RUSSIAN CHESS ON GAS POLITICS: EVALUATION OF TURKISH STREAM

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INTRODUCTION

Turkish Stream Pipeline Project (TSP) is the result of the altering Russian gas supply policies toward European Union (EU). Due to flustering disputes over Ukraine, initial step was planned as to bypass Ukraine with a new standalone pipeline that will transit Russian gas to Eastern Europe. However, increasing conflicts between EU and Bulgarian government made Russia take a step forward with a new standalone pipeline project, which is named as Turkish Stream.

In the concept of Turkish Stream, Russia is planning to transport the gas through Black Sea and Turkey and sell it in the Greek border of Turkey. This means, Russia will not have to deal with the transportation of her gas inside EU's borders. Being a self-assured seller, Russia also wishes that Balkan countries on the demanding side to provide their own gas export securities. This shift in Russia's gas sale and/or transportation policies may be an important indicator for the future gas politic analysis of the region.

In another aspect, doability of TSP will result in facing with too many milestones such as commercial, technical, political, market, etc. All these items require careful analysis that will help coherent evaluation of Turkish Stream.

In this study, after giving the historical overview of Russian gas export to EU, which is the determiner for TSP, doability of TSP will be evaluated from the technical, commercial, marketing, political and resource aspects. In addition to this evaluation, after mentioning the main risks for successful completion of TSP, other possible options will also be evaluated for any cases of TSP that may not be successful. Having the result of this evaluation, the future of regional gas politics and Turkey's situation will be analyzed.

HISTORICAL OVERVIEW OF RUSSIAN GAS EXPORT TO EU

Initially, existing key gas pipelines feeding the Europe will be described shortly in the concept of the historical overview of Russian gas export to EU. Latter, the previous steps before the Turkish Stream and South Stream Pipeline will be adverted. After mentioning the infrastructural situation, customer characteristics of Ukraine and the third energy package of EU will also be analyzed.

EXISTING KEY PIPELINES TO FEED THE EUROPE

Russia gas export to Europe started before 1940's with the small volumes of export to Poland. While considering the small portion of consumption volumes, location of the existing resources (which are affecting the transportation costs), lack of existing transportation systems, prices and economical items, gas trade between Russia and Europe could not find a chance to tighten. After the new giant discoveries in 1970s, new pipeline projects and more politically stabilized and industrialized Europe's trade volumes increased.

As seen in Map 1 below, the first key pipeline from Russia to Europe is the Brotherhood Pipeline (PHP), which is active since 1967 (despite the prevention attempts of USA). PHP is also known as Urengoy-Pomary-Uzhgorod Pipeline and has a capacity of 100 bcma and a 4500 km length. As depicted, PHP and its extensions by transiting and feeding Ukraine, meet an important portion of many European countries' gas demands, such as Germany, France, Czech Republic, Slovakia, Austria, Slovenia, Croatia, Italy and Hungary.

Second key pipeline from Russia to Europe is the northern lights pipeline, with a capacity of 51 bcma and a length of 7400 km. This pipeline consists of five major trunk routes with

different capacities and different construction times. However, the main line from Torzhok to Ivatsevich is completed in 1970s.[1] Due to, supplying gas to Poland and Lithuania and its main purpose being to directly supply the Brotherhood Pipeline i.e. her potential being linked to the Brotherhood, Northern Lights may not be accepted in the category of the most important gas import pipelines of Europe.

Third key pipeline, as shown in the map above is the Yamal – Europe Pipeline (YEP). YEP was activated in 1996 to feed Germany. After some upgrades in the compressor stations, the total volume of YEP has extended up to 33 bcma and its average length is 4200 km.

Fourth key pipeline is Nord Stream (we mean "nord stream1") with a total 55 bcma capacity and 1224 km length. Nord Stream Pipeline (NSP) is activated in late 2011 to feed Germany. However, only half portion of this 55 bcma capacity can be utilized due to the sanctions of EU's third energy package.

UKRAINE: A BAD CUSTOMER

By considering the location, existing pipeline capacities and gas storage capabilities, Ukraine is the most important route for Europe's gas supply security politics. For several decades, Ukraine represented a reliable transit platform for Russian gas export to Europe. However, in the aftermath of the independence of the two countries, gas conflicts between Russia and Ukraine started to emerge.[3]

Conflicts mainly are about the gas prices those Russia offered for Ukrainian domestic market. Although Ukraine buys the gas with a cheaper price than the other European countries, hence she knows that Russia is dependent on her to transit gas to Europe, which can be accepted a vital item for Russia's foreign politics, Ukraine every time tried to use this situation for the due gas pricing negotiations and deals. From the other side, Ukraine also is dependent to Russian gas while considering her energy consumption distribution. These situations and the unsolved disputes several times resulted in Ukraine not paying her debts to Russia and Russia cutting her gas supplies to Ukraine. Sometimes Russia erased the piled up debts of Ukraine, however, the situation has never changed.

