

THE NEW WAYS OF NATURAL GAS TRANSPORT AND THEIR EFFECT FOR SLOVAKIA

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Abstract

The energy security is one of the main goals of the European Union states. To secure the energy transform from natural gas have many aspects and nowadays the environmental aspects are important too. The main aim of this paper is to describe the new natural gas pipelines from Russia (Nord Stream, Blue Stream, South Stream), Middle East (Nabucco) to West Europe. Other forms to get natural gas are from the Liquidized Natural Gas terminals (Neum and Omisalj), which terminals are described, too. Slovakia is still the biggest transit state for Russian natural gas and in 2008 was signed a contract with Russian Gazprom for twenty years. If Slovakia wants to defeat this position, considered should be the links to these new pipelines or connection to the existing Yamal pipeline. The projects to secure the gas supply for Slovakia and ensure its position in gas transit are outlined.

Keyword: natural gas, transit, LGN terminal, Nord Stream, Blue Stream

1 Introduction

The European Union energy security was broken at the start of last year. The result of the natural gas price conflict between Ukraine and Russia was that Slovakia and the rest of West Europe were without natural gas supply for twelve days. Natural gas transport from Russia to other European countries is accomplished by two transit pipelines Yamal and Brotherhood now.

The Yamal pipeline transfers natural gas from Yamal peninsula in Russia through the Belarus and Poland to Germany. Current overall length of the pipeline exceeds 2.000 km. There are 14 compressor stations under operation, of which three are in Russia, five – in Belarus, five – in Poland and one – in Germany. The gas pipeline construction started in the year 1994 close to the German and Polish borders, and first sections of the pipeline were brought online as early as in 1996. Russian gas arrives at the Malnow compressor station in the vicinity of the German-Polish border [1]. Upon commissioning of the last one in 2006, Yamal – Europe reached full capacity – 33 billion cubic meters per year. The map of this pipeline is shown in **Fig. 1**.

The Brotherhood pipelines are the oldest transit pipelines through Europe and it was built for the natural gas transit from Russia to Austria in 1967. It runs across Russia, Ukraine, Slovakia, Austria, Czech Republic, Germany and Italy. The capacity of these pipelines is 90 billion cubic meters per year. Slovakia as a natural gas transit state plays an important role in gas transit from Russia to East Europe now, but to secure reliable supply of natural gas the European states decided was to build new pipelines as: Nord Stream, South Stream, Blue Stream and LNG terminals.



Fig.1 Map of the Yamal - Europe pipeline (Source:[1])

2 Nord Stream

The Nord Stream gas pipeline is a fundamentally new route for Russian gas exports to Europe. The target markets for gas supply via Nord Stream are Germany, the UK, the Netherlands, France, Denmark and other countries.

The new gas pipeline is very important in terms of meeting the increasing natural gas demand on the European market. Gas imports to the EU countries are anticipated to grow in the nearest decade by nearly 200 billion cubic meters or more than 50 percent. Due to a direct connection between the world's largest gas reserves located in Russia and the European gas transmission system, Nord Stream will be able to satisfy circa 25 percent of this extra demand for imported gas.

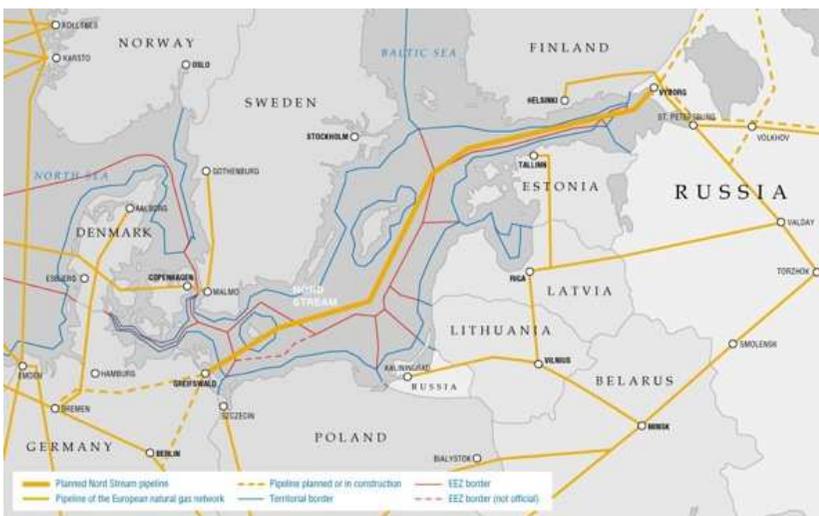


Fig.2 Nord Stream Route (Source: [3])

