015	
	Capacity to withdraw reserves covering oil consumption during 90 days		Emergency stock cover 57 days of the Slovnaft refinery demand in case that the refinery supplies only domestic Slovak market.			0,50%	63,33	0,003	
	Capacity to provide 3 refineries with oil supply during a short-term supply interruption (less than 21 days)		Emergency oil stock cover 26 days of averaged regular Slovnaft refinery demand for oil in normal operational mode (no restrictions on the operation applied).		8,00%	1,00%	123,81	0,012	
	Proportion of oil reserves to fuel reserves					5,00%	60,00	0,030	
	Available oil and fuels storage capacity		Storage capacity is dedicated to the state emergency reserves. There are commercial reserves as well, but these are not calculated in the security index. State reserves are covering 95 days of the averaged Slovak consumption and storages are full.			2,00%	100,00	0,02	
	Capacity to withdraw reserves covering fuels consumption during 7 days		Emergency stocks are held for 95 days. Of it 60% is oil and 40% are oil products. Of the calculation – emergency stocks cover 38 days of averaged oil products consumption of Slovakia.			7,00%	100,00	0,07	
	Capacity to withdraw reserves covering fuels consumption during 30 days		Emergency stocks are held for 95 days. Of it 60% is oil and 40% are oil products. Of the calculation – emergency stocks cover 38 days of averaged oil products consumption of Slovakia.	24,50%	16,50%	2,50%	100,00	0,025	0,2255
Capacity of fuel pipelines and terminals	Capacity of fuel terminals		Slovakia does not possess fuel terminals		15,00%		0	0,00	
	Capacity of fuel pipelines		There is a fuel pipeline connecting Slovnaft refinery with its storage sites on one side and on the other connecting the refinery with the Czech Republic. The capacity is 5000 m^3/day, but it is difficult to calculate it for the Index purposes.	25,00%	10,00%		0	0,00	0,00
Capacity of oil pipelines and terminals	Capacity of oil terminals		Slovakia does not possess oil terminals		4,00%		0,00	0,00	
	Capacity of oil pipelines		Capacity of the Slovak branch of the Friendship pipeline is 20 mil. tonnes. Annual Slovak oil demand is 6 mil. tonnes, which is covered by SR/RF contract. Adria is not included.	8,00%	4,00%		333,33	0,133	0,13
Railway and automotive logistics	Railway logistics		Railway logistics is not used to supply Slovakia with oil/oil products.		10,00%		0	0,00	
	Automotive logistics		Railway logistics is not used to supply Slovakia with oil/oil products.	15,00%	5,00%		0	0,00	0,00
Aggregate indicator of energy security for oil and liquid fuels sector in 2009									**0,5907**

Natural gas

Macro criterion	Micro criterion		Comments	Criterion weight Macro	Micro	Indicator for 2009 (%)	Value to aggregated indicator	
Domestic natural gas production			2009 – natural gas demand 5,9 bcm; natural gas production 103 mcm; 1,75%	25%		1,75	0,0044	
Import infrastructure	Capacity of import infrastructure	Pipelines	Slovak transit capacity in East-West direction – 90 bcm; import capacity from the Czech Republic – 9 bcm – reverse flow capability; Slovak natural gas demand – 5,9 bcm		6,50%	1 677,97	0,0650	
		Terminals			n.a.	n.a.	n.a.	
	Capacity of import infrastructure in respect of import directions		Slovak transit capacity in East-West direction – 90 bcm; Import capacity from the Czech Republic – 9 bcm – reverse flow capability	16,50%	10%	83,47	0,08	0,1485
Import structure	Import diversification	Supply directions	In 2009 only one supply direction (from RF *via* Ukraine) to cover Slovak domestic demand was used.		23,50%	0	0,00	
		Countries of origin	Only Russian gas was imported in 2009		10,00%	0	0,00	
	Import contracts time structure		In 2009 only long-term supply contract was in place	38,50%	5%	0	0,00	0,00
Gas storage capacity	Technical capacity of gas storage facility		Storage capacity for Slovak market is 3,34 bcm. 2009 gas demand 5,9 bcm. Average quarterly demand – 1,475 bcm		8%	226,44	0,18	
	Peak withdrawal capacity of gas storage facilities		Peak withdrawal capacity from storages (including interruptable capacity and storage located in the Czech Republic, but for Slovak market only) is 48,15 mcm/day. Peak gas demand equals to 30 mcm/day during winter days.	15%	7%	160,50	0,11	0,29
Market structure	Competitiveness in importers market		In 2009 only SPP imported natural gas to cover Slovak demand. There were no other gas importers besides SPP.		1,50%	0	0,00	
	Competitiveness in production market		Due to low domestic production this criterion is not relevant for Slovakia		1,50%	0	0,00	
	Competitiveness in wholesale market		In 2009 first traders entered the market, but the market shares acquired were not significant. In 2010 the situation will be different, but the official numbers will be available in July 2011.		1%	0	0,00	
	Competitiveness in retail market		In 2009 first traders entered the market, but the market shares acquired were not significant. In 2010 the situation will be different, but the official numbers will be available in July 2011.	5%	1%	0	0,00	0,00
Aggregate indicator of energy security for natural gas sector in 2009								**0,4463**

Slovakia's energy policy in the light of the *Energy Security Index*

In terms of oil supply security, Slovakia is relatively safe. This is due to the global nature of the oil market and more available options for oil imports. Slovakia is dependent on the imports of almost its entire oil consumption for its only refinery Slovnaft in Bratislava. Slovnaft's refinery capacity is 6 Mt, but the majority of its output is exported. Annual domestic demand for liquid fuels is around 2,2 Mt. Up to 65% of this volume is covered by the Slovnaft refinery production. The supply of the Slovak market with petrol and diesel is sufficient.

The situation is different in the import dependence on one supplier and one supply route. The Friendship pipeline does not play a very important role in the Russian energy strategy anymore and the stability of oil supplies in the mid-term period is a challenge for V4 countries. Slovakia is connected to the Croatian oil terminal Omisajl through the Adria pipeline, but the connection is not used on a permanent basis and serves as a back-up solution only. Therefore the Adria pipeline is added in to the *Energy Security Index* for the oil sector as an alternative route and its utilization will lead to an increase of its final result by 0,0125.

The aggregate Slovak indicator of energy security for natural gas sector in 2009 reached 0,4463. This number would reach higher score due to the huge transit capacity in relation to the domestic consumption, but it was restricted by the logic of the Index calculation. This is clear evidence of the transit nature of the Slovak pipeline system, which has its historical reasons. Former Czechoslovakia was chosen as the transit corridor for natural gas supplies from Soviet Union to Western consumers in 1960's.

Slovakia's energy supply security was based on this fact for long time until January 2009. Considering the dependence of one supplier and one transit route, Slovakia was strongly hit by the supply disruption. During the supply crisis in January 2009, the reverse flow capability of the West-East direction did not yet exist; it was managed as a consequence of the supply disruption and put into operation a few days before the crisis came to an end. This unprecedented situation led to the launch of the reverse flow capability on the CZ/SK connection point on a permanent basis. Therefore the daily capacity of 25 mcm (up to 9 bcm annually) is already included in the Index for 2009, even though this capacity was not available at the start of the supply crisis. Thus, the *Energy Security Index* for January 2009 would only be lower compared to the Index calculated for the whole year of 2009.

For countries with no significant domestic production, the import of missing raw materials is necessary. The import dependence itself does not represent a threat for energy security. The risk lies in the dependence of a single import source and on a single transit country. This was the case experienced by Slovakia during January 2009 and the high score of the *Energy Security* Index did not avoid the negative impact of the supply cut.

The import infrastructure score is positive due to the tremendous transit capacity, but the import structure score is negative. It was caused by the only supply contract established between the Slovak Gas Company (SPP) and Gazprom Export, covering domestic demand. The SPP was not forced to increase gas supply security by concluding diversified contracts, as the cornerstone represented the transit position and developed gas storages. As a consequence of the January crisis, the SPP concluded two supply contracts with its shareholders E.ON Ruhrgas and GDF SUEZ in 2009. This step represents commercial diversification and alternative supplies will be used through the reverse flow capability only in case of a physical supply disruption. These contracts will be included in future *Energy Supply Security Indexes*. The import infrastructure represents a precondition for import structure changes which will come with new interconnectors and reverse flow capability development. In 2010, there were gas swaps between traders thanks to the reverse flow capability from the Czech Republic.

Gas storages are another important factor of the Slovak energy security. Historically, storages were built along the transit route to cover seasonal fluctuations and to maintain transit reliability. Currently, part of the storage capacity is offered for commercial trading; therefore only partial capacity is used for domestic consumption coverage. The storage capacity represents over 50% of the Slovak gas demand and the daily withdrawal capacity is over the daily maximum demand during winter. After the January crisis, some of the measures undertaken by the government have focused on access to stored gas during disruptions for domestic emergency supplies.

In January 2009, the first alternative traders entered the Slovak market and have been competing with SPP, the former monopoly supplier. The first year of their operation can be described as testing the environment**,** but RWE presented ambitious plans for the near future. Thanks to various positive factors on the world gas supply scene, competition increased during 2010. Competition itself, without import diversification, does not contribute to supply security.

A typical Slovak feature is that oil and gas facilities situated in the country and their capacities exceed the domestic demand. This is the case of Slovnaft refinery, natural gas storages and the transit infrastructure for oil and gas capacities. Based on these facts, the final *Energy Security Index* numbers for Slovakia are high. The wrong structure of imports and low level of interconnections with neighboring countries are the real Slovak issues. Both arguments still represent the historical orientation of the country, as it was set decades ago. Currently, infrastructure requires a technical upgrade and a new way of thinking to maintain high level of its utilization.

3.5. Energy Security Index – Hungary

Endre Szolnoki and Melinda Farkas

Following the Polish methodology, we will list below the macro and micro criteria featuring the natural gas, oil and fuel security in Hungary, bearing in mind that energy security stands here as the ability to cope with supply disruptions. Based on these indicators we will feature in the next section ("Hungarian Energy Policy") the current natural gas, oil and fuel supply security in Hungary.

Oil and Fuel Indicators

Energy intensity (consumption/capita)			3%
Oil and fuels, and oil import	a. Domestic oil production	2%	
	b. Cover of domestic demand for liquid fuels by domestic production	12%	
	c. Diversification of oil supply	6%	
	d. Import rate from EU countries + Norway (Criterion is used to differentiate the risk deriving from import, assuming EU country import is less risky than non-EU import. Calculation: import volume from EU + Norway to overall import)	8%	
	e. Share of import warranted by long-term contract (Criterion is used to access the risk deriving from import with regards to the contractual perspective, long-term contract is proven o be less risky. Calculation: long-term contracted volume to total import)	5%	33%
Oil and fuels reserves	a. Capacity to withdraw stocks covering oil consumption during 90 days	13,5%	
	b. Capacity to withdraw stocks covering oil consumption during 120 days	4%	
	c. Capacity to provide the Danube Refinery with oil supply during a short-term supply interruption (<21 days)	12%	
	d. Proportion of oil reserves to fuel reserves	0,5%	
	e. Capacity to withdraw reserves covering fuels consumption during 30 days	1%	31%
Capacity of fuel pipelines			8%
Capacity of oil pipelines			20%
Railway and automotive logistics	a. Railway logistics	1%	
	b. Automotive logistics	4%	5%

Natural Gas Indicators

Energy intensity (consumption/capita)			3%
Domestic natural gas production			5%
Import infrastructure	a. Capacity of Pipelines	19%	
	b. Import capacity rate from EU countries + Norway (Criterion is used to differentiate the risk deriving from import, assuming EU country import is less risky than non-EU import. Calculation: import volume from EU + Norway to overall import	11%	30%
Import structure	a. Import diversificaton	17%	
	b. Import capacity warranted by long-term contract (Criterion is used to access the risk deriving from import with regards to the contractual perspective, long-term contract is proven to be less risky. Calculation: long-term contracted volume to total import)	10%	27%
Gas storage capacity	a. Technical capacity of gas storage facilities	10%	
	b. Peak withdrawal capacity of gas storage facilities	10%	
	c. Strategic storage capacity of gas	15%	35%

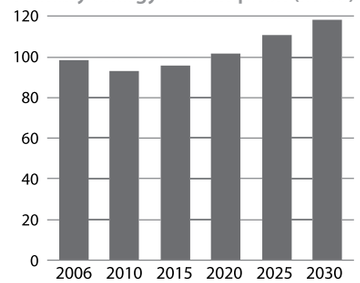
4. Analysis of national energy policy in the V4 countries

4.1. Energy policy of Poland

Piotr Szlagowski

The direction of an energy policy of Poland is driven by four major factors: (i) growing energy consumption, (ii) rising costs of greenhouse gas (GHG) emissions, (iii) dependence on crude oil and natural gas imports and (iv) an underdeveloped and aging infrastructure. With reference to the first of the above factors, it is to be noted that at present the primary energy consumption amounts to more than 90 Mtoe/year,[1] according to estimates we will observe a significant rise of this indicator – to over 100 Mtoe/year in 2020 and almost 120 Mtoe/year in 2030.[2] As a consequence, it is crucial to secure primary energy sources and to develop infrastructure that will allow Poland to face this challenge.

Primary energy consumption (Mtoe)[3]



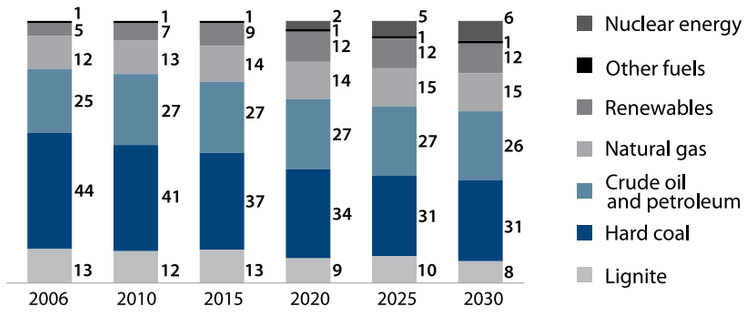
The vulnerability of the Polish energy sector to the rise of GHG emissions costs stems from the fact that the use of coal for energy purposes constitutes roughly 60% of the country's primary energy consumption. Poland is one of the biggest coal producers in the EU. In 2009 it was second only to Germany in overall coal production and first in hard coal production.[4] Such a state of affairs allowed Poland to benefit from relatively low cost coal-based electricity production and relatively low general energy dependence on imports. However, the introduction of EU-sponsored environmental policies, aimed at the reduction of GHG emissions by means of incorporating prices for emission allowances in the cost of energy production, revealed a systemic weakness; the lack of sufficient diversification of an energy portfolio which exposed Poland's vulnerability to any factor adversely impacting energy production based on coal. Hence, one of the main goals of the energy policy is to set out a low emissions development track.

Another significant factor is the dependency on imports of, predominantly, natural gas and, to a lesser extent, crude oil. This concern lies at the core of the energy security theme which is addressed by the *Energy Security Index* elaborated by the Kosciuszko Institute and, hence, it will be subject to further scrutiny in the subsequent paragraphs of this chapter.

1 *Polish energy policy until 2030* [*Polityka energetyczna Polski do 2030 roku*], November 10, 2009, Annex 2, p. 14.
2 Ibidem.
3 Ibidem.
4 U.S. Energy Information Administration, www.eia.gov.

The last of the crucial concerns underlying the directions of the Polish energy policy regards infrastructure. The clue of the challenge that current policy makers face is not about balancing development of new energy infrastructure and replacement of the old networks or installations; it is rather about doing both simultaneously with awareness that a fiasco in any of these fields may become a restriction on the further development of the economy.

Primary energy sources[5]



Against such a background, the government has defined the following priorities for the *Polish energy policy until 2030*:

- Improvement of energy efficiency;
- Increased security of supply;
- Diversification of the electricity generation structure through introduction of nuclear energy;
- Development of renewable energy sources, including biofuels;
- Development of competitive electricity and fuel markets;
- Reduction of the environmental impact of the energy sector.[6]

Due to the scope of this study, we shall concentrate on the above mentioned policy priorities with regards to the crude oil and petroleum products and natural gas sectors.

Crude oil and petroleum products

In 2009 total consumption of crude oil in Poland amounted to 24,5 Mt (533 kb/d). Since 2000 an average rise of 2,9% per year was observed. This consumption is mainly driven by demand for fuel oil and gas oil which jointly constitute half of the total consumption. In 2009 domestic crude oil reserves were estimated at 25,9 Mt with limited possibility for growth.[7] The current domestic production of crude oil in 2009 was estimated 0,66 Mt per year[8] which covers, approximately, only 2,5% of the total demand. This shows the extent to which Poland depends on the import of crude oil and also demonstrates the significance of the need for diversification.

In terms of imports, 94% of the total crude oil imported to Poland originates from Russia; the rest is imported from Algeria (approx. 2%), United Kingdom and Norway (approx. 1% each). However, the situation regarding petroleum products is different. In 2009 approx. 60% of petroleum products originated from the former USSR states, i.e. Russia (20%), Lithuania (13%), Kazakhstan (8%), Belarus (6%), 30% from Germany, 9% from Slovakia and 3% from the Czech Republic.[9] The crude oil from Russia is mainly imported through the Friendship (*pol.* Przyjaźń) pipeline which delivers oil from Russia *via* Belarus and Poland to Germany. Apart from the Polish refineries, it also supplies refineries in Schewdt and Spergau. Another pipeline – Pomorski – which connects Gdańsk and Płock, can be used to transport crude oil in both directions. This route is typically used to transport the Russian oil to the refinery in Gdańsk or for export *via* Naftoport (see below).

The two mentioned cities – Gdańsk and Płock – are locations of two main oil refineries. All six Polish refineries have a joint processing capacity of 580 kb/d, while refineries in Gdańsk and Płock are responsible for 98% thereof.[10] PKN Orlen which owns one of the main refineries secures its supplies of crude oil predominantly with long-term contracts (85% of its crude oil supplies). Moreover, 96% of its supplies are imported through the Friendship pipeline.[11] This fact demonstrates the extent to which this refinery relies on a single transport infrastructure and a single direction of supply sources. An alternative means of import is provided by oil terminals in Gdańsk (Naftoport), Gdynia and Szczecin. The latter support petroleum products and have a joint capacity of 4 Mt per year, while Naftoport has a capacity of 7,1 Mt per year (including 6,1 Mt per year of crude oil).

Poland, as a member of the IEA, is obliged to maintain stocks of crude oil and fuels in volume equal to the volume of 90-days average net imports from the previous year. According to this methodology, in 2010 Poland was required to maintain 38-48 mln barrels, while it stockpiled approx. 63,5 mln barrels. The stocks of such size would suffice to substitute an average net import of 126 days (as of 2009).[12] The total storage capacities operational in 2010 is yet higher – 11,6 mcm, thus allowing Poland to stockpile 72,7 mln barrels. These storage capacities are owned by three companies: PKN Orlen, Lotos Group and PERN Group, in all of which the state either has a substantial share (PKN Orlen) or totally controls (Lotos Group and PERN Group).

Given the historical heritage of a transit state for crude oil pipeline transportation and the lack of significant domestic production, it is clear that the energy policy with regards to the oil sector needs to focus on two main objectives: increasing the level of diversification of crude oil supply through obtaining it from various suppliers in various regions of the world and imported *via* various routes, and investment in storage facilities for both crude oil and petroleum products with capacities that would ensure continuity of supply in any potential crisis situation.[13]

Natural gas

Total natural gas consumption in 2009 amounted to 13,3 bcm. This volume was covered by 31% domestic production and 69% imports. Domestic production of natural gas has not changed significantly in recent

5 *Polish energy policy until* 2030, Annex 2.
6 Ibidem, p. 4.
7 Polski Instytut Geologiczny, http://surowce-mineralne.pgi.gov.pl/ropa.htm. (28.06.2011).
8 Polski Instytut Geologiczny, http://www.pgi.gov.pl/.
9 Polska Organizacja Przemysłu i Handlu Naftowego, http://www.popihn.pl/.
10 International Energy Agency, *Polityki Energetyczne Państw MAE – Polska, 2011 Przegląd*, p. 130. (Polish translation of: International Energy Agency *Energy Policies of IEA Countries: POLAND, 2011*).
11 Ibidem, p. 131.
12 Ibidem.
13 *Polish energy policy until 2030*, p. 12.

years; it is maintained at a firm level of approximately 4 bcm/year. Although the share of domestically produced gas is important in the country's overall consumption of this resource, the inflexibility of the production process does not allow it to be a safeguard for national energy security.

