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Russia and European Energy Security

Outcomes of the Nabucco, South Stream and Turkish stream projects

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Energy Security is one of the key topics that are of mutual strategic interest to both Russia and the EU. The aim of this paper is to analyze EU-Russia relations from an energy perspective. Both Russia and the EU face serious and complex energy challenges. Worldwide political and economical crises, several Russia-Ukraine gas conflicts and other challenges enforce the EU and Russia to intensify their cooperation and deepen integration in this field. This paper discusses the growing relevance of the EU-Russia energy relationships, focusing on Russia's increasing role in diversification gas route. This thesis presents a qualitative assessment of the impact of several gas pipeline projects, Nabucco, South Stream and Turkey Stream on EU's energy security. The dissertation provides the reader with detailed outlook of the role of geopolitics and transit countries in Energy Strategies. Several case studies will be presented to understand the nature of current EU-Russia Energy relations and their prospective.

Keywords: The EU, Russia, Energy Security, Natural Gas Supply, Pipelines, South Stream.

Contents

List of Abbreviations

Bcm	Billion Cubic Meters
LNG	Liquefied Natural Gas
The EU	The European Union
IEA	The International Energy Agency
WEC	The World Energy Council
USSR	The Union of Soviet Socialist Republics
TEP	The Third Energy Package
EC	The European Commission
Mtoe	Million Tonnes of Oil Equivalent
ITGI	The Interconnector Turkey-Greece-Italy Pipeline
TAP	The Trans-Adriatic Pipeline
TANAP	The Trans Anatolian Pipeline
SDC	Azeri Shah Deniz Consortium

Introduction

The topic of this Bachelor´s thesis is Russia and European Energy Security. The main field of the topic is Energy industry and its security aspects, specifically Natural gas logistics. The paper will cover different aspects of Russia-EU gas relations including geopolitics, history and current trends, logistical challenges; and new gas infrastructure projects led by the EU and Russia.

The Energy field is not a new topic and it always presents the interest for many groups of individuals, international organizations and countries. Energy security has often been an issue in energy policy for the past 100 years. Especially now it is a high priority issue on the policy agenda in view of its significance for the whole economy of every country.

Accordingly to ExxonMobil's 2015 energy forecast natural gas will be the fuel with the highest demand growth, overtaking coal as the second most popular energy source with a 65% gain vs. its 2010 levels. Most gas exports would be accomplished via LNG shipments, which will triple, flowing to Asia and Europe from the Middle East and Russia. Most energy trade overall will follow these routes, as European and Asian production will fall far short of demand. North America is expected to produce enough liquids and gas to become a net exporter, while Latin America will produce slightly more liquids than it requires. Exports from Africa will go down as local demand rises. Russia will remain the world's most abundant producer of gas, and oil surpluses will come from the Middle East and Russia. (Parekh Erin Nelson, 2015)

Demand for natural gas is growing but unfortunately many questions related to energy security are still unclear from different prospective. This thesis aims to bring to light the current state of the EU-Russia energy relations. New gas

projected routes and the rationale behind them, including their economic viability and political motivations will be discussed. I intend to define the term Energy Security both for Russia and the EU, assess the EU actions towards improving its Energy Security and role of Russia in these processes. The paper attempts to explain the issue of EU Energy Security of supply of natural gas with a special focus on Russia underlying their mutual interdependence. Thus, main research questions are: Is Russia and its gas projects an answer to European Energy Security? What is the role of Ukraine and geopolitics in Energy Security? What are the prospects of the EU's Energy Security diversification?

This paper was conducted on the basis of reviewing numerous newspaper and magazine articles, legal acts and regulations issued by the EU and Russia, outlooks and surveys on the energy industry, publications of energy industry analysts, as well as official web sources of energy institutions and ongoing gas infrastructure projects. Many publications were found from The International Relations and Security Network[1] (ISN ETH Zurich) which contains many articles and intergovernmental publications on energy matters. Due to the nature of the research work primarily a qualitative approach will be used to answer the research questions. In order to assess and understand nature of the EU-Russia energy relations several case studies will be done. According to Yin (2003) a case study is an appropriate research method when the author intends to answer "how" and "why" questions and cannot manipulate the behavior of those involved in the study.

[1] http://www.isn.ethz.ch/

2. Energy security

2.1 Energy Security definition

Energy security becomes more and more of an issue in the face of worldwide increasing energy consumption, uncertainty about the stability of supply, prices of energy resources and delivery conditions. Especially in the light of recent events in Ukraine between 2006 and 2014 Energy Security has become an urgent matter that must be under constant scrutiny. Threats to Energy Security are mainly seen in political instabilities of energy exporting and transit countries, geostrategic and geopolitical factors, decreasing reserves of natural recourses and the infrastructure of the existing energy markets.

The concept of Energy Security is not new and broadly defined in many scientific papers and legal acts. To my opinion the definition given by Cristian von Hirschhausen clearly describes the term "Energy Security".

> Energy security can be defined as a state where the risks related to high dependence on energy imports, political instability in producing and/or transit countries, as well as of other adverse contingencies, are mastered at reasonable economic costs (von Hirschhausen C., 2005, p. 2).

Another definition of Energy Security which is done by The International Energy Agency (IEA) also emphasizes the importance of constant and reliable supply of energy resources (Figure 1).

> Energy Security is the uninterrupted availability of energy sources at an affordable price. Energy security has many aspects: long-term energy security mainly deals with timely investments to supply energy in line with economic developments and environmental needs. On the other hand, short-term energy security focuses on the ability of the energy system to react promptly to sudden changes in the supply-demand balance (IEA, 2015).

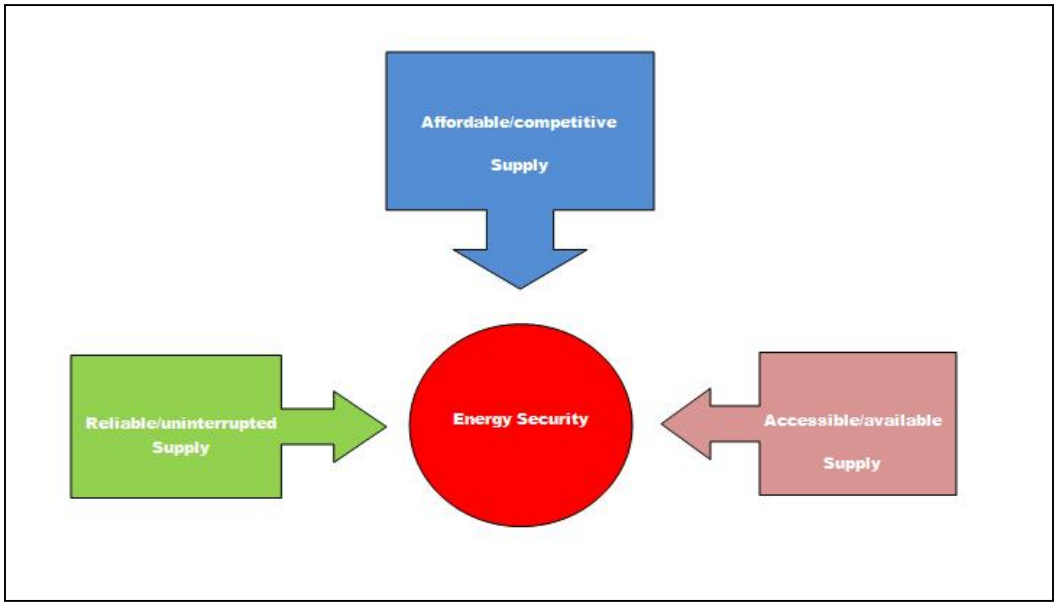

Figure 1. Defining Energy Security .Source: (IEA, 2015).

Figure 1 illustrates the IEA's above-mentioned definition of Energy Security. Reliability, affordability and accessibility of supply are the main characteristics of Energy Security. Energy Security of a country is highly dependent on uninterrupted supply of energy resources. Key factors of stable and constant supply of such resources are political stability and affordable prices of resources. A country that produces and can utilize different energy resources has a high Energy Security. The same could be applied to a country that has an access to a number of reliable suppliers with well established logistics infrastructures. On contrary a country that uses suppliers with unreliable transit distribution points has lower security level. The World Energy Council (WEC) created a certain index of Energy Sustainability which is called "Energy Trilemma Index". This Index ranks countries in terms of their ability to provide sustainable energy policies through the 3 dimensions of the energy trilemma: Energy Security, Energy Equity and Environmental Sustainability. WEC defines Energy Security as:

> Energy Security is the effective management of primary energy supply from domestic and external sources, the reliability of energy

> infrastructure, and the ability of participating energy companies to meet current and future demand (World Energy Council, 2015).

Thereby Canada, Russia, Qatar and the other 7 top countries have the highest Energy Security level mainly due their high level of energy production or low dependency on fuel exports (Figure 2). Even though Russia has an exceptional level of Energy Security its overall Trilemma index is quite low due to an average performance on energy equity (the accessibility and affordability of energy supply across the population), and a poor environmental sustainability ranking. On the other hand Switzerland maintains the highest overall Energy Trilemma index due to its high energy equity and ultra-low emission energy infrastructure.

Figure 2. Top 10 Energy Trilemma Index performers overall and per dimension. Source: (Wyman Oliver, 2014, p.16).

In conclusion we can say that Energy Security is a complex term that has several peripheral dimensions in terms of energy equity, environmental issues, political and economical matters. Energy Security is an integral part of the internal and external policy of any country. The following two sections present the EU and Russian energy policies to provide an overview of the high importance of Energy Security and related matters.