From the gas transit region to Europe, this conflicts and disputes directly affected the gas transits to Europe. As happened in 2006 and 2009, Russia cut off supplies to Ukraine and Ukraine diverted the European transit volumes to her domestic market, which resulted in gas crises in a few European Countries. As a result of this situation, Russia has been following a new strategy of diversifying her gas transit routes away from Ukraine. South Stream, Turkish Stream and newly proposed

Map 1: Russia to Europe gas pipelines.[2]

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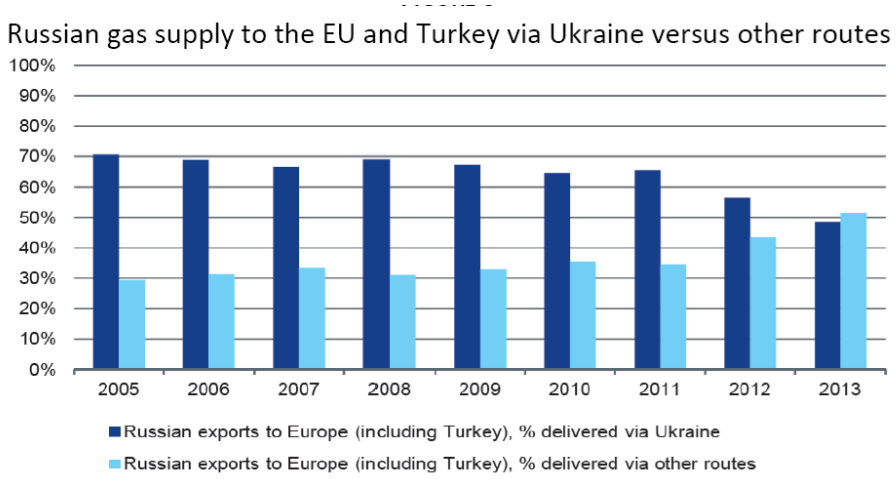


Figure 1: Russian exports to Europe via Ukraine and other routes.[4]

Nord Steram2 gas pipeline projects can be accepted as the results of this new strategy. However, rest of the paper will focus on the SSP & TSP.

The volumetric results of this new strategy can be observed from Figure 1 above. As it can be seen, Russian exports to Europe via Ukraine are decreasing and via other routes are increasing. However, a new project such as TSP is needed for long term solution.

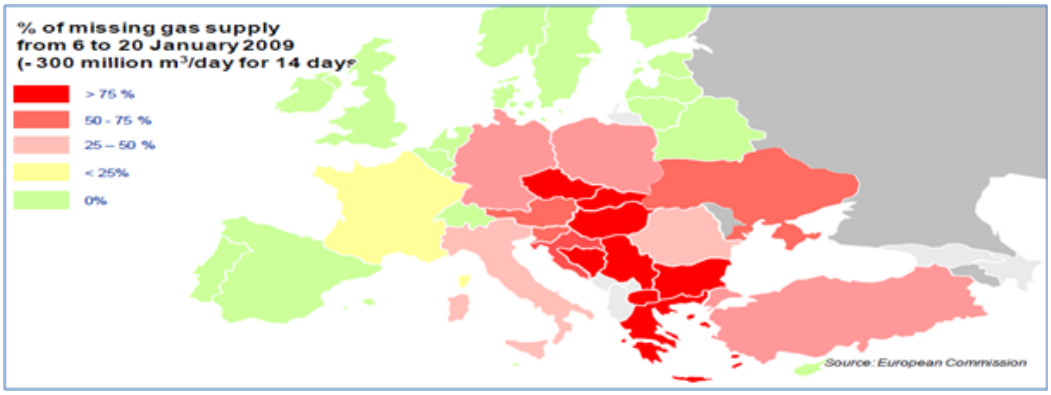
In addition, the South Eastern European countries, red colored in Map 2, are more dependent on the Russian gas transiting through Ukraine, the route diversification strategy of Russia is very important for that region.

"With SSP; Bulgaria, Serbia, Hungary, Austria, Slovenia, Croatia, Bosnia-Herzegovina and Italy markets were planned to be the potential markets."

SOUTH STREAM PIPELINE

As indicated above, there are four gas pipelines, which are the most important structures for Russia to feed the due European countries' gas hunger. In addition to these four lines, South Stream Pipeline Project (SSP) was launched by Russia to feed the Southern and Eastern European markets, in the same concept of bypassing Ukraine. SSP was planned to be a 900 km long offshore pipeline with a capacity of 63 bcma. Nearly 42 bcma of this 63 bcma was planned to be the existing volume being transported through existing pipeline structure transiting Ukraine. The remaining portion will be the new gas volumes for the due customers. As seen in Map 3, with SSP; Bulgaria, Serbia, Hungary, Austria, Slovenia, Croatia, Bosnia-Herzegovina and Italy markets were planned to be the potential markets.

Final investment decision of the SSP was made in December 2012 and the whole project was planned to be activated in 2020. However, SSP created controversy due to non-compliance with the European Union competition and energy legislation, such as the Third Energy Package, which stipulates the separation



Map 2: Percentage of missing gas supplies in 2009 gas crises.[5]

Map 3: South Stream Pipeline project.[6]

of companies' generation and sale operations from their transmission networks. Project was cancelled by Russia in December 2014 following obstacles from Bulgaria and the EU (due to the TEP), the 2014 Crimean crisis, and the imposition of European sanctions on Russia. The project has been replaced by proposals of Turkish Stream and Tesla Pipeline.[7]

Note that TESLA pipeline, which is the possible extension of Turkish Stream in Europe is planned to start from the Turkish border and to end in Baumgarten, as indicated in Map 4.

EU 3RD ENERGY PACKAGE

"The announcement of the Third Energy Package (TEP) in 2011, which outlined the EU's goal to create a liberalized gas market in Europe via the unbundling of vertically integrated gas companies, the imposition of third party access rules and publicized tariffs, marked the start of this progression. It also caused huge concern for Gazprom as it would mean a significant shift in its traditional business model. In particular, it threatened its pricing structure, which had always been based on a long-term oil-linked methodology, and its plans for access to customers via controlled infrastructure."[9] Note that although Gazprom has been working on shifting her price mechanism from the traditional model to hub model, in overall, hub price mechanism does not seem as beneficial as the traditional system for Russia.

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Map 4: CIS & Eastern Europe pipeline system.[8]

"Turkish Stream Pipeline project is the result of altering Russian gas export politics, mainly affected by bypassing Ukraine strategies, TEP and Bulgaria's attitude (suspending the preparatory operations for the construction of SSP in her offshore in 2014)."

