THE EU'S ENERGY SUPPLY SECURITY: OPTIONS FOR GAS SUPPLY DIVERSIFICATION AND THE ROLE OF TURKEY

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ABSTRACT

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With the gas disruptions to the European Union in 2006 and 2009 Ukrainian crises, the Community decided to diversify its supply sources and routes, develop energy infrastructure between the member states and increase energy efficiency to strengthen energy security of the Union. The thesis will examine the possibility of nine countries as being an alternative to Russian gas, and it will analyze Turkey's role in transmitting gas from the Caspian, the Middle East, and the Mediterranean regions to Europe. Besides, the energy security of Southeast European countries will be briefly mentioned since it is important for the energy security of the Community.

The thesis argues that besides Azeri gas which will be supplied to Europe in the short-run, Iraq has a potential to supply gas to Europe via pipelines in the medium to long-run. Moreover, Israel, Egypt, and Iran are potential LNG suppliers to the EU in the medium to long-run.

ÖZET

AVRUPA BİRLİĞİ'NİN ENERJİ TEDARİK GÜVENLİĞİ: GAZ TEDARİK ÇEŞİTLİLİĞİ İÇİN SEÇENEKLER VE TÜRKİYE'NİN ROLÜ

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Anahtar Kelimeler: Enerji Güvenliği, İthalat Bağımlılığı, Avrupa Birliği, Güneydoğu Avrupa, Türkiye, Çeşitlendirme

Avrupa Birliği'ne 2006 ve 2009 Ukrayna krizlerinde yaşanan gaz kesintileri nedeniyle Topluluk, tedarik kaynaklarını ve rotalarını çeşitlendirmeye, üye devletler arasında enerji altyapısı geliştirmeye ve Birliğin enerji güvenliğini güçlendirmek için enerji verimliliğini artırmaya karar verdi. Tez, dokuz ülkenin Rusya gazına alternatif olma olasılığını inceleyecek ve Türkiye'nin Hazar, Ortadoğu ve Akdeniz bölgelerinden Avrupa' ya gaz iletmesindeki rolünü analiz edecektir. Ayrıca, Güneydoğu Avrupa ülkelerinin enerji güvenliği, topluluğun enerji güvenliği açısından önemli olduğu için kısaca değinilecektir.

Tez, kısa vadede Avrupa'ya iletilecek olan Azeri gazının yanı sıra, Irak'ın orta ve uzun vadede boru hatları üzerinden Avrupa'ya gaz tedarik etme potansiyeline sahip olduğunu savunuyor. Dahası, İsrail, Mısır ve İran, orta ve uzun vadede AB'ye potansiyel LNG tedarikçileri olacaktır.

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INTRODUCTION

In the globalized world, energy is one of the crucial sources for countries. It affects social and economic activities. It affects social activities because people need energy in their households for heating, cooking and other purposes. It affects economic activities because industries need energy for production. Consequently, the life without energy is unthinkable. In the case of Europe, energy takes an important place since Europe is not an energy-rich continent. As a source of energy, fossil fuels have the highest share in the energy composition of the European Union (EU).[1] Among these fossil fuels, the thesis will focus on the issue pertaining to the trade and usage of natural gas.

Given the fact that the European Union production of natural gas has been decreasing, energy security has become one of the important pillars of the energy policy of the Community. The importance of the energy security of the Union increased especially after the 2006 and 2009 Ukrainian crises. With these two crises, European countries remained without gas even though they were not part of the conflict. This led the Union to reconsider its overdependence on supplies coming from Russia. After these crises, the EU decided to take measures to increase its energy security. These measures include increasing energy efficiency, developing energy infrastructures between the member states, diversification of sources and diversification of supply routes.

In reaction to these developments, Russia reformulated its energy strategy towards the Union. However, developments in LNG and shale gas, as well as the Union's diversification efforts, have compelled Russia to lower its gas prices to the European countries. The main reason for the reduction of gas prices is that Russia wants to protect its market share in the EU and it wants to ensure revenues coming from the sales of energy. In fact, Russian gas prices are indexed to oil prices. Consequently, Russian gas prices decreased as oil prices decreased. Therefore, the country has been able to protect

[1] "World Energy Balances." International Energy Agency. 2017: 626-640

its dominant market share in the EU. The Russian dominance is more apparent especially in Southeast European countries since these countries are highly dependent on imports of Russian gas.

In this respect, the main of the thesis is to investigate the ways of how the Union can consolidate energy security. As a result, this thesis investigates new opportunities for the European countries for decreasing their dependency on Russian gas and enhancing their energy security.

Furthermore, the thesis also aims to elaborate the role of Turkey in the EU's diversification efforts and decreasing the dependencies of Southeast European countries on Russian gas. In the current situation, Azeri gas will be supplied to Italy via TAP. 10 billion cubic meters (bcm) of gas is not a significant volume for Western European countries but it is the significant volume for Southeast European countries. The gas dependency of Southeast European countries is not the main subject of the thesis, but it is one of the topics that on the agenda of the European Union, since it directly affects the energy security of the Union. Therefore, the issue will be mentioned briefly.