2.2 The EU Energy Policy

Energy security has become an important policy area for the EU from the 2000s onwards. The main distinction in energy security concepts could be found between energy importing and exporting countries. The EU countries are mainly energy importing countries and they are naturally concerned about energy security of supply. The exporting countries are more concerned about the security of demand. Nevertheless many producing and exporting countries may also face energy disruptions of domestic supply what leads to domestic energy insecurity.

There are two major types of risks need to be taken into account: source risks and transit risks. The EU's leaders adopted an "Energy Policy for Europe" in March 2007 (Communication from the Commission to the European Council and the European Parliament - an energy policy for Europe, COM/2007/0001). The European energy policy is based on three-pillar strategy focusing on the competitiveness, security of supply and sustainability of energy. According to above mentioned legal act the main priorities for the EU are: minimizing the EU's vulnerability concerning imports, shortfalls in supply, possible energy crises and uncertainty with respect to future supplies.

The Energy Community Treaty (Council Decision 2006/500/EC of 29 May 2006 on the conclusion by the European Community of the Energy Community Treaty) provides for the creation of an integrated energy market (electricity and gas) between the European Community and the contracting parties. Other important legal acts of the EU are The Energy Charter Treaty and The Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects which were signed in December 1994 and entered into legal force in April 1998. The roots of the Energy Charter date back to a political initiative launched in Europe in the early 1990s. The collapse of the USSR resulted in devastating economic and social consequences in the countries of the former Soviet Union. Therefore gas transit risk was already evident, especially in Ukraine: with some supply reductions by Russia. At the end of the Cold War there was a need to overcome economic divisions especially in energy sector; for this and other reasons the Energy Charter process was initiated. Fifty-two European and Asian countries have signed or acceded to the Energy Charter Treaty. All EU states are individual signatories, but the Treaty has also been signed collectively by the European Community and Euratom so the total number of parties to the Treaty is fifty-four. Of these fifty-four, all have ratified the Treaty except for five: Australia, Belarus, Iceland, Norway and the Russian Federation. Belarus and Russia have accepted provisional application of the Treaty, which meant that - pending ratification. Russia and Belarus agreed to apply the Treaty to the extent that it was consistent with their own constitutions, laws and regulations. On 20 August 2009 the Russian Federation has officially informed the Depository that it did not intend to become a Contracting Party to the Energy Charter Treaty. (Energy Charter, 2015)

Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions of 10 November 2010 - Energy 2020, A Strategy for competitive, sustainable and secure energy (COM (2010) 639 final) sets out the European Commission's

energy strategy in the period to 2020. The strategy is structured around 5 priorities:

- limiting energy use in Europe;
- building a pan-European integrated energy market;
- empowering consumers and achieving the highest level of safety and security;
- extending Europe's leadership in the development of energy technology and innovation;
- strengthening the external dimension of the EU energy market.

The list of the EU's legal acts is huge and it mainly concerns field of sustainability, the implementation of a common energy market and a common energy security policy. But the barriers to the realization of a common energy security policy remain formidable. Some member states of the EU concern about transferring their sovereignty to the EU Commission. It could be explained by the fact that energy is a major domestic policy issue and a prerequisite for national economic growth. Additionally the consumption of energy varies considerably in each individual member state thus it is difficult for them to speak with one voice regarding the EU Energy policy. There is a fundamental conflict between the goals of energy security and the desire to create a competitive market – without centralized coordination. Thus, the energy security is likely difficult to achieve without balanced Energy policy.

In Europe, Energy politics constitute a solid economic and political challenge. The gas supplies to Europe are made according to agreements between gas supplying and gas transit countries. This system is not fully secure and vulnerable to disruption and gas 'wars' or crises. The Ukraine gas crises in 2006, 2009 and 2014 were real threats to energy security in the EU. A strong geopolitical tension between Russia and the West over Ukraine in 2014 has

forced gas importers in Europe to rethink their energy policies. Furthermore in 2007 the EU signed the so-called Third Energy Package (TEP) that outlines a set of rules regulating the European gas and electricity market. TEP aims at increasing competition on the energy market, allowing other players to join the sector and liberalizing energy prices. This Package consists of two Directives (Directive 2009/72/EC, Directive 2009/73/EC) and three Regulations (Regulation (EC) No 714/2009, Regulation (EC) No 715/2009, Regulation (EC) No 713/2009). (European Commission, 2015) One of the core elements of TEP prohibits a single company from both owning and operating a gas pipeline and contains rules on third party access to the natural oil transportation grid.

2.3 Russian Energy Policy

Oil and gas producing/exporting countries like Russia, Iran, Iraq, Kuwait, Saudi Arabia and others are mainly concerned about the security of demand. For such countries energy exports present the essential part of their revenues, thus the security of demand is a big issue for them. Besides, disequilibrium, or a shock, in energy prices may create instability. For Russia, a producer state, energy security has a different meaning, which stipulates security of demand, emphasizing greater access to markets and consumers (Yergin, 2006, p.77). Control of pipelines is a major matter for Russia. It is therefore not surprising that Russia chose not to ratify the Energy Charter Treaty mentioned above. The ratification of it will give the Energy Treaty Community the possibility to regulate transit issues and thus access to export pipeline networks under the principles of freedom of transit and non-discrimination.

Marshall Goldman, the author of the book "Petrostate: Putin, Power, and the New Russia" describes Russia as an energy superpower. Goldman calls Russian natural gas its New Secret Weapon. It is difficult to disagree with those

statements. Russia holds the largest natural gas reserves in the world (See Figure 3).

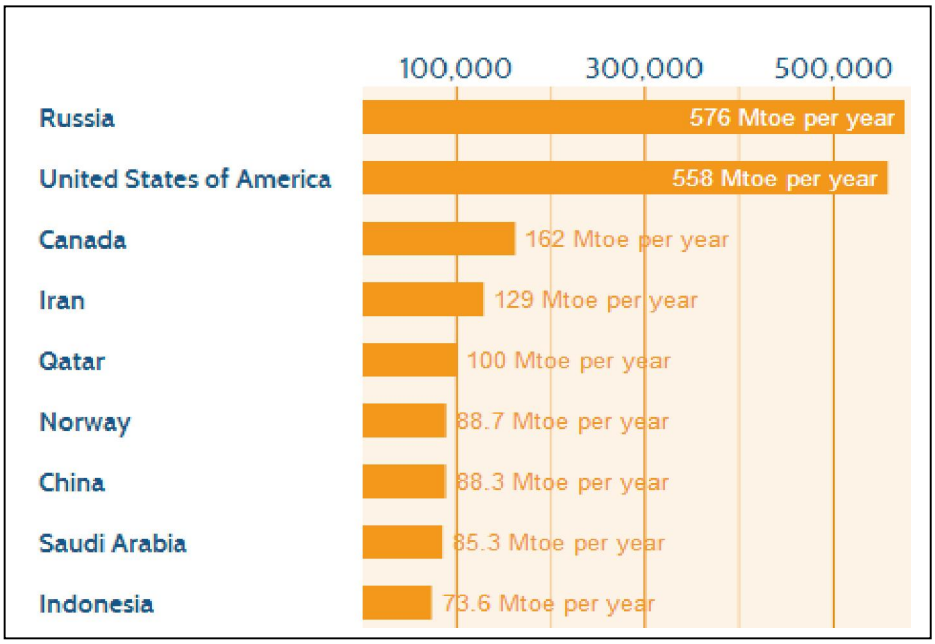

Figure 3. Top Gas Producing countries 2015, Source World Energy Council, 2015 [Online].

After the fall of the Soviet Union, the Kremlin no longer had the option of using military power to maintain its interests abroad. Therefore, Russia had to find another way to protect its interests. The Kremlin has gained control of Gazprom in order to render Gazprom's gas products as a tool to enforce Kremlin policies abroad.

In September 2005, Vladimir Putin, president of Russia, utilized the Kremlin's stake in Gazprom to enlarge the Kremlin's ownership of the Russian oil industry (Goldman, 2008, p.146). Currently the state-run Gazprom produces about 80% of Russia's total natural gas output. Gazprom controls more than 65% of Russia's

proved gas reserves. Additionally Gazprom has control over Russia's natural gas pipeline systems.

Vladimir Putin quickly admitted the importance of energy as a political tool. Mr. Putin also made it clear, by breaking up the well-known Yukos oil company and imprisoning its chief executive, Mikhail Khodorkovsky, that he would allow no one to challenge his authority. History evidences many examples of how Mr. Putin and Kremlin used natural gas as a political tool. In the fourth quarter of 2008, Armenia and Belarus paid the lowest prices (US$110 and US$128 per 1000 m^3 respectively), while Moldova and Georgia bought their gas at the highest prices (US$287.60 and US$235 respectively). Obtaining lower gas prices usually requires some concessions to be made to Russia. In the case of Armenia, Gazprom took control over strategic assets in the energy sector (the ArmRosGaz company, practically all gas infrastructures in the country, and the fifth block of the Razdan power plant), in the aftermath of the signature of a three-year gas deal in April 2006. (Loskot-Strachota, 2009, p.20)

Recent Russia-Ukraine conflicts confirm the strong political rationale behind the deals. Usually after gas conflicts Russia increases the gas price for Ukraine dramatically. Such fluctuations in prices do not sound like economically rational decisions, more like political ones. Russia desires to transport gas through Ukrainian infrastructure to Europe at the lowest rates possible. In order to reach this goal Russia may imply higher gas prices to influence Ukrainian politics. At the same time Ukraine as well wants to have highest transit fees from Russia. Thus, both Russia and Ukraine hold strategic economic weapons against each other. If Ukraine fails to pay its gas debts or its diplomacy becomes too Western (Viktor Yushchenko presidency, Petro Poroshenko presidency - since 2014), Russia may stop deliveries of gas to Ukraine, as it did in 2006 and 2009, damaging both Ukraine's and Russia's economies. These 2006 and 2009 gas crises can hurt the Russian government economically, humiliate Russia politically,

and damage its reputation in Europe as a stable source of supply. And the worst scenarios that may dramatically disrupt both supply and demand of natural gas are military conflicts, geopolitical confrontations between Russia and Ukraine, overall world political tension and western sanctions against Russia.