"According to the BP Energy Outlook 2035 report: "The EU's natural gas imports increasingly diversify; LNG net imports almost triple by 2035 and account for 30% consumption in 2035 up from 9% today. However, imports from Russia via pipeline remain an important source of supply, growing by 15% and maintaining a market share of around 31% by 2035."

As a result of TEP, firstly, Gazprom's full capacity use of the Nord Stream Pipeline was interrupted by EU Competition Commission. Hence, NSP is connected to Ostsee-Pipeline-Anbindungsleitung (OPAL) pipeline system; this meant a monopolized Gazprom in the case of EU Competition Commission. As a result, Gazprom was forced to use only half capacity of the pipeline.

Secondly, in 2012, again the EU Competition Commission agreed on Gazprom's commercial activities in the Balkan Countries resulting in a monopoly position in due high oil prices. That is why; TED again affected the utilization capacity of SSP's onshore parts after Bulgaria. This means, although Russia transports 63 bcma gas to Bulgarian onshore, she can only transport half of this volume to the European markets, by using her own pipeline. These conflicts resulted in an unexpected shift of Russia from SSP to TSP.

TURKISH STREAM PIPELINE

As described above, Turkish Stream Pipeline project is the result of altering Russian gas export politics, mainly affected by bypassing Ukraine strategies, TEP and Bulgaria's attitude (suspending the preparatory operations for the construction of SSP in her offshore in 2014). Gazprom CEO's statement issued in January 2015 also summaries the shift in Russian export strategy and the shift from SSP to TSP: "The principle of our strategy in relation to the European market is changing. The decision on stopping South Stream is the beginning of an end to our operation model of the market within which we oriented ourselves towards supplying to the end consumer. But you cannot win love by force. If the buyer does not want the purchase to be delivered home, well then perhaps he needs to get dressed and go to the store, and if it happens in winter, get dressed warmer. Well he could also take some package. Which can well be the Third Energy Package, but what counts most is that it should not be empty. In our case, the store is certainly the delivery point on the Turkish–Greek border."[10]

"The offshore part of the TSP will cross the Black Sea bed. Maximal depth along the route will reach 2,200 m. The length of the offshore part will amount to 910 km. As planned, the TSP pipeline will surface on the shore of the European part of Turkey near Kıyıköy with gas delivery point at Lüleburgaz for the Turkish customers, and a border crossing between Turkey and Greece in İpsala serving as delivery point for the European customers. The length of Turkish onshore section will total 180 km. The capacity of four strings totals up to 63 bcma, including 47 bcma to be supplied to the Turkish-Greek border."[11] As can be understood from the information above, 16 bcma gas via TSP will directed to Turkey and the other portion is planned to be transferred to EU. TSP is planned to have four parallel pipelines with each having is 16 bcma capacity. First line is planned to transfer the Turkey's portion and the other three lines for EU.

Off course, transportation of Russian gas from the Turkish border is also important. Hence, SSP was planned to extend to inside the Europe. TSP also has to be planned to link with some other pipeline projects to transport the gas to the customers inside Europe. This issue will be identified in the following sections.

DOABILITY OF TURKISH STREAM: FROM RUSSIA TO TURKEY – GREECE BORDER

The most popular pipeline project to handle due strategies of Russia can be accepted as the Turkish Stream Pipeline project. However, in this step, doability and the future of TSP has to be evaluated from technical, commercial, marketing, political and resource aspects. Political aspects will be the most determinative items for the future of TSP.

TSP: FROM THE MARKETING SIGHT

According to the BP Energy Outlook 2035 report: "The EU's natural gas imports increasingly diversify; LNG net imports almost triple by 2035 and account for 30% consumption in 2035 up from 9% today. However, imports from Russia via pipeline remain an important source of supply, growing by 15% and maintaining a market share of around

31% by 2035." This means, Russian gas demand in EU will increase. In addition, while considering that LNG supplies will be mainly to the coastal countries of EU, increase in LNG supply will not have a significant influence on TSP, where TSP's main interest is not coastal areas (except Italy and Greece).

Moreover, TSP's interest includes the countries that average more than 60% dependency on Russian gas. As pointed out in Map 5, 2014 Russian gas import values of due countries, which are also the possible markets for gas transported via TSP, total 74,31 bcma in the area including Italy and Turkey. By assuming the demand will increase in the coming years, 63 bcma after 2018 will easily be able to find enough market volume in the region. By the way, Italian and Turkish markets also have to be evaluated separately for long term estimations, because of possible LNG and other resource potentials. However, Russian gas again may be the cheaper way of supplies for both countries after comparing with other resources. As the result of these facts, there will be no market risk for TSP doability.

TSP: FROM THE RESOURCES SIGHT

According to the data taken from BP Statistical Review 2015, Russia with 32,6 tcm gas reserves has the 17,4% of the total gas resources in the world, coming after Iran in the ranking. In addition, another important value from the same report is (reserve/production) R/P ratio, which is around 50% for Russia. Which means Russia is developing her fields and has the resource development and investment environment inside.

Furthermore, according to the BP Energy Outlook 2035 report: "Russia remains the largest net exporter of energy with net exports meeting 4% of world energy demand in 2035 and Europe remains the largest importer of gas."

These approaches show that, from the sight of supply volume of gas resources in Russia there is no risks currently for TSP and for the technical life of the pipeline.

TSP: FROM THE TECHNICAL SIGHT

Turkish Stream, a new gas pipeline from Russia to Turkey will run across the Black Sea from the Russkaya CS near Anapa to Kıyıköy village in the European part of Turkey and further via Lüleburgaz to Ipsala on the border between Turkey and Greece.

660 kilometers of the offshore pipeline route will be laid within the old corridor of South Stream and 250 kilometers – within a new corridor towards the European part of Turkey. The offshore part of the pipeline, which is 910 km in length, will cross the Black Sea bed with Maximal depth of 2,200 m.

