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How to Enhance Security of Natural Gas Supply in Slovakia. The New Gas Infrastructure in Slovakia and Central Europe in the Context of the New European Energy Policy

Summary: *Europe is becoming increasingly dependent on imported hydrocarbons. The EU's energy import dependence will jump from 50% of total EU energy consumption today to 65% in 2030. What should Slovakia, which is is nearly 100% dependent on the import of Russian gas, do in order to improve its natural gas supply portfolio and increase security of supply? This paper gives a qualified opinion on these matters and simultaneous recommendations on the strategy Slovak policy makers should adopt. In addition, the possibilities related to increasing security of natural gas supply analyzed in this paper present also a challenge in the light of the common European energy policy.*

Europe is becoming increasingly dependent on imported hydrocarbons. With 'business as usual' the EU's energy import dependence will jump from 50% of total EU energy consumption today to 65% in 2030. Reliance on imports of gas is expected to increase from 57% to 84% by 2030.

The European Parliament and the Council adopted in April 2004 the *Directive No. 67* concerning the measures to safeguard security of natural gas supply. Energy issues were the main subject of the Summit discussions of the heads of EU states and government officials in March 2007 in Brussels. Natural gas plays a significant role in this respect. The gas/oil conflict between

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Ukraine/Belarus and Russia has uncovered the vulnerability of the European Union. Slovakia, the main transport corridor of the Russian gas delivered to the EU countries, is also affected by the problems. We can state that 20% of the natural gas consumption in the EU countries is covered by transit through the territory of Slovakia.

On the other hand, the Slovak Republic is nearly 100% dependent on the import of Russian gas. What should Slovakia do in order to improve its natural gas supply portfolio and increase Security of Supply? This paper wants to give a qualified opinion on these matters and simultaneous recommendations on the strategy Slovak policy makers should adopt.

European Energy Package

In response to the European Council call and priorities defined in its March 2006 Conclusions, the Commission adopted a so-called *Energy Package* on January 10, 2007, so as to contribute to the three objectives of the Energy Policy for Europe: security of supply, competitiveness and environmental sustainability.

The Council of the European Union adopted, on March 9, 2007, the European Council action plan 2007 – 2009 concerning the Energy policy for Europe. Communication from the Commission to the European Parliament and the Council contains also the priority interconnection plan, which will identify the most significant missing infrastructure up to 2013 and ensure pan-European political support to fill the gaps.

For a high dependence of an internal energy market on external supplies, the diversification of sources and appropriate interconnection networks are necessary to increase security of supplies and solidarity among Member States. Energy security should be supported in various ways.

There are measures necessary to be established to help the Member States which absolutely depend on one natural gas supplier, aimed at diversification. The Commission will be monitoring the implementation of a recently transposed directive for security of natural gas supplies and shall evaluate its effectiveness. The projects should also be developed to aim at bringing natural gas from new regions, establishment of new natural gas grids in Middle Europe and Baltic States, better use of possibilities with respect to strategic reserves and facilitating construction of new *LNG* terminals. The ways should also be investigated for strengthening of existing solidarity mechanisms to solve crisis such as energy correspondents network and gas coordination group. Besides, strategic natural gas reserves would contribute to security of natural gas supply. Substantial new investments in new supplying and transmission

capacities, which would be in need to secure a higher level of security, will have to be balanced by costs, which will arise for consumers.

The Commission estimates that the EU will need investment of EUR 220 billion in gas infrastructure during the next 25 years. We can summarize that the key drivers for the demand with respect to Gas Infrastructure in the EU area are as follows:

- declining indigenous production combined with growth in gas demand will increase dependency on gas imports;
- concerns over the security of supply drive the need for diversification of sources of gas imports;
- large seasonal swings in demand for gas require storage infrastructure to manage the physical gas flows;
- most of the existing infrastructure is contracted out on a long term basis. Market liberalization will drive new market entrants to seek infrastructure access.

The European Commission estimation of investment needs in the gas over the next 20 years is as follows:

- 100 billion EUR for gas infrastructure;
- 6 billion EUR for new interconnectors;
- 22 billion EUR for storage projects;
- 23 billion EUR for gas pipelines and Liquefied Natural Gas (LNG) projects;
- 50 billion EUR for transmission system of operators in the EU Member States.