In light of such strong political instability the EU and Russia should clearly understand the consequences of possible supply disruptions as some European countries entirely rely on Russia gas. This dependence leaves them vulnerable to supply disruptions. Thus Russia has been trying to implement different gas projects to diversify the routes for supplying Russian natural gas to European countries.

2.4 Dependency and Vulnerability

Russia remains an important trade partner for the EU, and vice versa. Russia holds the world's largest natural gas reserves (See Appendix A) and EU member states are the premier destination of Russian energy resources. Russia and the European Union are interdependent in terms of their energy policies. The EU is highly dependent on gas energy from imports by a factor of 65.8% in 2012 (Figure 4).

	1995	2000	2005	2010	2011	2012
Total	43.0%	46.7%	52.2%	52.7%	53.9%	53.4%
Solid Fuels	21.5%	30.6%	39.4%	39.4%	41.7%	42.2%
of which Hard Coal	29.7%	42.6%	55.7%	57.9%	62.3%	62.5%
Petroleum and Products	74.0%	75.7%	82.1%	84.4%	85.1%	86.4%
of which Crude and NGL	73.0%	74.5%	81.3%	84.6%	85.5%	87.8%
Natural Gas	43.4%	48.9%	57.1%	62.1%	67.1%	65.8%

Figure 4. EU 27 Energy Import Dependency by Fuel. Source: European Commission. (2014), p.24.

Energy dependency strongly differs among EU member states. Among its member states, only Denmark and the Netherlands presented exporting activity. In 2012, their natural gas dependency rates were minus 54.2 % and minus 74.5 % respectively (See Appendix B). The United Kingdom, a net exporter until 2003, became an importer with a dependency rate that reached 44.2 % in 2011. In 2012, the lowest dependency rates were recorded in Romania (21.2 %) and Croatia (37 %) while Finland, Estonia, Sweden and many other EU countries were 100 % dependent on gas imports. (European Commission, 2014, p.72)

Russia is the principal EU supplier with a 32 % share of total natural gas imports in 2012 followed by Norway with a 31 % share (Figure 5).

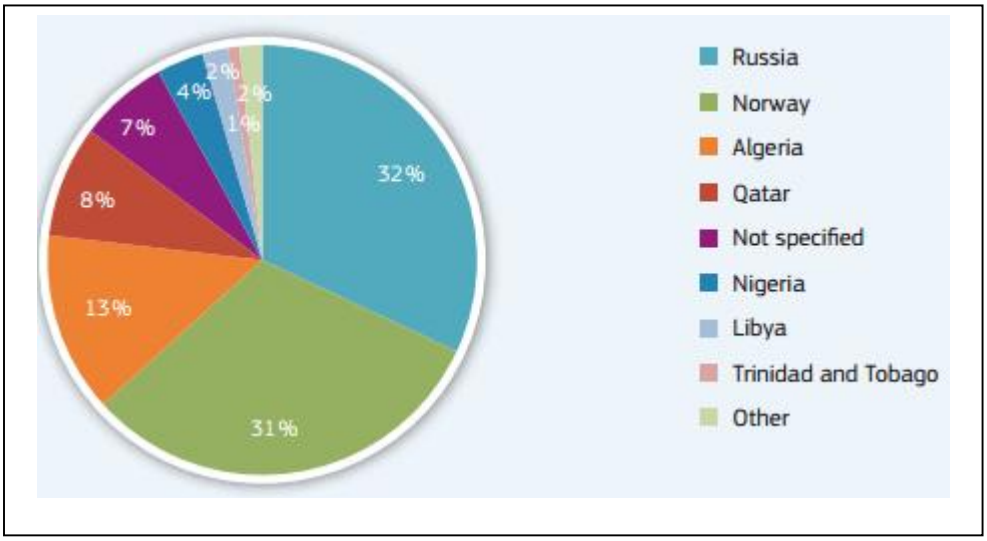

Figure 5. EU imports of Natural Gas by country of origin 2012. Source: (European Commission, 2014, p.26).

If alternative energy sources would not be implemented in the nearest future the overall dependence on energy imports is expected to grow, according to EU

forecasts (Figure 6) and international predictions made by the International Gas Union, in addition to forecasts of The Energy Research Institute of the Russian Academy of Sciences and Analytical Center for the Government of the Russian Federation (See Appendix C).

The EU predicts that because of "its green properties" and highly efficient application technologies, natural gas will remain the fuel of choice and will continue to make a growing contribution to the energy supply in the EU countries. Natural gas consumption in the EU is expected to increase from 438 mtoe in 2005 to 625 mtoe[2] in 2030, which is an increase of 43% (Figure 6). The share of natural gas in the European primary energy demand will rise from 24% in 2005 to 30% in 2030 (18% in 1990). (Eurogas , 2010, p.3) At 60% of the total demand increase, most of the growth will come from power generation.

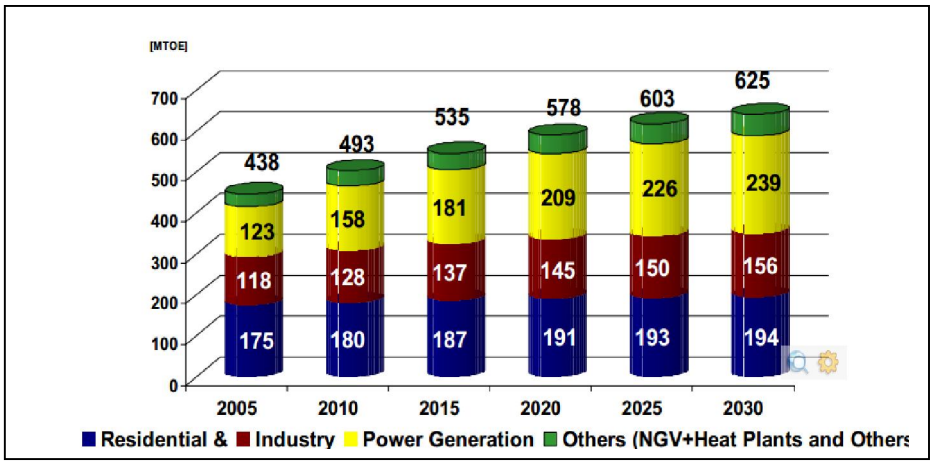

Figure 6. EU 27 Natural Gas Demand outlook by sector. Source: Eurogas (2010), p.3.

The high level of mutual dependency obliges both Russia and the EU to promote a respectful relationship. The EU and USSR conducted quite stable energy import-export relations even during the period the Cold War. The Russian-

[2] Million Tonnes of Oil Equivalent. The tonne of oil equivalent (toe) is a unit of energy: the amount of energy released by burning one tonne of crude oil, approximately 42 GJ (joules). Source: American Physical Society. (2015).

Ukrainian gas disputes of 2006, 2009 and 2014 have served as accelerator for building up new energy relations. Additionally, these events produced a new degree of concern that Russia is becoming an unreliable supplier or is using its energy products as political weapon.

Nonetheless, both sides are trying to build respectful relationship concerning energy security. On the occasion of the sixth EU-Russia Summit (30th October 2000, Paris), it was agreed to institute an Energy Dialogue on a regular basis between the EU and Russia to enable progress in mutual cooperation. The last (8^{th}) Energy Dialogue meeting of the EU-Russia Gas Advisory Council took place on 19 November 2013 in Brussels (European Commission, 2015). The overall objective of the energy partnership was to enhance the energy security of the European continent by binding Russia and the EU into a closer relationship.

The EU-Russia energy relationships are complicated due to the fact that not all EU members are equally dependent on Russian gas. We can clearly see that not all countries have the same concern towards Energy policy: For example, Finland is fully dependent on Russian gas; Spain receives none (Figure 7).

European Union (27 countries)	% Gas Imported from Russia
Austria	58
Belgium	0
Bulgaria	100
Cyprus	0
Czech Republic	78
Denmark	0
Estonia	N/A
Finland	100
France	19
Germany	40
Greece	60
Hungary	71
Ireland	0
Italy	29
Latvia	N/A
Lithuania	100
Luxembourg	0
Malta	0
Netherlands	11
Poland	52
Portugal	0
Romania	15
Slovakia	96
Slovenia	49
Spain	0
Sweden	0
United Kingdom	0

Figure 7. European Gas Imports from Russia by Country as Percentage of Total Consumption. Source: BP 2010. Global Statistical Review of World Energy.

It is also important to mention that some European state-owned companies aim to invest in Russia. Thus Moscow implements different rules when it deals with different states. One of Russia's top priorities has been the promotion of two major pipeline projects such as North Stream and South Stream. Moscow made deals with major German energy companies and secured the services of former German Chancellor, Gerhard Schröder, as chief lobbyist. Schröder was determined to press ahead with Nord Stream - German energy security was too important, despite the cost. With the South Stream project, Mr. Putin made deals with Austria, Bulgaria and Greece, as well as Turkmenistan, with the aim of

sabotaging the EU-preferred Nabucco pipeline. Therefore the Polish defence minister went so far as to compare a planned German-Russian gas pipeline to the 1939 Nazi-Soviet Pact partitioning Poland. (Beck J., 2006)

Energy relations between the EU and Russia cannot be solely built on commercial relations. , The overview of the previous chapters proves that politics and individual countries' interests are of high importance and many EU governments can find themselves coming under pressure from Russia.