Five Southeast European countries, Greece, Bulgaria, Hungary, Slovakia, and Slovenia are highly dependent on Russian gas, and they do not consume significant volumes of gas. These countries imported 21,1 bcm and consumed 22,6 bcm of gas in 2016 in which Russia supplied a total of 15,8 bcm to these five countries.[2] This means that Russian share in these five countries' gas imports and consumption were more than 70%. Two Southeast European countries, Romania and Croatia, had domestic gas production, so they were not dependent on Russian gas. Azeri gas can decrease Southeast European countries' import dependency on Russian gas significantly. The prospects of Azerbaijan to divert its gas to Southeast Europe is possible only if the country produces and supplies more gas to TANAP by developing its gas fields in the future.

All in all, in the short-run, Azerbaijan will supply its gas to Europe, so that energy security of the Union will be consolidated. Besides, in the medium to long-run, Iraq has a potential to supply gas to Southern Gas Corridor of Europe, but the prospects of Iraq to supply its gas to Turkey and then to Europe depends on the settlement of the disputes between KRG and the Iraqi government. Moreover, Israel, Egypt, and Iran are likely to provide gas as

[2] "Gazprom Annual Report 2016". Gazprom. 2017: 78. Accessed March 09, 2018. Retrieved from http://www.gazprom.com/f/posts/44/307258/gazprom-annual-report-2016-en.pdf

LNG to Europe. Consequently, gas competition in the European market will escalate which is vital for the energy security of the Union.

The thesis is divided into four chapters. In the first chapter, the objectives and legal basis of the energy policy of the European Union will be explained. Then, the chapter will provide an overview of the energy structure of the Community which includes production, consumption, and imports. After, current and planned natural gas pipelines will be explained. Moreover, the 2006 and 2009 Ukrainian crises will be elaborated, and its effects on the Union will be analyzed.

After the two Ukrainian crises, the Community decided to strengthen its energy security by diversifying Russian gas. Therefore, the second chapter will provide an analysis of nine countries to whether they can be an alternative to Russian gas through pipelines. Three countries from Caspian Region (Turkmenistan, Azerbaijan, Iran), three countries from North Africa (Egypt, Algeria, Libya) and three countries from the Middle-East& Mediterranean Region (Iraq, Israel, Republic of Cyprus) will be analyzed.

In securing energy supplies of the EU, Turkey will have a crucial role. For this reason, in the third chapter, Turkey's energy structure, energy policy, pipelines that pass from through its territory and planned pipeline projects will be explained. Furthermore, Turkey has a desire to evolve into a physical energy hub in its region. Therefore, the chapter will analyze the possibility of Turkey to become an energy hub in the Eurasian nexus.

The last chapter will focus on diversification efforts of the Union. At first, possible contributions of LNG, shale gas, and renewable energy to the energy security of the EU will be discussed. Then, how the interdependence between the EU and Russia affects the energy trade will be described. Russia both aims to bypass Ukraine and to protect its market share in the EU. In this respect, Russia has developed Turkish Stream and North Stream 2 pipelines. However, at this point, it is argued in this chapter that Azeri gas and LNG will increase competition among the gas suppliers. In the future, new gas players such as Iraq via pipeline, Iran, Egypt and Israel via LNG will join the competition in the European market, so that European countries will have alternative suppliers.

The methodology of the thesis is secondary data analysis. This means that I collected and analyzed reports, statistics, journals, website articles, books and many other sources to support and justify my arguments. In the thesis, I place the World Energy Outlook and World Energy Balances published by International Energy Agency (IEA) as a primary

source. Moreover, I provide statistics from Eurostat, The U.S. Energy Information Administration, BP, and ENI. Furthermore, I explained many concepts by using energy sections of the European Commission and the European Parliament. Besides, I used articles from popular newspaper websites such as BBC, Euractiv, Azernews, Hurriyet Daily News, CNBC, and Forbes.

CHAPTER 1: ENERGY COMPOSITION AND POLICY OF THE EUROPEAN UNION

Introduction

Energy constitutes one of the most important policy areas for the Union. Energy, which is needed to power a modern industrial society, is used in power generation, industry, transportation and in other areas. Europe does not have significant indigenous fossil fuel resources, so their production level is low. Rather than producing, the European Union (EU) imports its energy. Even though the EU imports crude oil, natural gas, and coal from other countries, the thesis will focus on natural gas, whereas oil and coal are fungible commodities available in the international markets, natural gas is still primarily transported through pipelines and thus regionally traded according to long-term gas contracts.

From 1998 to 2009, the EU adopted three energy packages which are about the liberalization of the electricity and gas markets. In 2007, the 2020 Strategy was formed. In 2011, 2050 Strategy was adopted, and in 2014, 2030 Strategy was set. These strategies are essential for the transition to a low carbon economy, increasing energy efficiency, and securing the energy supply of the Union. In 2014, the EU established Energy Security Strategy and finally in 2015, the Energy Union was founded. All these shows that the Community made progress to strengthen its energy framework. Especially after the 2006 and 2009 Ukrainian crises, the developments accelerated. With the two crises, gas flows reduced to Europe, and the European countries remained without gas. Besides, these two

crises demonstrated that gas supplies could be disrupted. For this reason, the EU, on the one hand, accelerated its progress of developments and on the other hand, it started to look for alternative suppliers.