The *Priority Interconnection Plan* is based on an in-depth analysis of the status of the projects of highest priority, the Projects of European Interest, specified in *Decision No. 1364/2006/EC* of September 6, 2006 laying down guidelines for trans-European energy networks.

This *Plan* illustrates the current state of completion of the 42 projects of European interest, for gas and electricity. Although not considered to be projects of European interest, *Liquefied Natural Gas* (*LNG*) terminals are also examined.

Overview of the Slovak Gas Industry

Slovak natural gas industry celebrated in 2006 its 150 anniversary. Taking into consideration the extent of the state (49 000 square km and 5.5 million inhabitants) we can say that Slovakia has a high developed gas infrastructure.

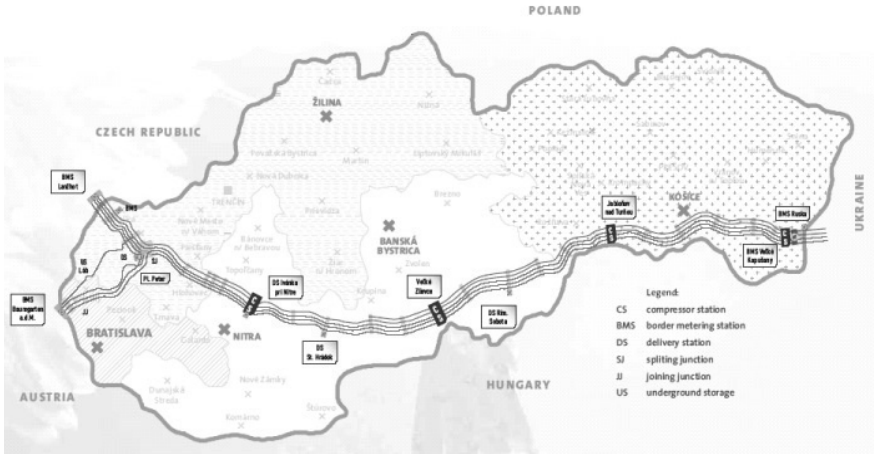

Chart 1: *Slovak Transmission Network*

Already since the beginning of its operations back in 1972 the Slovak transmission system has been operating as a reliable part of the international transmission network continuously transporting natural gas from the Russian Federation to countries of Central and Western Europe. The actual transmitted volume in 2005 reached 81.3 bcm, it means the average daily transmission volume totaled 223 mcm. (Chart No. 1).

The total length of distribution pipelines reached 30 566 km. Of the aggregate pipeline length, 6304 km are high pressure pipelines and 24 262 km are local networks, i.e. medium and low pressure pipelines (Chart No. 2).

By December 31, 2005, from the total number of 2891 municipalities in the Slovak Republic the number of municipalities connected to the gas grid was 2205, 76.3% of which are municipalities inhabited by 94% of the whole Slovak population.

The own consumption of Slovakia in 2005 was 6.32 bcm. Natural gas consumption is covered by import from the Russian Federation that represents 98% of the consumption, only the remaining share of 2% comes from domestic production.

In 2002 SPP (*Slovenský plynárenský priemysel – Slovak Gas Industry*) at that time a monopoly gas joint stock company underwent partial privatization, the shareholder with 49% of SPP shares is the consortium of foreign companies *EON Ruhrgas* and *Gaz de France*, the state has remained the owner of 51% of