3. European Energy Logistics

3.1 Gas infrastructure and Supply chain

A large proportion of natural gas needs to be transported from the producing countries to the consuming countries. International high pressure pipelines are fast transporters of the natural gas. They provide direct and reliable links from producers to consumers. Another mean of the gas transportation is gas liquefaction. Gas liquefaction makes natural gas easier to transport by ship or by road in tankers to the market where it is then degasified (Figure 8). Liquefied natural gas (LNG) has become as important as pipelines as a mean of international delivery of natural gas. Figure 8 is a simple illustration of the main components of the Natural gas value chain.

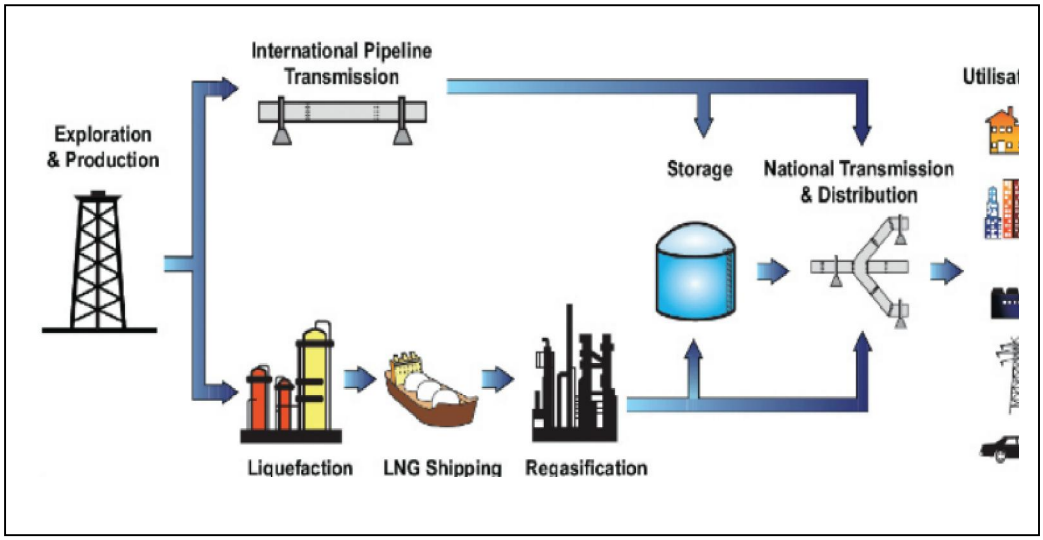

Figure 8 Gas Value Chain. Source: (WEC, 2013, p.116).

In Europe, indigenous resources currently satisfy about half of the gas demand. The largest European producers are Norway (105 bcm), the Netherlands (88 bcm) and the UK (60bcm). Europe is, and will remain, by far the largest net importer; European net imports could exceed 440 bcm by 2030, a 58% increase

compared to 2010 levels. Europe exports only small amounts of LNG from Snovhit in Norway. (WEC, 2013)

Europe receives natural gas from various sources, either by pipeline or in the form of LNG. As it was mentioned in the previous paragraph Russia is the main exporter of natural gas to Europe. After Russia, Norway is the second key natural gas supplier to the European region. Norwegian gas goes mainly to Germany, France and the UK. Around 81% of total imports to Europe come via pipelines. The other portion of Natural Gas comes as LNG from Algeria, Qatar, Nigeria, Egypt, and Trinidad & Tobago. For example, the UK, Italy, and Spain are the main importers of LNG from Qatar while France, Spain, and Turkey are the main buyers of Nigerian gas. (Niftiyev Efgan, 2013)

From the previous chapter we have learnt that over the next two decades, the total natural gas import demand in Europe may increase. It obliges Europe to think about additional supply and diversification. Besides the EU learnt in 2006, 2009 and 2014 how disputes in gas relations between Russia and Ukraine may influence the security stability of European gas market.

3.2 Transit countries and geopolitics

Russia's energy relations with the EU have created strong interdependence between the two counterparts - the EU needs Russian natural gas, and Russia depends on access to the EU energy market. But besides the EU and Russia there are other important players of EU-Russia gas relations - transit countries. Energy flows from Russia to Europe involves land transit countries like Ukraine and Belarus, and this attract great attention since the fall of the Soviet Union.

There are two major pipeline systems that carry Russian gas through Ukraine to Western Europe - the Bratstvo (Brotherhood) and Soyuz (Union) pipelines (Figure 9). The Bratstvo pipeline is Russia's largest pipeline to Europe. It crosses from Ukraine to Slovakia and splits in two to supply northern and southern European countries. The Soyuz pipeline links Russian pipelines to natural gas networks in Central Asia and supplies additional volumes to central and northern Europe. A third major pipeline through Ukraine (Trans-Balkan) delivers Russian natural gas to the Balkan countries and Turkey (US EIA, 2015).

In the past, as much as 80% of Russian natural gas exports to Europe transited Ukraine. This number has fallen to 50%-60% since the Nord Stream pipeline was built. The Nord Stream is a direct link between Russia and Germany under the Baltic Sea, and came online in 2011. The Nord Stream route crosses the Exclusive Economic Zones of Russia, Finland, Sweden, Denmark and Germany, as well as the territorial waters of Russia, Denmark, and Germany. (Nord Stream, 2015) This project is a good example of a constructive mutual cooperation in the sphere of Energy Security as the Nord Stream definitely reinforces security of supply bypassing Ukraine.

Figure 9. Major natural gas transit pipelines flowing trough Ukraine. Source: US EIA, 2015

Currently 16% of Russian natural gas consumed in Europe flows via Ukraine (US EIA, 2015). It means that if Russia constitutes 32% (see Figure 5) of overall Europe gas consumption, half of the supplies from Russian side are subject to transit risks. Especially the last 2014 Russia-Ukraine crisis has contributed to severely damaging relations between the EU and Russia and the rest of the western world.

Since the Ukraine Revolution February 2014 (the so-called Euromaidan Revolution) all transits via Ukraine have become a problematic issue. The Euromaidan Revolution resulted in civil war, Ukraine split and severe confrontation broke out between Eastern Ukraine and the Kiev authorities. Moreover after a referendum in March 2014 Crimea became the part of the Russian Federation. The referendum was not recognized as a legal act by the EU, USA and the rest of the world. Only several friendly to Russia countries such as Kazakhstan, Armenia, Argentina, Cuba, Venezuela, Abkhazia and few others accepted the referendum as legal. Assuming the fact that Russia has been de facto at war with Ukraine since Russian activity in Crimea, and its direct or indirect support to the anti-Kyiv armed rebellion in Donbas Energy Security of the EU become under extremely high risk. There is a real danger that gas suppliers can be disrupted as happened in 2006 and 2009 due to lack of agreement on debt and pricing issues. Civil war in Ukraine may lead to physical disruption of gas supplies what could be even more problematic than gas price negotiations.

Since the collapse of the Soviet Union Ukraine has used its strategic transit position to negotiate low gas prices. It was a mutual balance of fair gas price for Ukraine and low transit costs for Russia but only until the gas crises of 2006 and 2009 when Ukraine siphoned off gas intended for the European market. Ukraine's suspicious activities and its unwillingness to pay debts in time led Russia to rethink its energy security activities. Russia focused on the tactic of removing transit risks by implementation of new pipeline routes. Russia already

completed several projects: the Yamal Europe pipeline, the Blue Stream pipeline, the Nord Stream line across the Baltic Sea and few others under construction processes (Figure 10). And until recently by creating a new line through the Black Sea (The South Stream) Russia aimed to finally free Russia of its reliance on a potentially disruptive neighbor Ukraine.

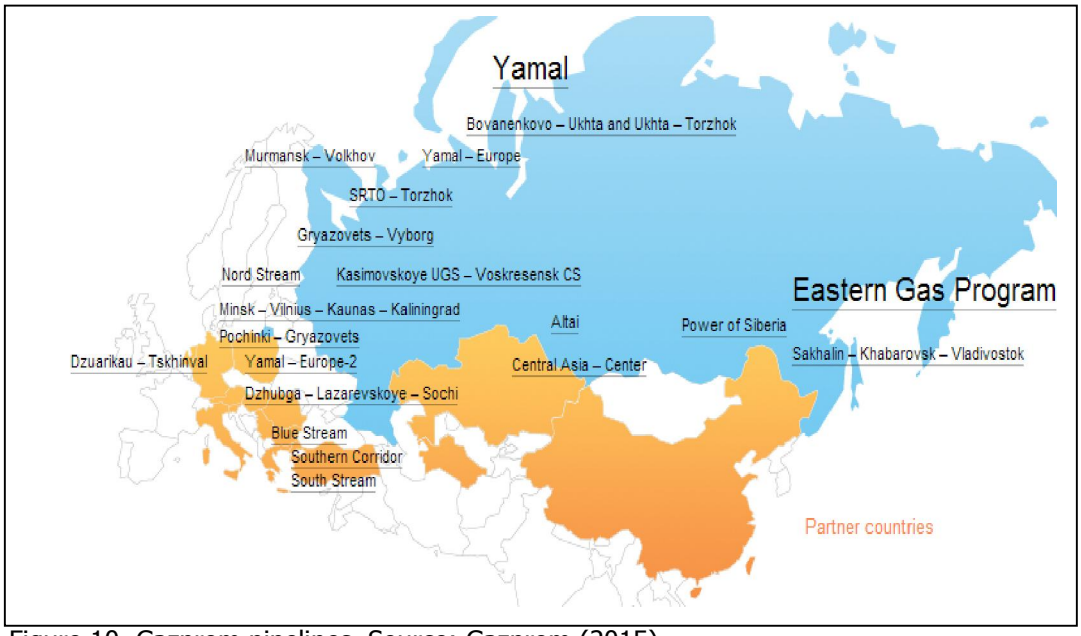

Figure 10. Gazprom pipelines. Source: Gazprom (2015).