The onshore gas pipeline section will stretch for 180 kilometers from the Black Sea coast of Turkey to the border between Turkey and Greece.

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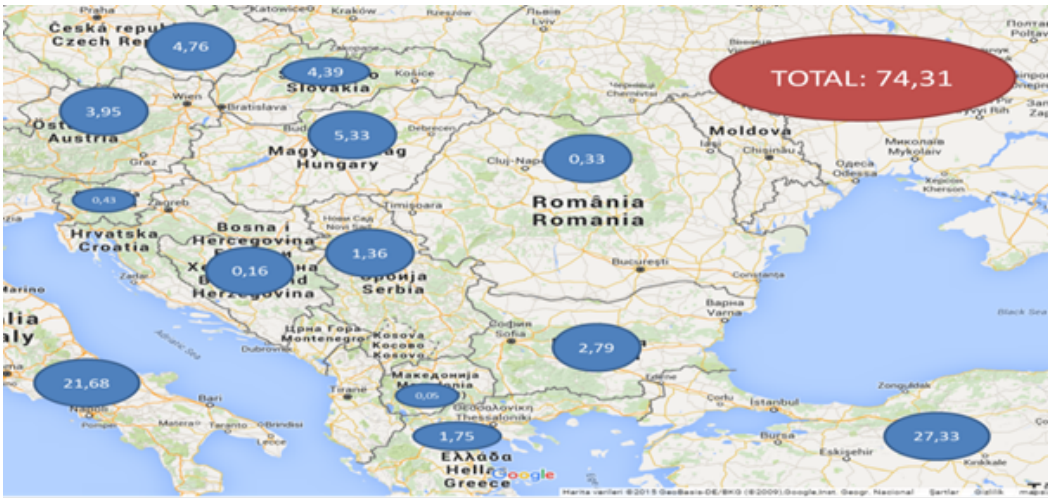

Map 5: Russian gas exports 2014.[12]

"Political side is the most important issue that will affect the doability of the project. After the Ukraine conflicts, TEP and Bulgaria's attitude, TSP was the best solution for Russia, although EU currently does not support and US is against the project."

Map 6: Turkish Stream Pipeline project.[13]

The annual gas pipeline capacity will total 63 billion cubic meters of gas. The offshore gas pipeline will consist of four strings with the capacity of 15.75 billion cubic meters each. Gas from the first string is intended exclusively for the Turkish market.

Estimated Cost & Tariff according to the existing technical information for TSP are summarized in Table 1. Note that; cost is calculated by using commercial software and tariff is estimated by benchmarking with the current similar projects. During tariff estimation process, rate of return of the project is accepted as 9%.

TSP: FROM THE COMMERCIAL SIGHT

Hence, Russia is financing the project, which means there are no financial risks. For commercial analysis, initial items given below are assumed:

- Russia's average unit gas cost @ Anapo (including the production and inside country transportation costs) is 30 USD/1000m^3

Note that; hence, the existing giant gas fields to supply the TSP are mature and also there are currently existing free capacities in the pipeline distribution system of Russia, as the lowest breakeven point; 30 USD / 1000 m^3 cost is accepted.

- Oil prices in the last quarter of 2018 is 75 USD
- Gas prices in EU for the last quarter of 2018 is between 330 – 370 USD/1000 m^3
- Gas prices in Baumgarten Hub for the last quarter of 2018 is 350 USD/1000 m^3

With the estimated tariff above, total unit cost of Russian gas in the Turkish-Greek border is (30+180) 210 USD. Up to this point, there is no commercial risk, where EU gas prices will be estimated to be between 330 - 370 USD / 1000 m^3. However, commercial analysis has to be repeated by considering the additional tariffs inside the EU.

Offshore Length	910 km
Onshore Length	180 km
Diameter	4x32"
Capacity	63 bcm
Water Depth	2200 m
Cost	18 MMM$
Tariff @ Greece Border	180 $ / 1000 m^3

Table 1: TSP technical summary.

TSP: FROM THE POLITICAL SIGHT

Political side is the most important issue that will affect the doability of the project. After the Ukraine conflicts, TEP and Bulgaria's attitude, TSP was the best solution for Russia, although EU currently does not support and US is against the project. However, from the Turkish side, the straining and worsening relations with Russia will be able to effect the last investment decision of the project.

Videlicet, the doability of the project has political risks according to the current approaches of Russia, EU, Turkey and US. On the contrary, Balkan countries, as being the customers politically support the project.

BEYOND TURKEY: GAS DELIVERY TO ITALY & BAUMGARTEN

For a planned 47 bcma gas supply via TSP to the due countries in EU, as the end points Austria and Italy, new pipeline infrastructures have to be considered and constructed. Commercial and political issues will be the determiners to select the routes and the due pipeline projects such as TAP extension, Western Nabucco, ITGI, IAP or others. However, continuing workshops between the countries Hungary, Serbia, Macedonia, Greece, Turkey, Albania and Bosnia & Herzegovina give clues about the possible doability of TESLA pipeline project, carrying gas from Turkish – Greek border to Baumgarten. In addition to TESLA, to feed the Italy market, TAP extension or ITGI pipeline projects may also be considered. However, commerciality will again determine the routes, so, all costs and tariffs have to be studied.

TESLA PIPELINE TO BAUMGARTEN

The Tesla pipeline – named after Serbian-American engineer and inventor Nikola Tesla – is a continuation of the controversial Gazprom - backed Turkish Stream. It is planned to cross through Greece, FYROM, Serbia and Hungary, and then reach the gas hub Baumgarten in Vienna.

The length of the pipeline is planned to be 1,300-1,400 kilometers and capacity is 27 billion of cubic meters of gas. According to the public announcements, TESLA is expected to be completed in 2019.