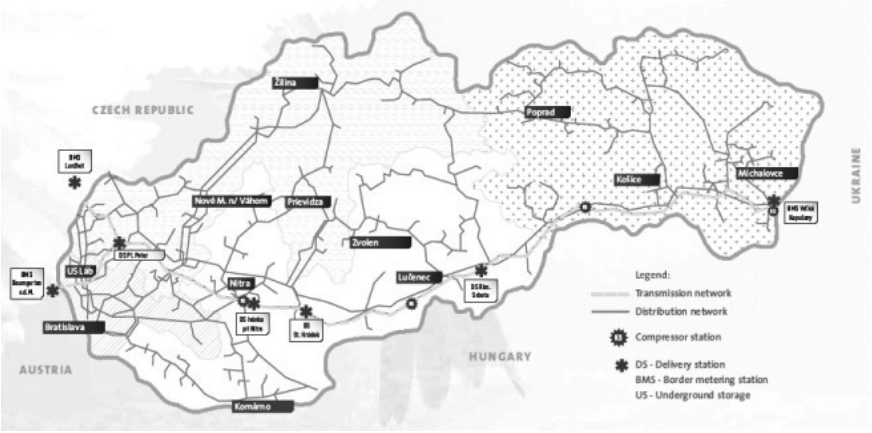

Chart 2: *Slovak Distribution Network*

shares. As from July 2006, the legal unbundling of this vertically integrated gas company has come into being by establishment of two daughter companies: *SPP – preprava* (*SPP Transmission*) and *SPP – distribúcia* (*SPP Distribution*).

There also exists the complex of underground natural gas storage facilities in Láb in the West Slovakia amounting to the total storage capacity of 2.4 bcm. Capacity of the storage facilities in possession of the companies *Nafta Gbely* is 1.75 bcm and *Pozagas Malacky* is 0.65 bcm. It is important to point out that with respect to the security of supply, industry and citizens in Slovakia have already been for 35 years accustomed to the full security of natural gas supply, in the past even at very low prices.

The Slovak Republic declared 33% gas market opening in the past years. This is a pure theoretical assertion and in the year 2007 we can declare that there still missing is the real gas market in the territory of Slovakia. Not one of the 45 big natural gas consumers has changed the supplier so far. The reasons for that are as follows:

- single monopoly source of natural gas and low domestic production;
- existence of long-term contracts for gas supply;
- validity of so-called *Destination Clause* of the company Gazprom for transit of natural gas through the territory of Slovakia to the West and South Europe
- long-year existence of single vertically integrated company SPP.

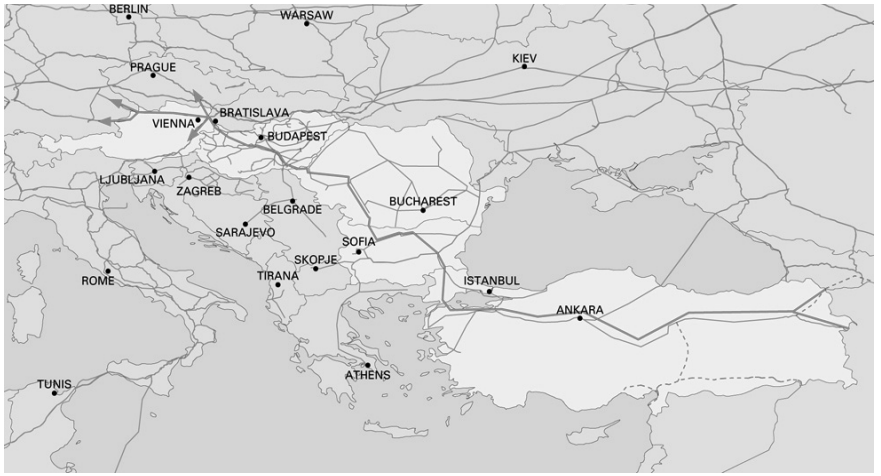

Chart 3: *Nabucco Gas Pipeline – Proposed route*

Despite the fact the Slovak Republic harmonized in 2004 its energy legislation with the EU law and in March 2005 the Slovak government passed the Gas market rules reflecting the EU principles.

European Large-Scale Gas Diversification Projects from the Point of View of Slovakia

The only regions with rich gas reserves, which are not yet connected with the European markets via pipeline, are the Caspian Region, Middle East and Egypt.

The Nabucco project represents a new gas pipeline connecting the Caspian region, Middle East and Egypt via Turkey, Bulgaria, Romania, Hungary with Austria and further on with the Central and Western European gas markets (Chart No. 3). The pipeline length is approximately 3,300 km, starting at the Georgian/Turkish and/or Iranian/Turkish border respectively, leading to Baumgarten in Austria. In this respect it has to be taken into account that a reasonable amount of the gas volumes, reaching Baumgarten, have to be further transported through Austria to the Central and Western European Countries. According to market studies the pipeline has been designed to transport a maximum amount of 31 bcm/y.