In 2009 Poland imported 9,1 bcm of natural gas. Given the fact that the imported volume covers the vast majority of domestic consumption, it would be prudent to diversify routes and sources of imports in order to spread the risk involved. Yet, almost 90% of gross import volume comes from Russia and less than 10% is bought from Germany.[14] With regards to the import infrastructure it shall be observed that currently there are no LNG terminals in Poland and the pipelines are focused on the transit of the Russian gas to the West. Apart from the East-West connections, there is a single interconnector with Germany. A number of new interconnectors are being developed or planned, including ones with the Czech Republic, Germany and possibly Lithuania. On top of that, a substantial change to this picture may be made by a reverse flow on the Yamal pipeline which is to be put in place. There is yet one more game-changer in terms of import diversification which is expected to influence the market, i.e. an LNG terminal in Świnoujście with a capacity of 5 bcm in the first phase (from 2014) and 7,5 bcm in the second phase (after 2020).

In parallel to the oil sector, storage facilities constitute an important element of the energy security framework with regards to natural gas. In 2009 the storage capacity of all storage facilities was 1,6 bcm, equal to approximately 12,5% of yearly domestic consumption.[15] Such a level should be considered as unacceptably low. In Germany, for instance, the yearly domestic consumption of natural gas is around 80 bcm,[16] while working gas capacity of all storage facilities is 20,4 bcm.[17] Therefore, Germany has the capacity to store gas in volume equal to 25% of its annual consumption. This difference between the two countries clearly shows the potential for the improvement of the energy security of Poland through the extension of storage facilities. According to the investment plans the total capacity of storage facilities in Poland should be more than doubled by the end of 2015 and amounts to 3,9 bcm.[18]

The main characteristic of the natural gas market in Poland is an extremely high concentration in all segments. From imports to production to wholesale to retail, Polish Oil and Gas Company (PGNiG), an incumbent NOC, holds a strong position. As a result, in each of the above areas the Herfindahl-Hirschman Index exceeds the level of 2500 points.

Given the dependence on imports from Russia, the lack of infrastructure that would provide potential for diversification and the lack of sufficient storage capacities, it is understandable that the main goal for this sector set out by the *Polish Energy Policy until 2030* is the diversification of imports in terms of both sources and routes.[19]

14 PGNiG S.A., http://www.pgnig.pl.
15 Kowalski J., "Natural gas", [in:]ed. Szlagowski P., *Energy Security of Poland 2010 – Opening Report* The Kosciuszko Institute p. 53.
16 *BP Statistical Review of World Energy*, June 2010, p. 27.
17 *GSE Storage Map information*, http://www.gie.eu.com/maps_data/downloads/GSE_STOR_August2010.pdf. (27.06.2011).
18 Oddział OSM – PGNiG S.A., http://www.osm.pgnig.pl.
19 *Polish energy policy until 2030*, p. 11.

4.2. Energy policy of the Czech Republic

Petr Binhack and Jakub Jaroš

Introduction

The energy security of the Czech Republic is currently at a relatively high level, in particular if we compare it with most of the other CEE states. The primary fuel mix is diversified and it is to a high extent based on readily accessible domestic fuels, predominantly brown coal. The vast reserves of Czech brown coal are complemented by substantial natural uranium deposits, which are, however, being used only partially.[1] The overall import dependence of the Czech Republic is therefore relatively low. Depending on the methodology employed, it's either 43% or 28% when using the Eurostat methodology which counts imported nuclear fuel as a domestic resource. This is significantly lower than the average in the EU (54%) and in the neighboring states.[2]

If we take a look at oil and natural gas, which are by far the two most important energy commodities imported from abroad (as the Czech Republic produces only negligible quantities of both), we see that the Czech Republic succeeded in breaking Russia's import monopoly on oil and gas when it diversified its suppliers and transit routes in the 1990s (however the share of Russian oil and gas in Czech imports is still predominant). Today, the Czech Republic has well established and secure alternative sources and routes of supply in oil and gas. On top of that, the Czech Republic also has its own oil refineries held by Western energy companies and extensive stocks of both oil and gas. The level of energy security of the Czech Republic is further augmented by a highly developed and reliable power grid that covers a vast proportion of its territory. The high base-load output of the Czech nuclear and brown-coal-fired power plants is conveniently combined with the peak output of the Czech hydro power plants and with the electricity output of most of the major Czech heating plants which is being used

1 The annual uranium extraction output of the Czech Republic roughly equals to half of the nuclear fuel used each year in Czech nuclear power plants. However, the Czech Republic has no uranium processing and enrichment facilities and therefore it produces no nuclear fuel of its own. All of the nuclear fuel therefore has to be imported from abroad (the importer is the Russian company TVEL).
2 According to the Eurostat methodology, the figures are as follows: Germany – 61%, Poland – 31%, Slovakia – 66%, Austria – 65%. All figures are for 2009. Source: Eurostat.

for grid-regulation purposes.[3] The Czech power-generation sector also relies heavily on two nuclear power plants, Dukovany and Temelín, which supply a large share of Czech base-load electricity constantly and with no CO_2 emissions. All of these factors combined mean that the Czech Republic disposes of a net surplus power generation and the capacity to export electricity abroad. It's also worthwhile mentioning, that while the Czech Republic still remains among the European countries with the highest energy intensity, the country has seen a tremendous increase in energy efficiency over the last two decades. This trend is largely due to the transition of the Czech economy from a predominantly heavy-industry-oriented one to less energy-intensive branches of industry and the services sector.

In spite of all of this, the future development of the Czech energy sector and Czech energy security is somewhat precarious at the moment. The country is facing several serious challenges that have the potential to disrupt the stability of the energy sector and it remains to be seen how it will cope with them. The most outstanding challenge at the moment concerns the future of the Czech brown coal reserves and the heating sector, which has been inextricably linked to brown coal for decades. Put simply, the issue boils down to the question of whether to continue to use the vast national brown coal resources for energy purposes in the future or – for various reasons – discontinue using it. The implications of the issue and of the way in which it will be resolved are extremely complex and are bound to result in profound changes of the whole Czech energy sector and economy. There's also the question of the aging Czech energy infrastructure, especially of some segments of the power grid and a portion of the power plants. These will have to be restored or replaced but due to phenomena like NIMBY ("Not in my backyard", i.e. the general reluctance on the part of the population to tolerate the buildup of new huge energy – or transport for that matter – infrastructure, like nuclear power plants or electricity lines, in or close to their settlements) and the immense financial burden this implies, it's not going to be an easy task. Finally, there's the issue of making sure that Czech import dependence stays low and that the oil and gas that is needed will be supplied continuously and safely in the years to come, even *vis-à-vis* adverse global and regional trends and developments.

Most of the mentioned issues are interconnected in some way or other and they affect each other. They are being dealt with by the energy industry (the private sector) on the one hand and the Czech government (the state) on the other. In the Czech Republic, as far as matters of energy and energy-security are concerned, the institutions of state with the biggest say are the Ministry of Industry and Trade (Ministerstvo průmyslu a obchodu – MPO), the Ministry of the Environment (Ministerstvo životního prostředí – MŽP), the Ministry of Finances (Ministerstvo financí), the Ministry of Foreign Affairs (Ministerstvo zahraničních věcí – MZV), the Cabinet and the Prime Minister and a number of governmental agencies and regulatory authorities (although almost all the national ministries are involved in energy issues at some level). In 2004, the MPO issued the *National energy concept* (*Státní energetická koncepce* – SEK) which is to be updated this year (work on the updated version has been going on since 2009). This document contains a vision and a national strategy for the development of the Czech energy sector in the upcoming decades and will be dealt with later on in this analysis.

An Analysis of the Czech oil and gas sector

Oil

The Czech Republic consumes approx. 7-8 Mt (8,1 Mt in 2009) of oil annually and about 98% of it has to be imported from abroad. About two thirds of the imported oil is of Russian origin, the rest originates in a broad mix of countries, including Azerbaijan, Kazakhstan, Norway, Algeria, Libya, Syria and other countries. The main and traditional import route for oil is the Friendship pipeline, which has been supplying Czechoslovakia and then the Czech Republic with oil since the early 1960s. In 2010, 4,9 Mt of overwhelmingly Russian oil were delivered *via* the Friendship pipeline to the Czech Republic, representing 58% of all the oil imports. This equals to less than 50% of the pipeline's annual capacity.

In 1997, the Czech government made the decision to diversify its import routes for oil and built the Ingolstadt-Kralupy-Litvínov (IKL) pipeline which links the Czech Republic to the Transalpine (TAL) pipeline. The TAL pipeline originates in the Italian marine terminal Trieste and connects Italy, Austria, Germany, and *via* the IKL pipeline (representing 41% of the Czech imports) also the Czech Republic. Via the TAL/IKL pipelines, the Czech Republic is directly connected to the global sea-borne oil market. The IKL pipeline, which cost the Czech government some 400 million USD,[4] has an annual capacity of about 10 Mt of oil. In fact, it only carries some 2-3 Mt of oil annually, mostly of Azerbaijani origin. Although the IKL pipeline is underutilized most of the time, it served its purpose fully in 2008, when Russia cut off the oil supplies to the Czech Republic *via* the Friendship pipeline for "technical reasons" after the Czech government had signed a treaty with the USA on the stationing of some components of the U.S. ballistic missile defense system on the territory of the Czech Republic. Thanks to the high surplus capacity of the IKL pipeline, it was physically possible to contract sufficient amounts of oil on the global oil market and replace the outage of the Friendship pipeline fully. The flow of oil through the Friendship pipeline was resumed shortly afterwards.

All pipelines in the Czech Republic are owned by the state-run company MERO and the state is also obliged to keep oil stocks for at least 90 days of supply.[5] However, MERO is only transporting the oil to the refineries, where the oil is processed to gasoline, diesel and other oil products. The major oil refining company in the Czech Republic is Česká rafinérská, which operates two refineries (one in Kralupy nad Vltavou and the other one in Litvínov). The firm is owned by three companies – Unipetrol, Eni and Shell. It's these companies that actually buy the oil on

3 These are so-called "combined or dual production cycle" heating plants that can work as power plants at the same time. They are primarily generating heat but if there is demand they can also generate and supply the grid with electricity, for example for regulation purposes.

4 Bchan D., *Eastern Europe's Energy Challenge: Meeting its Climate Commitments*, The Oxford Institute for Energy Studies, July 2010, p. 57.

5 In fact, the Czech Republic has 104 days of oil supplies according to the EU methodology and 119 or 122 days respectively of oil supplies according to the two various methodologies used by the IEA.

the stock market. The major shareholder of the refinery with 51% of the shares is Unipetrol, which used to be a state-owned company until it was privatized in 1995. Almost two thirds of its shares are held by the Polish energy company PKN Orlen. Recently the Czech media have been reporting that one of the shareholders of the refinery, Italian company Eni, was thinking about selling its share in the refinery to the Russian company Lukoil. This claim, however, remains unconfirmed by the company and continues to fuel vivid speculation among the Czech journalists and energy experts. Such a move on Eni's part would have far reaching security ramifications for the Czech Republic and therefore the government would try to have the final say in the transaction.

Thanks to the construction of the IKL pipeline, the existence of the oil stocks, refineries and other provisions, the Czech oil security is at a relatively high level at the moment. The operator of the TAL pipeline has recently pledged to grant the Czech Republic an expansion of its capacity allotment should there be another cut off of oil supplies *via* the Friendship pipeline. The level of Czech energy security would be enhanced even further, if the Czech Republic managed to get an ownership share in the TAL consortium. The Czech Republic has been engaged in negotiations to this end for some time but at the moment, it seems rather improbable that it would succeed as none of the present shareholders of the TAL pipeline is planning to sell a portion of their shares. A negative trend that has been taking place for some time is Russia's effort to redirect the flow of Russian oil exports from the Friendship pipeline to the Baltic transportation system (BTS). The share of Russian oil that is being exported to the West *via* the Friendship pipeline has been gradually decreasing and in 2009, it dropped to a mere 27%, while the share of Russian oil exports *via* tankers from the Primorsk terminal in the Baltic Sea reached a share of 37%.[6] This trend is most likely going to continue and even intensify in the future as Russia proceeds with the implementation of its strategy to circumvent the traditional CEE energy transit states and also due to the deteriorating technical shape of the Friendship pipeline. As a result, the Czech Republic might lose its advantage of having two supply routes for oil which it gained in the 1990s.

Gas

The Czech Republic consumes approx. 8-9 bcm of gas annually (8,57 bcm in 2010), of which it produces only 1-2%. The remaining 98% have to be imported from abroad and most of this gas is imported from Russia *via* the Brotherhood pipeline. In the past, Russian gas imports covered Czech consumption up to almost 100%. However, in the nineties, the Czech government decided to diversify away from Russia and concluded a contract on gas import with Norway. Since then, the share of the Norwegian gas in Czech gas imports has grown to over a thirds (in 2010, the shares were as follows: Russia – 58,8%, Norway 34,6% and Germany – 6,6%) and represents an important element in the Czech effort for import diversification and energy security. Although the Norwegian gas is not being physically delivered under normal circumstances and is being swapped for Russian gas flowing to Germany through the Jamal pipeline instead, it is physically deliverable through the German NETRA/ONTRAS pipeline network in times of emergency as it happened during the 2009 Russo-Ukrainian gas crisis. Another element of Czech gas security that demonstrated its usefulness during the crisis is the capacity to reverse the gas flow in the Czech section of the Brotherhood pipeline (owned by the German company RWE) that was employed in order to supply Slovakia that had been cut off from its gas imports completely.

In the last couple of years, there has been a lot of talk about the new sub-sea Nord Stream pipeline from Russia to Germany that circumvents traditional transit pipelines leading through Ukraine, Belarus and Poland that have been carrying gas from Russia to Europe for decades. Although some of the CEE countries such as Poland, Ukraine or the Baltic states have been complaining about this pipeline and have claimed that it decreases their energy security, Nord Stream will actually enhance the energy security of the Czech Republic. The Czech Republic will tap the Nord Stream pipeline through the OPAL/Gazelle pipelines and therefore will have access to the gas flowing through Nord Stream in case of a crisis and a cut off of traditional import channels.

Apart from this, the Czech Republic has also put in place a number of less visible but nonetheless important measures that should increase the security of gas supply. Among the most prominent of these is certainly the construction of a Czech-Polish interconnector pipeline that will connect the gas markets of the two countries and will lead to a greater interaction, transparency and permeability of their markets. The interconnector should enable the Czech Republic to access the Polish LNG terminal Swinoujscie in the future. Further measures are being planned, especially on the V4 level, including the construction of several interconnectors that would allow for the creation of a North-South Gas Corridor to compliment the traditional East-West gas-transit route (access to LNG terminals in Polish Swinoujscie and on the Adriatic coastline of Croatia). The Czech Republic also supports the construction of the Nabucco pipeline, which would tap the gas resources of the Caspian Basin and make them available to Europe. Last but not least, it is definitely worth mentioning the significant underground gas storage capacities that exist in the Czech Republic. These are, after Germany, the second largest ones in Europe and boast an impressive 3 bcm of gas storage annually which represents over a third of total annual gas consumption in the Czech Republic.

6 Presentation of Jaroslav Pantůček at the conference *The Czech oil industry – will the state take over the initiative?* Organized by the Institute for Public Debate on 25.11.2010. Figure 89. "Transneft's non-CIS Crude Oil Exports by Direction, mnt", slide 5.

4.3. Energy policy of Slovakia

Peter Ševce

Introduction

Slovakia imports almost 90% of its primary energy sources from abroad. This high level of external energy dependence makes the country one of the most vulnerable states in Europe in terms of energy security. Nearly all of Slovakia's three major energy sources – oil, natural gas and nuclear fuel is imported from one source – Russia. The share of natural gas in the energy mix represents 35%, nuclear power counts for 25% and oil for 18%. Over 75% of current energy fuels are imported from Russia through Ukraine. From the Slovakian energy security perspective, the regional V4+ cooperation and relations with Russia and Ukraine are of the strategic importance.

The power industry for the V4 countries is very similar. The Czech Republic, Poland, Hungary and Slovakia are dependent on the Russian supplies of oil, gas and nuclear fuel. All four countries have built their energy infrastructure and main pipeline system exclusively in the East-West direction while the North-South links are either non-existent or very insufficient. However, several discrepancies occur between these countries with a reflection in the energy policy and have an impact on their energy security. The Visegrad countries can be divided into two groups. The first unit consists of Poland and the Czech Republic and the second one is made up by Hungary and Slovakia. Due to their developed coal-mining industry, the Czechs and the Poles can cover a significant part of their energy demand by domestic sources. On the other hand, Slovakia and Hungary are poor countries in terms of natural resources and the domestic demand is covered by imports.

The consumption and use of individual raw materials in Slovakia are consistent and differentiated. Oil is almost exclusively used in transport and heating while its use in electric power production is very limited. On the other hand, domestic and industrial heating is dominated by gas and its importance in electricity production is increasing. This is connected with the nature of gas-fired power plants, which have the capability of flexible ancillary services for the electricity network. The role of natural gas in electricity production is expected to play an increasing role due to the integration of renewable energy sources based on EU commitments.

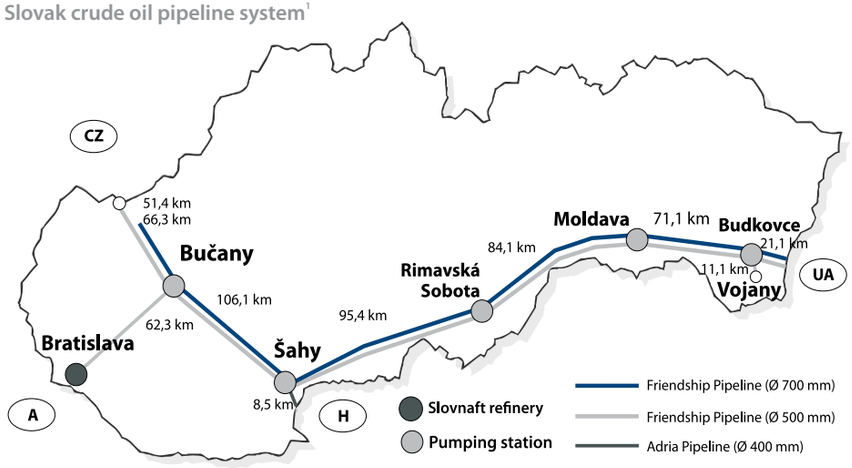
Oil

Slovakia only has the Slovnaft refinery, which belongs to the MOL portfolio, located in Bratislava. This facility is consuming the overall Slovak oil consumption. In 2009, 5,7 Mt of oil was processed, of which roughly 86% of light products were manufactured in high conversion ratio (with high added value). The annual capacity of the Slovnaft refinery is 6 Mt of oil or 120 000 bbl/day.

Motor fuels dominate the field with a produced volume of approximately 4,4 Mt. Of this amount, petrol production (gasoline) reached 1,6 and diesel 2,8 Mt. Nearly 500 thousand tons of residual fuel oil and 420 thousand tons of polymers were manufactured as well. Kerosene and other jet fuel production were only marginal. Based on these numbers and the high share of products with high added value, the Slovnaft refinery ranks among the leading manufacturers in terms of efficiency and quality in Europe. For example, using the same volume of oil, the Slovnaft can currently produce up to 1 Mt more fuel than it could in the 1990s. Over 70% of domestic motor fuel production is exported.

Annual gasoline and diesel consumption in Slovakia reached 630 thousand tons and 1,25 Mt respectively. This implies that Slovakia covers up to 65% of domestic demand for gasoline from its own inland consumption and the same applies for diesel consumption. In 2009, almost 220 thousand tons of petrol and 410 tons of diesel were imported. The Slovnaft refinery has higher production than the national demand; therefore, it is theoretically possible to cover full demand from own capacities. In 2009, fuel consumption was affected by the economy crisis, which led to the decline in sales of diesel and gasoline (by 12% and 7,5% respectively).