Replacing the scrapped South Stream pipeline, Turkish Stream comprising four lines with a combined annual capacity of 63 billion cubic meters of gas will carry gas from Russia to Turkey under Black Sea. Turkey is to take about 16 billion cubic meters while the remainder will be transited to a gas hub to be built on Turkey's border with Greece, for exports to Europe.

TESLA MARKETS AFTER TURKISH BORDER

Beyond TSP, as mentioned above, 47 bcma gas is assumed to be in the Turkish border for EU's consumption. In addition, by benchmarking with the current trade volumes, 20 bcma is planned to send to Italy. Other 27 bcma will be shared between the other due Balkan countries. By considering the 2014 Russian gas import volumes, for Balkan countries 27 bcma gas volume is assumed to be distributed as given in Table 2.

ITGI PIPELINE TO ITALY

"The ITGI (Interconnector Turkey-Greece-Italy) System is a multi-source import project that will contribute to the European diversification and security of supply by opening the so called "Southern Gas Corridor".[9] The pipeline is designed to transport approximately 15 billion cubic meters of natural gas a year from Caspian, East Med and/or Middle East areas to Italy and Europe through Turkey and

Greece	2
Bulgaria	3
Serbia	1,5
Bosna	0,2
Hungary	5,5
Slovakia	5
Austria	4,5
Czech Rep	4,5
Macedonia	0,1
Slovenia	0,4
Romania	0,3

Table 2: TESLA markets.

"Continuing workshops between the countries Hungary, Serbia, Macedonia, Greece, Turkey, Albania and Bosnia & Herzegovina give clues about the possible doability of TESLA pipeline project, carrying gas from Turkish – Greek border to Baumgarten."

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Greece.". In the first option, the re-designed capacity of new ITGI will be 20 bcma.

COMMERCIAL ANALYSIS

Then, by considering the above volumes, routes have to be studied. As depicted in Map 7 from the Turkish border;

- Gas to Bulgaria and Romania will be transported via existing Trans-Balkan Pipeline reverse flow. So, the remaining volume for the other markets will be 44 bcma.
- The remaining volume of 44 bcma has 2 main options to reach the due markets:
  - Option 1: Italy market's 20 bcma share will be transported via a new stand-alone pipeline (which may be a re-designed ITGI) and other 24 bcma portion will be transported in the planned TESLA route and will reach up to Baumgarten.
  - Option 2: 44 bcma including Italy's share will be transported with a 44 bcma capacity TESLA project and Italy will get her portion with a new link from Baumgarten.

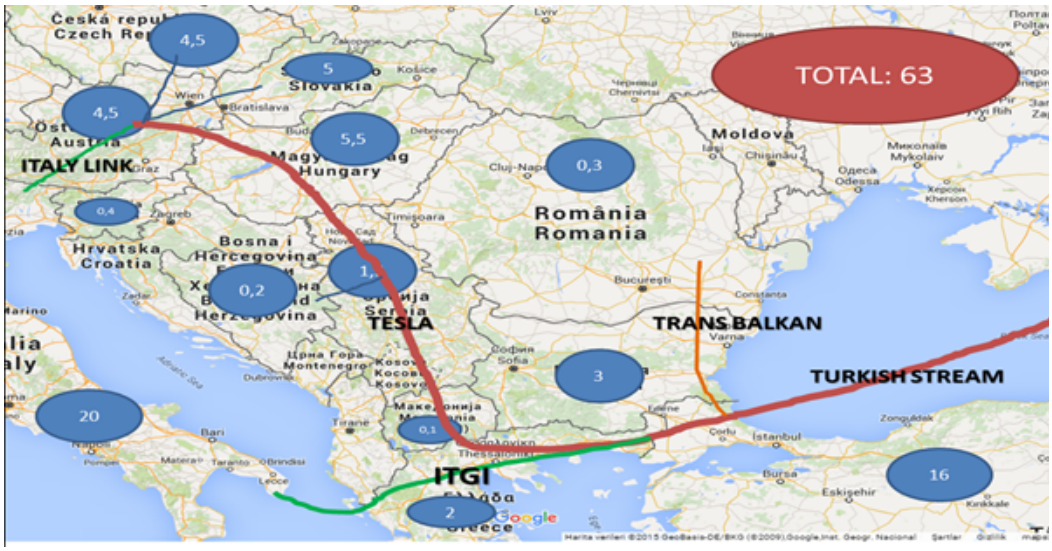
Both options can be observed in Map 7.

OPTION 1:

As indicated above, gas will be supplied through two standalone pipeline infrastructures to Austria via Tesla with 24 bcma, and to Italy via ITGI (or to the small extent via TAP) with 20 bcma. However, extension of TAP is not considered due to possible other gas supplies via TANAP. The extended volumes can be filled with Azeri resources. In addition, TAP can technically be extended up to 20 bcma, so additional 10 bcma will not be enough for Italy's portion.

Cost estimations to see the viability of two routes were evaluated by commercial software and benchmarking procedures are followed for the tariffs. As a result;

- Estimated cost for 24 bcma TESLA: 8 billion USD
- Estimated tariff for 24 bcma TESLA @ Macedonia: 15 USD / 1000 m^3
- Estimated tariff for 24 bcma TESLA @ Serbia: 30 USD / 1000 m^3 (Bosna will get her gas from this point)
- Estimated tariff for 24 bcma TESLA @ Hungary: 70 USD / 1000 m^3
- Estimated tariff for 24 bcma TESLA @ Baumgarten: 120 USD / 1000 m^3 (Czech Rep., Slovakia and Slovenia will get their gas from this point)Estimated cost for 20 bcma ITGI: 6 billion USD (Benchmarked with TAP)
- Estimated tariff for 20 bcma ITGI @ Italy: 140 USD / 1000m^3



Map 7: Extension of TSP and due market's volumes.