Thus the Russian-Ukrainian crisis of February 2014 has boosted the issue of Energy Security both in the EU political agenda and the Russian one. Eventually, on May 2014 the EU published its new European Energy Security Strategy. The Strategy aims to ensure a stable and abundant supply of energy for European citizens and the economy. The EU published "Short term measures for winter 2014-2015" in case of a complete halt of Russian gas imports to the EU or in case of a disruption of Russian gas imports through the Ukrainian transit route (European Commission, 2015). But short term measures may not resolve the long-term issue. Supplier and route diversification is needed to overcome the low energy security level.

4. Diversification of Gas routes in Europe

4.1 Overview of competing pipeline projects

In order to increase Energy Security level the EU should reduce its energy import dependency by the means of internal measures, such as adapting the energy mix towards alternative and renewable sources, increasing energy efficiency, reducing consumption and diversification of new gas routes. The necessity to find an alternative to Russian Natural gas was the main factor that forced Eastern and Central European states to start the cooperation with the South Caucasus. As it was mentioned before the need for alternative sources became especially visible after gas crises of 2006 and 2009, when supplies to several Eastern and Central European countries were disrupted because of gas price conflicts between Ukraine and Russia. The European Commission decided to add the Fourth Corridor or the Southern Gas Corridor to the three existing gas corridors. From its inception, this project sought to take natural gas from the Azeri field Shah-Deniz 2 (Sartori Nicolo, 2012, p.3). There are several competing players within the Southern Gas Corridor project, presenting different interests and not all of them supported by the EU. The Southern Gas Corridor initially included three main pipelines: the Interconnector Turkey-Greece-Italy Pipeline (ITGI), the Trans-Adriatic Pipeline (TAP) and the Nabucco pipeline. Another possible pipeline in the Southern Corridor until recently was the Russian project - the South Stream (Figure 11).

The Nabucco project was the main competitor of the Russian South Stream Project. The South Stream was actually a reflexive project, as it was designed right after the EU announced its desire to build a direct Caspian Sea-Middle East-EU southern gas corridor, primarily through the Nabucco pipeline. Nabucco was planned to be a 3,300km natural gas pipeline project through which it was intended to bring up to 31 billion cubic meters annually of Central Asian gas from

the eastern end of Turkey, across Romania, Bulgaria, and Hungary into Austria by 2020. Construction was expected to begin in 2008 and finished in 2011-2013. It was designed to bypass Russia to transport gas to Central Europe. For these reasons this pipeline had a substantial geopolitical significance, and was strongly supported by the EU. But the project had encountered financial problems and lack of political will in some member states, particularly Hungary, which in March 2007 announced that it had agreed to a Russian proposed extension of the Blue Stream pipeline project instead (Borisocheva, 2007, p.14). Eventually in 2012 the Nabucco consortium decided to downsize its project into a Nabucco West pipeline with a capacity of 16 bcm - just over half the capacity of the originally planned 31 bcm pipeline - due to high construction costs and the lack of gas suppliers (Figure 12). Figure 12 represents new-formed players of the Southern Gas Corridor. The "Nabucco classic" project turned into two compatible pipeline projects. These are the Trans Anatolian Pipeline (TANAP), which would carry Azerbaijani gas through Turkish territory, and Nabucco West, which would continue gas transportation through the European sector.

Another pipeline mentioned by the European Commission was the Trans Adriatic Pipeline (TAP). In 2012, the TAP pipeline was competing with Nabucco West for the gas from Azerbaijan. If constructed, TAP, will ship 10 bcm of gas per year, with the option to increase the capacity up to 20 bcm. It will run through Greece and Albania, under the Adriatic Sea to southern Italy. The construction of TAP would provide the countries involved in this project, such as Greece and Albania, with a large inflow of foreign direct investment and foster economic growth (Kusznir Julia, 2013, p.3). On 13 February 2013 the countries involved in TAP, Albania, Greece and Italy, signed a tri-lateral intergovernmental agreement which reinforced their full political support for this project. Currently there are several problems with TAP project. The gas connectors between the countries involved in this pipeline are under development, so it will take time until the TAP

will be constructed. The project needs additional investments. Greece's current financial problems are still unresolved, so there are no guarantees that the project will start in time. The project is currently in its implementation phase and is preparing for construction of the pipeline, which is planned to begin in 2016. (TAP, 2015)

Figure 11. Projected pipelines in the Southern Gas Corridor. Source: CSS Zurich. (2008), p.2.

The Nabucco West project envisaged the construction of a pipeline from the Turkish–Bulgarian border to Austria through Bulgaria, Romania and Hungary. It was initially proposed to carry 10 bcm of Azerbaijani gas annually and later 16 bcm (Kusznir Julia.2013, p.3).

The main dilemma or task for Azerbaijan was to choose the best alternative. It was up to Azerbaijan and the Azeri Shah Deniz Consortium (SDC) to decide which gas export route from TANAP to Europe to use.

Figure 12. New Players of the Southern Gas Corridor in 2012. Source :Neftegas, 2013.

4.2 Case Analysis: TAP Vs. Nabucco West

SDC had to choose between two options and probably the decision was made after assessing the following areas of each project: market opportunities, timing, scalability, capacity, management operability, funding availability, project quality and political issues. For better understanding of each project I built the table with the main features of each project (Table 1[3]).

[3] The Table was constructed by the author in 2013 by the means of the following sources: TAP, 2013 [Online] and Sobjak, (2012). TAP 2015 presents new figures for certain categories (see TAP, 2015 source). Decision by SDC was made in 2013 thus I decided to leave the table as it was in 2013.

Table.1 Key Features of Nabucco West and TAP (2013)

Key Features	Nabucco West	TAP
Length	1329 km	867 km
Capacity	10-23 bcma	10-20 bcma
Estimated cost	2.7 bilion $	1.5 billion $
Construction to begin	2013	2013
Gas to be delivered by	2018	2019
Transit Countries	Bulgaria, Romania, Hungary (Austria)	Greece, Albania, (Italy)
Partners and owners	OMV (24%), MOL (17%), Transgaz (17%), Bulgargaz (17%), BOTAŞ(17%), GDF (9%)	BP (20%), SOCAR (20%), Statoil (20%), Fluxys (16%), Total (10%), E.ON (9%), Axpo (5%)

Source: Author's own construction.

A short summary evidences that TAP had few economic advantages over Nabucco West as the estimated costs were almost half less - 1.5 billion $. In economic terms, TAP had the whip hand. With a similar capacity, TAP's estimated construction costs were lower and thus this project was more economically viable than Nabucco West. The main reason behind it was the shorter route of the project. TAP's main destination market is Italy, where natural gas is sold at a higher price than in Austria[4]. In political terms, TAP had also more advantages than Nabucco West. TAP had stronger governmental support from the transit countries than Nabucco. Nabucco West generated a strong rivalry with Russia and Gazprom in particular; TAP had generated fewer concerns in Russia. TAP had better relations with Russia which is a strategic

4 http://www.fuel-prices-europe.info

partner of Azerbaijan. Moscow never made a secret of its aversion to the Nabucco project. In order to avoid EU-Azerbaijan energy cooperation, in 2010 the Kremlin made a strategic proposal to purchase the total volume of Azeri gas at European market prices, asking nothing in exchange (Mikhelidze, 2013, p.4). Thus, we can assume that TAP was less seen by Gazprom as competitor while it remained physically within the EU's borders.

Nabucco project was originally born as a megaproject: very ambitious, with a large budget and high political goals to decrease dependency on Russian Gas. Financial and political constraints downsized the project dramatically from Nabucco Classic to Nabucco West. For Russia in 2013, the main purpose of the South Stream gas pipeline project was to prevent Nabucco and TGI from transporting Caspian gas directly to European market.

Nabucco West and the EU itself undermined the importance of alliances and common interests. Nabucco was mostly a Central and Eastern European project ruled by OMV[5] (Austria's leading oil company). The Austrian company was competing against BP[6] and Statoil[7], respectively one of biggest national oil companies. Opposite, TAP was able to establish close alliances with key players prior to SDC's final decision. TAP partnered with TANAP and therefore with its main shareholder, the State Oil Company of the Azerbaijan Republic (SOCAR), which was also the owner of 10% of SDC. Thus, in political terms Nabucco West was very weak even though from very beginning it had strong EU and US support.

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[5] http://www.omv.com
6 BP - British Petroleum is one of the world's leading international oil and gas companies. Http://www.bp.com
7 Statoil - Norwegian leading energy company in oil and gas production. http://www.statoil.com

The game between TAP and supported by the EU project Nabucco West was over in 2013. On 28 June 2013 Azeri Shah Deniz Consortium (SDC) made a historic decision that put an end to a long race initiated by the EU to decrease dependency on Russian gas (TAP, 2015).