Slovak crude oil pipeline system[1]



1 Transpetrol, http://www.transpetrol.sk.

The Slovnaft technology is adjusted to processing heavy Russian crude, thanks to investments made in the last decade and therefore, it is in the commercial interest of the company to continue with its processing in the future as well.

The only operator of the crude oil pipeline system in Slovakia is the state-owned company Transpetrol. The Slovak system consists of two lines, first is Friendship and second is a short extension to the Adria. The capacity of the Friendship pipeline, crossing the Slovak territory, is 20 Mt annually.

The second pipeline was originally a branch of the Friendship pipeline leading from Šahy in the South to Hungary. On Hungarian territory, this branch connects to the Adria pipeline. Adria was built because of the potential diversification of crude oil supply sources and was put into operation in 1980. It starts in the Croatian port of Omisajl and continues *via* Croatia and Hungary. In Slovakia, this extension is only 8,5 km long and connects to Friendship pipeline near the city of Šahy. The capacity of the Slovak-Hungarian section is up to 3,5 Mt of oil, which is enough to cover the Slovak oil demand.

In 2008, this branch was used for crude oil transport from the Hungarian refinery Szazhalombatta to Slovnaft based on Slovnaft's requirements, transporting a total annual volume of over 0,2 Mt (only 4% of the Slovnaft annual consumption). Currently, the Adria-Friendship interconnection is used only as a back-up solution in case of oil supply disruptions from Ukraine.

The only Transpetrol customer in Slovakia is the Slovnaft refinery. It accounts for approximately 55% of the quantity transported by the Friendship pipeline. This is connected with long-term underutilization of this branch of the Friendship pipeline at the level of 50%. In the Czech Republic, the refineries Česká rafinérska and Paramo are dependent on the Friendship oil supplies. Both companies account for less than 5 Mt of oil annually. Should the Friendship oil supply experience a shortage, all three refineries will be hit, but not equally. The Adria pipeline system serves as a back-up solution for Slovnaft and the Czech connection to the IKL system. Nevertheless, a real solution for a potential Friendship operation termination is missing.

In Slovakia, emergency oil reserves are in the competence of the State Material Reserves of the Slovak Republic. Current levels of oil and oil product reserves cover 95 days of average daily consumption. In order to mitigate a supply crisis, the Council Directive 2009/119/EC revised the system of oil stockholding. Member States must maintain a total level of oil stocks corresponding, at the very least, to 90 days of average daily net imports. The impact of the new system will lead to the increase of Slovak oil stocks until the end of 2012. Oil reserves account for 60% and oil products for 40% of state emergency stocks. Among oil products, gasoline accounts for 36%, diesel for 53%, jet fuel for 5% and heating oil for 6%. Together with commercial reserves, these level reach up to 120 days of average daily consumption. Current levels of the oil reserves cover 26 days of the average Slovnaft consumption. Slovakia and the Czech Republic, are among the last two EU countries, where material reserves are in full responsibility of the state.

Natural gas

Natural gas is another fuel with an important position in the country's energy mix, which is almost fully imported from abroad. Annual domestic demand oscillates at around 6 bcm and the inland production covers only 2%. Domestic market supply is covered by a long-term contract between the SPP (Slovak Gas Company) and Gazprom Export, in effect since 1st of January 2009 through 2029. During 2009, and in reaction to the supply crisis, SPP established two contracts with its shareholders, namely E.ON Ruhrgas and GDF SUEZ to supply up to 1 bcm of gas from the Western direction in case of supply disruption. This amount is in surplus to natural gas from the long-term contract between the SPP and Gazprom Export.

Slovakia is considered a highway for Russian gas flowing to its European consumers. The annual transmission capacity of the pipeline is 90 bcm and ranks in first place among the EU states. In 2009, 66 bcm of gas were transported. Slovakia based its national energy security strategy on the crucial role that it has played in transiting Russian gas to other EU Member States. This has not been the case since the January 2009 supply crisis. Moreover, the current development of gas infrastructure in Europe indicates that the Central European transit corridor will lose its specific position and importance in the mid-term period.

There is one entry point at the Slovak-Ukrainian border and two exit points, one to the Czech Republic and one to Austria. Through the exit points, gas can be imported from the West as well. The reverse flow capability will be used only in case of supply disruption; usual operations are commercial gas swaps between various gas traders. The Slovak pipeline system is

Slovak natural gas transit system[2]

2 Eustream, http://www.eustream.sk.

a good example of the linear gas infrastructure orientation in the V4 countries, which has its historical reasons. Based on this orientation, Slovakia has not truly diversified gas sources and import routes, given that the North-South interconnectors gaining access to new gas sources are missing.

Gas storages are located in the Western part of the country and their capacity reaches 2,77 bcm. Of this amount 1,5 bcm is used for domestic market supply, the rest of the capacity is sold to other traders. For the Slovak market supply purposes, gas stored in Dolní Bojanovice located in the Czech Republic (with a capacity of 0,6 bcm) is used as well. Total capacity available for Slovakia is therefore over 3,3 bcm and it will increase in coming years.

Until the end of 2008, the gas market structure was dominated by the SPP. In 2009, new gas suppliers entered the market with a primary focus on industrial consumers, where commodity prices are not regulated. Due to the economy crisis, shale gas development in the USA and the gas surplus in Europe, spot gas prices were under the oil-indexed pipelined gas. This was the impetus for the competition development in Slovakia and new entrants competing with lower prices acquired significant shares mainly among large consumers. During 2010, the competition was increasing and traders started to focus on households as regulated segment as well.

January 2009 supply crisis

Slovakia was one of the worst hit countries in Europe during the 2009 Russia-Ukraine gas crisis. According to some sources, Slovakia lost 100 million EUR a day, or 1 billion EUR over the duration of the entire crisis, and the gas-cut related recession led to a 1-1,5% decrease in GDP. Gas supplies were entirely cut for 13 days during winter. This is a real wake-up call as to what happens when energy security is taken for granted. Even one interconnector would be enough to mitigate the financial impact of the supply crisis. Since its independence in 1993, the January 2009 supply crisis represented the highest threat to the security of the country.

As a result, there were several measures undertaken by respective, responsible institutions and companies to increase the readiness of the country in case of any future supply disruptions. On the government level, newly adopted legislation has transferred the responsibility for the security of gas supplies (during periods of shortages) to gas suppliers. Gas suppliers have to comply with the supply security standards, which are monitored by the Ministry of Economy. Another measure was the application of regulated access to gas storages and the right of the Ministry of Economy to devote some gas storage capacity for emergency issues in the initial phase of the gas storage site preparation.

At the SPP level, the reverse flow capability of the network and commercial diversification of gas supplies were two major undertaken measures. Modifications on the pipelines in the Czech Republic and Austria together with the upgrade of the Slovak transmission system now allow switching to reverse flow within several hours. Gas imports in January 2009 from Germany *via* the Czech Republic are perceived as a precedent; the West direction for supplies was used for the first time in the history of the gas system operation. Commercial diversification is represented by two contracts concluded with the SPP shareholders – E.ON Ruhrgas and GDF SUEZ. Up to 1 bcm is available for Slovakia in case of supply disruption from other sources (except Russian) imported from the West. A third major tool of supply security is the contractual capacity in gas storages, where the SPP stores up to one third of the Slovak annual gas consumption for domestic market coverage.

Since January 2009, energy security is a topic with an adequate political backing. The highest political representatives support the pipeline connection with Hungary and Poland and promote the North-South Corridor.

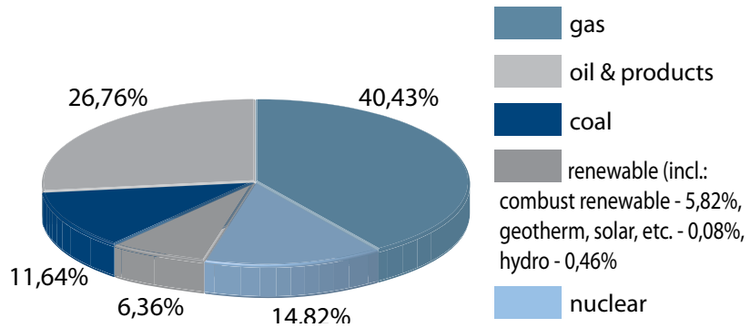
4.4. Energy policy of Hungary

Endre Szolnoki and Melinda Farkas

Considering the last 20 years in Hungary, while GDP was remarkably increasing, after 2000, energy consumption has been rather stagnating and only slightly increasing. The fossil energy sources' net import increased while coal production's importance weakened significantly, so the energy mix changed in a way that natural gas became more dominant.[1] Hungary is on the second place after the Netherlands regarding the share of natural gas in the total primary energy supply. However, the Netherlands is a gas exporter unlike Hungary. The Hungarian energy mix is dominated by hydrocarbons while renewables are not much prevalent.[2]

The primary energy usage per capita is pretty low in Hungary; the only country having an even lower value in the EU-25 is Poland. The same applies for electricity usage. On the other hand, the primary energy demand is 2,7 times bigger than the EU average. As a result the efficiency of energy usage is much worse than the EU average primarily in the residential sector, but also in the industry.[3]

Share of Primary Energy Usage in 2008[4]



1 MVM: *Energy Policy Thesis of Hungary 2006-2030.*
2 Hungarian Hydrocarbon Stockpiling Association, http://www.husa.hu/, (16.05.2011).
3 Ibidem.
4 http://www.ensec.org/index.php?option=com_content&view=article&id=278:the-road-to-hungarian-energy-security&catid=114:content0211&Itemid=374.

In line with the energy security definition, detailed in the *Energy Security Index* paper we will discuss the current Hungarian gas and oil policy, considering the possible answers in case of a supply disruption.

Natural Gas

Hungary is among the IEA member countries with the highest share of natural gas in its energy mix (40-45%), and imports about 82% of its gas consumption from one single supplier.[5] The domestic gas consumption is very much weather dependant below a temperature limit. The usage in winter is seven times higher than the summer demand; this is mainly due to residential.[6] Considering the so-called consumption swing (the rate of the highest and lowest monthly consumption) which is above the value of three in Hungary, in order to fulfil demand, very high market flexibility is required which can be ensured through adequate storage capacity.[7]

Residential use accounts for the majority of demand. Relatively little gas is used in large-scale industrial application, hence the industrial demand for gas has decreased in the last 20 years.[8] In case of disruption Hungary would have major consequences in the residential sector mainly in heat generation during the winter season (80% of district heating is produced by gas, and individual gas heating is even more widespread), but it would also affect electricity generation (35% of electricity is produced by gas) and industrial operations (19% share in the sector mix).

Natural Gas Balance in 2009 (in bcm)[9]

Natural Gas Consumption	11,115
Domestic production	3,090
Total Import	8,025
• from Eastern direction	6,064
• from Western direction	1,961

Domestic production has not been able to cover demand since the early 1980s. Currently, about 3 bcm of natural gas is produced in Hungary, which covers about 20-25% of the total domestic consumption. It is estimated that Hungarian reserves will last another twenty years with continuous decrease.[10] The highest-ever natural gas consumption of the country, 89,5 mcm/day, was measured on 9 February 2005. Based on the data above the capacity of the domestic natural gas system is almost double this value, which suggests that the technical background of the security of supply is appropriate.[11]

There are two sources of natural gas imports: Ukraine and Austria. From the East, directly from Ukraine, Russian gas is transported through the Friendship pipeline. The second source is the

5 International Energy Agency, *Hungary: Statistics*, http://www.iea.org/stats/countryresults.asp?COUNTRY_CODE=HU&Submit=Submit, (16.05.2011).
6 MOL Magyarország, *Tények a földgázról*, http://www.mol.hu/gazkerdes/szallitas.html, (28.06.2011).
7 *Jelentés Az Energiapiacokról*, http://www.rekk.eu/images/stories/letoltheto/jelentes/rekk_jelentes_2009_02.pdf, (28.06.2011).
8 International Energy Agency, *Hungary: Statistics*, http://www.iea.org/stats/countryresults.asp?COUNTRY_CODE=HU&Submit=Submit, (16.05.2011).
9 Natural gas resources of Hungary, http://www.eon-foldgaz-trade.com/cps/rde/xchg/SID-540C7314-90057E1F/eon-foldgaz-trade/hs.xsl/2589.htm, (16.05.2011).
10 *Tájékoztató a Magyar Energia Hivatal 2009. évi tevékenységéről*, Budapest, 2010, http://www.eh.gov.hu/gcpdocs/201012/tajekoztato_2009_web.pdf, (28.06.2011).
11 http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/NATIONAL_REPORTS/National%20Reporting%202010/NR_En/E10_NR_Hungary-EN.pdf, (16.05.2011).

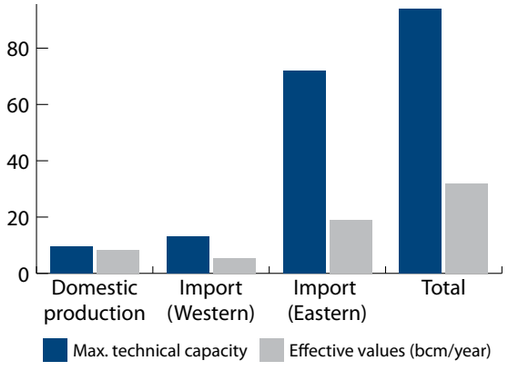
The daily peak and annual capacity of the Hungarian gas system[13]

	Daily System Peak Capacity	Annual Capacity
Underground Storage	80,1 mcm	6,13 bcm
Domestic Production	10,2 mcm	2,8 bcm
Imports	85,1 mcm	26,3 bcm
Transit	16,2 mcm	5,85 bcm

Austrian HAG pipeline. This pipeline could also provide Norwegian or Dutch gas, however, it is currently used to transport Russian gas. As a result 86% of the import comes directly or indirectly from Russia (Gazprom), the rest comes from Germany (E.On Ruhrgas), France (Gas de France) or Ukraine.[12] Since 2010 due to an import capacity expansion project the gas transmission capacity from Ukraine can be doubled. The new pipelines expanded the domestic import capacities by 25%, i.e. with 30 mcm/day.

Capacities of cross-border interconnection points are the following: Western entry point – Mosonmagyaróvár: 13,1 mcm/day and Eastern entry point – Beregdaróc: 72 mcm/day. Gas turnover of the cross-border interconnection points: Mosonmagyaróvár: 5,7 mcm/day import gas on average, for domestic use and Beregdaróc: 21 mcm/day import gas for domestic use +12 mcm transit towards Serbia and Bosnia and Herzegovina.

Maximum technical capacity vs. effective values in 2009 (mcm/day)[14]



Considering the possibility of any disruption, in case of a Western cut, Hungary could increase its imported volume on the Friendship pipeline, as the current turnover is way lower than the pipeline maximum capacity. On the other hand, as mentioned before, the gas through the HAG is also Russian, so it could be the case that the Friendship pipeline would stop transporting natural gas too. If the Friendship pipeline alone or together with the HAG pipeline would be interrupted, Hungary would suffer from an about 75-80% supply shortage. Beside domestic production, Hungary would rely on its storages in this case.

Hungary has excellent geological facility for underground natural gas storages using depleted gas fields.[15] Commercial stocks are owned by E.ON Földgáz Storage Zrt which operates four underground natural gas storage facilities with a total capacity of 4,3 bcm of mobile gas and 55,1 mcm/day withdrawal capacities.[16] Based on 2008 and 2009 peak day usage, the maximum value was 79,1 mcm/day. This suggests that the mobile commercial gas storage can only cover part of the demand of a winter day, but about 70% in the worst case scenario.

Further to this, based on Act XXVI/2006 on Safety Stockpiling of Natural Gas by 2010, new underground gas storage was built with a total capacity of 1,2 bcm. The Hungarian Hydrocarbon Stockpiling Association (MSZKSZ) is responsible, and the government has the right to initiate a stock withdrawal.[17] The storage in Szőreg dedicated for strategic stock has actually 1900 mcm mobile capacity with 25 mcm/day peak capacity. Above the 600-1200 mcm strategic stock (with a withdrawal capacity of 20 mcm/day), it can store 700 mcm (with a withdrawal capacity of 5 mcm/day) natural gas for commercial purposes.[18]

To sum up, Hungary ensured a significant storage level in case of a crisis, which can offset in short term the vulnerability deriving from the less diversified import routes.

Further to the safe storage capacity of Hungary, significant progress has been realized also in the cross-border capacities. The Szeged-Arad gas transmission pipeline has been completed (capacity: 4,8 mcm/day). This Interconnection can provide the possibility for a two-way gas transmission from 2010 July between Hungary and Romania. Moreover, a construction of the 206 km long Hungary-Croatia interconnector (Városföld-Slobodnica gas transmission pipeline) has commenced – the pipeline capacity will be 19,2 mcm/day. As a result of the inter-connection of the Hungarian-Romanian and the Hungarian-Croatian systems Hungary will significantly improve its security of gas supply, as there will be four points of entry of the domestic gas pipeline system instead of the existing two.[19]

The major part of cross-border capacities has been allocated by long-term contracts.[20] In more details there are four long-term natural gas import contracts:

1. Panrusgas with a capacity of 9000 mcm/year until 2015
2. E.On Ruhrgas with a capacity 500 mcm/year until 2015
3. Bothli Trade AG with a capacity 900 mcm/year until 2014
4. Gaz de France 600 mcm/year until 2012
5. + The long-term transit contract with Serbia including 12 mcm/day until 2012[21]

12 MOL Magyarország, *Tények a földgázról*, http://www.mol.hu/gazkerdes/szallitas.html, (28.06.2011).
13 The road to Hungarian energy security http://www.ensec.org (27.06.2011).
14 *Hungarian Energy Office Annual report to the European Commission*, www.energy-regulators.eu.
15 *Jelentés Az Energiapiacokról*, http://www.rekk.eu/images/stories/letoltheto/jelentes/rekk_jelentes_2009_02.pdf, (28.06.2011).
16 Molnar G., *A gazpiac helyzete a forrastol a fogyaszt*, http://www.hungas.hu/application/uploads/file_uploads/pdfs/MGE20100225.pdf, (28.06.2011).
17 Ibidem.
18 Hungarian Hydrocarbon Stockpiling Association, http://www.husa.hu/, (16.05.2011).
19 *Eves Jelentes 2009 Annual Report*, Hungarian Gas Association, http://www.hungas.hu/application/uploads/file_uploads/reports/GE%20Annual%20Report%202009.pdf, (28.06.2011).
20 http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_PUBLICATIONS/NATIONAL_REPORTS/National%20Reporting%20, (16.05.2011).
21 *Eves Jelentes 2009 Annual Report*, Hungarian Gas Association, http://www.hungas.hu/application/uploads/file_uploads/reports/GE%20Annual%20Report%202009.pdf, (28.06.2011).

Long-term contracts ensure a higher security in supply with regards to price and risk hedging. Hungary is secured by long-term import contracts until 2015, by the time other infrastructural plans are expected to operate already. We will discuss these in more details in the next section.

All in all, in case of a gas disruption of limited magnitude Hungary does have tools to mitigate the shortage mainly by storage capacity. Import is not as much diversified, especially as all sources are originated to one country, which should be improved in the future through new transportation routes and, moreover, through new supply countries. Natural gas is too dominant in the total primary energy mix, so beside ensuring natural gas supply meeting with demand another goal should be to lower the gas dominance in the energy mix.

Crude Oil, Fuels

Oil is the second most important energy source of Hungary and accounts for more than 25% of the total energy consumption.[22] The share of oil, as well as the share of fuels, has declined significantly since 1990 as these fuels have been gradually replaced by natural gas.[23] Oil production peaked in 1985 at approximately 2,5 MTA, and has been declining since, with a more rapid decline from 1990.[24] Currently it has a domestic crude oil production of 0,7 MTA.[25] The production of oil covers 29% of the country's needs.[26] As such, the country is very much relying on foreign sources.