OPTION 2:

In this option, All 44 bcm/annum gas goes to Austria and Italy gets her 20 bcma portion via a small link from Baumgarten. So, TESLA will have a 44 bcma capacity. According to the results;

- Estimated cost for 44 bcma TESLA: 14 billion USD
- Estimated tariff for 44 bcma TESLA @ Macedonia: 23 USD / 1000 m^3
- Estimated tariff for 44 bcma TESLA @ Serbia: 45 USD / 1000 m^3 (Bosna will get her gas from this point)
- Estimated tariff for 44 bcma TESLA @ Hungary: 105 USD / 1000 m^3
- Estimated tariff for 44 bcma TESLA @ Baumgarten: 190 USD / 1000 m^3 (Italy, Czech Rep., Slovakia and Slovenia will get their gas from this point)
- Estimated cost for 20 bcma Italy Link: 1 billion USD
- Estimated tariff for 20 bcma Italy Link: 10 USD / 1000 m^3

As a result of these 2 scenarios; the total tariff costs are given in Table 3.

UPDATED COMMERCIAL ANALYSIS INCLUDING THE TSP

Tariff for 44 bcma TESLA @ Baumgarten	190 $ / 1000 m^3
Tariff for 24 bcma TESLA @ Baumgarten	120 $ / 1000 m^3

Table 3: TESLA tariffs.

The new economics of the project including TESLA extension, by considering the previous assumptions, estimated unit gas costs in due points are given in Table 4.

Note that; total gas unit cost at the due delivery point includes the average gas production cost in Russia, inside Russia transportation costs, TSP tariff and due tariffs in due pipelines in the European part up to the delivery points.

According to the results given in Table 4, Scenario 2 is not feasible while assuming the gas prices will be between 330 – 370 USD/1000 m^3 in 2019. Hence, not economic, Scenario 1 has to be selected.

As a result, although the economics are not so satisfactory in Italy, in regards to due assumptions, for all delivery points, netback can be accepted above zero so; TSP will again be doable.

However, if the "unit production + inside country transportation" cost will be higher than 30 USD / 1000 m^3, then Italy or Baumgarten markets may not be the economical options for Russian gas transported via TSP. Therefore, this approach may be able to force TSP not to feed Italy and Baumgarten markets with new standalone pipeline projects. Therefore, cheaper upgrades in the current distribution systems in Europe may be the solution to feed some portions of due markets. This means, there is a chance for TSP to be constructed with less capacity such as 16 + 16 bcma, where 16 bcma is for Turkey and the other portion is for EU, can be transported via the upgraded existing structure.

"If the "unit production + inside country transportation" cost will be higher than 30 USD / 1000 m3, then Italy or Baumgarten markets may not be the economical options for Russian gas transported via TSP."

	Scenario1	Scenario2
Delivery Point	Total Unit Gas Cost (USD/1000m^3)	Total Unit Gas Cost (USD/1000m^3)
Macedonia	225	233
Serbia	240	255
Hungary	280	315
Baumgarten	330	400
Italy	350	410

Table 4: Total unit costs of Russian gas after TSP & TESLA.

"The organization, owners and financial issues of TESLA will have a vital role for the doability of TESLA again due to the TEP."

As an additional final note for TESLA, again due to the TEP, the organization, owners and financial issues of TESLA will have a vital role for the doability of TESLA.

A NEW ASPECT OF BEING TSC ONLY TO BE TWO LINES

As mentioned above, due to economic reasons, there is a possibility of TSC to be constructed as two parallel lines with each capacity of 16 bcma is being discoursed. In this scenario, Russia will construct the 16 bcma pipeline to Turkish coast and then after the legislative and political issues between the EU countries solved, will construct the second parallel line up to the Turkish – Greek border. From the Greek border, gas will be transited via upgraded existing pipeline systems and reverse flows. In this case, not all but some of the Balkan countries such as Greece, Bulgaria, Romania, Italy (via the extended TAP), Macedonia, Serbia and Hungary may share the 16 bcma volume of the second line.

In this case, new costs and estimated tariffs are written below:

TSC Line 1 (16 bcma) to Turkey, Cost (billion USD): 4,2

TSC Line 1 (16 bcma) to Turkey, Tariff (USD/1000m^3): 80

TSC Line 2 (16 bcma) to Greece, Cost (billion USD): 5,4

Note: If the second line will be constructed just after the first line then the cost is estimated to be 4.5 billion USD and tariff will be around 90 USD/1000 m^3.

TSC Line 2 (16 bcma) to Greece, Tariff (USD/1000 m^3): 100

As a result, this case also seems doable according to the commercial analysis.

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OTHER ROUTES

If there will be again unsolved political disputes on the doability of TSP, then there will be two options. Which are turning back to Ukraine transit route and SSP.

In addition to these two options, LNG transportation and supply possibility of other markets can be a different solution for Russia as a seller.

TURNING BACK TO GOOD OLD UKRAINE TRANSIT ROUTE

As mentioned above, if the political disputes will not solved on TSP, one of the alternatives is Brotherhood Pipeline, which is one of the oldest pipeline from Russia to Europe through Ukraine.

The pipeline runs from Siberia's Urengoy gas field to Uzhgorod in Western Ukraine. From there, the natural gas is transported to Central and Western European countries. Together with Soyuz and Progres pipelines, it forms the western transit corridor in Ukraine. It crosses the Russian–Ukrainian border north of Sumy. In Ukraine, it takes gas to the Uzhgorod pumping station on the Ukrainian border with Slovakia and to smaller pumping stations on the Hungarian and Romanian borders. The pipeline crossed the Ural Carpathian Mountains and more than 600 rivers including Ob, Volga, Don and Dnepr rivers.