In the first part, the energy policy of the EU will be explained. This part includes the objectives and legal basis of the energy policy. Then, reforms in the field of energy from the 1990s to 2015 will be described. In the second part, the energy structure of the EU will be demonstrated. This will include production, consumption, and imports of the Community. After, current and planned pipelines will be described. The EU has currently 14 pipelines that import natural gas from different countries. There are four pipelines from North-Eastern corridor, five pipelines from North-Western corridor, four pipelines from South-Western corridor and one interconnector from South-Eastern corridor.

To meet with the gas demand, new pipelines will be online in Europe in the short to medium terms. In North-Eastern Corridor, Russia decided to build Nord Stream 2 to bypass Ukraine and to supply gas directly to the European market. In South-Eastern Corridor, four pipelines were decided to be constructed by the Union to bring gas from the Caspian and the Mediterranean regions. Russia responded to these attempts of the European Union by initiating the construction of Turkish Stream in the same corridor to protect its domination in the European market. Besides, one pipeline is decided to be built by the EU in South-Western corridor to bring gas from North Africa. All these demonstrate that the Community concentrates on its South-Eastern corridor to diversify Russian gas. In the last part, 2006 and 2009 Ukrainian crises will be elaborated, and its effects on the EU will be analyzed.

1.1. The European Union Energy Policy

Energy has a prominent place in the European politics. The member states use different energy sources for their energy supply. Among them, the most important energy products that EU imports are natural gas and crude oil. As the dependency for the energy of

member states varies, it is hard to agree on common energy policy. For energy security and sustainability, the EU has worked on creating a common energy policy for many years. The EU energy policy was first included into the EU framework with Lisbon Treaty. Title XXI- Article 194(1) of the Treaty on the Functioning of the European Union (TFEU) explains the general objectives of the energy policy. According to the Treaty, the primary objectives of the EU energy policy is: "To ensure the functioning of the energy market, to ensure the security of energy supply in the Union, to promote energy efficiency and energy saving and the development of new and renewable forms of energy and to promote the interconnection of energy networks."[3]

Additionally, Article 194(2) states that decision making procedure is subject to the ordinary legislative procedure in which the Commission submits a proposal to the Council and the Parliament and two institutions approve or amend the proposal.[4] This shows that provisions of Article 194 state the objectives and decision making the procedure of the energy policy.

The EU energy policy is affected by specific provisions and other provisions. Specific provisions such as Title VIII- Article 122 of TFEU explains what measures can be taken when there is difficulty in the supply of energy.[5] Secondly, Title XVI- Article 170-172 of TFEU points out the necessity of interconnections of energy networks. There are also other provisions which are related to energy. Other provisions such as Title VII- Article 114 of TFEU deals with internal energy market regulations.[6] Secondly, Title V- Article 216-218 of TFEU defines how the EU engages in agreements with third countries and which procedures the EU follows in negotiations.[7]

In the 1990s, natural gas and electricity markets were under the control of the member states. The EU Commission and the member states decided to open energy markets of the member states for competition and liberalize these markets. As a result, the First Energy Package was adopted in 1996 about electricity and in 1998 about natural gas.[8] The Second Energy Package was adopted in 2003. With this package, new electricity and

[3] Braun, Jan Frederik. "EU Energy Policy under the Treaty of Lisbon Rules." 2011: 3. Working Paper, European Policy Institutes Network.
[4] Braun, 11
[5] Gouardères, Frédéric, Veronica McWatt, and Lucile Fleuret. "Energy Policy: General Principles." Fact Sheets on the European Union. January 2018. Accessed April 06, 2018. Retrieved from http://www.europarl.europa.eu/atyourservice/en/displayFtu.html?ftuId=FTU_2.4.7.html
[6] Gouardères, 2018
[7] Braun, 5
[8] Gouardères, Frédéric, Veronica McWatt, and Lucile Fleuret. "Internal Energy Market." European Parliament. February 2018:1. Accessed April 6, 2018. Retrieved from http://www.europarl.europa.eu/ftu/pdf/en/FTU_2.1.9.pdf

gas suppliers entered into markets of the member states and this enabled European consumers to choose their electricity and gas suppliers.[9] Competitiveness increased with the second package. In 2009, the Third Energy Package was adopted. This package amends the second package and includes further liberalization of electricity and gas markets.[10] These three energy packages are essential steps for liberalizing the EU energy market as well completing the internal energy market of the EU. With the unbundling, competition increased in the European energy market.