Estimated investment costs including financing costs for a complete new pipeline system amount to approximately 5 billion Euro.

Nabucco Gas Pipeline International GmbH is owned by the *Nabucco* partners. It was formed as the controlling company of the project and it, in turn will be the parent company of the five *Nabucco National Companies*. The parent company will be responsible for initially financing the project and then selling capacity to shippers. During the second half of 2007 an open season is expected to begin, where interested shippers will be able to share their interest in gas transportation to *Nabucco*. During 2006 letters of intent were signed with shippers from Norway, Austria, Italy, Germany, Switzerland and Ukraine. Negotiations are also underway with the Netherlands, France, Iran, Italy and the Czech Republic.

At present there are five shareholders in the project, although MOL are looking a bit shaky at the moment as they are appear to be unsure whether to commit to *Nabucco* or *Gazprom*'s Blue Stream expansion. A possible sixth and even seventh shareholder is expected to be announced by the year end along with approval for full third party access (TPA) exemption. Then the final investment decisions can be made.

The five National Companies (Austrian *ÖMV,* Hungarian *MOL,* Rumanian *Transgaz,* Bulgarian *Bulgargaz,* Turkish *Botas*) will be based in their respective countries and will be responsible for construction of their part of the pipeline and then operation and ongoing maintenance. The pipeline will be owned by the five national companies, each company owning the pipeline in its respective territory.

Construction is now scheduled to begin in 2009 from Ankara to Baumgarten, beginning operation in 2012 of up to 8 bcm. The next phase would be the construction of the remainder of the pipeline from Ankara to the Turkish-Iran and Turkish-Georgian borders. This is expected to be competed by 2013. The final phase is to build compression stations along the pipeline and maintain the pressure at 31 bcm a year. This is expected to commence around 2015 bringing the completion date at max. flows to 2020.

The other diversification project is the *Trans-Caspian gas pipeline* which could transport gas from Kazakhstan across Azerbaijan and Georgia, into Turkey and then on to Western European markets through the *Nabucco* pipeline. The Kazakh minister of energy visited the European Commissioner Mr. Piebalgs in May 2006 and submitted a proposal for drawing up feasibility studies. The project is supported by the European Union and it is also mentioned in the *Green Paper*. Kazakhstan disposes of the approved natural gas reserves amounting to 3 trillion cubic metres. In direct competition to the Trans-Caspian gas pipeline, *Gazprom*'s. decision to build the Caspian gas

pipeline which would run along the *Caspian*'s eastern coast via Kazakhstan which was proposed in May 2007 as part of the agreement struck between the leaders of Russia, Turkmenistan and Kazakhstan.

Possibilities of the Construction of the New Gas Infrastructure in Central Europe and in Slovakia

Investments in Infrastructure for Gas Import via Regasification Terminals and Pipelines

The increased importance of *LNG* in the recent years in related to the general growth of the demand for natural gas. Demand for *LNG* is strong and will remain strong. According to Wood Mackenzie, demand for *LNG* in 2006 amounted to 158 mil. tones. By 2012, that figure will grow to 328 mil. tones a year. The use of *LNG* is supported by the development of *LNG* transportation capabilities, and primarily by the expansion of the *LNG* tanker fleet (204 vessels in 2006 – data after *Maritime Business Strategies LLC*, additional 145 ships to be build by 2010) as well as the price competitiveness of *LNG* versus pipeline gas.

LNG's market share increases in Europe, the capacity of its import terminals, which stands at 76 bcmy now, will rise to at least 140 bcmy by as early as 2008. Also of vital importance for the growth of interest in *LNG* is the location of newly discovered gas field in the regions of the world that are difficult to connect by pipelines with the countries that are the main consumers of the gas. *LNG* is also an excellent method of covering peak demand for gas.

ADRIA LNG Project – Croatia

As long as the *LNG* is transported by ships, the Slovak Republic will be left to connect to regasificating terminals of the nearest seaside countries. The most developed is the ADRIA – *LNG* project supposing construction of a gas line system from the Croatian regasification terminal Omišalj on the island Krk (Chart No. 4). Since 1995, when the pre-project preparation began, 7 states have taken part in the project including the representative from Slovakia (SPP, š.p.). The project had been several times modified and its realization postponed till it got a new impulse during the Russian-Ukrainian dispute at the beginning of 2006.

