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Prospects for the Construction of the Poseidon Gas Pipeline as a Factor in Supplying the Needs of the Southern Europe Countries with Natural Gas

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ABSTRACT

The European Union (EU) is one of the largest energy consumers in the world. However, it faces issues of high fuel import dependency, energy resources import diversification, lack of pipeline infrastructure, etc. There are several ways to improve EU's energy sector by wider use of natural gas (NG). Such projects as Interconnection Turkey-Greece-Italy-Poseidon, Trans Anatolian Pipeline, Trans Adriatic Pipeline, TurkStream and others may provide necessary capacities. Turkey plays an important role as a transit country for NG supplies and in the future it can become one of the key gas hubs in the south-eastern part of Europe, as it occupies a strategically advantageous geographical position. This paper reviews the main economic development and energy sector indicators of the EU, along with current and future NG supply and transit projects. It is stated energy cooperation between Russia, Turkey and the EU is essential for sustainable development of both EU and Turkey energy sector. Hence, recommendations for NG sector development and further energy cooperation with Russia are provided.

Keywords: Natural Gas, Energy Supply, Energy Cooperation

JEL Classifications: Q3, Q4

1. INTRODUCTION

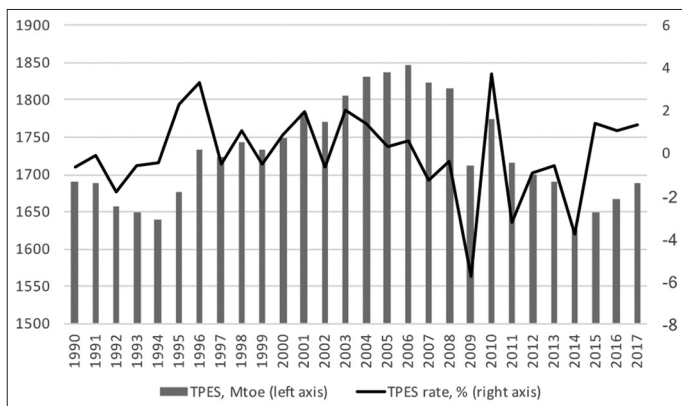
The European Union (EU) is one of the largest energy consumers in the world. As of 2017, the total primary energy consumption by the EU countries amounted to 1689.2 million toe, which is 1.4% more than in 2016, and 8.6% less than in 2006 (Figure 1).

In the energy balance of Turkey in 2017 oil and oil products shared 35%, natural gas (NG) - 23% and solid fuels, including coal - 15%. Shares of nuclear power plants and renewable energy source (including High pressure processings) accounted for by 13% (Figure 2).

According to Eurostat, in 2016–2017 about 55% of all energy consumed in the EU-28 countries was produced from imported energy resources, and, correspondingly, 45% from own sources (including renewables). EU's own-sourced energy production came from nuclear power stations (29%) and RES (28%), the share of coal and other solid fuels is 17%, NG - 14%, oil and oil products - 10% (Figure 3).

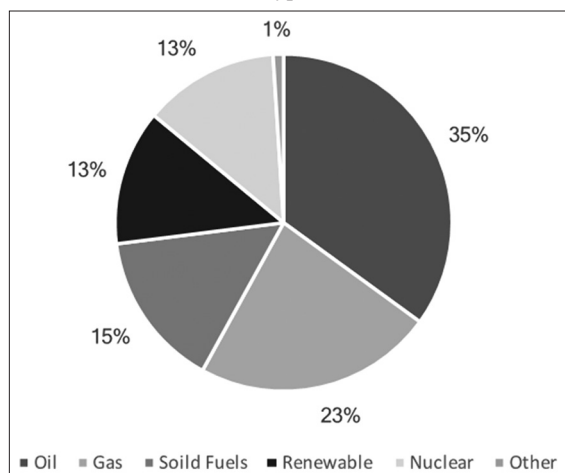
The countries of the EU import coal, oil and NG. Over the past decade, the main supplier of all three major types of energy resources in the EU is Russia. In 2016, Russia's share in the supply of coal and oil to Europe exceeded 30%, and in gas supplies approached 40% (Table 1). Important suppliers of coal, in addition