In conclusion we can say that Nabucco's biggest rival seemed to be Gazprom's South Stream but eventually, Nabucco West was not beaten by Russia but by its inability to secure a gas source (Azerbaijan). Nabucco West managed to bring together different governments of the transit countries but failed to unite its interests with the Azerbaijani government and SOCAR or other members of SDC, including BP and Statoil. Thus TAP was able to succeed where Nabucco failed. Eventually not only commercial advantages of TAP but political one made TAP more attractive choice.

For its part by the time 2013 the EU was not able to remain a credible actor in the region, defend its interests by diversifying energy supplies. Azerbaijan's decision to select TAP was favorable for Russia. In 2013 Gazprom got a chance to develop its South stream project until the EU introduced a new Energy Security Strategy (implementation of TEP) promoting strict competition in the Gas market.

4.2 The South Stream Project

According to official Gazprom website (2015) the South Stream project was primarily aimed at strengthening European energy security. The major objective of the South Stream project was meeting Europe's additional demand for natural gas and ensuring a direct connection between suppliers and consumers thus raising significantly both Russian Energy Security and European one. By

implementing this project Russia could eliminate transit risks and build strong energy relations with Europe.

The South Stream pipeline was one of Gazprom's largest and most expensive infrastructural projects. The project envisaged the construction of a gas pipeline with a total length of approximately 2,385 km (a 930 km maritime section and 1,455 km onshore in Europe) and an annual capacity of 63 bcm, which would run from Russian gas via the Black Sea to Central and South-Eastern Europe (see Figure 13). According to this scenario, South Stream with full capacity of 63 bcm per year could have a significant impact on European Energy Security. The first gas had to be supplied via South Stream in late 2015 reaching its full capacity in 2018.

Between 2008 – 2010 years, Russia signed intergovernmental agreements with transit countries: Bulgaria - January 18, 2008; Serbia - January 25, 2008; Hungary - February 28, 2008; Greece - April 29, 2008; Slovenia - November 14, 2009;
Croatia - March 2, 2010; Austria - April 24, 2010 (Gazprom, 2015).

All signed intergovernmental agreements and in particular the Nabucco's failure highly inspired Gazprom to continue its efforts to build the South Stream gas pipeline. From very beginning the South Stream project comprised of several joint companies set up for the project implementation purposes (Figure 13). In September 2011 the Shareholders Agreement of the South Stream Transport B.V. (offshore sector) was signed for the construction of the offshore gas pipeline section. The South Stream Transport B.V originally was a joint venture of Gazprom (a 50 % stake in the project), Italian Eni (a 20 % stake), German Wintershall Holding (a 15% stake) and French EDF (a 15% stake).

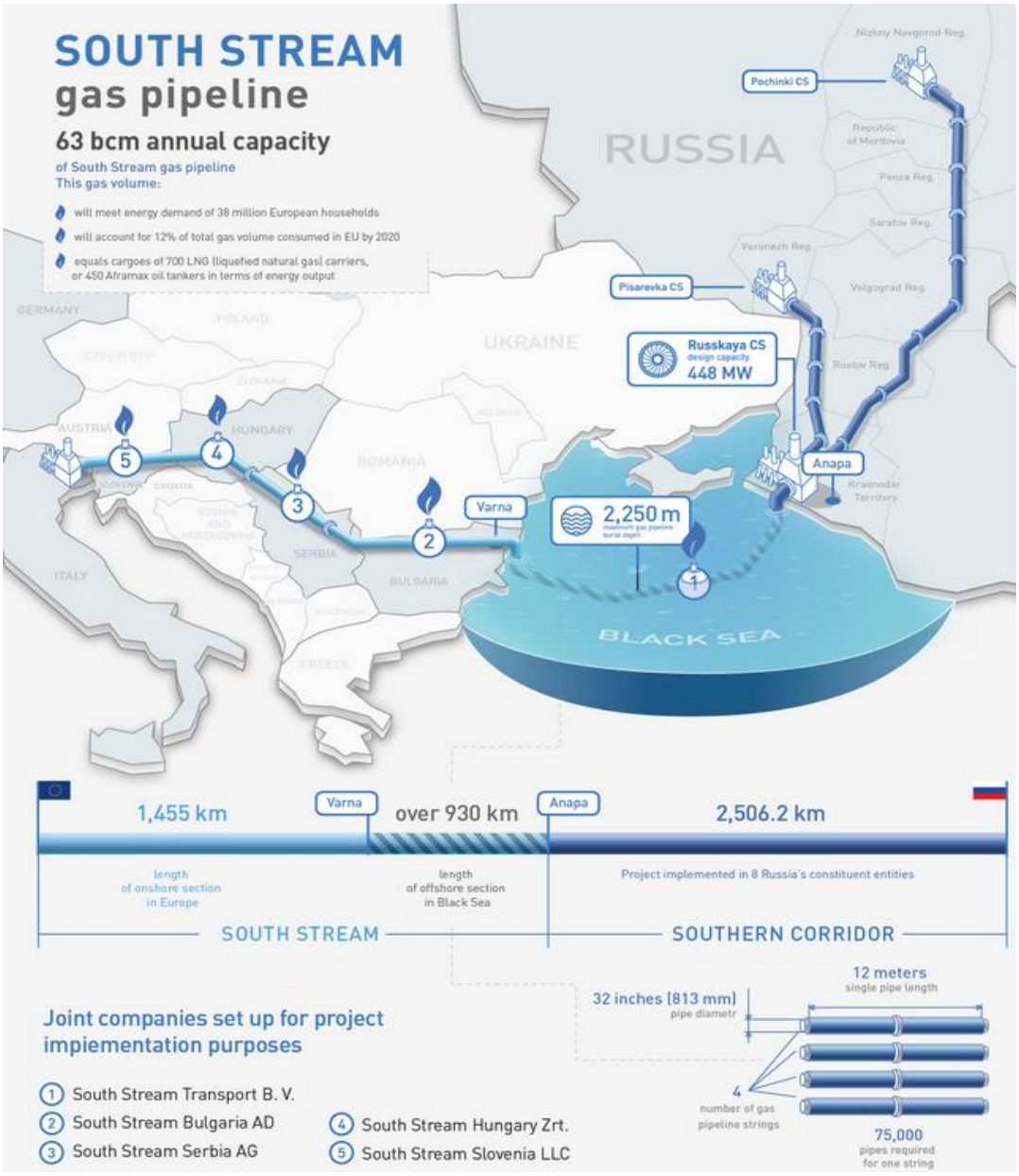

Figure 13. South Stream Gas pipeline. Source (Gazprom, 2015).

In December 2012 the South Stream gas pipeline construction started near Anapa in the Krasnodar Territory. On October 31, 2013 the first joint was welded at South Stream's Bulgarian section near the Rasovo CS site. On November 24,

2013 the construction of South Stream's Serbian section started in the vicinity of Sajkas village, South Backa District. On December 29, 2013 Gazprom entered into agreements with Eni, Wintershall and EDF on purchasing 50 per cent of total shares in South Stream Transport from them. (Gazprom, 2015)

The South Stream project was by far the largest ongoing Russian-European gas infrastructure project until its cancellation in December 2014. Eventually the signed agreement, launched constructions, sunk costs did not save the project. From the very beginning the South Stream Project was not simply a commercial one. As mentioned in previous chapters, Russia sees its natural resources as a political tool. Russia's decision to cancel construction of the South Stream pipeline stipulates a significant change in Russian security strategy. The rationale behind the decision will be presented in the next section.

4.3 Case Study: From South stream to Turkish stream

4.3.1 Case overview

The case study "From South stream to Turkish stream" represents an interpretation of a recent significant change in European-Russian Energy relations. This case study offers possible reasons and consequences of the cancellation of the South Stream project and Russia's reorientation in its Energy Strategy. Policy transformations and prospects of the future developments both of EU and Russia energy security will be presented at the end of the case study. Analysis presented in this section is mainly based on recent geopolitical and economic events, with no claim to their dogmatic final certainty. I believe that energy relations present a long-term geopolitical game which could change any practical implementation issues overnight.

Russia's decision to cancel such a huge ongoing project with a history of 8 years was a big surprise not only for Europe but as well for the rest of the world including Russian politicians, entrepreneurs and scientists. As it was mentioned in previous chapters until recently the main Russian Security Strategy stipulated the diversification of routes for supplying Russian natural gas to European countries. The main aim of this diversification was the elimination of the unreliable transit partner - Ukraine. Especially in the face of numerous Russian-Ukraine gas disputes energy security has become a complex issue requiring a combined group of actions in order to prevent or minimize Energy Security risks. It was planned to build the South Stream pipeline and stop the transit deals with Ukraine close to 2019. Moreover it was recently confirmed in April 2015 by the Russian Energy Minister Alexander Novak that Russia would not extend gas the transit agreement with Ukraine which was signed in 2009 for the period of 10 years (Soldatkin, 2015). Therefore the decision to stop the South Stream project did not mean that Russia decided to fold its hands and accept the EU political pressure.

Russia openly announced that it would reach its Energy Security goals regardless all constraints. Russia showed that it values Europe as a gas market but at the same time does not want to dance to the EU's tune. In early December 2014 Gazprom cancelled the South Stream project and made it clear that diversification of the gas supplies will be done by other means, implementing other gas routes. Right after closure of the South Stream project Gazprom CEO Alexey Miller announced that European companies should themselves take over responsibility for the delivery of Russian gas from the Turkish border to the end consumer according to the Third Energy Package. Miller also stressed that Russia's Energy Strategy had changed:

> 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 of our operation model on the market, within which we oriented ourselves toward supplying [gas] to the end consumer on the European market. …But you can't win love by force. If the buyer doesn't 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, of course, 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 (Interfax, 2014).