At present, Hungary imports around 80% of its oil requirements and all come from Russia. Hungary is supplied by three pipelines, first of all by the Southern Friendship (Friendship II/Friendship-2) pipeline system from Russian fields with a capacity of 7,9 MTA.[27] The Friendship-2 passes from Uzhgorod (Ukraine) into Hungary and runs from Fenyeslitke to Szazhalombatta refinery. Secondly, there is also a connection between Szazhalombatta and Sahy (Slovakia), connecting Friendship-1 and Friendship-2, which is fully reversible with a capacity of 3,5 MTA.[28] Thirdly, Adria pipeline with the capacity of 9,8 MTA runs North into Hungary from the terminal at Krk Island on Croatia's Adriatic coast and reaches Százhalombatta refinery.[29]

In case of a supply disruption caused by either the Friendship-2 or the Adria pipeline, one of them can fully substitute the other and alternative transportation is also available *via* railway or automotive. However, these other supply routes' (in comparison to the direct Friendship or Adria route) transportation costs are higher.

22 Austrian Energy Agency, *Supply: Energy Sources*, http://www.enercee.net/hungary/energy-sources.html, (28.06.2011).
23 *HUNGARY – Energy Mix Fact Sheet*, http://ec.europa.eu/energy/energy_policy/doc/factsheets/mix/mix_hu_en.pdf, (28.06.2011).
24 International Energy Agency, *Monthly natural gas survey,* http://www.iea.org/stats/surveys/natgas.pdf, (28.06.2011).
25 ILF Consulting Enginners, Purvin & Gertz, *Study on the Technical Aspects of Variable Use of Oil Pipelines – Coming into the EU from Third Countries*, http://ec.europa.eu/energy/oil/studies/doc/2010_reporting_technical_aspects.pdf, (28.06.2011).
26 Austrian Energy Agency, *Energy Supply*, http://www.enercee.net/hungary/energy-supply.html,(28.06.2011).
27 Ibidem.
28 Consulting Enginners, Purvin & Gertz, Study on the Technical *Aspects of Variable Use of Oil Pipelines – Coming into the EU from Third Countries*, http://ec.europa.eu/energy/oil/studies/doc/2010_reporting_technical_aspects.pdf, (28.06.2011).
29 Lynch R., *An Energy Overview of the Republic of Hungary*, http://www.geni.org/globalenergy/library/national_energy_grid/hungary/EnergyOverviewofHungary.shtml, (28.06.2011).

To sum up, despite the high rate of import, Hungary is not vulnerable in case of an oil supply disruption of a limited magnitude. The Hungarian refineries have access to alternative supply routes, so any supply cut can be mitigated by other sources, alternative transit routes.[30]

Further to this, Hungary is obliged to be continuously able to cover 90 day oil consumption from dedicated security storage, which is an additional strong pillar of oil supply security. Hungary's oil stocks are consistently well above the IEA/EU 90-day obligation.[31] The Hungarian Hydrocarbon Stockpiling Association is responsible for the regulated level of stocks.[32]

Hungary has four refineries, all of which are owned and operated by MOL. The main refinery is the Danube Refinery at Százhalombatta in central Hungary. It has a distillation capacity of 8,1 Mt per year and is currently the only crude processing refinery in Hungary. The product demand in Hungary is expected to grow, driven by a significant increase in demand for road diesel. This is likely to put pressure on refiners to increase crude oil processing and fuel oil conversion capabilities.

Stock levels in 2009 (kt)[33]

Oil/Fuel Type	Quantity (kt)
Crude Oil	567,9
Gasoil	443,3
Petrol	211,7
Power Plant Fuel	40,1

The Danube Refinery itself has a maximum production capacity of 8,1 MTA, while in 2009 the total production was 7 MTA driven by the market demand. MOL also owns the Bratislava Refinery, operated by Slovnaft which is the second largest refinery in MOL Group (6,1 MTA crude distillation capacity) and one of the most complex units in Europe. Further to the Hungarian and Slovakian refineries, an alternative supply source could be the OMV Schwechat refinery (9,6 MTA crude distillation capacity) if needed.

Domestic fuel sales, (liters)[34]

	2009	2008	Change% y/y
Petrol	774.786.444	779.400.589	-0,6%
RON 95	745.029.250	750.151.216	-0,7%
RON 98	29.757.194	29.249.973	1,7%
Diesel	826.758.862	776.411.549	6,5%
Fuel Total	1.601.545.306	1.555.812.138	2,9%

All in all, Hungary is safely supplied by refined products domestically and could be served not only by its production, but could fairly easily, cost-effectively cover its demand from the neighbouring countries in case of internal crisis.

30 ILF Consulting Enginners, Purvin & Gertz, *Study on the Technical Aspects of Variable Use of Oil Pipelines – Coming into the EU from Third Countries*, http://ec.europa.eu/energy/oil/studies/doc/2010_reporting_technical_aspects.pdf, (28.06.2011).
31 Austrian Energy Agency, *Energy Supply*, http://www.enercee.net/hungary/energy-supply.html,(28.06.2011).
32 MVM: *Energy Policy Thesis of Hungary 2006-2030*.
33 http://www.husa.hu/_userfiles/image/kiadvanyok/beszamolo2009/eves_jelentes.pdf (27.06.2011).
34 http://www.securities.com/Public/intellinews/INTELLI_OGEHU.pdf (27.06.2011).

5. Challenges for the energy policy of the V4 countries

5.1. Challenges for the energy policy of Poland

Piotr Szlagowski

The growing energy consumption, rising costs of the GHG emissions, dependence on crude oil and natural gas imports and an underdeveloped and aging infrastructure constitute the main challenges for the energy policy of Poland in the coming years. Energy industry in Poland is undergoing a structural transformation on an unprecedented scale. The gradual departure from the use of coal as a primary source of energy, the construction of the first nuclear plant in the country, the development of infrastructure in virtually every sector of the industry, not to mention the exploration and exploitation of shale gas, are only a few of the many tasks. However, due to the scope of this study, we shall concentrate on the crude oil, petroleum products and natural gas sectors, with a focus on energy security issues in particular.

Crude oil and petroleum products

The Polish Energy Policy until 2030 sets out two main goals to be achieved with regards to the crude oil and petroleum sectors. First, increasing the level of diversification of crude oil supply through obtaining it from various suppliers situated in various regions of the world and imported *via* various routes. Second, investments in storage facilities for crude oil and petroleum products with capacities that would ensure the continuity of supply in crisis situations.[1]

Given the characteristics of a transit state for crude oil pipeline transportation and the lack of significant domestic production, diversification of the oil supply is the main challenge for the energy policy of Poland with regards to this sector. "Construction of infrastructure allowing for the transportation of crude oil from other regions, including the Caspian Sea region within the framework of the Euro-Asian Oil Transport Corridor (EAOTC)"[2] – this is the first of the executive tasks of the *Polish Energy Policy until 2030* for enhancement of the security of oil supply. The infrastructure referred to in the quoted passage is the Odessa-Brody-Płock-Gdańsk pipeline – a project with a history dating back to the early 1990s. The aim of the project is twofold – to diversify routes of oil supply and to reduce dependence on imports from Russia. The pipeline connecting two Ukrainian cities – Odessa and Brody – was originally constructed for transportation of Caspian oil in the Western direction, however, in 2004 the Ukrainian government

1 *Polish energy policy until 2030*, p. 12.

2 *Polish energy policy until 2030*, Annex 3, p. 20.

decided to reverse the transportation direction in order to deliver Russian oil to the Black Sea region. The project of the Odessa-Brody-Płock-Gdańsk pipeline has been renewed in 2007 when the presidents of Poland, Ukraine, Lithuania, Georgia, Azerbaijan and a representative of Kazakhstan reached an agreement on extending the Odessa-Brody pipeline to Poland. Subsequently, a special consortium for carrying out the project was created – MPR Sarmatia, and the project received EU funding. However, due to delays the project may not be finalized by the end of 2014 and keeping the deadline is a precondition for securing the financing of the project by the EU.[3]

Diversification of sources of supply and transportation routes is one thing and taking advantage of being a transit state for pipeline transportation of Russian oil to Germany is another. At present, the Friendship pipeline is being extended through addition of a third trunk of its Eastern section which will raise its transmission capacity to 50 Mt per annum by the end of 2012.[4] However, the future position and development of the Friendship pipeline may be endangered by the construction of the Baltic Pipeline System II (BPS-2) – a second trunk of a pipeline operated by the Russian oil company Transnieft that will run from the Unechta junction of the Friendship pipeline situated near the Russia-Belarus border to the Ust-Luga terminal in the Gulf of Finland. The BPS-2 project was proposed in the aftermath of the January 2007 oil transit dispute between Russia and Belarus. The objective of the project was to bypass Belarus thus reducing Russia's dependence on this transit state.[5] As a result the role of the Friendship pipeline may be significantly reduced.[6] Hence, this rationale affects also the position of other transit states, including Poland.

The other important challenge for oil and fuels sector is the development of domestic infrastructure with investments in storage facilities for crude oil and petroleum products. The expected rise of demand for storage capacities shall be met by planned cavern underground storage facilities in Pomerania which will have a capacity of 6 bcm (38 mln barrels).

Finally, having taken into account the role of oil companies in providing energy security, it is essential for the state to maintain its shares in strategic companies of the oil and fuels sector. In this context the privatization of Lotos, a process initiated in late 2010, raises certain concerns since among the potential buyers are several Russian companies. A takeover of Lotos by one of them could result in the tightening of bonds with the Russian oil sector and, therefore, adversely impact the strategic aim of energy policy which is a reduction of dependence on Russian oil.

3 International Energy Agency, *Polityki Energetyczne Państw MAE – Polska, 2011 Przegląd*, p. 133.

4 Ibidem, p. 132.

5 Geropoulos K., *BPS-2 to redirect oil volumes from Druzhba pipeline*, "New Europe", 26 May 2007, http://www.neurope.eu/articles/74317.php. (27.06.2011).

6 Konończuk W., *The Construction of the BPS-2 oil pipeline starts*, "East Week. Analytical Newsletter" 22(172), 17 June 2009, p. 7, http://www.osw.waw.pl/sites/default/files/EastWeek_172.pdf. (27.06.2011).

Natural gas

The *Polish energy Policy until 2030* anticipates the growth of natural gas' share in the country's energy mix from 12% back in 2006 to 15% in 2025. According to the authors of that document, the rise of demand for natural gas will result from the growing use of CCGT technology and the necessity to build gas-fueled power plants in order to provide back-up and peak-demand production for wind farms.[7] The above mentioned raise of natural gas' share in the energy mix would require the consumption growth from 14,5 bcm in 2006 to 20,2 bcm in 2030, which – according to *Polish energy policy until 2030* – shall be covered by growth of both domestic production and import.

Although the increase of domestic gas production is one of the measures listed in the *Polish energy policy until 2030*, it is doubtful whether it is possible to achieve this with reference to conventional gas. In recent years not only was the domestic production stabilized and amounted to 4,28 bcm/year in 2006 to 4,11 bcm/year in 2009, but also no significant discoveries of new conventional reserves were made.

With reference to the growth of imports, it is essential to indicate four factors that will have a significant influence on the matter in question. First, PGNiG (the state controlled monopolist on the domestic gas market) extended a long-term gas contract with Gazprom until 2022. During this period, Gazprom will supply PGNiG with 10 bcm/year. Second, the LNG terminal in Świnoujście is to be operational in 2014. In the initial phase, it will have a yearly capacity of 5 bcm. Ultimately, after 2020, its capacity shall grow to 7,5 bcm/year. Third, extension of an interconnector at the Polish-German border (Lasów) is due to be finalized by the end of 2011 (from 1 bcm/year to 1,6 bcm/year); another interconnector – at the Polish-Czech border (Cieszyn) – will be operational in 2011 with initial capacity of 0,5 bcm/year (to be extended up to 3 bcm/year). Finally, due to the introduction of the EU Regulation 994/2010, which imposes an obligation to provide for the reverse flow capacity on every interconnection gas pipeline, this will allow to receive from the Yamal pipeline gas contracted by the Western importers.

It is noteworthy that despite the above developments, the decline of coal's share in the energy mix (from 57% in 2006 to expected 39% in 2030) is to be counterbalanced chiefly by the increase in share of the energy mix of renewable and nuclear energy (from 5% in 2006 to expected 18% in 2030). Therefore the role of natural gas as a transitional fuel, which would assist the change from coal-based to low-emissions economy, should not be overestimated. One of the reasons for this is the limited availability of the resource at an economically acceptable price.

This assumption, however, may be subject to verification. According to preliminary estimates, Poland may have as much as 5,3 tcm of unconventional gas reserves. If the shale gas exploration delivers positive and economically feasible results, the share of natural gas in the country's energy mix may rise substantially. There is however a potential obstacle that may effectively hinder exploitation of unconventional gas in Poland, i.e. the EU environmental policy.

7 *Polish energy policy until 2030*, Annex 2, p. 13.

However, in order to make shale gas a game-changer one more condition would need to be fulfilled, i.e. the infrastructure development has to keep growing pace in order to ensure that pipelines for domestic distribution and/or export are in place. At present the state owned TSO – GAZ-SYSTEM – manages a transmission network of 9768 km. However, the company unveiled a major investment plan with the aim to build 1000 km of new transmission pipelines by 2014.[8] Moreover, in the first half of 2011 the government prepared a draft act on transmission corridors which shall improve the pace of investment processes regarding gas, heat and electricity transmission and distribution networks.

The above infrastructure developments, together with the previously described investments in new capacity for underground storage facilities, may create the foundations for enhanced energy security and further development of the domestic market.

The market structure is expected to be subject to substantial changes in the coming years. This process may yet be accelerated once the reverse flow on the Yamal pipeline is activated. Moreover, the new President of the Energy Regulatory Office, appointed in late May 2011, announced a roadmap for the liberalization of the natural gas market in Poland. This plan is expected to bridge a gap between the expectations of the European Commission regarding market development in Poland on the one hand and the present state of affairs with a highly concentrated market. It shall also be an important voice in a debate on the implementation of the III Energy Package which is especially important as the new Gas Law, which may entail a more comprehensive and tailor-made regulatory model, is currently being drafted.

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The III Energy Package and strong EU climate policy caused a substantial change to decision-making processes regarding energy policy. Enhancement of measures that are to deliver an integrated EU-wide energy market and introduction of common GHG emissions reduction targets provide a common framework for domestic energy policies of the EU member states. Although still far from speaking with one-voice, in the wider picture there has been a shift of the *locus* of energy policy decision-making to the regional and EU level. Given the historically determined characteristics of the Central European energy sectors, the interests of these states are to a certain extent incoherent with the aims set out by the EU-15. Therefore, in light of a need to face challenges such as enhancement of energy security through diversification of import routes and interconnectedness of EU member states or influencing EU policy with regards to GHG emissions cuts, regional coordination of national energy policies is highly desirable. It is worth emphasizing that the institutional set up under III Energy Package provides room for such regional cooperation and more of such collaboration is in place, with more interests of the Central European states being taken into account when defining the EU policies.

8 GAZ-SYSTEM S.A., http://www.gaz-system.pl.

5.2. Challenges for the energy policy of the Czech Republic

Petr Binhack and Jakub Jaroš

The future development of the Czech energy sector is rather blurred at the moment and the way the Czech Republic will choose to satisfy its energy needs in the future still remains rather unclear. The Czech Republic is approaching its limits in the important question of the future of the exploitation of its vast reserves of brown coal, which fuels the majority of its central heating plants and a large portion of the Czech power plants. The country has around 10 billion tons of extractable brown coal which should suffice for another 200 years at the current annual extraction rate. However, in the 1990s, the Czech government passed a decree which introduced so-called "territorial-ecological limits" to brown coal mining. The governmental decrees from the 1990s limit the expansion of mining beyond the borders of existing brown coal mines. The limits were introduced mainly because of the ecological devastation to the region brought about by surface mining. If the mines were to be expanded, two sizable villages would have to be destroyed and their inhabitants moved somewhere else, which is a very unpopular thing to do for any government. Within the limits of the present mines, there is about a billion tons of brown coal left. At the present speed of mining, the brown coal reserves in the mines will suffice for some more 20-30 years. However, first shortages of brown coal are supposed to be felt already in the period 2012-2015 as some mines will be reducing their annual coal production and others will be shut down.

Particularly hard-hit will be the Czech centralized heating sector (so-called CZT, "centrální zásobování teplem" or centrally supplied heat) that is based predominantly on brown coal as its fuel. The system is made up of heating plants linked up to the district heating grids that cover large parts of the Czech Republic. The other half of Czech heating is decentralized (local boilers) and rests mostly on gas with some share of coal and biomass. The Czech centralized heating system is largely a legacy of the old Communist days as most of it was built in the seventies and eighties. It is a system that has worked reasonably well throughout the last decades (it is efficient-burning and plants with adjacent pollution are mostly located out of major population centers) and shows a remarkable resistance towards change.

If there won't be enough brown coal for the central heating system, the plants will either have to switch to alternative fuels such as biomass, black coal or gas or the system will disintegrate and will be replaced by decentralized heating. Switching to alternative fuels isn't as easy as it might

seem at first look. There's by far not enough biomass in the Czech forests to fuel this transition and long-distance transport doesn't make sense for biomass. Black coal mining in the Czech Republic is facing the same destiny as brown coal. It could be transported from abroad but that would send its price up. Gas is much more expensive than domestic brown coal at the moment and it would have to be imported from abroad thus increasing the import dependence of the Czech Republic. The change of fuel would also require a complex reconstruction of the heating plants incurring massive investments which lie out of the scope of possibilities of most plant operators. In case the heating plants won't have the fuel to operate or the transition to alternative fuel skyrockets the price of the heat they produce beyond a certain level making it uncompetitive, the Czech central heating system will disintegrate and might be to a large extent replaced by decentralized, local heating (household boilers), based on gas as its fuel.

Such a development would significantly increase the use of gas in the Czech Republic, especially if it was coupled with the transition of a part of the power plants from brown coal to gas as well. Such a trend can be already partly observed as the major energy companies in the Czech Republic are in the process of constructing gas-fired power plants and some of the old brown coal fired plants are planned to be reconstructed to gas-fired ones. Calculations made by the Ministry of Industry and Trade (MPO) indicate that if this trend fully materializes, it could drive gas consumption in the Czech Republic up by 50% in this decade alone (2010-2020), rising consumption from the present level of some 8 bcm per year to as much as 12 bcm. The shift to gas cannot be explained by the looming brown coal shortage alone.

Another significant factor is the *Emissions Trading Scheme of the European Union* (EU ETS), which will move from allowances to auctioning in its third period (2013-2020). Therefore, possibly already from 2013 on, large emitters will have to pay considerably more for their CO_2 emissions and that will put significant additional costs on heat and electricity produced from brown coal. Further extra costs will be incurred by putting into operation the *Industrial Emissions Directive* of the EU, which is planned to be introduced in 2016. This directive will require plant operators to cut emissions of CO_2, NO_x and other industrial pollutants by a further 50%. As a result, the coal industry, coal-burning power plants and especially the coal-fired central heating sector, have come under massive pressure and their future is unclear.

This faces the Czech government – which is the ultimate guarantor of the energy security of the Czech Republic and is responsible for a stable supply of households and companies with energy – with a major dilemma: are the territorial-ecological limits decreed in the 1990s to be abandoned and mining continued beyond the limits of present mines or is the brown coal industry to be gradually dampened and finally shut down in some 20-30 years? If so, then what can and should replace the brown coal fired power and heating plants? These thoughts are fuelling a major debate that's taking place in the Czech Republic at the moment. The current coalition government has pledged in its coalition agreement of 2010 not to touch the limits for the term of its rule, i.e. till 2014. However, at the moment, it seems that the "pro-coal lobby" is gaining the upper hand in the Czech Republic. People linked to the brown coal sector who are well connected in the political sphere seem to be successful in projecting their views into governmental thinking and relevant official and semiofficial documents. The greatest proponent of a continued exploitation of domestic energy resources, in particular brown coal and natural uranium, has traditionally been the MPO. The MPO is charged with the drafting of the *National energy concept* (*Státní energetická koncepce* – SEK), which was approved in 2004 and is still valid. The 2004 SEK advocated a continued reliance on domestic energy resources like brown coal and natural uranium. Work on its updated version has been going on ever since 2009 and should be finalized and approved by the government this year. Quite recently, the MPO has issued a report on the status of the update of the SEK, which gives us an idea about where the MPO stands on the issue of brown coal.