There are no transit countries on Nord Stream's route as shown in **Fig. 2**, which enables to reduce Russian gas transmission costs and exclude any possible political risks. Nord Stream will

provide the most reliable gas deliveries to customers in Western Europe and it will link Russia's Baltic coast near Vyborg with Germany's Baltic coast in the vicinity of Greifswald. The pipeline length will be as average 1.200 km. Planned for commissioning in 2011, Nord Stream's first string will have a throughput capacity of 27.5 billion cubic meters per year. Completion of the second string by 2012 will raise Nord Stream's throughput capacity to 55 billion cubic meters.

Based on the multiyear comprehensive analysis of technical, environmental and economic aspects and factors of the European energy supply security, the sea route is an optimal solution for the construction of a new pipeline carrying gas to Europe.

The Baltic Sea area along the Nord Stream route was thoroughly examined before the pipeline placement start-up. The pipeline route is as straightforward as possible, however, it bypasses the environmentally sensitive areas and chemical weapons dump sites, military zones, critical navigation routes and other dedicated areas serving business or recreational purposes. The Nord Stream route is designed so as not to cross the World War II ammunition dump sites.[3].

3 South Stream and Blue Stream

South Stream gas pipeline system of meeting the latest environmental and technological requirements will significantly raise the energy supply security of the entire European continent. The project provides for South Stream's offshore section to run under the Black Sea from the Russian coast (Beregovaya compressor station) to the Bulgarian coast. The total length of the offshore section will be around 900 km, maximum depth – over two km and full capacity – 63 billion cubic meters. [4] The Two possible routes are under review for South Stream's onshore section from Bulgaria- one, northwestwards and the other, southwestwards as we can see in **Fig. 3**. The South Stream gas pipeline from Bulgaria runs across Serbia, Hungary and Austria to Germany.

The Blue Stream gas pipeline is designed to transit Russian natural gas to Turkey across the Black Sea bypassing third countries. The pipeline will supplement the existing gas transmission corridor from Russia to Turkey crossing the territory of Ukraine, Moldova, Romania and Bulgaria. The Blue Stream has substantially increased the reliability of gas supply to Turkey thus developing the country's gas market and gas infrastructure. The Blue Stream pipeline is a unique gas transmission facility which has no analogues in the world. The total length of the Blue Stream gas pipeline accounts for 1,213 km.[5]



Fig.3 South Stream and Blue Stream gas pipelines (Source:[5])

4 Project Nabucco

The Nabucco route is a natural gas pipeline project for Turkey, Bulgaria, Romania, Hungary and Austria [6]. The extent of detailed planning and, in particular, its development by prospective gas importers makes it look increasingly probable that, during the next few years, we will see the development of at least one of the major pipeline systems for the delivery of Eurasian gas to Europe via Turkey.

The geographic locations of Turkey, Bulgaria, Romania, Hungary and Austria are connected to the major producers/suppliers of natural gas in the Caspian Sea region. The major consumers of energy in Turkey and Europe make south east Europe an important transit route for Russian, Caspian and Middle East natural gas supplies. The total capacity of the Nabucco project is estimated at 20–30 billion cubic meters with a total of 3630 km of pipelines. It will meet the market needs in the North, central and West Balkan regions. Transit countries would use 8–10 billion cubic meters/year so that the delivery to Baumgarten would be around 17–20 billion cubic meters/year [7].