In 2007, European Council adopted 2020 Energy Strategy: "to reduce greenhouse gas emissions by 20% to increase the share of renewable energy to 20% and to make a 20% improvement in energy efficiency."[11] In 2015, the greenhouse gas emissions reduced by 22%, so the EU achieved its 20% reduction aim. In the same year, the share of renewable energy rose to 16.7%.[12] This means that the EU can achieve its 20% target before 2020. 11 out of 28 members reached the 20% target of increasing the share of renewables.[13] Regarding the objective of energy efficiency, in 2015, the EU achieved its target of final energy consumption, but it could not achieve its target of primary energy consumption. Primary energy consumption reduced by 16.9% and a further 3.1% reduction is needed until 2020.[14] It can be foreseen that the EU will achieve all of its targets until 2020.

In 2011, the European Commission adopted an energy roadmap called 2050 Strategy for sustainable and secure energy. 2050 Strategy is the long-term goal of the EU. Parallel to 2020 and 2030 Strategies, 2050 Strategy is also an important stepping stone for the transition to low carbon economy. With this strategy, the EU aims to reduce greenhouse gas emissions by 80-95% compared to 1990 levels by 2050.[15]

In 2014, the EU leaders adopted the 2030 Strategy for Climate and Energy. The new strategy was built on the 2020 strategy, and the objectives were set for the years between 2020 and 2030.[16] With this strategy, the EU set "At least 40% cuts in greenhouse gas

[9] Aykın, Sibel, Ileana Tache, and Ahmet Başar Karaman. "Energy Policy of the EU and the Role of Turkey in Energy Supply Security." 2017. *Bulletin of the Transilvania University of Brasov.Series V: Economic Sciences 10 (2)*:291
[10] Aykın, 291
[11] "Europe 2020 Indicators- Climate Change and Energy." Eurostat. August 9, 2017. Accessed April 06, 2018. Retrieved from http://ec.europa.eu/eurostat/statistics-explained/index.php/Europe_2020_indicators_-_climate_change_and_energy
[12] "Europe 2020 Indicators- Climate Change and Energy.", 2017
[13] "Renewable Energy Statistics." Eurostat. February 2, 2018. Accessed April 17, 2018. Retrieved from http://ec.europa.eu/eurostat/statistics-explained/index.php/Renewable_energy_statistics
[14] "Europe 2020 Indicators- Climate Change and Energy.", 2017
[15] "2050 Energy Strategy." Energy Strategy and Energy Union. October 09, 2014. Accessed April 06, 2018. Retrieved from https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/2050-energy-strategy
[16] "2030 Energy Strategy." Energy Strategy and Energy Union. October 09, 2014. Accessed April 06, 2018. Retrieved from https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/2030-energy-strategy

emissions from 1990 levels, at least 27% share for renewable energy, at least 27% improvement in energy efficiency".[17] The strategy is vital for the transition to a low-carbon economy and sustainable development.

In 2014, the EU Commission released Energy Security Strategy for the EU countries in response to gas disruptions to the EU because of two Ukrainian crises. The main aim of the strategy is to ensure continuous and abundant supply of energy to the EU.[18] In the short term, the Commission developed and simulated two scenarios to the EU member states. The first scenario was about the complete cessation of Russian gas and the second scenario was about disruptions in Russian gas. The results of the scenarios showed that long supply disruptions to the EU severely affect Southeast Europe.[19]

In the long term, the five key areas were identified for the security of supply of the EU. Firstly, increasing energy efficiency by reaching 2020,2030 and 2050 targets. Secondly, building and strengthening the energy infrastructure of the EU as well as completing the internal energy market. Thirdly, speaking one voice in the external energy affairs. Fourthly, strengthening and deepening cooperation between the member states in the field of energy. Lastly, increasing sustainable energy production, diversifying supplier countries and energy routes.[20]

In 2015, the Energy Union was established. The three main objectives of the Energy Union are the security of supply, sustainability, and competitiveness.[21] The Energy Union is grounded in 2030 Strategy and Energy Security Strategy.[22] The three long-established objectives are supported by five crucial dimensions.[23] The first one is security, solidarity, and trust. With this dimension, the EU tries to ensure diversification of energy sources of the Union and to ensure solidarity and trust between the member states. This dimension is essential because the member states firmly adhere to their right to decide on their energy policies, energy mix, and suppliers. In this context, foreign policy decisions regarding energy are taken independently from each member state rather than collective decision

[17] "2030 Climate & Energy Framework." Climate Action. February 16, 2017. Accessed April 06, 2018. Retrieved from https://ec.europa.eu/clima/policies/strategies/2030_en
[18] "Energy Security Strategy". European Commission Accessed March 7,2018. Retrieved from https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/energy-security-strategy
[19] "Energy Security Strategy", 2018
[20] "Energy Security Strategy", 2018
[21] "Energy Union." European Council for an Energy Efficient Economy. March 2016. Accessed April 6, 2018. Retrieved from https://www.eceee.org/policy-areas/energy-union/
[22] "Building the Energy Union." Energy Strategy and Energy Union. August 03, 2017. Accessed April 06, 2018. Retrieved from https://ec.europa.eu/energy/en/topics/energy-strategy-and-energy-union/building-energy-union
[23] "Energy Union and Climate". European Commission. Accessed March 7, 2018. Retrieved from https://ec.europa.eu/commission/priorities/energy-union-and-climate_en

making. Consequently, the EU aims to increase security, solidarity, and trust between member states to increase cooperation between member states in the field of energy.[24]