From the report we learn that the draft of the updated version of the SEK very much resembles the original version from 2004 in the core idea that the Czech energy sector should be based on domestic energy resources, especially brown coal and natural uranium. The draft was put before the government in 2009 but was refused by the then-green Ministry of the Environment, which disagreed with the proposal to abandon the limits on brown coal mining, to go ahead with natural uranium mining and to extend the Temelín nuclear power plant by two further blocks. Therefore, the MPO came up with an alternative draft of a segment of the updated SEK which demonstrated that the substitution of the brown coal used in the central heating system by alternative fuels would be far too an ambitious goal.[1] Later on, this alternative draft was scrapped for "socioeconomic, technical, ecological and security reasons" and "an unrealistic time horizon for the change of the fuel basis" and the experts of the MPO have since concentrated on the work on the original draft of the updated SEK (the pro brown coal one). The authors of the report claim that if the central heating system breaks down due to a lack of fuel or an increase of the prices that will make central heating uncompetitive, the Czech Republic will suffer far-reaching and grave consequences such as unemployment and a downturn of the economy (especially in the affected regions). According to the experts of the MPO (a special "working group for the heating sector" has been set up at the MPO in November 2010 to deal with the issue of brown coal mining limits and the heating sector), this scenario could become quite realistic in the not too distant future as the Czech Republic will suffer a shortage of some 5-6 Mt of brown coal already in 2013 (current volume of production is approx. 45 Mt of brown coal). They conclude that a transition of the central heating system to alternative resources is possible only on a limited scale and with the effect of a price increase of heating. Therefore, they claim that the government of the Czech Republic should clearly and immediately signalize the will to develop and modernize the central heating system and to make available the brown coal reserves beyond the territorial-ecological limits. As the expansion of existing mines beyond their limits is bound to take quite a long time, available brown coal should be earmarked primarily for heating plants in the meantime. The shares of the individual fuels in the Czech primary fuel mix (solid fuels, liquid fuels, gaseous fuels, nuclear energy and renewable energy sources) should even out till 2050 to approx. 20% for each fuel (that

1 To replace the 12 Mt of brown coal used in the CZT, for instance it would be necessary to get either an additional 17 Mt of biomass (11x the current production in the Czech Republic) or 5,2 bcm of additional gas (current annual Czech consumption amounts to some 8 – 9 bcm). See: Zpráva o aktualizaci Státní energetické koncepce, MPO, March 2011.

means a significant drop in coal utilization over the period of the next 40 years) and import dependence should not exceed 50%. According to the authors of the report, this should protect the Czech economy against the volatility of prices of energy commodities and strengthen its competitiveness. At the same time, the security and reliability of energy supplies of the Czech Republic will be safeguarded.

However, the MPO and the advocates of mining beyond the limits might have a hard time pushing through their ideas. The government pledged in its 2010 coalition agreement not to touch the limits during its term. Any move against this pledge would amount to a breach of the agreement and at least one of the coalition parties, the Public Affairs (Věci veřejné – VV), is strongly critical of any attempts to abandon the mining limits. Critical as well is the political opposition (particularly the Social democrats and the Communists) and the general mood in the population is also rather in favor of keeping the limits (as mining beyond the limits would mean wiping out two North-Bohemian villages). Speaking out in favor of the abandoning of the limits too loudly could therefore cost the governing parties dearly in the next elections. There is, unfortunately, no broader political and societal consensus on the related issues of the limits and the central heating sector in the Czech Republic. The nature of the electoral cycle plays in favor of addressing short-term and acutely pressing issues rather than those of a long--term character which cannot be really exploited for electoral purposes, further aggravates this problem. However, the state is the final provider and guarantor of security and from this perspective it has to make a final decision about which way to go on this issue. Statesmanship and a vision are needed in order to handle future energy challenges of the Czech Republic.

5.3. Challenges for the energy policy of Slovakia

Peter Ševce

The main conclusion of the energy security discussion among the V4 countries is a strong orientation on common cooperation and the extension of the V4 relations in the energy sector to Bulgaria, Romania and Croatia. A single country has only limited tools for any energy security improvements and common collaboration can bring a win-win situation for every country. The V4 countries should follow the policy based upon two pillars: developing common positions with respect to EU initiatives and at the same time launching and implementing concrete projects of regional scale and added-value.

Beside the natural supply crisis in January 2009, there was a similar situation with oil supplies in January 2007. The oil flow through Friendship pipeline was terminated because of a dispute between Russia and Belarus. Poland, Slovakia, Hungary and the Czech Republic were affected by the interruption. Concerning natural gas, the first supply crisis experienced by European consumers happened in January 2006. All supply disruptions point out that the V4 countries are vulnerable to any future disputes between the producer and the transit country due to the lack of diversification applicable to both commodities. As presented in the Slovak example, investment in interconnectors is much lower compared to the costs caused by a supply disruption. Supply diversification is not only important for the energy security of the country; it opens the door to higher competition on the market and it has a positive effect on the end-user price.

According to some analysts, there is a serious threat that after 2014, the Friendship pipeline supplies will be terminated. The current supply contract between Slovakia and Russia guarantees 6 Mt of oil annually and ends in 2014. Negotiations to extend the agreement have to start as soon as possible to guarantee the oil flow in the long-term perspective. Another risk is the possible depletion of oil fields in Western Siberia which feed the Friendship pipeline. A final risk includes the Russian energy security strategy until 2020 which prefers oil exports through the Primorsk terminal in the Baltic Sea. The general Russian energy strategy prefers bypassing transit countries in exports of both commodities – oil and natural gas.

From the Slovak point of view, any natural gas and oil supply bypass of Ukraine has a negative effect on the supply security in Slovakia. As the Russian strategy of bypassing transit countries is clear, Slovakia has to intensify the diversification attempts in collaboration with other CEE countries.

There are several alternatives for refineries in Central Europe to cover the Friendship outage. One of them is the Adria pipeline capacity increase and import of oil from the Omisajl terminal. Another option Slovakia could benefit from is the reverse flow of oil from the Czech Republic, which is connected to the Western pipeline system through the IKL pipeline. This alternative is limited by the capacity of the TAL pipeline and can serve only as a complementary solution. The third option is the Odessa-Brody pipeline which opens the door for Caspian oil supplies into Central Europe. Transporting both Caspian and Russian oil from Brody in Ukraine to Kralupy in the Czech Republic is technically possible because only half of the Friendship oil duct capacity is currently utilized. Besides an increase of the Friendship utilization and access to new oil sources, permanent operation of the Odessa-Brody-Friendship pipeline in its original direction has a positive impact on the Ukrainian energy independence. In Ukraine's case, energy independence is a precondition for state independence. The Odessa port can serve in the near future as a hub for oil supplies from the Caspian and Central Asian states with further flow into the Central European countries. Coordination of the V4 countries in this issue should be on the agenda of regular common inter-ministerial meetings with the Ukrainian participation.

Another supply option for Slovakia is a project connecting the OMV refinery in Schwechat with Slovnaft. OMV is connected through the AWP pipeline with the TAL originating in Trieste. The connection is very sensitive due to environmental issues. Another negative point is the lack of free capacity in the Austrian pipeline, which does not offer enough commercially interesting oil amounts for Slovnaft. Contractual details favorable to Slovakia and a non-threatening route to the environment are a precondition of further project development.

Coherent regional response is necessary towards the Russian oil exports through the Primorsk terminal (Baltic Pipeline System 2), which will lead to changes in the geography of oil supplies in the Central European region. Analysis of already identified oil supply infrastructure projects have to be evaluated with the focus on the vulnerability of oil supplies.

The increase of energy security through the development of gas infrastructure projects is within the competences of the V4 countries. It consists of the reverse flow capability of existing pipelines and development of cross-border lines. The integration of the V4 gas network with the Western system will grant access to new sources, support the competition on the market and increase the maturity of the market.

Pipelines connecting Slovakia to both Austria and the Czech Republic already have reverse flow capability; however, it will be used only in case of supply disruption. During the January 2009 crisis, it was clear that the most vulnerable region within the Slovak territory is its Eastern region, where no gas storage capacity exists. Therefore the reverse flow capability of the domestic pipeline system together with the development of gas storage in the Eastern part of Slovakia is presently underway.

Current Slovak natural gas supply security is based on more tools than it was based on before January 2009. It encompasses the supply security standards specification, regulated access to the gas storages, deeper competences of state authorities, natural gas storages development, commercial diversification of gas supplies, reverse flow capability of pipeline networks in Austria and the Czech Republic and further upgrade of the Slovak transmission system.

The above mentioned measures do not resolve the linear characteristics of the pipeline infrastructure in the V4 countries. This is a historical heritage because these countries served as transmission regions between the producer in the East and consumers in the West. This status restricts the free flow of gas and access to new possible sources. It gives Gazprom a leverage position over gas supply and has its reflection in higher gas prices as well. The planned North-South Interconnection will connect all countries and open new routes for the gas imports. This is a cost-effective solution which is in competences of the V4 members.

From the Slovak and regional perspectives, the greatest importance dwells in the connection to Hungary and Poland. It will enable the connection of the region to planned LNG terminals in Poland and Croatia and to two planned gas pipelines – Nabucco and/or South Stream. Both projects are part of the broader North-South Interconnector between Baltic and Adriatic Sea.

The route of gas corridor connecting the LNG terminal in Świnoujście with the Adria LNG terminal[1]

In 2009, the operators of the transmission pipelines in Slovak Eustream and Hungarian FGSZ, started talks and non-binding Open Season procedure to ascertain the market interest. In 2010, two binding open season procedures took place, both evaluated by the Eustream as sufficient for final investment decision. On the Hungarian site, FGSZ's evaluation was less promising and

1 Based on: Osiecki G., *Polska namawia Brukselę: Dołóżcie się do gazociągu*,http://biznes.gazetaprawna.pl/grafika/484237,58860,polska_namawia_bruksele_dolozcie_sie_do_gazociagu.html (4.02.2011).

the second open season result was not officially communicated until now. Despite the political backing of the project by the highest representatives of both countries underlined with common declaration, the final decision about the project still lacks Hungarian approval.

The EU member states have commitments towards increasing renewable energy sources share in their energy mix. The integration of wind and solar sources, which are dependent on the weather conditions, are considered as non-stable and non-predictable making the availability of flexible generation capacity necessary. This capacity is important for maintaining the stability of the electricity grid and reliable supplies to customers. Gas-fired power plants are the most suitable for these purposes from several points – lower emissions, sufficient regulation of the output, ancillary services availability and high efficiency. The trend of gas-fired power plants plans is present in Slovakia as well. At the end of 2010, the Malženice CCGT power plant was put into operation with 430 MW of installed capacity. There are substantial plans for installation of several more gas-fired power plants. Gas supply security is a precondition for development of such power generation sources because there is a direct connection with the stability of the electricity networks.

The era in which energy security was based solely on the important role of the country as a transit state is over. Besides the development of cross-border pipelines, the pressure to change pricing formulas in existing long-term contracts with Russia will be another challenge. With a decreasing level of gas transport in Slovakia, it will be essential to find an alternative utilization of its transmission grid's spare capacity. Moreover, the gas title transfer taking place at the Slovak/Ukrainian border (entry point Veľké Kapušany) requires a formal framework agreement. Slovakia can serve as a virtual trading point and a first EU country where the price of the Russian gas is set. After the integration of the Central European markets, and with connections to new gas sources, gas trading should become commercially competitive.

Energy security can be reached on neither a unilateral, nor a bilateral basis. Hungarian and Polish presidencies of the Council of the European Union are the best opportunities to address the energy issues on the EU level. Slovakia remains the country that has most to gain from cross-border cooperation in energy security. Whether it will be able to move from political rhetoric and declarations to deeds remains to be seen in the months and years ahead.

5.4. Challenges for the energy policy of Hungary

Endre Szolnoki and Melinda Farkas

The current Hungarian energy policy has a strategy focusing on energy security, competitiveness, sustainable development and consumer protection. The high import rate and the decreasing domestic production cause big challenges to the state. Hungary expects that its domestic energy demand will increase and as there is a global competition generating security policy questions, the procurement becomes more challenging, driving market prices high. In order to improve energy security major investments are necessary. Further to this, stricter environmental and climate protection regulations are expected to step in, inspiring new innovations. The aim is to create an energy structure where domestic production is stable or possibly increases, import is more balanced, its origin and transit is diverse and secure. The supply security depends on the source, on the transit system, on strategic stocks and on the conversion capacity and reliability. Due to the high import rate, Hungary should ensure its security by strategic stocks in the first place. In Hungary, the only domestic energy source that is also available in the long term is lignite. Hungary relies on using this fossil which could improve the import dependency in case of electricity. However, the country is also willing to consider its possible effects on nature and climate. Hungary is willing to inspire further research on the available hydrocarbon reserves and also encourage utilizing natural gas reserves with low calorific value.[1]

Moreover, as renewable energy can increase the rate of domestic energy production, its share in the energy mix should grow. The high energy import dependency can be mitigated by: 1. Diversification of sources and transit routes; 2. Developed infrastructure; 3. Reliable and strong storage capacity; 4. Improved energy efficiency, energy saving (the goal is that energy consumption increases much slower then GDP, so that with a 4% GDP increase the primary energy usage grows only by 0,7%. Most important tasks are: to increase energy production efficiency and to decrease energy consumption); 5. Increased share of renewables in the energy mix (it would, on the one hand decrease import dependency and, on the other, devote to sustainable development. When we talk about renewables in Hungary currently we mainly talk about biomass, bio-fuels, also party about wind and locally about geothermal and solar energy); 6. Increased nuclear energy (capacity increase, R+D); 7. Regional cooperation, interconnections; 8. Competitive energy

1 MVM: *Energy Policy Thesis of Hungary 2006-2030.*

markets; 9. More intense cooperation and solidarity steps among neighbouring states.[2] [3] With reference to the listed tools to improve energy security, we will further elaborate on their application in relation to natural gas, oil and fuels.

Natural gas

As mentioned earlier, Hungary is very much depending on import, for example more than 75% of households are indispensably using natural gas for heating.The share of natural gas should be decreased or at least stabilized, but not increased. This could be done by using bio-gas, and facilitation of highly effective decentralized energy production.[4] Further to this, the government has to subsidize the hydrocarbon exploration and production of reserves with low-calorific natural gas, which could slow the overall production decrease.[5]

The total Hungarian storage capacity is adequate to balance the current winter-summer demand fluctuation. Yet, considering the increasing consumption additional mobile capacity is required to be built. Further to this, the Hungarian geological facilities could give a regional central role to the country in natural gas storage services.[6] In the medium term it is expected that IEA regulations will change and require a strategic stock level covering consumption of 120 days. In this case, Hungary needs to increase its stock capacities from 1200 bcm to 1600 bcm, for which the circumstances stand already. Based on the country's membership in IEA and EU, in case of any disruption, Hungary can also count on the solidarity of other Member States.[7]

The government is supporting the development of new gas pipelines to Hungary, such as the Nabucco (31 bcm capacity planned by 2015) or South Stream pipeline (63 bcm capacity planned by 2015), or the construction of a liquefied natural gas (LNG) terminal in Croatia. These projects could contribute to diversification of the routes and sources of gas imports in the future.[8] Further to these, there is another regional cooperation project where Hungary expressed its interest, namely the Azerbaijan-Georgia-Romania Interconnector (AGRI). Hungary became the fourth country to sign up to the AGRI pipeline project. Natural gas would be transported from Azerbaijan to Georgia where it would be liquefied and sent *via* tankers further through the Black Sea to Romania and then transmitted *via* pipelines to Central-Europe.[9] The interconnector will have a capacity of 7 bcm. One third of the capacity will end up in Romania while the rest will be distributed through the rest of the EU.[10]

2 Regional Centre For Energy Policy Research, *Security of Gas and Electricity Supply in Central and South-East Europe,* http://www.rekk.eu/sos/images/stories/workshop_summary_final.pdf, (28.06.2011).

3 http://www.rekk.eu/sos/images/stories/download/closing_workshop/bencsik_janos.pdf, (16.05.2011).

4 Regional Centre For Energy Policy Research, *Security of Gas and Electricity Supply in Central and South-East Europe*, http://www.rekk.eu/sos/images/stories/workshop_summary_final.pdf, (28.06.2011).

5 *FGSZ ZRT. ÉveS jelenTÉS 2009*, http://fgsz.hu/sites/default/files/http:/www.fgsz.hu/files/FGSZ_EvesJelentes_2009_HU.pdf, (28.06.2011).

6 Regional Centre For Energy Policy Research, *Security of Gas and Electricity Supply in Central and South-East Europe*, http://www.rekk.eu/sos/images/stories/workshop_summary_final.pdf, (28.06.2011).

7 MVM: *Energy Policy Thesis of Hungary 2006-2030.*

8 International Energy Agency, *Hungary: Statistics*, http://www.iea.org/stats/countryresults.asp?COUNTRY_CODE=HU&Submit=Submit, (16.05.2011).

9 The Journal of Turkish Weekly, http://www.turkishweekly.net/news/107296/minister-agri-to-supply-gas-to-various-european-countries-.html, (16.05.2011).

10 Duna, *Hungary signs up for the AGRI pipeline*, http://www.dunatv.hu/english/news/business/hungary_signs_up_for_agri.html, (28.06.2011).

In comparison to this, Nabucco would bring 31 bcm annually through Turkey, Bulgaria, Romania, Hungary and Austria. Political commitment for the latter pipeline has grown with every gas crisis. However, the other competing Southern Corridor projects have attracted political support across the region, such as the South Stream project and the Azerbaijan-Georgia-Romania Interconnector (AGRI) also mentioned above. These projects in fact are less likely to be realized than Nabucco as they are regarded as red herrings. The two decades old Croatian LNG terminal proposal has had weak support as well. The project owners (OMV, Total, E.ON, Geoplin) have conflicting interests that stand as a barriers to project implementation.[11]

Furthermore, apart from the projects effecting Hungary directly, we should also mention some other initiatives which will not physically go through the country, but could influence the country's supply security, such as the Trans-Adriatic Pipeline (TAP), linking the Italian and Greek gas systems, or the Turkish-Greek-Italian Interconnector (ITGI) which could even question the necessity of Nabucco. On the other hand, EU is willing to harmonize these projects as the main aim is to establish a Southern Gas Corridor.[12]

Short term goals are to develop cross border capacities. The Hungarian-Romanian linkage from Szeged to Arad was finished with a two-directional gas transmission capacity of 12,1 mcm/day. The Hungarian-Croatian Interconnector from Városföld to Slobodnica is estimated to be done in 2011. The project would further integrate the EU gas market and provide gas transit capacity from Hungary to Croatia, Bosnia and Herzegovina and Italy of up to 7,5 bcm a year and from Croatia to Hungary of up to 5,5 bcm a year.[13] These two investments are the first steps to the North-South Energy Connection. For Hungary it is strategically important to establish a North-South Connection between the Baltic, the Adriatic and the Black Sea. Further steps were also made by concluding an inter-governmental agreement on the construction of a similar Hungarian-Slovakian pipeline, on 28 January 2011.[14] Hungary's FGSZ Foldgazszallito and Slovakia's Eurstream will build the interconnector. This pipeline would provide a second access to Baumgarten and to the main transit pipeline, hence actually to the European network system.

Discussions are held on development of Slovenian pipelines as well. Both projects could assist the European goals such as: building a North-South Gas Corridor and also establishing the Hungarian-Slovenian-Italian transit system. Through these developments Hungary could become a regional distribution centre and also get access to European gas networks.[15]

11 Andzsans-Balogh K., *The Road to Hungarian Energy Security*, "The IAGS Journal of Energy Security (JES)", http://www.ensec.org/index.php?option=com_content&view=article&id=278:the-road-to-hungarian-energy-security&catid=114:cont ent0211&Itemid=374, (28.06.2011).

12 EurActiv, *A Déli Gázfolyosó: vezetékek versenye Európa gázellátásáért*, http://www.euractiv.hu/energia/linkdossziek/a-deli-gazkorridor-vezetekek-versenye-europa-gazellatasaert-000196, (28.06.2011).

13 IntelliNews Hungary Energy Report, Hungary Energy Report, August 2009, http://www.securities.com/Public/intellinews/INTELLI_OGEHU.pdf, (28.06.2011).