Also in this time its chances of success look stronger than ever, because of robust demand for gas in Europe and the EU's desire to reduce its dependence on Russia. In April 2007 OMV said gas sales in 2006 had surged by 158% to EUR 2,1 billion and that this year its focus would be on developing a 10 billion cm a year Croatian terminal. A consortium led by Austria's *OMV* is

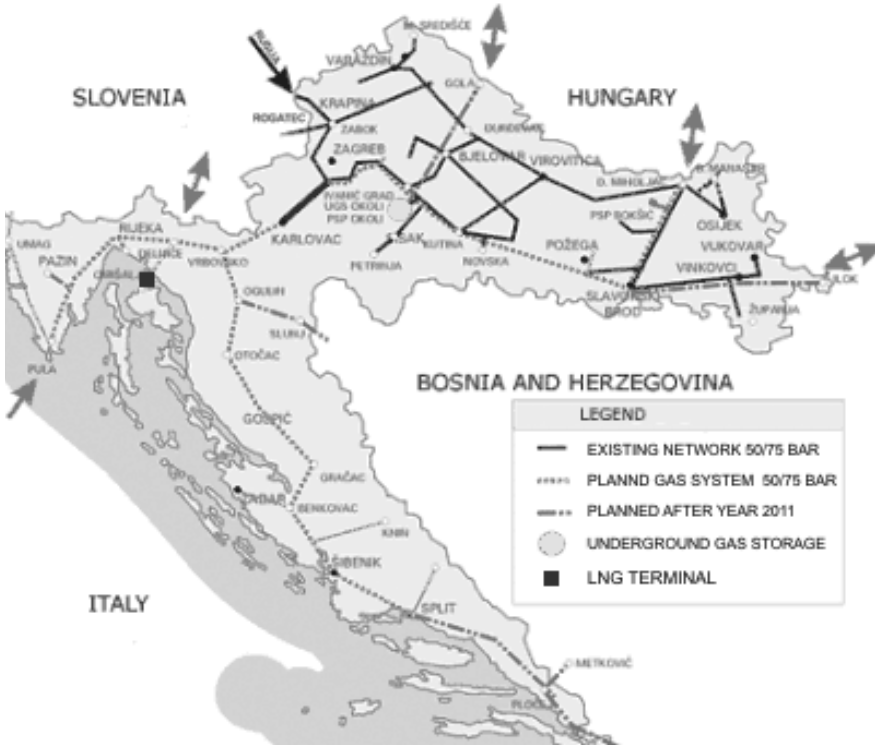

Chart 4: *LNG Adria*

close to completing the feasibility study. In September 2006, *Adria LNG Study Company* – comprising Austrian *OMV* (28,37%), French *Total* (28,37%), Czech *RWE Transgas* (15,95%), Slovenian *Geoplin* (5,11%) and Croatian *INA* (22,2%) – signed an agreement with Germany's *E.On Ruhrgas* to prepare joint feasibility studies for the construction of the import terminal. These environmental and technical studies – to be completed 'soon' – will update those started in 1995 and will include the preliminary risk assessment of the project. The studies carried out over 10 years ago, identified Krk Island, in the Kvarner archipelago in the northern Adriatic Sea, as the best location for the terminal. But the Croatian authorities have also set up a commission charged with finding the best location on the Croatian side of the Adriatic Coast. The decision for the exact location is still outstanding.

The *Adria LNG* consortium is currently in talks with Croatia's government which wants to increase its share in the project to up to 25% via the state power company HEP and gas transport company *Plinacro*. The *Adria LNG Study Company* partners have also proposed that these studies will be followed by an intensive technical and economic planning stage, during which other local companies will participate. The feasibility and basic engineering studies should be completed by the end of 2008. In principle, the terminal could be commissioned by 2012. North Africa and the Middle East are being suggested as the sources of supply (mainly Algeria and Qatar).

In April 2007 Austrian's *OMV* signed a *Heads of Agreement* covering three major investments in Iran. The deal should see *OMV* help Iran's *State National Iranian Oil Company* develop Phase 12 of the South Pars gas field, take a stake in the Iran *LNG* project being developed by *Shell* and *Repsol* and buy *LNG* from Iran to help supply its planned regasification terminal in Croatia.