The second one is a fully integrated internal energy market. This dimension ensures the continuous flow of energy to member states with a strong infrastructure and without technical or regulatory barriers.[25] Between 1996 and 2009, three legislative packages were adopted. The main aim of these packages was to integrate internal energy markets of the EU, and they addressed the issues of "market access, transparency, and regulation, consumer protection, supporting interconnection and adequate levels of supply."[26]

The third one is energy efficiency. With this dimension, the EU aims to increase the efficiency of energy resources, reduce energy imports and reduce greenhouse gas emissions. To increase energy efficiency and environmental protection, the EU developed 2020,2030 and 2050 strategies. These strategies will not only increase the efficiency and environmental protection, but it will also decrease energy bills and energy imports.[27]

The fourth one is climate action. In this dimension, the EU tries to ensure to transition to a low carbon economy, increase the use of renewable energy and it is committed to international climate change agreements. The EU quickly ratified the Paris Agreement, which is global climate change action agreement opened for signature in 2015, to show its commitment to fight against climate change. Besides, the EU increased the use of renewable energies, and it successfully separates economic growth from greenhouse gas emissions, so that the Union has decarbonized its economy.[28] With 2020, 2030 and 2050 strategies, the Community aims to transition to low carbon economy.

The last one is research, innovation, and competitiveness. In this dimension, the EU supports research, innovation and new technologies for clean energy and transition to a low carbon economy.[29] All these accelerate the process of transition to clean energy and low carbon economy. Research, innovation, and competitiveness are supported by the Investment Plan for Europe and European Fund for Strategic Investment which are funding tools of the European Commission and the European Investment Bank.[30]

[24] Aykın, 291
[25] "Building the Energy Union.", 2017
[26] Aykın, 291
[27] Aykın, 292
[28] Aykın, 292-293
[29] "Building the Energy Union.", 2017
[30] Aykın, 293

In 2016, the Commission adopted regulation about the Governance of the Energy Union with a view to affecting convergence on energy policies and building deeper cooperation among the member states. The regulation is vital for the management of the Energy Union. The goals of the governance of the Energy Union are:

- Bring together energy and climate actions as well as actions in other relevant policy areas, leading to more and longer-term policy coherence. This also provides long-term certainty and guidance for investors;
- Secure implementation of the internal energy market and the delivery of the 2030 energy and climate framework, notably the implementation of the agreed 2030 targets on renewables, energy efficiency, non-Emissions Trading System and interconnections;
- Streamline current planning and reporting requirements, avoiding unnecessary administrative burden;
- Involve an energy dialogue with stakeholders to inform policy-making and support active engagement in managing the energy transition;
- Deepen the cooperation between the Member States, including at the regional level, and with the Commission;
- Improve the data, analysis, and intelligence needed to underpin the Energy Union by pooling the relevant knowledge and making it easily accessible to all stakeholders, and
- Annual reporting to the European Parliament and the Council on the state of the Energy Union in order to address the key issues and steer the policy debate.[31]

As a normative power[32], the European Union gives importance to the implementation of the external dimension of internal policies in many areas. Regarding energy, three factors are the most important: "Diversification, speaking with one voice and a properly developed internal energy system."[33] With diversification, the Union aims to increase the number of energy partners in order not to become overdependent on one country. With speaking as one voice, the EU tries to create a common energy interest and a collective

[31] "Energy Union.", 2016.
[32] It refers to diffusing norms such as peace, cooperation, rule of law, justice and human rights in respect to relations with the third parties.
[33] Maciulis, Vitas. "The External Dimension of the EU's Energy Policy." European Economic and Social Committee. April 28, 2016: 3. Accessed April 06, 2018. Retrieved from http://edz.bib.uni-mannheim.de/edz/doku/wsa/2016/ces-2016-0083-en.pdf

spirit in energy. With a developed internal energy system, the Community intends to create a strong internal energy market and to break external influences. In the following part, national preferences in energy policy will be explained.

1.2. National Preferences

Energy is on the agenda of the European Union already in the very beginning of the European integration process. European Coal and Steel Community (ECSC) which was founded in 1951 and EURATOM which was founded in 1957 are two important institutions for securing energy supply of the member states. For many years, the European Commission together with the European Parliament tried to include specific objectives and decision-making procedure regarding energy to the treaty law.[34] However, the efforts of the two institutions failed repeatedly because member states were reluctant to transfer competencies to the supranational institutions of the Union in the energy matters. Treaty of Maastricht underlined the importance of energy security and policy, so that energy became one of the priority areas for the Community. However, the treaty did not spell out specific objectives about the member state cooperation.[35]

With the 2009 Lisbon Treaty, specific policy objectives for energy was defined. Besides, the treaty included a mandate for policymaking in energy matters. The Community has made several attempts to extend energy policy making in supranational level, and it finally included a separate part on energy in the last treaty.[36] However, member states still firmly adhere to their right to decide on their energy policies, energy mix, and suppliers. For this reason, it can be concluded that the European institutions cannot interfere in the autonomy of the member states in energy matters. As a result, the

[34] Tosun Jale, Sophie Biesenbender, and Kai Schulze. "Energy Policy Making in the EU." 2015: 23. Springer.
[35] Tekin, Ali, and Paul Williams. "Geo-Politics Of the Euro-Asia Energy Nexus: The European Union, Russia And Turkey". 2010: 13. Springer.
[36] Tosun, 23

supranational body cannot go beyond calling for cooperation and facilitating dialogue between the member states.