Figure 1: European Union-29 total primary energy consumption dynamics in 1990–2017



Source: Eurostat data sets, 2017

Figure 2: European Union-29 total primary energy consumption by fuel type in 2017



Source: Eurostat data sets, 2017

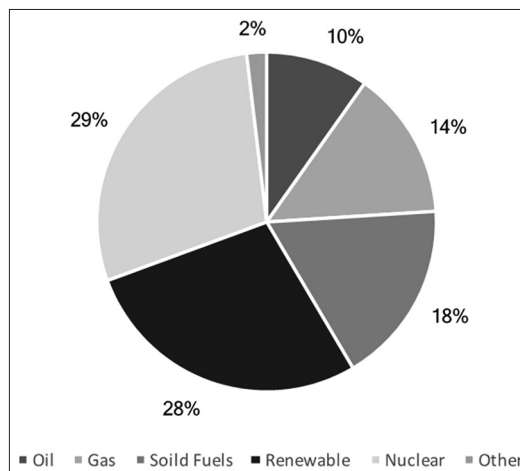
to Russia, are Colombia, Australia, the USA and South Africa, main suppliers of oil are Norway, Kazakhstan and the Middle East, gas is imported mostly from Norway, Algeria and Qatar.

The EU’s overall dependence on imports of solid fuels, oil, and NG remains extremely high. In 2016, the EU depended on the supply of coal and solid fuel by more than 40% of oil by almost 88% and gas by 70% (Table 2).

2. ANALYSIS

It can be seen from the statistics that during the last decade primary energy consumption in the countries of the EU tends to decrease. This is the result of the EU energy policy which also is aimed for improving energy efficiency, lowering energy consumption as well as reducing dependence on energy imports. However, the dependence of the EU on energy imports does not decrease, but in the case of NG continues increases intensively. This may be explained by a significant fall in domestic gas production in the EU and in Norway in recent years, which is due to the depletion of deposits in the North Sea (BBC News, 2019) and high risks of

Figure 3: European Union-29 own-sourced total primary energy consumption by fuel type



Source: Eurostat data sets, 2017

further development of gas reserves in the Netherlands and other countries of continental Europe (Reuters, 2018). At the same time, own energy production from renewable sources, despite all the support from the European authorities, cannot by any chance replace hydrocarbon resources in the foreseeable future. Under current conditions, NG remains the most popular type of fuel for heat and electricity production in the EU, due to its high efficiency and ecological affordability (in comparison to coal and petroleum products). Thus, the opportunities for diversification of the import of NG in order to ensuring the reliability and security of its supply are becoming the most relevant in the agenda of the EU energy policy nowadays.

Russia, as already noted, provides up to 40% of the supply of NG to the EU, currently via two main routes: The North Stream and transit through Ukraine. Supplies from Norway are declining; supplies from the African region also cannot be increased due to the limited production and transport capabilities of suppliers. At the same time, the EU has a well-developed infrastructure for receiving LNG and it should be noted that the supplies of LNG to the EU grew by 16% in 2017. However, due to the current market conditions a large-scale LNG imports to the EU, for example, from the United States, are unprofitable for the suppliers because of the high LNG prices in comparison with the Russian pipeline gas (Xu, 2018). Russia is going to be able to supply gas at the most acceptable and competitive price conditions both via the future northern (North Stream-2) and on the southern routes (the Turkish flow and options for its continuation within the Southern gas corridor (SGC) through Greece and Italy).