The pipeline is 4,500 kilometers long, of which 1,160 kilometers lays in Ukraine. Its diameter is 56 inches. The total capacity of the pipeline is 100 bcma and it has 42 compressor stations, of which nine are placed in Ukraine.

Besides the advantages of without any current capital investment, the disadvantages can be accepted as being old and disputes between Russia and Ukraine. While considering 1967 is the activation date and assuming the maximum life of a standard gas pipeline is 50 years, this line has to be replaced after 2017 for a reliable transfer. This means, no cost advantage of this pipeline is up to 2017. Therefore, an estimated extra more than 18 billion USD cost will have to be considered. By adding the new additional costs and the current disputes, this option does not seem to be selectable.

ONCE AGAIN SSP

The other alternative, which is already unofficially cancelled pipeline project, is South Stream Pipeline. It is almost the same technical aspects of Turkish Stream. The offshore pipeline is planned to carry 63 billion cubic meters of natural gas per year. It was planned to have four parallel lines with capacity of 15.75 billion cubic meters each. The offshore pipeline was planned to use pipes with a diameter of 32 inches, designed for 4,022 psi of working pressure and having the pipe wall thickness of 39 millimeters. The offshore section is expected to cost 14 billion USD.

Pipeline sections in Bulgaria, Serbia, Hungary, and Slovenia was planned to have capacity at least 10 billion cubic meters per year after the completion of the first pipeline of the project. The onshore pipeline was planned to have eight compressor stations and it is expected to cost 8 billion USD. At least, two gas storage facilities were planned to be constructed, of which one was an underground storage facility in Hungary with capacity of minimum 1 billion cubic meters and another one in Banatski Dvor, Serbia with capacity of 3.2 billion cubic meters.

From the commercial side, both SSP and TSP are estimated to have the similar benefits to the investors. So, political and market related issues will be determinant in such a case SSP to turn back. Moreover, Russia may apply only the offshore section of SSP and give up the onshore part of the pipeline due to the continuing effects of TEP.

LNG & OTHER MARKETS?

In the concept of Russia's target to bypass Ukraine in her gas export policies LNG supplies reaching to other markets via pipelines (such as China) and other pipeline projects through northern Europe to feed the central & southern Europe will not give the economical results to Russian economy as TSP and SSP.

In addition, reaching the other markets such as China is another issue that has to be considered separately. Hence, Russia is planning to sell her resources located in the eastern and central Russia. In the concept of this project, which is called as "Power of Siberia" that has a planned capacity of 38 bcma and by the end of 2018, the 2200-kilometres-long section linking Chayanda field in Yakutia with Blagoveshchensk on Russo-Chinese boarder will be completed. It is further planned to build a section linking Chayanda with the Kovykta field in Irkutsk Region (some 800 km pipeline), and a section from Svobodny in Amur Region to Khabarovsk (1000 km). This will link the Power of Siberia to Sakhalin-Khabarovsk-Vladivostok gas transmission system.[14]

As a result, LNG and other market options will not commercially take the place of planned pipelines and will not be the solution.

ANALSYS & TURKEY'S SITUATION

ANALYSIS: EUROPE

"In 2014, Gazprom Export supplied 146.6 billion cubic meters of gas to European countries. Western European countries accounted for approximately 80% of the company's exports from Russia, while Central European states took 20%. The Western European market (including Turkey) consumes the bulk of Russian exports. In 2014, Gazprom Export delivered 117.9 billion cubic meters of gas to markets in the region. The Eastern and Central European natural gas market is particularly important because of its geographical proximity to Russia. The Russian "blue fuel" takes account of about 3/5 (three-fifths) of gas consumption in the region. In 2014, Gazprom Export sold 28.7 billion cubic meters of gas in this market".[15]

This explanation above shows the importance of Russian gas for Europe. In addition, Russian supplies are a lot more important for the South Eastern European countries, due to the market share. In the concept of the Russian gas export strategy, bypassing Ukraine is a key element for further decisions. That is why; Europe (mostly South Eastern Europe) needs a new route to get the Russian gas. As men-

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tioned above, there are two main alternatives to handle the due capacity being transited via Ukraine. They are South Stream and Turkish Stream pipelines.

Mainly and officially due to the TEP, today and in the future, EU will have disagreements with both the projects. From the offshore technical designs and the economics, both projects are nearly the same. From the demanded onshore parts, where Turkish Stream officially does not have such an extension, again the disagreements will be observed.

From another view, EU needs this volume of gas, which is planned to be transported through SSP or TSP. That is why; although there is no agreement and a solution today, for both EU (buyer) and Russia (seller), a solution to be taken is expected. Hence, this unsolved demand situation will be more difficult than the agreement on one of these pipeline projects for EU.

By comparing SSP and TSP from the side of EU, politically SSP seems a better solution. However, commercially, while considering the high tariffs to transit Italy's gas through Baumgarten, seems a worse selection. Therefore, TSP can be acceptable for EU in the future.

However, at this point the main determiner will be the Turkey – Russia relations.

ANALYSIS: TURKEY

Turkey is the second largest gas customer of Russia, after Germany. In 2014 Gazprom supplied 27,33 bcm[16] gas via the existing pipelines Blue Stream (with 16 bcma capacity) and Trans-Balkan, where the total import gas volume of Turkey was 33 bcma.[17] This means more than 80% volume of Turkish gas was supplied by Russia. This means Turkey is dependent to Russian gas to sustain her energy security. Moreover, the gas power plants realized 47% of electricity production in Turkey in 2014. Although in 2015, this rate has decreased up to 36%[16] levels, natural gas effect on the Turkish electricity market is another important issue for Turkey. From the Russian side, Turkey is the second largest good customer. In such a time, when the oil and gas prices are lower than the expectations, for Russia to keep her relations prosperous with the reliable customer Turkey is important.