Speaking with one voice is one of desire for the EU. Representation as a single body in relations with energy producing and transit countries can increase the bargaining power of the Union. Also, it can solve energy-related problems since all members would take a common stance. In principle, member states agree on speaking with one voice, but they are reluctant to transfer their rights to supranational authorities. This situation can be better explained with intergovernmentalism.

According to intergovernmentalists, states choose to cooperate when the costs for non-cooperation are high. During cooperation, national interests of the countries are at the forefront, so interests of the countries determine the level of cooperation. Thus, cooperation can fail when the outcome and national interests clash. Besides, distribution of benefits can create conflicts between the countries. At this point, intergovernmentalism assumes that in order to overcome conflict, states choose the best option that is close to national interests or status quo.[37] The concrete example of this issue is the construction of Nord Stream 2 pipeline. Poland and the Baltic countries perceive the pipeline as a threat to the energy security of the Union while Germany, Austria, and some Western European countries have a perspective that the pipeline has nothing to do with energy security of the European Union.[38] Besides, German officials stated that the pipeline could lower gas prices in Germany, so the pipeline will be beneficial for Germany.[39] This demonstrates that European countries act along with their national interests and they interpret energy security differently.

National energy preferences and policies increase vulnerability to the pressures coming from energy-exporting countries. Different approaches regarding energy policies, energy mix, and energy suppliers by member states can undermine the formation of harmonized energy policy as well as energy security.[40] Western European countries, especially, Southeast European countries are dependent on gas coming from Russia, but it was Southeast European countries that were severely affected by the two Ukrainian crises.

[37] Tekin, 28
[38] Keating, Dave. "Angela Merkel May Be Souring On Russia's Nord Stream." Forbes. April 10, 2018. Accessed May 02, 2018. Retrieved from https://www.forbes.com/sites/davekeating/2018/04/10/angela-merkel-may-be-souring-on-russias-nord-stream/#4afc9f377cf8
[39] Riley, Alan. "Nordstream 2: How Germany Lets Down Europe." The Globalist. February 28, 2018. Accessed April 17, 2018. Retrieved from https://www.theglobalist.com/germany-nordstream2-energy-security-european-union/
[40] Tekin, 14

These countries were dependent on the Soviet era pipelines carrying gas from Russia to Western Europe through their territory. In 2006 and 2009 Ukrainian crises, Russia stopped providing gas to Ukraine, which was a result of its claim that Ukraine did not pay for all gas it imported. Thereupon, Ukraine reduced gas flows to European countries by taking gas from the pipelines to meet its demand.

In fact, energy security became one of the priorities for the European Union after Central and Eastern enlargement. Therefore, different national approaches to energy matters and uncoordinated energy policies not only jeopardize energy security of the Southeast European countries but it also jeopardizes the energy security of the community.

1.3. Energy Composition of the EU

Europe is not an energy-rich continent, so there is a considerable gap between energy production and consumption within the European continent. The table below shows the production and consumption of oil, natural gas, and coal in the European Union between 2006 and 2016. In each source, both production and consumption declined in 10 years. However, the fall in production is much higher than the fall in consumption. In other words, in 10 years, production in oil, gas, and coal declined by 39%, 41,4%, and 30,8% respectively. On the other hand, consumption in these three sources declined by 15,6%, 12,5%, and 27,1% respectively. While the biggest decline in production occurred in natural gas, the least decline in consumption again occurred in the same source. As a result, the Union has been relying more on imports, mainly on natural gas, to fill the gap between production and consumption.

PRODUCTION AND CONSUPTION OF OIL, NATURAL GAS AND COAL IN MILLION TONNES OIL EQUIVALENT (MTOE)											
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
OIL											
Production	116,1	114,2	106,6	100	93,6	81,7	73	68,5	67,3	71,9	70,8
Consumption	727,3	711,8	707,7	670,1	665	644,5	618,8	601,7	590,8	600,6	613,3
NATURAL GAS											
Production	181,7	169,3	170,8	155	158,2	139,8	132	130,4	119,3	107,8	106,4
Consumption	441,1	434,7	445,4	416,5	448,1	404,7	394,7	388,1	344,7	359,2	385,9
COAL											
Production	193,2	187	178,9	167,9	165,7	168,5	168,1	157,3	150,6	144,6	133,6
Consumption	327,2	328,4	303,6	267,4	280,2	288,1	294,3	288	268,4	261,1	238,4

Table 1: Production and Consumption of Oil, Natural Gas, and Coal in Million Tonnes of Oil Equivalent (Mtoe)[41]

The table indicates that oil production decreased in a decade due to a lack of resources for production. Until 2014, oil consumption decreased significantly, but then it started to increase due to demand coming from transportation and industry sectors and a decline in oil prices.