The construction of the Turkish Stream gas pipeline began on May 7, 2017. The gas pipeline consists of two lines, first one is intended for supplying the Turkish market, the second one - for the countries of Southern and South-Eastern Europe. Each line has a capacity of 15.75 billion cubic meters per year. The construction of the Turkish Stream is carried out in accordance with the approved plan simultaneously on the coasts of Russia and Turkey and in the Black Sea. On April 30, 2018, Gazprom announced the completion of the deep-sea laying of the offshore section of the first line of

Table 1: Main origin of primary energy imports, EU-28, 2006–2016, (% of extra EU-28 imports)

Solid fuels											
Country	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Russia	25.0	24.8	26.1	30.0	26.9	26.0	25.5	28.8	29.1	28.9	30.2
Colombia	11.4	12.7	12.3	17.4	19.9	23.5	24.1	21.8	21.1	23.9	23.4
Australia	12.0	13.0	11.7	7.5	10.5	8.7	7.3	7.5	6.3	9.8	14.6
United States	7.8	9.1	14.0	13.5	16.8	17.9	22.9	22.4	20.5	16.1	14.1
South Africa	23.1	20.1	16.5	15.8	9.6	7.8	6.3	6.7	9.8	7.7	5.1
Indonesia	9.3	7.8	7.3	7.0	5.5	5.0	4.5	3.1	3.4	3.5	3.0
Canada	2.8	3.0	2.6	1.4	2.0	2.2	1.6	1.8	2.5	1.6	2.0
Mozambique	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.3	0.3	0.5	0.8
Kazakhstan	0.2	0.1	0.3	0.2	0.2	0.3	0.3	0.3	0.5	0.5	0.8
Others	8.5	9.4	9.2	7.3	8.6	8.6	7.4	7.5	6.4	7.4	6.0
Crude oil											
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Russia	33.8	33.7	31.8	33.6	34.7	34.8	33.7	33.7	30.4	29.1	31.9
Norway	15.4	15.0	15.0	15.1	13.7	12.5	11.2	11.8	13.1	12.0	12.4
Iraq	2.9	3.4	3.3	3.8	3.2	3.6	4.1	3.6	4.6	7.7	8.3
Saudi Arabia	9.0	7.2	6.8	5.7	5.9	8.0	8.8	8.7	8.9	7.9	7.8
Kazakhstan	4.6	4.6	4.8	5.3	5.5	5.7	5.1	5.7	6.4	6.6	6.8
Nigeria	3.6	2.7	4.0	4.5	4.1	6.1	8.2	8.1	9.1	8.4	5.7
Azerbaijan	2.2	3.0	3.2	4.0	4.4	4.9	3.9	4.8	4.4	5.2	4.5
Iran	6.2	6.2	5.3	4.7	5.7	5.8	1.3	0.0	0.1	0.0	2.9
Algeria	2.5	1.9	2.5	1.6	1.2	2.6	2.9	3.9	4.2	4.2	2.8
Others	19.7	22.4	23.3	21.8	21.6	16.1	20.9	19.7	18.7	19.0	17.0
NG											
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Russia	39.3	38.7	37.4	33.0	31.9	34.4	34.9	41.1	37.4	37.6	39.9
Norway	25.9	28.1	28.5	29.7	27.9	27.6	31.8	30.4	32.1	32.0	24.8
Algeria	16.3	15.3	14.7	14.1	13.9	13.1	13.3	12.6	12.0	10.8	12.4
Qatar	1.8	2.2	2.3	5.9	9.7	11.6	8.3	6.5	6.8	7.7	5.6
Nigeria	4.3	4.6	4.0	2.4	4.0	4.4	3.1	1.7	1.5	2.0	2.0
Libya	2.5	3.0	2.9	2.9	2.7	0.7	1.9	1.7	2.1	2.1	1.3
Peru	0.0	0.0	0.0	0.0	0.0	0.0	0.8	0.5	0.5	0.3	0.5
Trinidad and Tobago	1.2	0.8	1.7	2.0	1.4	1.2	0.9	0.7	0.9	0.6	0.2
Turkey	0.0	0.0	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Others	8.8	7.3	8.3	9.7	8.2	6.8	4.8	4.5	6.5	6.7	13.1

Source: Eurostat data sets. (2017). EU: European Union

Table 2: Energy dependency rate, EU-28, 2006–2016 (% of net imports in gross inland consumption and bunkers, based on Tonnes of oil equivalent)