Probably TEP was one of the main reasons behind the South Stream cancellation. The implementation of the TEP by the European Commission in 2011 meant a significant shift in Russia's traditional gas business model. The main provisions of TEP were presented in the second Chapter (see section 2.2 The EU Energy Policy). This TEP raised a lot of disputes between Russia and the EU in terms of the gas diversification matters. It is important to mention that TEP came into force in 2011 when Russia already had gas diversification agreements with some European countries regarding the South Stream project. Thus Gazprom made a lot of efforts to find a sound compromise between EU and Russian legal rules of business; while the EU promoted its firm position that any onshore pipelines via EU countries such as Bulgaria, Hungary and Austria must comply with TEP rules. Nevertheless Gazprom continued debates on legal matters until all discussions were overwhelmed by 2014 geopolitical events in Ukraine. We may assume that Gazprom could reach a certain compromise with the EU if the February Ukraine Revolution had not happened.

For Russia, a crunch point was reached when the origin of TEP disputes were weighted down by the Ukraine-Russia war disputes and following US and EU political and economic sanctions. I think mainly driving by anger and that EU does not have a single opinion on certain matters Russia reoriented its gas Strategy towards securing Turkish gas market. It is important to mention that Turkey did not support US and EU sanctions against Russia despite the fact that it aimed to become a member of the EU. I think it was politically right decision

for Turkey not to spoil warm relations with Russia. According to Gazprom's official web site (2015) Turkey is Gazproms's second largest sales market behind Germany. Gazprom supplied Turkey with 27.4 bcm of natural gas in 2014. Eventually on December 1 Gazprom and Turkey signed the agreement on constructing an offshore gas pipeline across the Black Sea to Turkey. Thus, currently Russia aims to secure gas supply to Turkey directly without transit interruptions (not via Ukraine) and with the following possible supplies to south-east Europe by the means of the new Turkish Stream.

Gazprom intends to build Turkish gas pipeline with capacity of 63 bcm, with nearly 50 bcm to be conveyed to a gas hub on the border between Turkey and Greece (Gazprom, 2015).

4.3.2 Analysis of Transformation

Logically it was in the EU's interests to conduct a constructive dialogue with Russia concerning the implementation of the South Stream project especially after closure of the Nabucco one and the numerous gas crises. Instead the main European view on the South Stream Project was rather negative than positive, excluding several countries like Hungary, Bulgaria which could gain from mutual cooperation. The EU‘s behavior could be explained rather by the fear of Russian dominance in the EU market or by political antipathy due to confrontation with Ukraine and annexation of Crimea.

On the one hand the cancellation of the project could be seen as a small victory for the EU which was firm on its TEP rules. On the other hand Russia will continue to supply gas but on its own terms. In my opinion Russia showed its

political and economic power and ability to remain calm and not respond to EU's regulatory impediments and economic sanctions.

Thus the closure of the South Stream project entailed a significant change in Russia's Energy Strategy and relations with the EU. Gazprom left behind its initial plans of direct supplies to end users via territory the of the EU countries. Lack of mutual agreement within the EU forced Russia revise its policy towards new possible markets and opening new routes.

The dramatic change in Russian energy policy could be risky for the EU and it should be Europe that is more worried than Russia. Gazprom was quick to reduce its dependency on European market by boosting energy cooperation with China and Turkey.

> On May 21, 2014 Gazprom and China National Petroleum Corporation signed the Purchase and Sale Agreement for the Russian gas supply via the eastern route. The 30-year contract provides for gas supplies in the amount of 38 billion cubic meters of gas per year. (Gazprom, 2015)

Russia's reorientation towards trading on hubs instead of deliveries to end consumers via the Turkish stream may improve Gazprom's bargaining position as a low cost producer with vast gas resources close to Europe. And it unlikely that gas demand in Europe will fall within the next decades. Furthermore, the initial constructions of the South Stream can be reoriented for Turkish stream in what could be a real payoff for Gazprom. Turkish Stream seems to be a more economically rational project rather than simply a political one.

This case study reveals a significant change in EU-Russia energy relations. Current EU-Russia relations present more straightforwardly commercial relations and not any more a strategic partnership as it used to be. However, the case is ongoing and changes in the EU-Russia energy relationship may happen any time.

Conclusions

At the beginning of the thesis I intended to answer several research questions: Is Russia and its gas projects an answer to European Energy Security? What is the role of Ukraine and geopolitics in Energy Security? What are the prospects of the EU's Energy Security diversification? Analysis of the current state of the EU-Russia energy relations shows that it is very difficult to answer the first question positively. The positive answer is possible only in case of constructive mutual cooperation between counterparts. Who is to blame - Russia or the EU? It is clear that both Russia and the EU are highly interdependent in terms of energy security, and mutual cooperation could increase their level of energy stability. Until recently Russia promoted its strategic relationship with the EU, trying to serve both its own and the EU's interests. But was the EU open to this strategic alliance? Even though the EU conducted the Energy Dialogue with Russia to enhance its energy security, the EU Commission constantly tried to eliminate Russia as a market player. Only few EU member states were showed their interest in constructive energy relations. Case studies show that the EU was not able to be productive in terms of its energy security diversification. The "Nabucco case" evidences the EU's inability to be a credible actor in the region, defend its interests. The EU may rely on TAP as an alternative source but as was discussed earlier there is no guarantee that it will be constructed in time and can meet whole gas demand of the EU. And it seems that the current Greek government will try to build warm relations with Russia rather than serve the EU's interests, and consequently would not be so interested in the TAP project. Through the cooperation with Russia Greece may improve its economic situation.

But even if the EU had been more successful in implementing its energy strategy it could be difficult, if not impractical, to consider replacing all Russian natural gas imports. Russia is the principal EU supplier with a 32 % share of total natural gas imports which could hardly be immediately substituted.

I think that the major issue for the EU in developing a more effective Energy policy is absence of mutual understanding between the EU members. EU energy security starts with having a common vision. There is a fundamental conflict between the goals of energy security and the desire to create a competitive market - without centralized coordination. Thus, the energy security is likely to be difficult to achieve without a balanced energy policy within the Union. The dissidence in the EU is especially evident when it comes the levels of gas dependency of each EU member state.

Besides it is very important to understand the role of geopolitics in the energy sector. Energy relations are not simply economic. The case study on the South Stream project demonstrates that sometimes geopolitics plays a crucial role in countries' activities and decisions. Russia understands that it is hardly possible to conduct effective political and commercial relations with Kiev there for it stays firm on its strategy to diversify new gas routs bypassing Ukraine. From this point of view Russia seems to be more effective in securing its energy policy. Russia was quick to agree on gas supplies to China and build relations with Turkey. This reorientation to new markets decreases Russia's dependence on the EU gas market. Thus it is the EU that should be more worried than Russia. It is in the EU's interests to promote a respectful relationship towards Russia due to its high dependency level. The EU should be more careful in building gas relations with Russia. The Turkish Stream could be an option for the EU to mitigate the transit risks and by this means increase its energy security level. The power play goes on and the future of any gas project is not clear. But it is clear that Russia made a significant shift to more commercially-based relations with the EU. I believe that geopolitics would always define energy relations thus the EU should try to restore its "strategic partnership" with Russia.

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Appendix A

Natural Gas, proved reserves.