Like oil, the natural gas production also shows a declining trend between 2006 and 2016. Since 2014, the Netherlands, which is the biggest gas producer of the EU, has decreased its gas production to reduce possibilities of an earthquake. Therefore, gas production and net exports of the country have fallen since 2014.[42] The country exports gas to France, Belgium, Germany, Italy, the Netherlands and the UK.[43] As a consequence, these countries need to find alternative gas suppliers. The second biggest gas producer of the Union, the UK, leaving the Union. Therefore, the total gas production of the community will decrease significantly. Contrary to oil demand, natural gas demand has ups and downs. Especially after 2014, natural gas consumption started to increase. This can be attributed to declining natural gas prices as well as Russia's ability to supply a vast amount of cheap gas to Europe. Declining trend in gas consumption between 2010 and 2014 can be attributed to the increase in energy efficiency thanks to climate strategies of the Union.

[41] "BP Statistical Review of World Energy 2017", 2017. Accessed March 3,2018. Retrieved from https://www.bp.com/content/dam/bp/en/corporate/pdf/energy-economics/statistical-review-2017/bp-statistical-review-of-world-energy-2017-full-report.pdf

[42] "Netherlands- Energy." Export.Gov. October 30, 2017. Accessed June 19, 2018. Retrieved from https://www.export.gov/article?id=Netherlands-Energy

[43] Honore, Anouk. "The Dutch Gas Market: Trials, Tribulations and Trends." May 2017. Accessed June 19, 2018. Retrieved from https://www.oxfordenergy.org/wpcms/wp-content/uploads/2017/05/The-Dutch-Gas-Market-trials-tribulations-and-trends-NG-118.pdf

Coal production in the Union decreased in ten years. The significant decline occurred especially after 2012. The production falls because of the EU's desire to transition to a low carbon economy. Until 2012, coal consumption had fluctuations. After 2012, coal demand started to go down in line with the fall in coal production. All these shows that the production of oil, natural gas, and coal are insignificant to meet the demand from these sources.

	1990	2000	2005	2010	2014	2015
Total Primary Energy Suppy(Mtoe)	1646,71	1695,15	1793,70	1726,49	1566,97	1586,36
Total Production of Energy(Mtoe)	951,42	950,38	909,22	842,67	777,19	770,71
Total Net Imports of Energy(Mtoe)	752,25	826,76	984,89	957,34	884,62	906,70

Table 2: Tpes, Production, and Imports[44]

Total Primary Energy Supply (TPES), which is the total energy supply that is used domestically, of the EU increased from 1990 to 2005, and then it decreased between 2005 and 2014. One of the main reason for this fall is because of the significant decline in energy production. Then, in 2015, TPES of the EU slightly increased since imports of the Union increased. In total, TPES of the European Union decreased by 3.6% in 25 years. Regarding energy production, total energy production of the Union has fallen from 1990 to 2015 which accounts for 19%. This is mainly because the EU is not an energy-rich continent. Regarding imports, from 1990 to 2005, imports of the EU raised significantly. Between 2005 and 2014, imports of the EU have fallen, and the imports rose again in 2015. One of the reasons for the fall in imports is because of the two Ukrainian crises and increase in energy efficiency. The imports of the Union increased by around 20% in 25 years. As it can be seen, the fall in energy production has compensated with imports.