Fuel Type	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
All products	53.6	52.8	54.5	53.6	52.7	54.0	53.4	53.1	53.4	53.9	53.6
Solid fuels	41.5	41.3	44.8	40.9	39.4	41.9	42.3	44.3	45.8	42.4	40.2
Crude oil	83.9	83.4	85.1	84.3	85.3	86.2	88.4	88.3	88.2	88.7	87.8
NG	60.3	59.5	61.7	63.6	62.5	67.2	65.9	65.4	67.4	69.0	70.4

Source: Eurostat data sets, 2017. EU: European Union

the gas pipeline. At that time, in total, 1161 km were laid along two lines, which is approximately 62% of the total length of the offshore section. The startup of the second line deep-water laying is scheduled for the third quarter of 2018.

On May 26, 2018 during the St. Petersburg International Economic Forum-2018 PJSC Gazprom and the Government of Turkey signed the Protocol on the land section of the second line of the Turkish Stream gas pipeline, for the supply of Russian gas to the European market. Approval of all documents allows proceeding directly to practical actions for the implementation of the project. At the moment, the issue of continuing the second line of the gas pipeline outside of Turkey remains open. Parties are considering two options: The first one is to build the pipeline through Bulgaria and Serbia, the second one - through Greece and Italy within the

SGC. Not the most successful experience of cooperation with Bulgaria in the attempt to build the South Stream on the one hand, and the continued successful cooperation of Russia with Greece and Italy in the gas industry, on the other, make the Greek-Italian option more promising.

At the same time the SGC promises to become in the long term an extremely important route of gas supply to the EU, largely due to Italy's key role in these projects. It should be noted that Italy is a key participant in the vast majority of EU energy projects. In the Regulation of the European Parliament and of the council of April 17, 2013 No. 2013/347 the guidelines of the trans-European energy infrastructure were singled out and high-priority routes of transmission lines, gas pipelines and oil pipelines were identified, among which are:

1. Interconnector North-South (NSI West gas) in Western Europe. This route facilitates the transportation of gas between Northern and Southern Europe, diversifies sources of supply and increases the availability of gas in the short term.
2. NSI East gas in Eastern Europe. This corridor facilitates regional interconnections and market integration between the Baltic, Adriatic and Aegean seas, the Eastern Mediterranean and the Black Sea, increasing diversification and security of supply.
3. SGC. It is connected with the infrastructure of gas imports from the Caspian Sea basin, Central Asia, the Middle East and the Eastern Mediterranean to Europe to increase the diversification of European gas supplies.
4. Baltic energy market interconnection plan, (gas) is aimed to reduce the isolation of the three Baltic states and Finland and their dependence on one supplier (Russia). In addition, it will strengthen the internal infrastructure and increase the diversity and security of supplies in the Baltic region.

According to abovementioned Regulation 2013/347/EC, regional cooperative groups have been established for each of the above corridors. These groups are designed to promote cooperation between member states, regulating national authorities, project promoters, Agency for the Cooperation of Energy Regulators, European Network of Transmission System Operators for Gas (ENTSOG) and other interested parties.

Italy participates in three regional groups: NSI West Gas, NSI East Gas and SGC. Among these projects, the construction of the SGC is of the greatest interest, since it extends beyond Europe and involves the participation of third parties. SGC is designed to ensure the import of NG to Italy from the Caspian Sea and potential additional production pools in the Eastern Mediterranean and the Middle East. Initially, two routes were proposed for this project:

1. Trans Adriatic Pipeline (TAP) is intended for the supply of gas from Azerbaijan (Shah Deniz-2 field) to Italy through Greece and Albania. The projected length is 870 km, the capacity is 10 billion cubic meters per year (with the possibility of increasing up to 20 billion cubic meters per year).
2. Italy-Greece interconnector (IGI) is a section of the planned system “Turkey - Greece - Italy” for the transportation of Azerbaijani gas. The pipeline layout consists of a Greek part (623 km by land) and an underwater part between Greece and Italy (Poseidon project, 207 km). Total throughput amount 14 billion cubic meters per year.