5 LNG terminals

The liquefied natural gas (LNG) market is becoming a challenging issue in the potential for natural gas transport [8,9]. It is estimated that the world LNG trade in 2002 was 159 billion cubic meters and will become 410 billion cubic meters by year 2015. This corresponds to an LNG market share of 6% in 2002 and 10% in 2015. This proves that LNG terminals are promising options for future natural gas supply. In this respect, this has been selected as a potential option for the natural gas supply to south east Europe. It is anticipated that the liquefied gas will be transported with ships to an LNG terminal to be built in the Port of NEUM where degasification and storage capacity will be built [10]. The natural gas will be transported through Bosnia, Croatia and Hungary to its final destinations. Recently, project 5C for construction of the highway Neum – Sarajevo – Slavonski Brod has been under consideration [11]. It is anticipated that a natural gas pipeline will follow the same geographical route. It will start at the port of NEUM and end in Baumgarten (Austria). The LNG terminal NEUM will open a new potential route to bring natural gas from Mediterranean countries (Algeria, Tunis and Libya) [12] and the Middle East (Qatar, Oman and Iran) [13] to South, East and Central Europe. In particular, this route can substantially contribute to the potential diversification of the natural gas market. Other LNG terminals are planned to be built in Croatia and Poland.

6 Slovakia and the new ways

Slovakia as a transit state is nearly one hundred percent dependent on Russian gas, and this the main reason why this state need a new ways of transport. The new routes of gas transit mainly South Stream and Blue Stream override the territory of Ukraine, Belarus and Slovakia. Eustream a.s. (natural gas transit company in Slovakia) signed the new contract with Gazprom about the gas supply for the next 20 years in 2008. This is a solution for Slovakia only for next 20 years, but nobody knows what will be after it. To secure the gas supply to Slovakia the pipes of central Europe have to be linked. The first link will be build between Slovakia and Hungary another project is to link Slovakia to Yamal pipeline across Czech Republic. The schemes of these links are given in **Fig 4**. Solutions for the natural gas transport will be LNG terminals in Poland and Croatia. Slovakia has a tendency to be linked to these LNG terminals.

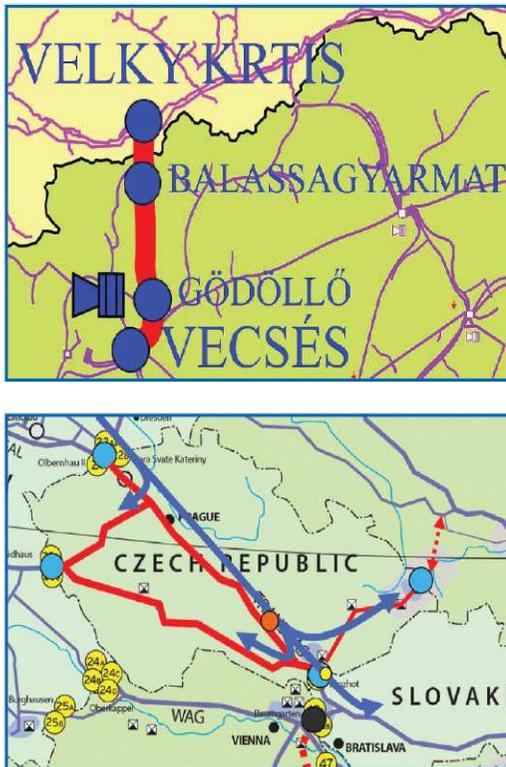


Fig.4 The links for Slovakian gas transport. (Source[14, NET4GAS, FGSZ Zrt.])

7 Conclusions

Germany is the fourth biggest natural gas consumer in the world with 96 billions cubic meters of natural gas. The main gas pipelines as Yamal and Brotherhood were constructed only to link East Europe (Russia) to West Europe (Germany) in the past. These links are not prospective now, because the disagreements between Russia and Ukraine or Russia and Belarus, and they can blockade the natural gas transport from East Europe to West Europe.

The main aim of the new pipelines (Nord Stream, South Stream, Blue Stream and Nabucco) is to secure the natural gas transit to the European Union, and to overcome the natural gas crisis. The solution for secure gas transport for Slovakia is to connect the Slovakian pipelines to these new pipelines leading across Hungary, Poland and to LNG terminals in Croatia. Projects about this links are on table, now it is only up to the European countries to realize it before the next natural gas crises starts.

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