	At end 1993 Trillion cubic metres	At end 2003 Trillion cubic metres	At end 2012 Trillion cubic metres	At end 2013 Trillion cubic feet	Trillion cubic metres	Share of total	R/P ratio
US	4.6	5.4	8.7	330.0	9.3	5.0%	13.6
Canada	2.2	1.6	2.0	71.4	2.0	1.1%	13.1
Mexico	2.0	0.4	0.4	12.3	0.3	0.2%	6.1
Total North America	8.8	7.4	11.1	413.7	11.7	6.3%	13.0
Argentina	0.5	0.6	0.3	11.1	0.3	0.2%	8.9
Bolivia	0.1	0.8	0.3	11.2	0.3	0.2%	15.2
Brazil	0.1	0.2	0.5	15.9	0.5	0.2%	21.2
Colombia	0.2	0.1	0.2	5.7	0.2	0.1%	12.8
Peru	0.3	0.2	0.4	15.4	0.4	0.2%	35.7
Trinidad & Tobago	0.2	0.5	0.4	12.4	0.4	0.2%	8.2
Venezuela	3.7	4.2	5.6	196.8	5.6	3.0%	*
Other S. & Cent. America	0.2	0.1	0.1	2.2	0.1	*	24.9
Total S. & Cent. America	5.4	6.8	7.7	270.9	7.7	4.1%	43.5
Azerbaijan	n/a	0.9	0.9	31.0	0.9	0.5%	54.3
Denmark	0.1	0.1	†	1.2	†	*	7.0
Germany	0.2	0.2	0.1	1.7	†	*	5.9
Italy	0.3	0.1	0.1	1.8	0.1	*	7.3
Kazakhstan	n/a	1.3	1.5	53.9	1.5	0.8%	82.5
Netherlands	1.7	1.4	0.9	30.1	0.9	0.5%	12.4
Norway	1.4	2.5	2.1	72.4	2.0	1.1%	18.8
Poland	0.2	0.1	0.1	4.1	0.1	0.1%	27.5
Romania	0.4	0.3	0.1	4.1	0.1	0.1%	10.6
Russian Federation	n/a	30.4	31.0	1103.6	31.3	16.8%	51.7
Turkmenistan	n/a	2.3	17.5	617.3	17.5	9.4%	*
Ukraine	n/a	0.7	0.6	22.7	0.6	0.3%	33.4
United Kingdom	0.6	0.9	0.2	8.6	0.2	0.1%	6.7
Uzbekistan	n/a	1.2	1.1	38.3	1.1	0.6%	19.7
Other Europe & Eurasia	35.6	0.4	0.3	8.8	0.2	0.1%	33.4
Total Europe & Eurasia	40.5	42.7	56.5	1999.5	56.6	30.5%	54.8
Bahrain	0.2	0.1	0.2	6.7	0.2	0.1%	12.1
Iran	20.7	27.6	33.6	1192.9	33.8	18.2%	*
Iraq	3.1	3.2	3.6	126.7	3.6	1.9%	*
Kuwait	1.5	1.6	1.8	63.0	1.8	1.0%	*
Oman	0.2	1.0	0.9	33.5	0.9	0.5%	30.7
Qatar	7.1	25.3	24.9	871.5	24.7	13.3%	*
Saudi Arabia	5.2	6.8	8.2	290.8	8.2	4.4%	79.9
Syria	0.2	0.3	0.3	10.1	0.3	0.2%	63.9
United Arab Emirates	5.8	6.0	6.1	215.1	6.1	3.3%	*
Yemen	0.4	0.5	0.5	16.9	0.5	0.3%	46.3
Other Middle East	†	0.1	0.2	8.1	0.2	0.1%	35.3
Total Middle East	44.4	72.4	80.3	2835.4	80.3	43.2%	*
Algeria	3.7	4.5	4.5	159.1	4.5	2.4%	57.3
Egypt	0.6	1.7	2.0	65.2	1.8	1.0%	32.9
Libya	1.3	1.5	1.5	54.7	1.5	0.8%	*
Nigeria	3.7	5.1	5.1	179.4	5.1	2.7%	*
Other Africa	0.7	1.0	1.2	43.3	1.2	0.7%	56.9
Total Africa	10.0	13.9	14.4	501.7	14.2	7.6%	69.5
Australia	1.0	2.4	3.8	129.9	3.7	2.0%	85.8
Bangladesh	0.3	0.4	0.3	9.7	0.3	0.1%	12.6
Brunei	0.4	0.3	0.3	10.2	0.3	0.2%	23.6
China	1.7	1.3	3.3	115.6	3.3	1.8%	28.0
India	0.7	0.9	1.3	47.8	1.4	0.7%	40.2
Indonesia	1.8	2.6	2.9	103.3	2.9	1.6%	41.6
Malaysia	1.8	2.5	1.1	38.5	1.1	0.6%	15.8
Myanmar	0.3	0.4	0.3	10.0	0.3	0.2%	21.6
Pakistan	0.7	0.8	0.6	22.7	0.6	0.3%	16.7
Papua New Guinea	†	†	0.2	5.5	0.2	0.1%	*
Thailand	0.2	0.4	0.3	10.1	0.3	0.2%	6.8
Vietnam	0.1	0.2	0.6	21.8	0.6	0.3%	63.3
Other Asia Pacific	0.3	0.5	0.3	11.5	0.3	0.2%	17.5
Total Asia Pacific	9.3	12.7	15.2	536.6	15.2	8.2%	31.1
Total World	118.4	155.7	185.3	6557.8	185.7	100.0%	55.1
of which: OECD	14.6	15.3	18.7	678.3	19.2	10.3%	16.0
Non-OECD	103.8	140.4	166.6	5879.5	166.5	89.7%	76.7
European Union	3.7	3.2	1.6	55.6	1.6	0.8%	10.7
Former Soviet Union	35.3	36.9	52.8	1869.5	52.9	28.5%	68.2

Source: BP Statistical Review of World Energy 2014, p.20.

Appendix B

EU Import Dependency Natural Gas, 2012 (%).

%	1995	2000	2005	2010	2011	2012
Imports From Extra-EU						
EU-28	43.4	48.9	57.1	62.1	67.1	65.8
Index 1995	100.0	112.7	131.6	143.3	154.8	151.8
Intra and Extra-EU Imports						
BE	98.2	99.3	100.6	98.8	100.6	98.6
BG	99.5	93.5	87.7	92.6	86.1	83.3
CZ	98.0	99.8	97.8	84.8	110.2	89.0
DK	-47.2	-64.8	-113.9	-68.3	-55.3	-54.2
DE	78.6	79.1	79.6	81.2	86.8	85.7
EE	100.0	100.0	100.0	100.0	100.0	100.0
IE	3.6	72.1	86.7	95.7	96.1	95.6
EL	0.0	99.1	99.1	99.9	100.0	100.3
ES	97.4	101.6	101.4	99.4	101.6	99.6
FR	93.0	100.0	99.3	93.0	103.3	96.6
HR	11.6	41.0	23.7	18.1	19.5	37.0
IT	63.9	81.1	84.7	90.5	90.2	90.2
CY						
LV	99.0	101.9	105.6	61.8	109.4	113.8
LT	100.0	100.0	100.6	99.7	100.3	100.1
LU	100.0	100.0	100.0	100.0	99.9	99.7
HU	60.3	75.4	81.1	78.7	65.6	72.9
MT						
NL	-76.4	-49.1	-59.3	-61.6	-68.6	-74.5
AT	84.8	80.6	87.7	74.4	103.2	86.3
PL	64.6	66.3	69.7	69.3	75.1	73.8
PT		100.3	103.8	100.4	101.6	99.7
RO	24.9	19.8	30.1	16.8	22.2	21.2
SI	100.6	99.3	99.6	99.3	99.8	99.8
SK	86.8	98.8	97.5	99.9	104.8	89.8
FI	100.0	100.0	100.0	100.0	100.0	100.0
SE	100.0	100.0	100.0	100.0	100.0	100.0
UK	1.0	-10.7	7.0	37.7	44.2	47.0

Source: European Commission (2014), p.72

Appendix C

Forecasts for Natural Gas Demand:

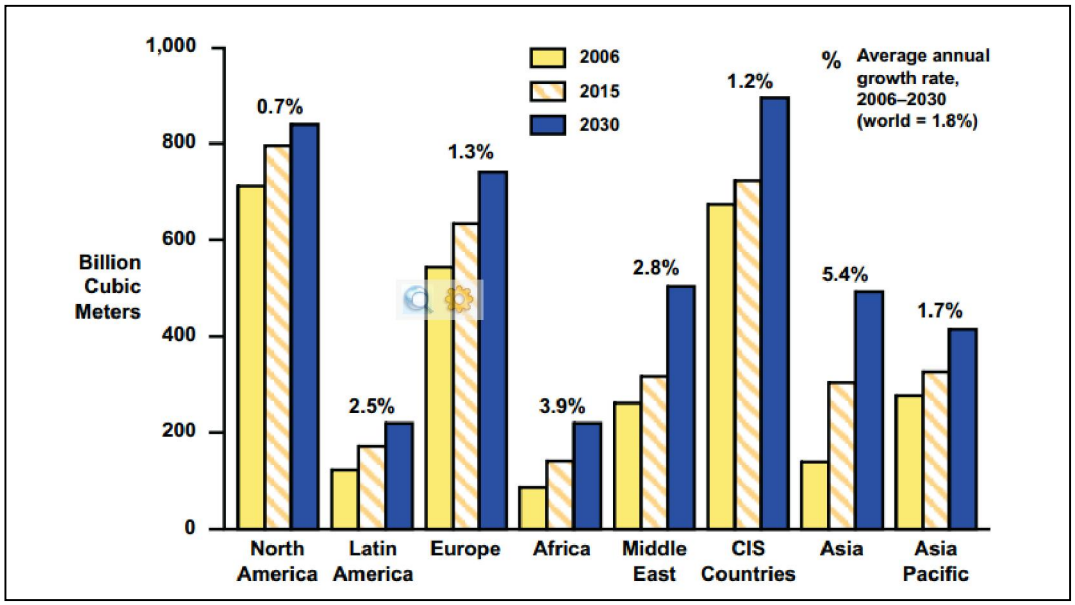

Figure 1. Gas Demand by Region, 2006-2030. Source: International Gas Union (2009), p.20.

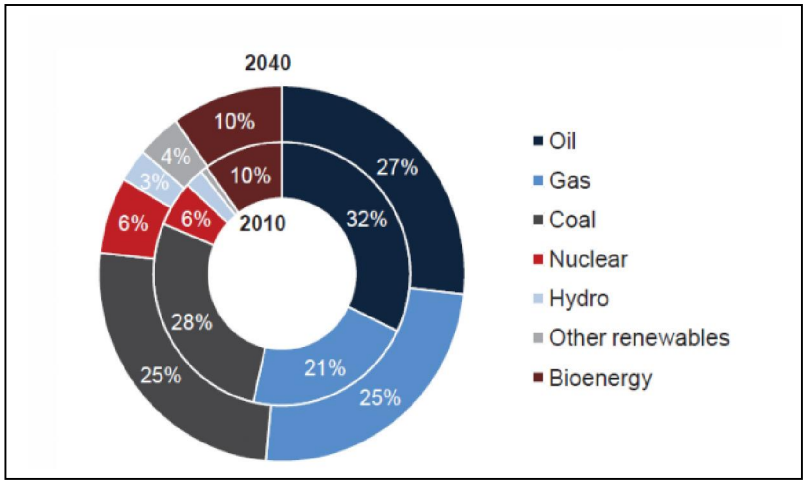

Figure 2. World primary energy consumption. ERI and RAS forecast for 2010 - 2040. Source: ERI RAS, ACRF, 2013, p 98.