According to the decision of the European Commission, the TAP gas pipeline became the priority route for the supply of Azerbaijani gas to the EU within the framework of the “SGC” project. In May 2016, the construction of a gas pipeline began. Estimated launch date is 2020.

However, Poseidon, the gas pipeline connecting Greece and Italy on the bottom of the Ionian Sea, was included in the list of projects of the general interest in the oil, gas and electricity sector (project of Common Interest (PCI) (EUR Lex., 2017), adopted in October 2013 by the European Commission. Each project is designed to ensure a significant improvement in the energy situation of at

least two countries, facilitating market integration, diversification and security of supply. PCI is accompanied by a priority status at the national level, that requires Member States to expedite authorization procedures, and allows the project to obtain an improved regulatory framework. These projects also allow access to European funding (5.85 billion euros from CEF, as well as 30 billion euros from EU funds for the development of energy, transport and digital infrastructure for the period 2014–2020) (Theodoros et al., 2016).

On November 23, 2017, the European Commission presented the third PCI list, consisting of 173 priority energy corridors. According to the document, the Poseidon project is one of the components gas supply route from the reserves of the eastern Mediterranean. The pipeline is also included in the latest 10-year Development Plan in accordance with the task of the ENTSOG to create a single European gas market that can meet the current and future needs of Europe. To date, the Poseidon project has benefited from European grants of about 9 million euros under the European Economic Recovery Plan and programs on the Trans-European Energy Networks (TEN-E) (Gas, 2017).

The Poseidon project is developed by the joint stock company IGI Poseidon SA, which is a joint venture of 50–50% of the Greek DEPA SA and the Italian Edison SpA. The company is developing gas routes in South-Eastern Europe and is currently also promoting projects of Greece-Bulgaria interconnector (IGB) and East Mediterranean gas pipeline (EastMed). During 2017, IGI Poseidon SA continued to actively develop all three pipeline routes (Figure 4).

3. DISCUSSION

The Poseidon project is an effective integrated option for completing the SGC. This route is aimed at providing additional and diversified, in terms of sources and routes, volumes of gas to the market of South-Eastern Europe and the whole EU. The project is a key tool to expand the route of existing supplies to the Black Sea, and to develop new sources from the Eastern Mediterranean that can be accessed for the EU market through the EastMed project (IGI Poseidon Project, 2018).

Figure 4: Italy-Greece interconnector Poseidon S.A. routes: Poseidon (1), Greece-Bulgaria interconnector (2), EastMed (3)



Source: Italy-Greece interconnector poseidon project

Initially, the Poseidon gas pipeline project was developed and approved for the purpose of connecting gas transmission systems of Greece and Italy. However, for the purposes of the EU concerning the security of energy supplies, it was extended to the Turkish-Greek border.

Today, the pipeline route consists of the ground part (Interconnector Greece-Italy, IGI Project) that is to transport NG from the Turkish border in the town Kipi to the Greek coast in the Thesprotia prefecture. Further, the pipeline connects with the underwater part of the IGI-Poseidon project, crossing the Ionian Sea to the Italian coast in Otranto, where it will be connected to the Italian national gas transportation system. The project is intended to eventually become part of the route of the Interconnector Turkey-Greece-Italy (ITGI)), which will allow Italy to import NG from Russia. The recently revised configuration of the project will provide capacity up to 20 billion cubic meters per year.

In 2017, Italy reached a number of agreements in support of the Poseidon pipeline, namely:

1. June 2, 2017 in the framework of the St. Petersburg International Economic Forum PJSC Gazprom, the Greek DEPA SA and the Italian Edison SpA signed an agreement on cooperation to organize a southern route for the supply of Russian gas to European countries: First from Russia through Turkey to Greece and then to Italy. Based on the document, the companies will also coordinate the implementation of the Turkish Stream project and the Poseidon project from the Turkish-Greek border to the Italian border.
2. In July 2017, in accordance with the above-mentioned agreement, IGI Poseidon began accelerating the preparation of the necessary regulatory framework and technical developments for the revised Poseidon gas pipeline configuration. In August 2017, the Company issued contracts for initial engineering design and licensing to the best engineering companies.
3. In September 2017, the gas pipeline was included in the Greco-Italian declaration of cooperation, signed by Prime Minister Alexis Citrass and his Italian counterpart Paolo Gentiloni.
4. In November 2017, the Italian ministry of economy included the Poseidon project in the national energy strategy for energy.