"In 2014 Gazprom supplied 27,33 bcm16 gas via the existing pipelines Blue Stream (with 16 bcma capacity) and Trans-Balkan, where the total import gas volume of Turkey was 33 bcma."

In this concept, TSP is beneficial for both Russia and Turkey. With TSP mainly:

- Russia
  - will find a reliable and stable transit country by bypassing Ukraine
  - will be able to reach all demanded markets with the due extensions
  - will supply Turkey gas directly, without any transmitter
- Turkey
  - will find a second direct gas supply from Russia, without a transit country
  - will put an important step on her strategy of being a gas transit center
  - will be able to find a chance to get Turkmen – Uzbek – Kazakh gas in the future
  - will have more chance for more volumes of gas supplies

As a result, TSP is beneficial and important for both Russia and Turkey. In TSP's alternative SSP, Russia has to deal with a less (economically and politically) stable transit country Bulgaria and has to finance the inner Europe part of the pipeline. In addition, she will not be able to use the full capacity of TEP although she finances the whole SSP (including onshore part). However, with the TSP, Russia will be able to reach all her demanded markets with less endeavor, money and struggle. Furthermore, the first step of the project, which is the delivery of Turkish volume, is ready to launch, This means less risk, less work, less money, making EU to think about her own gas demand and less headache.

However, recent events and their results confused both parts. Russia is attacking to the Syrian Turkmens near Turkish border, by claiming that she was bombing the ISIS. On the other side, during these unjust attacks, her aircraft's border violation made Turkey to shoot it down, to protect her own air land. The results of this event badly affected the

relations between these countries. Naturally, there occurred political risks for the doability of TSP.

Russia today, in the concept of TSP, may be studying on new alternative strategies; however, future political moves and actions will show the final results. In addition, it will not be easy for Russia to find another economic way to feed the South Eastern Europe by bypassing Ukraine and without Turkey, while TEP is not deactivated. Commerciality will also be an important factor as the politics before giving the last decisions.

From another view, the losers of cancellation of TSP will be both Russia and Turkey and also EU, if another valid solution cannot be found. However, the gainer will be US, who wants Russia to put in more struggle. (Note: Bulgaria again will be the gainer, however, from the global politics side, this fact is not considered.)

As a result, for the future steps of TSP, both Russia and Turkey have to think about the possible gain-gain philosophy other than taking sharp actions.

TURKISH STREAM OR AGAIN SOUTH STREAM?

There are public statements about the cancellation of SSP; however, there is not an official cancellation letter sent to the Bulgarian government. This currently means that there is a chance for Russia to step back to SSP again. Nowadays, the speeches and declarations of Bulgarian and Russian authorities give the signal about the studies on a shift of TSP to SSP.

By considering the onshore transportation route of Russian gas, with the already worked organizational items, agreements and funding SSP may be one step ahead compared to TSP, where its extension route TESLA is not clear, yet. However, Italy's volumes change the balances in economics and make it uneconomic for Italy to get her gas from Baumgarten, will be another issue to be considered.

As a result of the political conflicts between Russia and Turkey, there is a chance for SSP to turn back to life; however, economical, market related and legislative (TEP) items have to be cleared.

RESULTS

There are five sources for EU to meet her gas demand. First are the politically most suitable and an economic choice, which is Norway. However, the supply volumes of Norway are decreasing. The second is the Russian supplies, which are and which will be the dominant resource according to the volumes and price comparisons. Third are the North African resources that only provide gas to Spain or Italy. Forth are the possible LNG supplies with naturally higher prices. Last is the Azeri supply, which is planned to be started with 10 bcma in 2019's. While comparing these five options, Russia will be the most important supplier in the future as today.

The most important gas supply option for EU: Russian gas has three main routes to follow. Which are Nord Stream, Yamal and Brotherhood pipeline systems. Nearly 60% of Russian gas has been transited via Brotherhood pipeline system to the Europe. So, Brotherhood is the most strategic line for Russia and EU gas trade. From the technical sight, this pipeline system is old and has to be modernized with an estimated cost of more than 18 billion USD. From the political sight, Russia does not want her trade to suffer from Ukraine's unexpected actions and plans to change her trade route by bypassing Ukraine.

As the result of this scenario, South Stream and Turkish Stream pipelines are put forward as alternatives to (some parts of) Brotherhood pipeline system. With South Stream or Turkish Stream Russia will be able to feed the South Eastern Europe and some parts of Central Europe. Trans-Balkan's part of Brotherhood pipeline system will be able to be used for other gas transportations without being dependent on Ukraine.

Initially, the selected route was the South Stream, however, due to some conflicts with

"Future political moves and actions will show the final results. In addition, it will not be easy for Russia to find another economic way to feed the South Eastern Europe by bypassing Ukraine and without Turkey."

EU, Russia shifted from SSP to Turkish Stream. Doability of Turkish Stream is possible by considering the technical, resource based, commercial and market related issues. However, unsolved political conflicts will be the determiner for the future of the project.

Due to worsening relations between Russia and Turkey may be resulted in the cancellation of TSP and a step back to SSP. However, with the current conditions of SSP, this occurrence will not be possible also. In addition, such a step will be resulted in the increased interest of Turkey on other gas supplies such as more Azeri gas, Iranian & Eastern Mediterranean gas and LNG. This will also result in Russia to lose her second big and reliable customer Turkey.

"Doability of Turkish Stream is possible by considering the technical, resource based, commercial and market related issues. However, unsolved political conflicts will be the determiner for the future of the project."

Forward moves on the chessboard over the Middle East & Europe may change all the balance in the region; however, the best and doable option seems to be the TSP and 24 bcma TESLA to feed the due markets.

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ABSTRACT