Baltic Sea LNG project – Poland

The Board of *PGNIG SA* (*Polskie Górnictwo Naftowe i Gazownictwo*) adopted in December 2006 a resolution selecting Swinoujscie near the port

Chart 5: *LNG Baltic Sea*

Chart 6: *Project North – South*

of Szezecinto as the location for development of a *LNG* terminal on the Baltic Sea coast (Chart No. 5). Once all formal and legal conditions are fulfilled, it will be possible to pass on to the development phase, which has been planned for years 2008 – 2010. The completion of the terminal is expected to take place in 2011. It is assumed that the initial terminal capacity will be 2,5 bcm a year. The terminal design will enable further capacity extension up to 5,0 – 7,5 bcm a year, if justified by increased demand for gas.

Investment cost: cca EUR 400 million, cost of ships not included; cost of connecting to system cca EUR 30 to 100 million.

The *LNG* will be transported to the Polish coast with 3 *LNG* tankers of the capacity of 140 000 cm of *LNG*. Anticipated sources of supplies: Algeria, Egypt, Libya, Nigeria, Norway and Qatar.

Poland's economy minister and the Algerian oil minister have signed in January 2007 a memorandum of cooperation focusing on the energy field and specifically *LNG* supplies of Algerian *LNG* to Poland from 2010. Also vice-president at *Statoil Rune Bjornsen* confirmed during an *LNG* summit in Barcelona in April 2007 that this Norwegian company is ready to import *LNG* for a Polish regasification terminal. These facts prove the earnest interest of Polish representatives to build the new *LNG* terminal on Baltic Sea coast.

It is obvious that when intending import of gas from *LNG Adria* and *LNG Baltic Sea* terminals Slovakia has to include the mapped possibilities of transmission roads and construction of new connected pipelines in the feasibility study. The Slovak transmission pipeline system has been constructed and operates in the direction East (Ukraine) – West (Austria, Czech Republic). There are no North (Poland) – South (Hungary) connections so far. With respect to the facts stated in this chapter the construction of pipe-lines North – South will be a particularly topical issue in the next years (Chart No. 6).

Building of New Underground Gas Storage Facilities (UGS) in Slovakia

UGS represents a very important part of gas industry and in the future their importance increases. They perform a significant role in the process of liberalization. The influence of UGS contributes to the optimization of gas transportation and connection of energy systems both in regional conditions but more frequently in the international environment. UGS facilities form an important part of the gas chain, but are cost-intensive, too.

Underground storage facilities of natural gas in Slovakia have a storage capacity that is equal to 38% of the natural gas quantity used in Slovakia per year. Consequently, if the European Commission wants the member states to produce in their underground storage facilities two-month reserves, Slovakia fulfils the requirement. On the other hand, increasing the storage capacities in Slovakia – the most significant shipper of Russian natural gas – will contribute SoS increasing for concerned EU states importing Russian gas.

The workers of *Nafta Gbely* a.s. have considered construction possibilities of additional storage capacities in the territory of Slovakia on the grounds of geological research. There is mainly considered the conversion of oil-gas reservoirs similarly to those already existing underground storage facilities. There have been chosen 3 areas:

- near the area of underground storage facilities Láb (object Gajary – Baden, object Láb 5);