14 Hungarian presidency of the Council of the European Union, *New chapter in European energy policy,* http://www.eu2011.hu/news/new-chapter-european-energy-policy,(28.06.2011).

15 Hungarian Hydrocarbon Stockpiling Association, http://www.husa.hu/, (16.05.2011).

Additionally, the new EU Regulation No. 994/2010 also affects Hungarian supply security. The Regulation forces Member States to meet two supply security *standards*. The first one, called *infrastructure standard*, is a ratio of supply infrastructure capacity, excluding the largest entry point into the system, over peak demand (the N-1 rule). Member States for which the ratio is below one would have three years to carry out the needed investment in new supply infrastructure. The infrastructure standard also requires Member States to ensure that, within three years of entry into force, gas can move both ways at all interconnection points. The other standard, the *supply standard*, provides for guaranteed supply for *protected customers* in the face of extreme weather events.[16] These regulations also improve the supply security level of the country.

An additional new factor affecting the Hungarian gas system is the Russian Natural Gas Exchange. It will open in June, and participant expects a high turnover. Further to this, due to expected higher demand, increased oil prices, losses realized at the beginning of this year and redirected gas transportations to Japan, Gazprom is willing to increase the European gas prices significantly,[17] which will again strengthen the European need for source diversification.

There is a significant efficiency potential in the generation sector thus demand side efficiencies could reduce the level of demand. Old gas-fired power plants in Hungary are operating with 35% efficiency. These gas-fired power plants could be replaced by more efficient Combined Cycle Gas Turbines, which could have efficiency well over 50%. Moreover, investments in the network infrastructure to reduce network losses, is another step towards saving energy. Increasing efficiency could therefore reduce the dependence on Russian gas.[18]

All in all, Hungary's mid-term natural gas security perspective is well adapting the supply security trend aiming to diversify transport and sources. After the recent economic downturn it is not likely that the Hungarian peak demand (90 mcm/day) will be reached again before 2020. While no significant capacity increase in gas storage is expected, the network of new interconnector capacities will significantly increase. By 2015 the country's transit capacity is expected to increase further by 11,5 bcm annually, and the new reverse flow capabilities of the interconnectors will mean an additional 16,1 bcm supply capacity, reaching 42,4 bcm total. This level of surplus capacity will enhance market liquidity in the post-2015 era. This falls in line with the reshaping of the Hungarian domestic market in light of a new import contract with the Russian supplier, (as most likely, there will be less capacity fixed under the new import contracts) and the end of gas release and contract release schemes. These developments are able to serve as a reasonable guarantee of gas supply security and to counter-balance the side effect of expected further decline in domestic production until 2020.[19]

16 Findlater S. Pierre Noël P., *Gas Supply Security in the Baltic States: A Qualitative Assessment*, http://www.eprg.group.cam.ac.uk/wp-content/uploads/2010/03/FindlaterNoelCombined2EPRG1008.pdf, Electricity Policy Research Group (EPRG), University of Cambridge, March 2010.

17 Energiainfo, *Ötszáz dolláros gázár az év végére?*, http://energiainfo.hu/index.php?par=&option=news&id=23934, (28.06.2011).

18 Regional Centre For Energy Policy Research, *Security of Gas and Electricity Supply in Central and South – East Eaurope*, http://www.rekk.eu/sos/images/stories/workshop_summary_final.pdf, (28.06.2011).

19 Andzsans-Balogh K., *The Road to Hungarian Energy Security*, "The IAGS Journal of Energy Security (JES)", http://www.ensec.org/index.php?option=com_content&view=article&id=278:the-road-to-hungarian-energy-security&catid=114:cont ent0211&ltemid=374, (28.06.2011).

Crude oil, fuels

Besides, domestic production Hungary has two pipeline sources where one can perfectly cover other's shortfall. Accordingly, the supply and transition diversification is given with regards to oil, so the main goal is to maintain the current system, further development is not required. Domestic production is expected to shrink due to geological reasons which will push up import level further. Domestic demand is entirely covered by the existing refineries and in case of increased demand capacities can be raised. The transmission line's infrastructure is in a good state and it is diversified by automotive and railway transportation. In the region, there are more than ten refineries from which import is possible at a competitive price. Further to this, in case of any disruption in the pipeline transportation, the transport can be switched to watercraft, automotive or railway. Crude oil is mainly used as a fuel for a transportation sector. As a result, the demand will only decrease, if bio-fuels and/or hydrogen or electricity will become much more significant transportation fuel. The current compulsory strategic stock level covering demand for 90 days is in line with the EU regulations. For several times the EU has put on the agenda an idea to increase this level to 120 days. It is worth noting that such an increased stock level instruction could be also accomplished by the current system.[20]

The European Commission conducted a thorough analysis of the possible infrastructural developments in the region. Based on this, the Sisak-Szazhalombatta-Sahy pipeline seems to be the most attractive and realistic option for security of supply in the short-term, from the point of view of CEE. Its capacity could be expanded according to the actual requirements with very limited investment. Three technical measures have been considered along the Szazhalombatta-Sahy section in order to pump oil to the Friendship-1, supplying the Slovak Republic and the Czech Republic, if necessary: (i) constructing a second parallel line or (ii) modifying the existing Szazhalombatta pumping station and (iii) using of drag reducing agents. The first option has the advantage of making it possible to achieve a higher capacity. However, without normal use the second pipeline would be idle and would have no commercial justification. On the other hand, this bears the highest potential for further expansion. The second and the third option's costs would not have to be incurred until the pipeline is needed. These options would be a very cost-effective solution in terms of initial investment, but would lead to considerable operating costs.

Demand for oil, especially for road diesel, is expected to grow as well supporting the domestic need for oil.[21] This is likely to put pressure on refiners to increase crude oil processing and fuel oil conversion capabilities and increasing the imports of diesel even *via* the Danube River.

20 MVM: *Energy Policy Thesis of Hungary 2006-2030*.

21 International Energy Agency, *Hungary: Statistics*, http://www.iea.org/stats/countryresults.asp?COUNTRY_CODE=HU&Submit=Submit, (16.05.2011).

6. Energy challenges – V4 common standpoint?

6.1. V4 in the European Union

Mariusz Ruszel

The V4 presidencies of the Council of the European Union

Out of all of the V4 countries, it was the Czech Republic that first took the presidency of the EU Council in the first half of 2009. No sooner had they taken the EU helm than they were posed with an urgent challenge of negotiating a gas agreement between Russia and Ukraine. The situation was worsened by internal reshuffles on the Czech political arena that eventually led to the passing of a vote of no confidence in the Czech Prime Minister, Mirek Topolanek. Neither the economic recession coupled with noticeable tensions between Prague and Paris or Italian criticism made the task any easier for the Czechs. When assessing the Czech presidency, it must be emphasised that Prague did not exercise either excessive authority or sufficient "political power." Furthermore, weakened by the government crisis, the Czechs were unable to realise their ambitious goals such as resolving EU energy problems, combating economic crisis and developing external relations, including the "Eastern Dimension" of the European Neighbourhood Policy.[1] Nonetheless, the Czech presidency definitely signalled the need to diversify the sources of energy supplies and indicated the risk of the EU's exclusive dependency on the supplies of energy resources from Russia. They were also successful in negotiating a gas agreement between Moscow and Kiev, where Prague took every effort to ensure that the position adopted by Brussels was cohesive.

With the Lisbon Treaty that came into force on 1 December 2009, part of the competences of the presidency was transferred to the permanent President of the European Council and the EU High Representative of Foreign Affairs and Security Policy. In connection with the above, the taking of the presidency of the European Council by Hungary on 1 January 2011 occurred under the new EU institutional conditions. Priorities of the Hungarian presidency focused primarily on four issues. Firstly, they concentrated on the economic growth and strengthening of the EU economic policy with a view to create new work places. Secondly, they focused on progressing with the integration processes of an internal EU policy and, within the scope of this priority, on developing a common energy policy as well as ensuring energy security of the EU. Thirdly, they promoted the idea of a citizen-friendly EU by means of enhancing the common area of freedom, security and justice as well as by fighting organised crime. Lastly,

1 Jarzyński W., *Czech presidency – an attempt to summarize*, "Biuletyn PISM" no 1 (533), Warsaw, 8 January 2009.

the Hungarian presidency focused on the EU enlargement policy to include the following candidate countries: Croatia, Turkey, Iceland and Western Balkan countries and supporting the European External Action Service. The Eastern Partnership (EP) summit planned to take place during the Hungarian presidency on 27 May 2011 has been postponed until the autumn 2011 – the time of the Polish presidency of the European Council. The aim of the EP is to strengthen the EU cooperation with the six countries participating in the programme.[2]

Poland will succeed Hungary at the EU helm and take the presidency of the European Council in the second half of 2011. The Polish government in a document *A 6-month programme of the Polish presidency of the Council of the European Union in the second half of 2011*, released on 15 March 2011, defined six overall priorities: internal market, Eastern relations, strengthening of the external EU policy, joint security and defence policy, negotiations of a long-term Financial Perspective 2014-2020, and taking full advantage of Europe's intellectual potential. One of the most important Polish priorities will be external EU energy policy, which shall promote rules valid for the EU internal energy market in relations with non-EU countries. At the same time, such directives could become recommendations for actions undertaken by the European Commission. Thus, the Polish presidency shall concentrate on recommendations pertaining to the increase of energy security, development of energy infrastructure and the common energy market.

Slovakia is the last of the V4 countries to take the presidency in the second half of 2016 for the first time in its history since joining the EU.

It is crucial for the V4 countries to understand that on the EU arena they are bound by common interests and that they can execute them interchangeably through the institution of the presidency. In addition, holding the presidency shall enable them to gain necessary experience, develop a professional and efficient model for public administration and its key departments as well as enhance their prestige and political position in the EU.

Coalition capabilities of the V4 countries

The efficiency of influencing EU decisions is to a large extent contingent upon the capability of forming coalitions of countries representing a common stance. Such coalitions are usually based on a community of interests, which denotes that given countries can in particular cases share common interests but have different views on other issues. It is fair to say that problems which pertain to ensuring energy security of the V4 countries in CEE are to a large degree similar. Despite this fact, at the stage of accession negotiations to the EU and during the first years of accession, the difficulty in building a coalition among the V4 countries was quite noticeable since they were more interested in competing rather than cooperating with each other. In the period between 2004-2007, the V4 countries competed with one another for favours of the key Western European players, having failed to realise the benefits of a team standpoint. In consequence, they did not manage to signal common interests of the CEE countries in Brussels and developed mutual distrust for one another. A breakthrough moment came in 2008 and since 2009 we can observe a more intensive cooperation of the V4 countries. The area of common interests in the V4 group lies in the strengthening of their energy security. It needs to be emphasised that being dependent upon the Russian supplies of natural gas, treated occasionally by Russia as an instrument of inflicting political pressure, is not equally perceived by all the V4 countries as a threat. Having repeatedly experienced the adverse effects of gas crises between Russia and Ukraine, only Poland and the Czech Republic determinately opt for the diversification of energy supplies. Interestingly, Slovakia and Hungary do not perceive the deepened economic cooperation with Russia as a threat. As Piotr Bajda from the Institute of Political Studies PAN aptly observes, Slovakia without a major public debate sold the Slovak pipeline to the Russian oil company, Yukos, whereas Hungary, against the opinion expressed by the European Commission, decided to participate in the South Stream project.[3]

Coalition capabilities of the V4 countries transpose directly to informal diplomatic and lobbying activities that affect EU decision processes. A joint agreement between the V4 leaders on the intensification of energy policy cooperation denotes a tightening of the cooperation between energy attachés representing these countries in Brussels where law regulations are created. Informal meetings play a crucial role in mapping out nearly all issues that subsequently appear on the EU agenda. Therefore, it is important to have a good network of contacts for sharing and communicating one's aims and priorities since official voting in the EU institutions is frequently a result of these informal agreements. Thus created coalitions of the member states facilitate activities undertaken by the heads of states at the European Council level where all the strategic decisions are made. With regard to the European Commission, it is lobbying and experts' activities that play the most vital role.

The implementation of the Lisbon Treaty has strengthened the political significance of the European Parliament. Hence the political potential of 107 MEPs (in the term 2009-2014) representing the V4 countries and accounting for 14,53% of all MEPs is not to be overrated. These MEPs, within the scope of the increasingly popular "ordinary legislative procedure" (formerly a co-decision procedure) since the Lisbon Treaty, influence the shape of the European law, participate in sittings of the EP commissions as well as undertake parliamentary and extra-parliamentary initiatives of their own. However, it is the European Council that constitutes the main decision-making body and increasingly strengthens its position among other EU institutions. The voting potential of the V4 countries in the EC translates to 58 out of 345 votes, which comprises 16,81% of all EC votes. Poland has 27 votes, Czech and Hungary have 12 votes respectively and Slovakia has 7 votes.

2 *Strengthening Europe. Aims of the Hungarian presidency,* http://www.prezydencjaue.gov.pl/archiwum/550-umacniamy-europ-priorytety-wgierskiej-prezydencji (30.04.2011).

3 *Determination decides the success of Union*, http://www.mue.com.pl/index.php?option=com_content&view=article&id=66:o-sukcesie-w-unii-decyduje-determinacja&catid=42:ekspertyzy-opinie&Itemid=61 (30.04.2011).

Evaluation of the efficiency of influencing EU decisions in the realm of V4 Group's energy policy

With regard to the energy policy, the assessment of influence exerted on the EU decisional processes cannot be made on a win-lose basis. Affecting the EU energy policy is a process while preferences of the V4 countries are taken into account to a larger or smaller extent depending on a document. This results from the uniqueness of the EU decision processes: building coalitions, seeking common solutions, mutual support in various matters, making compromises and concessions are some of the elements of these processes. Influencing the EU energy policy is difficult for it is characterised by particularistic interests of individual member states and their energy concerns. According to Krzysztof Żmijewski, the EU energy policy is dominated by national interests of the so-called «DEFI» group (Deutchland, England, France, and Italy).[4] As Jacek Saryusz Wolski MEP points out, it is not easy to break through the EU bureaucratic structures, dominated by the old diplomacy of Western Europe, i.e. Great Britain, Germany, France, Italy, Spain, the Netherlands, and Belgium.[5] Affecting EU decisions occurs both formally and informally, with lobbying activities playing a vital role. Czech and Hungary seem to manage their EU lobbying activities well. With a network of people "well--distributed" among EU institutions, they are able to move confidently within the framework of the EU decision process. In the first years of EU membership, Czech and Hungary were much better organised than Poland and Slovakia. They quickly established appropriate structures together with a well-organised lobbying activity in Brussels. Suffice to say that the agency of the biggest Czech energy company, ČEZ, has had its premises in Brussels since 1999. In comparison, Polish Oil and Gas Company (PGNiG) established its agency in Brussels in 2007 and Gas System in 2008.

Paradoxically, it was the gas crises between Russia and Ukraine that turned out to be a catalyst for the EU energy policy. They undermined Russia's reputation and credibility as a stable and reliable natural gas supplier. Political conditions created at that time urged for taking decisive actions and debate that would result in ensuring energy security of the EU. In 2006 Poland put forward "The European Energy Security Pact" (ETBE), an initiative which eventually did not make its way to the European Council's agenda but nevertheless signalled the need for energy solidarity. The V4 countries endorsed the ETBE project. Considerable political success was negotiation of the statement "in a spirit of solidarity between Member states," included in the Lisbon Treaty and pertaining to energy security. During energy-climate package negotiations, the V4 countries adopted a joint declaration in which they called for the EU energy and climate policy that would "reconcile environmental aims with the requirements of sustainable economic growth, while the EU should refrain from adopting solutions that do not take into consideration the differences in the economic potential of the respective EU member states."[6] The final shape of the energy-climate package, presupposing a derogation of the obligatory purchase of CO_2 emission permits, took into account stipulations propounded by the V4 countries.

4 Żmijewski K., *The words are written down, the deed, the date*, http://www.wnp.pl/blog/2_272.html (14.11.2010).

5 Haszczyński J., *entering the hunting grounds of old Europe*, http://www.rp.pl/artykul/559489-Wejsc-na-tereny-lowieckie-starej-Europy.html (14.11.2010).

6 *The Visegrad Group on climate and energy package,* http://www.euractiv.pl/gospodarka/artykul/grupa-wyszehradzka-o-pakiecie-energetycznoklimatycznym (30.04.2011).

Negotiations of the *security of supply regulation* (SOS) conducted in the years 2009-2010 impeded adopting a common stand in a number of issues and the collaboration between the V4 countries in the initial period of negotiations was far from excellent. Currently, it is in the best interest of the V4 countries to jointly aim at developing energy infrastructure that will allow for "internal export" of natural gas and electricity as well as the extraction of unconventional gas in their territory in order to guarantee energy security of the EU. Building of the North-South Gas Corridor is of strategic importance to all the V4 countries. The project assumes creating gas interconnections between the V4 countries, linking the LNG terminal in Świnoujście with the Adria LNG terminal on the island of Krk in Croatia. The Gas Corridor is planned to run through Poland, Czech, Slovakia, Hungary, Croatia as well as Romania and Bulgaria at the Black Sea. The North-South Gas Corridor has a fundamental importance, especially in the context of industrial extraction of shale gas in the V4 group›s territory and plans to build the Nabucco pipeline. The coalition of countries endorsing the initiative of building the Gas Corridor forms the so-called V4+ group which additionally includes Croatia, Romania, Bulgaria, Slovenia and Austria. Considerable success not only for the V4 countries but all the EU Member States is the adoption of *The Third Energy Liberalisation Package* (The Third Package). Acceptance and implementation of The Third Package in March 2011 was in the interest of all the V4 countries.

Case study: Regulation SOS (Security of Supply)

At the initial stage of works on a draft of a given EU document a team of experts is appointed who prepare the contents of the document in a *non-paper* form – in other words its unofficial version. At the stage of creating an initial version of the SOS regulation, there was already a Slovakian expert in the team who had worked in the Slovakian government administration and, prior to the commencement of official negotiations, had returned from Brussels to Bratislava. One can only speculate that Slovakia was one of the first countries to obtain the initial and unofficial version of this document. During the first two months of negotiations, the V4 group cooperation was far from excellent. On 24 February 2010 a political declaration was signed in Budapest that was supposed to contribute to better cooperation between negotiation teams during their informal meetings held with the aim to bring together different views. During the course of negotiations with the participation of all the EU Member States, it was agreed that the document would adopt a form of a resolution with the legal basis being the article 194 the Treaty on Functioning of the EU. The article touches upon four main issues related to energy policy: security of energy resources supply, energy efficiency, development of energy market and infrastructure. In the final version of the SOS regulation a relatively narrow definition of "protected consumers" was defended and so-called "triggers" were agreed on. Additionally, the document foresaw the improvement of the so-called infrastructural standard and strengthening of the role of the European Commission in developing preventative action plans. The V4 countries did not support the idea put forward by Poland calling for the European Commission to develop an *Emergency Plan*, *Preventive Action Plan* and *Risk Assessment*. Looking back, it can be said that had the V4 countries cooperated with each other during negotiations in the same way they did at the final stage of determining the contents of the resolution, it is quite conceivable that more would have been achieved. Under the High Level Group (HLG), operating currently within the V4, there are working subgroups accountable for the North-South Gas Corridor and natural gas

critical management. During the meeting of a HLG sub-group responsible for natural gas critical management in November 2010, it was agreed that the V4 countries shall exchange on a current basis their experience in risk assessment and the implementation of the SOS gas regulation in order to prepare preventative action plans. Therefore, this V4 sub-group creates the possibility to investigate whether there are any convergent points between the countries which, if there are, will enable the V4 group to prepare their own regional preventative action plans.