During the past year, the Company continued to take the necessary actions with regard to the rights to the corridor for the construction of the pipeline and the acquisition of land in the municipality of Otranto (Apulia region) in order to provide the service area required by the Italian ground part of the project. These projects highly likely will be implemented successfully and on time.

In conclusion, it should be emphasized that the Poseidon project will make a significant contribution to the task of developing additional gas transmission capacities in Europe and will contribute to strengthening the energy security of the southern part of the continent. Another important milestone is that the ITGI project, along with the TAP under construction, will turn Turkey and Italy into the main gas hubs of Southern Europe.

In the geopolitical strategy of Turkey, the energy aspect, namely NG, plays an important role. In the short-term vision of its energy

strategy, Turkey intends to become a transit gas hub, and in a long-term vision a regional commercial gas hub (Tagliapietra, 2014), connecting it with the European regional hub (Figure 5).

When Trans Anatolian Pipeline and TurkStream come up, Turkey will be able to diversify its gas imports and create an opportunity for re-exporting gas to other countries, realizing its goal for creating a regional gas hub. In the long term, Turkey has great chances to fulfill its goals for creating not only as a transit hub, but a trading one. In recent years, Turkey has successfully solved the main issues (Ozdil, 2015), that stand in the way of creating a gas hub. In particular, the market environment and regulations were improved, the domestic price of gas regulations were established, underground gas storage facilities were built or expanded, along with LNG terminals (Enstitüsü, 2017).

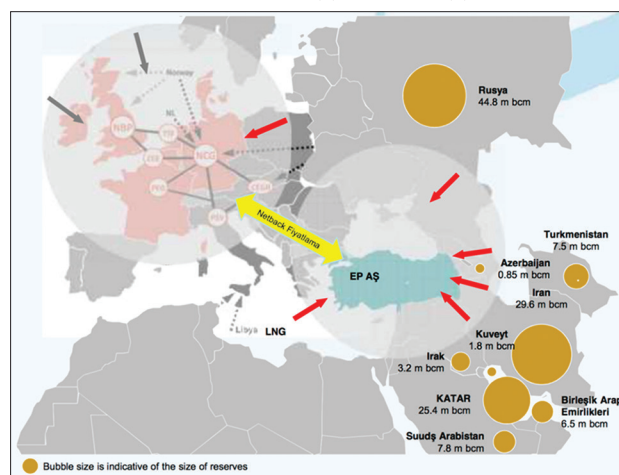
4. CONCLUSIONS

We agree that the drivers of the creation of a gas hub in Turkey are the implementation of the SGC and the rather high level of demand for gas from the EU, as well as the implementation of the necessary structural reforms in the country.

Thus, the creation of a gas hub gives Turkey a large number of advantages, the effect of which will only increase with time. Turkey will be able to solve its energy security problem and a number of other internal economic challenges: The flow of investments into the country will increase (Dünya, 2016), new jobs will be created, and infrastructure will improve. Also, the creation of a gas hub contributes to the implementation of Turkey's regional geopolitical ambitions.

At the same time, in the current market environment, effective use of all gas transmission capacities being built in the south-east of Europe will be possible only with the participation of Russia, since there are no other market participant in the region that can supply NG sufficient for filling the transit pipelines. This will allow Russia with even greater confidence to guarantee the reliability

Figure 5: Eurasian natural gas infrastructure Italy-Greece interconnector Poseidon S.A. routes: Poseidon (1), Greece-Bulgaria interconnector (2), EastMed (3)



Source: Ozdil, 2015

and continuity of NG supplies to the European market as part of fulfilling contractual obligations to partners, and the EU countries to strengthen energy security by obtaining an additional and cost-effective mechanism for importing NG, a reasonable alternative to which in the European energy sector just does not exist.

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