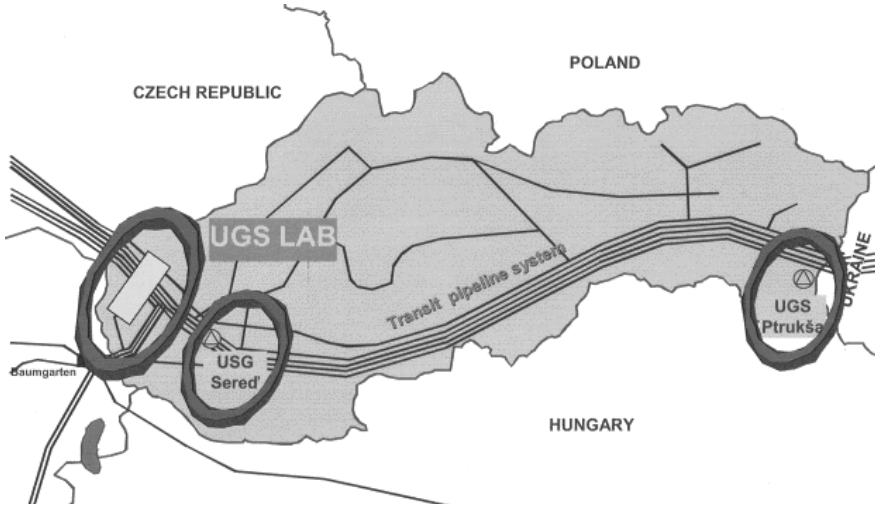

Chart 7: *New UGS projects*

- the area near the town Sereď in Western Slovakia;
- in the field of East-Slovak Neogene, especially the object Ptrukša, in the Eastern Slovakia.

The geographic situation demonstrates the Chart No. 7. The most perspective seems to be the object Gajary-Baden that gives the possibility to create an underground storage facility of 600 mcm and daily mining output of 12 mcm with respect to its extent and reservoir parameters. The estimated costs related to construction of the storage facility amount to about SKK 5 bill. (EUR 130 mill.). Green Paper states the cost range related to the construction of a comparable storage facility between EUR 100 and 200 mill.

With respect to the object Láb 5 connecting with the existing underground storage facilities Láb 1 to Láb 4 the assumed storage capacity is from 925 up to 1250 mcm, with a daily output from 9.5 to 13 mcm. The storage space is situated at a depth of about 2 km and that would increase financial requirements, therefore project development has been provisionally stopped. Both mentioned objects are situated near the Slovak-Austrian border and Slovak – Czech border in the geological locality *Viedenská panva* (*Viennese basin*). Besides Slovakia, Austria and the Czech Republic also have built up their natural gas storage facilities. The present capacity of all the underground

storage facilities in this locality represents approximately 7.5 bcm, the perspectives of their increasing estimate at 16 bcm. The interconnection of the storage facilities and building of a Middle-Europe Gas Centre is a big challenge for future.

The location of the object Sereď is advantageously situated near the transit pipeline, however, the CO_2 content is 75% and that represents high technology requirements.

The Ptrukša object offers 210 mcm storage possibilities with a daily exploitation output of 2.3 mcm. However, the collected attributes of the object are not suitable, reservoir structures are diffused into more tectonic units with bad communication. There would be a need of many new bores with the increase of construction costs.

Conclusions and Recommendations

Now, I think, it is in order to come back to the question stated in the introduction: What should Slovakia do in order to improve its natural gas supply portfolio and increase Security of Supply?

The Slovak Republic should enter the project initiated by the European Union in an active way and use the possibilities created by the EU space (e.g. the diversification project *Nabucco*, *LNG* terminals in the close countries as Croatia and Poland). The same way should be taken at the construction of the new connecting pipelines with neighboring countries and the development of storage facilities. Despite the fact that the natural gas consumption of the Slovak Republic with respect to the diversification projects is relatively low. The most simple and the cheapest solution being offered is the conclusion of long-term contracts with the existing supplier *Gazprom* export at reasonable prices. All the conditions of the Slovak Republic are suitable for it. Two thirds of natural gas supplies from the Russian Federation will be at least to 2011 transmitted to Western Europe through Slovakia

Energy security policy of the Slovak Republic submitted by the Ministry of Economy for public debate should include even more courageous approaches at involving Slovakia in the European diversification projects.

The state holds 51% share in the *SPP a.s.* (Slovak incumbent) and roughly 30% share in the *Nafta a.s.* (Slovak system storage operator). Neither *SPP* nor *Nafta* is involved in *Nabucco* or the *LNG* projects. But, both could benefit from their implementation.

For example, *SPP* could be prepared to support one or more of these projects by signing a long-term, take or pay gas purchase agreement which in turn would guarantee in part of the throughput and there by support external

debt financing. Or try to think over the possibility the UGS project of Nafta as an integral part of the North-South gas pipeline project or the *Nabucco* project.

The possibilities related to increasing security of natural gas supply analyzed in this paper are a challenge in the light of the common European energy policy to which we will have to find an adequate answer in Slovakia.