To summarise, it is fair to say that the V4 countries' EU membership has rendered them more responsible for the shaping of the EU energy policy. The period of accession negotiations was characterised by competition between the V4 countries that continued over the first years of the EU membership with the V4 countries trying to contend for Western European countries' favours. The EU diplomacy – particularly when energy policy is concerned – is dominated by particularistic interests of the EU members states and their energy concerns. Similar problems regarding the assurance of energy security brings together energy interests of all the V4 countries, although not all of them perceive the supply of natural gas from Russia as a threat. The experience of the first years of EU membership together with the consequences of gas crises between Russia and Ukraine suffered by European countries, triggering in some cases changes on their political scene, have urged the V4 countries to tighten their cooperation. The coalition capabilities of the V4 countries, based on a common interest, create a real possibility for a joint and effective influence on the EU decision processes. Energy policy related projects require broad coalitions and support of a number of Member States, while the V4 group cooperation increases the lobbying potential of all the four countries. Hitherto achieved political successes in the form of securing critical entries in EU documents can give rise to even more spectacular achievements of the V4 group on the EU forum. To achieve this, it is essential to build their cooperation on mutual trust that needs to be constantly strengthened. Holding presidency of the European Council by the V4 countries creates possibilities for the realisation of their political priorities within the EU agenda. Above all, however, it should build their prestige and image as well as bring them closer to the circle of the key players jointly responsible for the development of EU integration. Professionalisation of state administration personnel and invaluable experience gained during respective presidencies held by each of the V4 countries should bear fruit in the form of better and more effective means of influencing EU decision processes. The growing role of the V4 countries in Brussels along with the development of energy infrastructure between the V4 countries and unconventional gas extraction in Europe can contribute to the increase of the energy security of the EU. [compare: map, p. 65]

6.2. V4 energy cooperation with special view on natural gas

Maciej Kołaczkowski

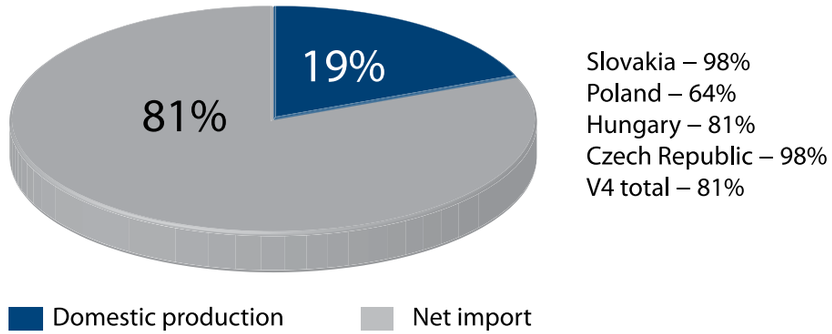
Special focus of V4 cooperation in energy is the natural gas sector, where challenges and issues are similar among countries, and solutions are seen to be feasible in the most efficient way on the regional level. Cooperation in natural gas is seen as a flagship of V4 initiative, and it seems to play the role of a driving force for other energy sectors, like oil and electricity.

Strategic basis for cooperation

Visegrad region has very modest natural gas domestic production. While on average European Union indigenous production equals ca. 37% of EU consumption,[1] in the V4 region it is only 19%. The biggest producer is Poland covering 36% of its consumption, second is Hungary covering 19% from indigenous sources, with downward trend. The Czech Republic and Slovak production is negligible.[2]

Modest indigenous production means high import dependency. What is remarkable and valid for all V4 countries, high import dependency goes together with almost full reliance on one

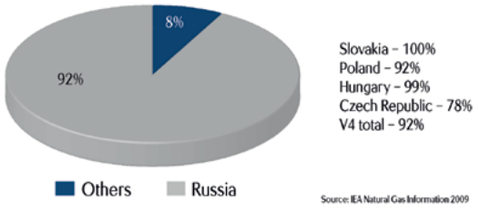
Domestic production and import of natural gas in the V4 countries[3]



1 Eurogas Annual Report 2008/2009.
2 IEA Natural Gas Information 2009.
3 Ibidem.

supplier, namely Russia. On contractual basis V4 one-supplier dependency equals to 92%. The remaining 8% is import from Germany to Poland, and from Norway to the Czech Republic. Slovakia dependency on Russia is full, Hungary has small amounts from other suppliers.[4] Exploration of further details reveals that situation in this respect is even more serious. Poland buys in fact re-exported Russian gas from the German supplier, while the Czech Republic only contractually buys Norwegian gas, receiving on physical basis Russian gas from the Brotherhood pipeline (*swap* transactions).

Import structure for V4 countries[6]



National markets in the region are relatively small, what could lower its attractiveness for potential external gas alternative suppliers. According to BP,[5] the biggest market in the region is Poland consuming 13,9 bcm/y, second is Hungary with 11,8 bcm/y of consumption and Czech and Slovak markets consuming 8,7 bcm/y and 5,7 bcm/y respectively, with no intraregional flows.

Infrastructural gaps are a common challenge for V4 countries. On one hand, on the territory of Poland, Slovakia and the Czech Republic there is a huge transit infrastructure, namely the Yamal and Brotherhood pipelines, major routes for Russian deliveries to the EU with yearly transit equalling aprox. 100 bcm.

There are no significant alternative supplies possibilities for the region. On the other hand, besides limited temporary possibility to reverse the Brotherhood pipeline from the Czech Republic to Slovakia, there is no interconnection between V4 countries at the moment, resulting in lack of market integration and low security of supplies reaction potential. Gas markets of V4 countries, even though being neighbours, are perfectly separated from each others.

One could argue that huge transited amounts of gas and relatively small consumption are quite a comfortable situation in terms of security of gas supplies. For sure this could be an important element of building security of supplies, but as it became obvious in January 2009, without alternative supplies possibilities (diversification) and market integration (interconnections), feeling of being secure thanks to being a major country for transit is delusive. When the Brotherhood pipeline stopped pumping, V4 countries were locked in their national markets without possibilities for solidarity reaction.[7]

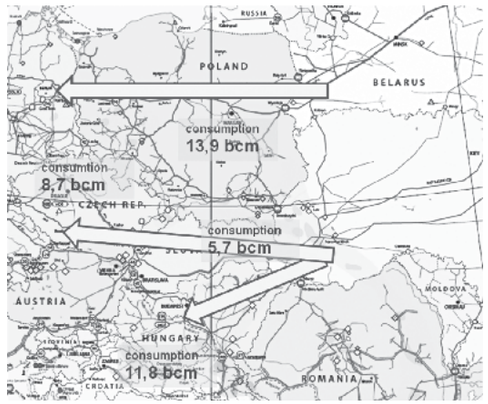
4 Ibidem.
5 *BP Statistical Review of World Energy 2010*, data 2008.
6 *IEA Natural Gas Information 2009*.
7 Slovakia was hit the most. The crisis started on 1st Jan 2009, and already on 18th Jan 2009 minor physical reverse flow from the Czech Republic was undertaken on temporary basis.

Formal basis for cooperation

Visegrad cooperation was established by leaders of Czechoslovakia, Hungary and Poland on 15th February 1991, by signing in the Castle of Visegrad, Hungary the *Declaration of Cooperation*. The *Declaration* was signed by President Vaclac Havel, Prime Minister Josef Antall and President Lech Wałęsa.

The current format of energy V4 cooperation was established by V4 leaders during their meeting on 3rd June 2008 in Wieliczka, Poland by summoning HLG for energy security. The common goal was to revitalize and strengthen energy cooperation. Preliminary works of the HLG focused on preparing strong formal and precise fundaments for the cooperation, with first blueprints of the North-South Gas Corridor.

Poland, Slovakia and Czech transit infrastructure[8]



Next and the most visible milestone was the *Declaration of Budapest* from 24th February 2010 agreed by Prime Ministers. What is remarkable here, the *Declaration* of Budapest was signed by not only V4 members, but also other important partners, what broadened the energy cooperation also for non-V4 stakeholders.[9] The *Declaration* confirmed similarities of challenges, but also reaffirmed common dealing with it on regional as well as on the EU level underlining the importance of diversifying fossil fuels supplies to the region and expressing V4+ views on *Security of Gas Supplies Regulation*. Leaders noticed the lack of interconnections and reverse flows possibilities and indicated that the internal gas market is still uncompleted.

Signatory countries supported the idea of North-South Interconnections, to connect Polish and Croatian LNG terminals through the V4 region, and in parallel they supported Romanian LNG terminal and CNG projects in Black Sea region. The *Declaration* raises also a number of issues that could be summarized as EU ones, *inter alia* stressing importance of the cohesion policy for energy infrastructure development. In the institutional dimension the *Declaration* foresees holding regular High Level Meetings and creating expert working groups. The *Declarations* gave the fundament for further cooperation in energy, especially in the framework of HLG and its working groups. To summarize HLG duties and priorities one could distinguish two pillars:

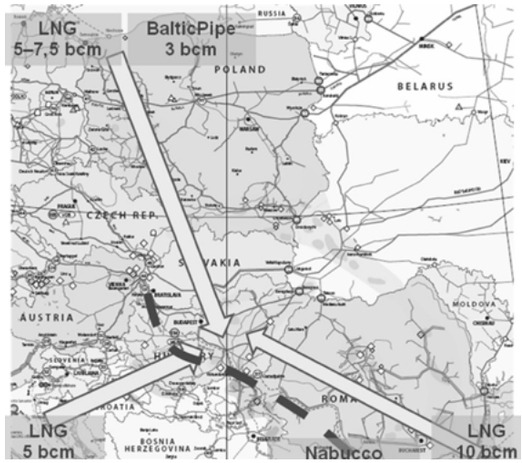
8 *BP tatistical Review of World Energy*, data for 2008.
9 The Czech Republic, the Republic of Hungary, the Slovak Republic and the Republic of Poland, the Republic of Austria, Bosnia and Herzegovina, the Republic of Bulgaria, the Republic of Croatia, the Republic of Serbia, the Republic of Slovenia and Romania.

to facilitate realization of North-South Gas Corridor and to coordinate V4 countries contribution to the EU energy policy. The first task is a kind of permanent duty, while EU coordination is connected with the EU agenda, what means it is conducted more on *ad hoc* basis.

North-South Gas Corridor

The Corridor is a flagship of the energy cooperation in the V4 framework. The general idea is to assure access for alternative gas supplies for the region, and to interconnect transmission systems to allow gas to flow not only in East-West direction, but also in North-South (bidirectional) manner. At the moment the North-South Gas Corridor aims to create a kind of triangle, with LNG terminals on each top of the triangle and with Nabucco pipeline in the middle, with well interconnected systems among the region. V4 cooperation regarding North-South Gas Corridor was broadened in the V4+ framework, with indispensible involvement of Croatia and Romania. Significant advantage of the Corridor is its scope. This is not one, huge-scale project with enormous financing needed, but rather a series of small-scale components removing identified infrastructural gaps, also in terms of intra-national networks.

North-South Gas Corridor (triangle)[10]



North-South Gas Corridor will give access to an alternative external source, realization of the idea shall facilitate completion of the EU internal gas market with all its benefits like competition, price arbitrage possibilities, infrastructure optimization (i.e. underground storage capacities utilization). Moreover, it will increase security of supplies thanks to infrastructural possibilities for reaction in case of emergency. Other, less direct effect could be increased attractiveness for alternative external suppliers that could have found V4 separated markets too small to make it profitable to compete with the dominant supplier at the moment. As V4+ will be in fact one, regional market it shall be recognized respectively. Besides V4+ region, the North-South Gas Corridor idea has also significant potential for synergies when combined with BEMIP[11] initiative, that is focused on interconnections within the Baltic Sea region.

10 *BP Statistical Review of World Energy*, data for 2008.

11 *Baltic Energy Market Interconnection Plan* (BEMIP), http://ec.europa.eu/energy/infrastructure/bemip_en.htm.

HLG deliveries

Basing on principles expounded in the D*eclaration of Budapest*, HLG prepared a letter from V4 Ministers responsible for energy to Mr. Gunter Oettinger, EU Commissioner for Energy, concerning development of energy infrastructure in the region and in the EU,[12] with two general threads: North-South Gas Corridor and energy infrastructure development on the EU level. General context of this action was awaiting Communication of the EC concerning energy infrastructure priorities, accompanied by expected EC proposal to create a new EU financial instrument for infrastructure development. The V4 expressed its devotion and readiness to contribute to the further process, indicating crucial and highly effective role of the cohesion policy in developing energy infrastructure. Moreover, the V4 for the first time specified the idea of the North-South Gas Corridor, indicating specific projects to be included.[13] Besides LNG terminals the general idea assumes realization of interconnections between every neighbouring country in the region and extention of internal gas networks where needed. In medium term Baltic Pipe (Polish-Denmark interconnection) is also considered as a new source of Norwegian supplies.

Mr. Oettinger welcomed the North-South Gas Corridor initiative, and strongly supported the idea of cooperation on regional level. Appreciating V4 initiative he also promised to introduce the North-South Gas Corridor as one of the priorities to the upcoming Communication, what became reality on 17th November 2010, when EC announced its *Energy Infrastructure Package*[14] Communication and indicated the idea to connect three Seas: Baltic, Adriatic and Black as one of EU priorities. Proirities set up in the Communication were endorsed by the European Council on 4th February 2011.

On 3rd February 2011 Mr. Jose Manuel Barroso acting jointly with leaders of respective countries established a HLG, chaired by the EC and comprised of Bulgaria, The Czech Republic, Hungary, Poland, Romania, Slovakia and Croatia as an observer, aiming at realization of the priority to interconnect three Seas. According to Terms of Reference "The High Level Group shall deliver an Action Plan on the development of interconnections in the sectors of gas, electricity, and oil by the end of 2011. The work should also contribute to the definition of criteria for project prioritization and selection as set out in the Infrastructure Communication. These criteria will allow the identification at EU level of "Projects of European Interest". Support from the EU, also in terms of financing for the "Projects of European Interest" is expected. Scope of works covering not only gas, but also electricity and oil shows effectiveness of the V4 cooperation that was welcomed by the Commission and extended on other sectors. Going back to V4 HLG forum, works are finalizing to prepare in the mid of 2011 detailed technical specification, including major characteristics of projects that comprise on the North-South Gas Corridor.

12 The letter was signed on 14th September 2010.

13 At this stage Romania was not participating, and was not a part of the letter. From the beginning of 2011 Romania participates in the HLG and is found by V4 as an important stakeholder in the whole idea.

14 Energy infrastructure priorities for 2020 and beyond – A Blueprint for an integrated European energy network. COM(2010) 677.

Commercial level

The cooperation is conducted with close coordination and with participation of the industry, namely national transmission system operators. This assures that V4+ cooperation is not a highly politicised dialog with ambitious long-term perspective goals but with poor influence on the reality and without deliveries in short term. Besides significant political work done also on EU forum, there is constant progress in terms of project development where industry involvement is crucial. Going from the North in the Southern direction:

- LNG terminal in Świnoujście – construction works are onging, first LNG cargo is contracted on July 2014,
- Baltic Pipe – Polish TSO, Gas-System proceeds preparatory works to announce Open Season procedure in 2013,
- Poland – Slovakia interconnector – in late 2010 *Memorandum of Understanding* was signed between TSOs to shape the project and prepare feasibility study,
- Czech – Poland interconnector – construction works are ongoing, infrastructure will be on line in October 2011,
- Czech – Slovakia reverse flow – TSOs are finalising technial works to allow permanent major reverse flows,
- Hungary – Slovakia interconnector – final stage of market interest examination, intergovernmental agreement was signed late 2010 to assure its realisation,
- Croatia – Hungary – from the end of 2010 online in the direction to Croatia,
- Hungary – Romania – from late 2010 online in the direction to Romania.

[Map: compare p. 56]

Maciej Kołaczkowski is employed at Ministry of Foreign Affairs of Poland. Presented statements are his private and personal, and do not represent to any extent a position of the Ministry of Foreign Affairs of Poland.

6.3. Shale gas in the V4 countries

Mariusz Ruszel

Potential of shale gas resources in V4 countries

Shale gas is an unconventional form of gas collected in bituminous slate, which is why its extraction requires advanced technologies. Among the V4 countries, Poland has the greatest amount of this natural resource on its territory. According to some American sources, Polish shale gas potential is around 1,5-3 tcm[1], whereas in the view of the American Energy Information Agency, Polish shale gas potential can even reach up to 5,3 tcm. Currently, companies such as ExxonMobil, Concoco Phillips and Chevron possess concession for exploration, which so far is mainly carried out on the territories of Lubelszczyzna, Mazovia, Pomerania and Sudetian Monocline. In the future, the research area will most probably cover 12% of the country's territory. Besides, it is likely that shale gas could be found in Hungary and the Czech Republic. Falcon Oil and Gas (F.O.V) carry out the research in Mako Trough in the central Southern part of Hungary. Besides, at the beginning of 2011, Austrian BasGas and the British Cuadrilla Resources started their research in the Northern part of the Czech Republic, in the vicinity of Valašské Meziříčí. More detailed data on the shale gas potential of the V4 countries will be known in a couple of years.

The challenges of shale gas exploitation

Among the biggest challenges facing shale gas exploration is the strict EU climate policy. The EU has been introducing stricter environmental policies in order to reduce the GHG emissions. As most of the shale gas is found on the territory designated as *Nature 2000*, it is likely that its exploration will encounter a number of obstacles. For instance, ecologists emphasize both the fact that a lot of water resources are used for such works, as well as the general threat to the natural environment. Both in the EU and in the individual Member States that potentially have resources of unconventional gas, there are not enough legal regulations to facilitate the exploration of shale gas. A crucial challenge is to convince the local communities as well as the owners of the soil to agree on its exploration and exploitation. Another challenge would be to assure the profitability of the shale gas's exploration which depends on a number of factors,

1 Wood Mackenzie company specifies the shale gas stock at the level of about 1,36 tcm , whereas according to the Advanced Res. Int. it is 3 tcm.

such as: its price on the world markets, the costs of borehole, technology, machinery and infrastructure. Certainly, any delays of explorations would be in the interest of Russia for which a potential finding would be competitive to its gas.

Therefore, Russia will presumably be supporting the pro-environmental arguments to successfully prevent shale gas exploration in the EU. Besides, the Russian monopolist Gazprom *via* EuRoPol Gaz will have a decisive role in case of sending gas from Poland to the countries of Western Europe as it is in charge of the only existing pipeline – Yamal-Europe pipeline of 30 bcm[3] of gas capacity per annum.

Unconventional gas resources in Europe[2]

The EU's position on shale gas is not well-specified yet. On one hand, the EU, as an international organisation, should aim at increasing its energy self-sufficiency and so exploitation of shale gas, which would be free of political risks. It seems therefore that in the heyday of an increasing demand for energy and a desire to limit industrial exploitation of emissions of carbon dioxide (*via* combustion of low-emission resources), Brussels should desire the creation of legal instruments which would facilitate shale gas exploitation. Nevertheless, energy policy of the EU is characterized by particularism of the national interests, where many countries maintain close economic ties with Russia and so are unlikely to agree on changes that could impact their hitherto prevailing economic cooperation in an adverse way. Bearing in mind not only the environmental challenges, but first and foremost, the long-run political benefits, it is justifiable that the EU Commission increased its involvement in the matters concerning industrial exploitation of shale gas on its territories. In June 2010 Jose Manuel Barosso, the President of the European Comission has stated: "New technologies are usually a way to solve the problems, however, it is too early to have a comprehensive assessment of this particular technology which is why we are still collecting information on the subject".[3]

2 Based on: "Shale gas. Basic information", PKN Orlen, Warsaw July 2010, p. 43. [in:] Jezierski H., *Concession policy and legal regulations for exploration and production of gas.*

3 *Barosso: too early to be*, http://www.forbes.pl/artykuly/sekcje/wydarzenia/barosso--za-wczesnie--by-cieszyc-sie-z-lupkow-,4557,1 (10.01.2011 r.)

Areas of shale gas exploration in Hungary by Falcon Oil & Gas Company[3]

The geopolitical importance of shale gas exploitation for the V4 countries

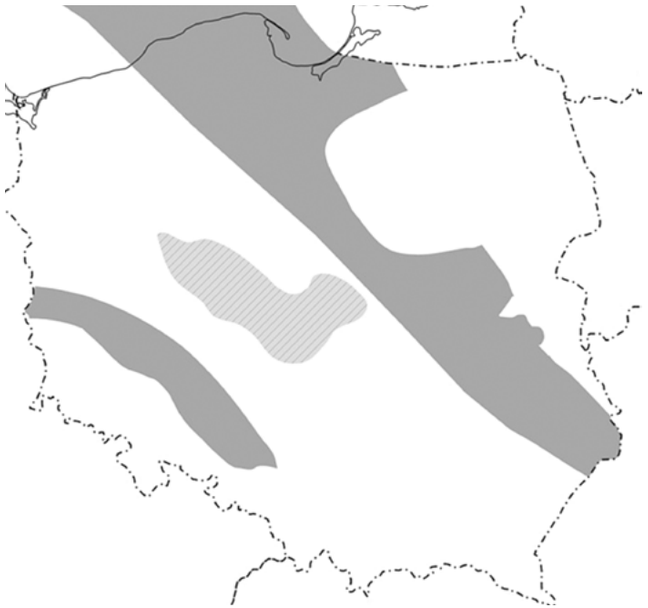
The exploitation of shale gas on the V4 territories will certainly have substantial geopolitical consequences. First and foremost the V4 countries will increase their energy security and will decrease their dependence from the Russian gas. A quick development of the industrial infrastructure could enable gas transport between the V4 countries and would lead to their diversification of the resource provision. As the V4 countries are dependent on the gas supplied from Russia, it is in their interest to secure themselves from a possible Russian reluctance to supply energy**,** which often takes the form of "technical problems". It would, in addition, secure the V4 countries from lack of supply that results from the technical problems with the pipeline due to corrosion or natural disasters.

If the development of the industrial infrastructure between the V4 countries occurs and there is an access to the Yamal pipieline on a competitive basis, then the exploitation of shale gas in CEE will result in a greater EU market saturation. As a result, in case of concluding any long-term contracts with Russia, it will be easier to negotiate any discounts regarding its gas supplies. Besides, the involvement of American energy companies in the research and exploration of slate, and finally its exploitation and sale on the European market, means that the financial profits for these firms will be at the expense of the Russian Gazprom. The increase of the American involvement in Europe constitutes a chance to revive the cooperation between the EU and NATO regarding the European energy security issues. Eventually industrial exploitation of shale gas will weaken Russian instrument of foreign policy that gas supplies constitute.

4 based on: Falcon Oil & Gas, http://www.falconoilandgas.com/hungary.php.

Predicted resources of shale gas on the V4 countries' territories can constitute a substantial resource basis which would allow the EU to diversify its gas supplies to greater extent. A success in overcoming both the external and internal challenges which could prevent the exploitation of shale gas can increase EU's energy security. It is crucial to expand the system connections that enable transmission of gas between the CEE countries as well as to pursue the realization of the North-South Gas Corridor.[5] It is in the interest of the V4 countries to establish a strong alliance which would strive to revive the political discussion regarding the need to increase the EU's energy security e.g. *via* the exploitation of shale in Europe. Brussels should notice the long-term benefits arising from shale gas's exploitation in Europe. Hungarian and the Polish presidency of the EU Council in 2011 will be an adequate time to discuss the EU's energy security issues which could be improved by exploiting of shale gas in the V4 countries.

Potentially shale gas-rich areas in Poland[5]



5 On the 14th of September 2010 the V4 countries have sent a letter to the European Commissioner for Energy, Günther Oettinger, in which a project of the construction of the North-South Gas Corridor from the LNG terminal in Swinoujscie to a terminal located in Croatia, Krk. [in:] *Szansa na polsko – słowacki interkonektor w korytarzu Północ – Południe*, http://www.osw.waw.pl/pl/publikacje/best/2011-01-19/szansa-na-polsko-slowacki-interkonektor-w-korytarzu-polnoc-poludnie (22.01.2011).

6 Państwowy Instytut Geologiczny, http://www.pgi.gov.pl/.

6.4. Regionalization of energy policy

Piotr Szlagowski

Introduction

The aim of this paper is to indicate the weaknesses of the legal and organizational framework of the existing EU energy policy and to suggest means to mitigate thereof through regional cooperation (on the example of the Central European countries). In order to address such a question this paper will focus on two elements. First, we shall point out the shortcomings of the legal and institutional framework in place and, subsequently, we shall proceed to assessing the convergence of interests of the Central European countries in the energy sector. It is to be argued that interests of the countries of the Central European region, partly due to their geopolitical location and partly because of their common experience of economic transition, are to a large extent coherent. In view of the author, the analysis of the two above mentioned elements allows to draw a conclusion that the enhanced regional cooperation would fill the vacuum in the EU energy policy institutional framework and, in consequence, devote to integration of energy markets under a single market framework on one hand and adjustment of thereof to the capacity and needs of the Central European states on the other.

Construction of the internal energy market

Initial projects and the First Energy Package

In 1985 the Commission published a white paper on completing the internal market where it was argued that the energy sector needs to be included in the general framework of the internal market development.[1] The scope of directives included in the *First Energy Package* was limited to the issues related to improving the transparency of gas and electricity prices charged to industrial end-users,[2] the transit of electricity and gas through transmission grids within the Community and the conditions for granting and using authorisations for the prospection, exploration and production of hydrocarbons. In 1992 the Member States dismissed a proposal

1 White paper from the Commission to the European Council: Completing the Internal Market, 14.06.1985, COM(85) 310 final. See also: *The Internal Energy Market. Commission Working Document*, 2.05.1988, COM(88) 238 final.

2 Directive 90/377/EEC of 29 June 1990 concerning a Community procedure to improve the transparency of gas and electricity prices charged to industrial end-users, OJ L 185, 17.7.1990, p. 16-24.

of further liberalization prepared by the Commission chaired by Jacques Delors. Three years later the Commission tabled a green paper and subsequently a white paper which contained new proposals for energy market liberalization[3]. Adoption of the *First Energy Package*, i.e. directives concerning common rules for the internal market in electricity[4] and gas,[5] was a climax of this process. Both legal acts required the Member States to gradually liberalize the aforesaid segments of domestic energy markets and successively raise the number of categories of entities entitled to choose their energy supplier.

Second Energy Package

The variation of the degree of deregulation of the national energy markets among the Member States was an important feature of the liberalization process at this stage. *The Second Energy Package*, adopted in 2003, was to alleviate these differences through the introduction of two--step liberalization of national energy markets – by 2004 for large end-users and by 2007 for the rest.[6] However, the *Second Energy Package* failed to fulfill the expectations, mostly due to its fragmentary implementation by the Member States. As a result, in April 2006, the Commission initiated 17 proceedings against the Member States. At the same time, the Directorate General for Competition carried out major research on competition in the electricity and gas sector – the Energy Sector Inquiry.[7]

Energy Sector Inquiry 2007

The authors of the Inquiry recommended two main courses of action: (1) stricter execution of competition law with regard to the energy sector and (2) introduction of structural changes to the energy markets, accompanied by a reform of the regulatory system.

While the first element was fairly straightforward, the second one was to put foundations for the new legal and institutional framework of the energy sector. It was to include unbundling of transmission system operators, enhancing the transparency of market operations and strengthening the competences of national regulatory authorities, enhancing the cooperation between them and improving their consistent approach on trans-boundary issues.

The above outline of development of the internal energy market allows us to make the following remarks. First, the described legislative actions were not aimed at providing an integrated EU energy policy but an integrated internal energy market. Second, among the reasons for the failure of actions preceding the *Third Energy Package* was the lack of measures to ensure the creation of the internal energy market. These two elements were to be addressed by the *Third Energy Package* and by a number of policy documents setting out the EU energy policy fundamentals.

3 *For a European Union Energy Policy,* Green Paper of the Commission, 11.1.1995, COM(94) 659; *An Energy Policy for the European Union*, White Paper of the Commission, 13.12.1995, COM(95) 682.

4 Directive 96/92/EC of the European Parliament and of the Council of 19 December 1996 concerning common rules for the internal market in electricity. OJ L 27, 30.1.1997, p. 20-29.

5 Directive 98/30/EC of the European Parliament and of the Council of 22 June 1998 concerning common rules for the internal market in natural gas. OJ L 204, 21.7.1998, p. 1-12.

6 Directive 2003/55/EC of the European Parliament and of the Council of 26 June 2003 concerning common rules for the internal market in natural gas, L 176, 15.7.2003, p. 57-78; Directive 2003/54/EC of the European Parliament and of the Council of 26 June 2003 concerning common rules for the internal market in electricity, L 176, 15.7.2003, p. 37-56.

7 DG Competition Report on Energy Sector Inquiry 2007, 10.01.2007, SEC(2006) 1724.

Third Energy Package

Before moving on to the EU energy policy fundamentals, as described in a few policy documents of both the Commission and the Council, we shall review the main changes brought by the *Third Energy Package*. In accordance with the recommendations of the Energy Sector Inquiry, the *Third Energy Package* introduced a new unbundling regime and a reform of the regulatory system. Due to the limited scope of this paper, we shall focus on the latter element.

Starting from the national level, it needs to be pointed out that national regulatory authorities are significantly strengthened by the latest legislation. They received a guarantee of legal and functional independence, yet fostered by the ECJ Grand Chamber judgment in case C-518/07 *Commission v. Germany*. Moreover, the objectives, competences and duties of national regulatory authorities are directly defined. In consequence, these bodies are likely to become virtually independent from national energy policies. At a European level, three bodies were created: the Agency for Cooperation of Energy Regulators, responsible for the coordination of regulatory actions carried out by national regulators, and the European Networks of Transmission System Operators for Electricity and Gas, responsible for the optimization of management and the coordination of exploitation of transmission systems. These bodies are to foster the alignment of regulatory and technical standards among the Member States.

Although the strengthening of national regulatory authorities and the coordination of their actions at the European level, with a possibility for ACER to evolve towards regulatory position *per se*, may be seen as a step in the right direction to avoid repeating the mistakes of the *Second Energy Package* which failed to provide legal and institutional measures for delivering the internal energy market, it is also visible that there is a gap between the two levels of the regulatory system – national and European. It shall be noted that the Commission considers filling this vacuum by redefining the Regional Initiatives which currently exist under the ERGEG institutional umbrella.

EU energy policy fundamentals

As stated before, the legislative actions carried out since 1980s were not aimed at providing an integrated EU energy policy but an integrated internal energy market. In consequence, the policy targets with regard to energy were defined from the perspective of boosting the market competition and not, for instance, from the perspective of securing the supplies or diversifying the energy portfolio. *The Third Energy Package* perpetuates this approach, this time with a more suitable tool-box.

The connection of energy issues with the competition agenda was supplemented by linking energy issues with the climate agenda. The European Council's presidency conclusions of March 2007 summit set a direction for integrating climate and energy policy.[8] It was indicated that „[t]he challenges of climate change need to be tackled effectively and urgently",[9] thus identifying the overall goal of such integration. It was further explained that „[g]iven that energy production and use are the main sources for the GHG emissions, an integrated approach to climate and energy policy is needed to realise this objective".[10] In consequence, although it was stated that the integration should be achieved in a mutually supportive way, the direction of influence was clearly defined – the energy policy needs to be adjusted to the assumptions put forward by the climate policy.

The linking of competition and climate policies with the security of supply – being the only energy issue par excellence – completed a stage of forming the core objectives of the EU energy policy, hence, in a number of subsequent documents they were reiterated and presented in detail.[11]

The secondary character of the EU energy policy determines the effectiveness of realization of objectives defined under the energy, competition and climate/environment agendas. Due to the well-established principles of the latter two, any objective defined on grounds of the energy policy needs to meet requirements set out on the basis of the other two fora. Therefore, given the fact that so far the EU has not elaborated any principles with regard to energy that would enter the corpus of acquis and, thus, could potentially limit the climate policy, the energy agenda is structurally disadvantaged.[12] The principle of energy solidarity set out in article 194 of the Treaty on Functioning of the EU is only a first step towards emancipation of the energy policy.

It is necessary to emphasize that no common interest may be potentially defined within all the three fora. This limitation leads to a situation in which those interests of the Member States that can be defined in environmental/climate or competition terms are more likely to be realized than those which are defined in terms of energy policy.

Consistency of interests

The Central European states, i.e. Estonia, Latvia, Lithuania, Poland, the Czech Republic, Slovakia, Slovenia, Hungary, Romania and Bulgaria, have relatively consistent interests in terms of energy policy.[13] As for the electricity sector, it may be observed that all the countries, except for Poland, are highly dependent on external sources of fuel supply.[14] The majority of these states are likely to face problems with the adjustment to GHG emission reduction targets and therefore, suffer from the costs of allowances. With reference to the natural gas sector, all of these countries are highly dependent on gas supplies from Russia and none of them has sufficient interconnector (or LNG) capacities. Furthermore, most of them also lack sufficient storage facilities[15]. The least consistent interests are in the oil sector. Nevertheless, overdependence on the supplies from Russia and concerns regarding the lack of diversification of routes are shared by the majority of the Central European countries.[16]

This brief review of the areas of common interests demonstrates a potential for regional cooperation. Nevertheless, a closer analysis of the fields of cooperation should be undertaken in order to precisely determine the scope of collaboration. At this stage, we may cite an exemplary list prepared by Ernst & Young (Warsaw branch) and published in its report on the energy partnership in Central Europe. The identified initiatives are (from most beneficial to all the states of the region): the Nabucco gas pipeline and the development of electricity grids, nuclear power plants, natural gas interconnectors and gas storage facilities, LNG terminals and North-South Gas Corridor.[17]

Concluding that the Central European states have a wide range of common interests is one thing and noting that these common interests fall outside the scope of the EU energy policy priorities is a different thing. Two notable examples can be given. One is the competition between the Nabucco and South Stream pipelines which mainly stems from the lack of a common energy policy, particularly of its external dimension. Another case is the EU climate policy with its GHG emissions reduction target and the EU Emissions Trading Scheme. For instance, in case of the Czech Republic, reaching the reduction target of 20% is achievable provided that the country will pursue nuclear energy and CCS will prove to be economically viable and socially acceptable, while a raised target of 30% reductions is virtually beyond reach.[18] In case of Poland, the total cost of GHG emission reductions, including indirect costs, is estimated at 7,5% GDP loss by 2015 and 15% GDP loss by 2030 in comparison to BAU scenario.[19] Therefore, arguably, the vulnerability of the Central European countries, resulting from the transitional character of their economies, was not duly taken into account when drafting the climate action measures.

8 Council of the European Union, Brussels European Council 8/9 March 2007 – *Presidency Conclusions*, Brussels, 2 May 2007, para. 27 – 39.
9 Ibidem, para. 27.
10 Ibidem, para. 28.
11 See *inter alia* Communication from the Commission to the European Parliament and to the Council, *An Energy Policy for Europe*, Brussels 10.1.2007, COM(2007) 1 final; Communication from the Commission to the European Parliament and to the Council, 20 20 by 2020 – *Europe's climate change opportunity*, Brussels 23.1.2008, COM(2008) 30 final; Communication from the Commission to the European Parliament and to the Council, *Second Strategic Energy Review – An EU Security and Solidarity Action Plan*, Brussels 13.11.2008, COM(2008) 781 final.
12 Koskenniemi M., *Report of the Study Group of the International Law Commission – Fragmentation of international law: difficulties arising from the diversification and expansion of international law*, 13.04.2006, paras. 15, 21-33.
13 Nosko A., Orban A., Paczyński W., Cernoch F., Jaros J., *Energy security. Policy paper*, Visegrad Security Cooperation Initiative 2010, p. 5-6.
14 Ernst & Young, *Partnerstwo Europy Centralnej w Sektorze Energii. Propozycja dla krajów UE-10*, May 2011, p. 22.
15 Ibidem, p. 23.
16 Ibidem.
17 Ibidem, p. 24.
18 McKinsey & Company, *Costs and potentials of greenhouse gas abatement in the Czech Republic – Key findings*, Prague 2008, p.33-36.
19 EnergSys, *Raport 2030: Wpływ proponowanych regulacji unijnych w zakresie wprowadzenia europejskich strategii rozwoju energetyki wolnej od emisji CO_2 na bezpieczeństwo energetyczne Polski, a w szczególności możliwości odbudowy mocy wytwórczych wykorzystujących paliwa kopalne oraz poziom cen energii elektrycznej*, September 2008, p. 85-86.

Regional cooperation

A number of shortcomings of the EU energy policy as well as the legal and institutional set up may be mitigated by closer regional cooperation of the Member States. It is especially true when one evaluates the current state of affairs from the Central European point of view.

First, the European energy debate is dominated by the rationale of environmental and competition policies. A shift to an energy-based debate would be in the interest of the Central European countries, especially when we take into account the current direction of the EU climate policy and attempts to increase the GHG emissions reduction target from 20% to 30% by 2020. Any greater consideration of the energy needs and potential of the Member States would require at least partial departure from the environmental rationale in favor of the energy rationale. This shift, however, is unlikely to happen, unless it is sought by a significant group of stakeholders. Arguably, a coalition of the Central European states could be of such importance.

Second, it shall be noted that the role of regional markets may be defined in two ways: either as a stepping stone on the way to creating a single market, where the regional centers of market integration are in place only during a transitional period, or as an important element of the ultimate picture of the single energy market, which would consist of well-integrated regional markets with separate centers of integration. If a true EU energy policy, not only a result of other EU policies, is to be created, then two scenarios of national policies and interest would have to be considered. In the long run, the creation of a multicentric pattern, although best suited for the realization of interests of the Central European states and easier to achieve, would be likely to hinder the emergence of the single EU policy. However, in the short and medium-term, the strengthened regional cooperation would foster market integration and policy coordination. In the latter scope, it would contribute to the balancing of interests of the Member States from different regions when creating the EU energy policy.

Furthermore, regional cooperation, particularly through reinvented regional initiatives, may play an important role in the shaping of the EU energy market. Currently, the Commission seeks to develop a clear idea of the future role of regional initiatives.[20] According to the Communication from December 2010, the new tasks of regional initiatives are to focus around the implementation of the EU acquis (including network codes)[21] and other regional issues, such as investments in infrastructure, regional balancing and security of supply.[22] Moreover, the regional initiatives would have to fit into the picture with ACER already in place and with clearly defined competencies and powers. This institutional supervision executed by ACER is to be part of the top-down approach which shall be developed in parallel to the hitherto bottom-up approach where it was up to an individual regional initiative to define its goals.

20 Communication from the Commission to the European Parliament and the Council *The Future Role of Regional Initiatives*, Brussels, 7.12.2010, COM(2010) 721 final.

21 Ibidem, p. 4.

22 Ibidem, p. 5.

Another important issue related to the reshaping of the regional initiative concept is its delimitation.[23] The proposed delimitation of individual initiatives seems to have been done pursuant to a principle according to which regions shall be overlapping in order to foster communication between them through those Member States that participate in more than one initiative. It is understandable, given the fact that it is the single European market that it is an ultimate goal of the Commission's policy. However, the Central European states shall make effort to secure that in parallel to regional initiatives there is a forum where coordination of the policies among the Central European states may be carried out. Such a body would also focus on closer coordination of the individual regional initiatives and thus contribute to the creation of the single market.

Conclusions

It is often emphasized that the regionalization of energy markets would allow optimizing infrastructural investments and thus fostering the construction of integrated transmission grids. It is worth remembering that the same principle applies to energy policy, with the formation of more consistent crisis management mechanisms for situations of supply disruptions as an example. This is the very concept that underlies the preventive action plans and emergency plans elaborated on the regional level under Regulation 994/2010 concerning the measures for safeguarding the security of gas supply.[24]

Regional cooperation in the energy sector may play a dual role – that of an intermediary *en route* from a patchwork of national energy markets and policies to a single energy market and a single voice condensed in the European energy policy, or – that of a spine of an alternative concept for creation of the single European energy market – a multicentric one with strong regional markets; where regional markets would constitute a single market, but where bonds between regions would be weaker than within them. Despite the difference between these scenarios, regional cooperation may be an indispensable element if the market integration is to be achieved and the interests of the Central European states are to be taken into account in Brussels on an equal footing with those of other Member States.

23 Ibidem, p. 6.

24 See also art. 6 of Directive 72/2009 and art. 6 of Directive 73/2009 on promoting regional cooperation and regional solidarity.

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www.ata-sac.org

Energy security of the V4 countries. How do energy relations change in Europe is a result of a project initiated by the Kosciuszko Institute that aims at examining and comparing energy security of the V4 countries. In the presented publication experts from Poland, the Czech Republic, Slovakia and Hungary analyze the issue basing on the Energy Security Index, indicate problems and challenges for national energy policies and provide further recommendations in the field of crude oil, liquid fuels and natural gas. Additionally, the study includes an assessment of the V4 countries energy cooperation and the future prospects for shale gas exploitation in the region.

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