[44] "World Energy Balances.", 608-635

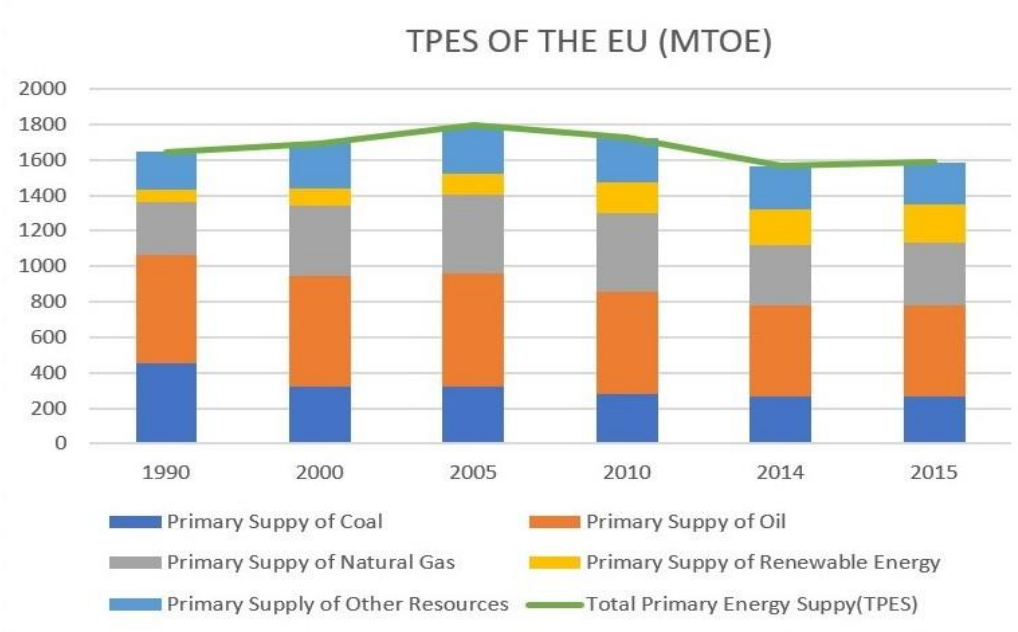

Figure 1: Tpes of the EU (Mtoe)[45]

In the TPES of the EU, oil has the highest share. It was followed by natural gas and coal. From 1990 to 2015, the share of coal has fallen gradually. Even though oil has had the highest share from 1990 to 2015, its share also decreased. On the other hand, from 1990 to 2015, the shares of natural gas and renewable energy rose significantly. This is because after the nuclear accident in Fukushima in 2011, the European countries have increased their reliance on renewable energy and natural gas and they have phased out their nuclear power plants.[46] Consequently, fossil fuels continue to possess the highest share in the TPES of the EU.

Total Final Consumption (TFC), which is an aggregate of energy used by consumers, of the European Union accounted 1113.5 Mtoe in 2015.[47] The greatest energy-consuming sector in the EU is the transportation sector with 368.5 Mtoe. The second greatest energy demand came from the housing sector with 282.8 Mtoe. Industry sector followed the housing sector and consumed 281.7 Mtoe in 2015. Finally, service sector consumed 151.4 Mtoe. The remaining 29.1 Mtoe was used in other sectors such as agriculture and forestry.[48]

[45] "World Energy Balances.", 626-640
[46] Katona, Viktor. "The Slow Death Of Nuclear Power In Europe." OilPrice.com. August 30, 2017. Accessed June 19, 2018. Retrieved from https://oilprice.com/Alternative-Energy/Nuclear-Power/The-Slow-Death-Of-Nuclear-Power-In-Europe.html
[47] "World Energy Balances.", 98
[48] "Consumption of Energy." Eurostat. June 2017. Accessed May 14, 2018. Retrieved from http://ec.europa.eu/eurostat/statistics-explained/index.php/Consumption_of_energy

As stated before, the energy production of the EU has declined. This situation pushes the member states to import crude oil, coal and natural gas from other states. According to the International Energy Agency report (IEA), the EU imported 539.67 Mtoe of oil, 112.31 Mtoe of coal and 247.22 Mtoe of natural gas in 2015.[49]

Partner	Value (Share %)	Net mass (Share %)
Russia	28.6	29.3
Norway	12.6	12.0
Nigeria	8.9	8.5
Kazakhstan	7.5	7.0
Saudi Arabia	7.0	7.0
Iraq	6.6	7.7
Azerbaijan	5.7	5.2
Algeria	5.4	4.8
Angola	3.5	3.6
Libyan Arab Jamahiriya	2.6	2.5
Mexico	2.0	2.4
Egypt	1.6	1.5
Kuwait	1.2	1.3
Others	6.8	7.2

Sources: Eurostat database (Comext) and Eurostat estimates

Table 3: The Imports of Crude Oil from Main Trading Partners[50]

Table 3 illustrates that EU imports crude oil mainly from 13 countries with Russia on the lead with the share of 28.6%. It is evident in the table that the EU has many trading partners in crude oil. This stems from the portability of crude oil. In other words, the Community can diversify oil and coal because it can be transferred by ships which make the trade of oil and coal more flexible compared to the trade of gas. In the case of natural gas, it is mostly transferred through pipelines to the European continent.

Partner	Value (Share %)	Net mass (Share %)
Russia	38.5	37.5
Norway	35.5	37.6
Algeria	11.7	10.7
Qatar	7.6	7.9
Libya	2.7	2.4
Nigeria	1.7	1.7
Others	2.3	2.3

Sources: Eurostat database (Comext) and Eurostat estimates

Table 4: The Imports of Natural Gas Shares of Main Trading Partners[51]

[49] "World Energy Balances.", 611-619

[50] "Extra-EU28 Imports of Petroleum Oil, Crude And NLG, Main Trading Partners" Eurostat, 2015. Accessed March 23, 2018. Retrieved from http://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Extra-EU28_imports_of_petroleum_oil,_crude_and_NLG,_main_trading_partners,_2015.png&oldid=305798

[51] "Extra-EU28 Imports of Natural Gas, Shares (%) of Main Trading Partners" Eurostat, 2015. Accessed March 23, 2018. Retrieved from http://ec.europa.eu/eurostat/statistics-

Table 4 indicates that the EU imports natural gas mainly from six countries. Among them, Russia is the biggest gas supplier of the EU with 38.5% in 2015. This demonstrates that Russia has a prominent place in the European energy market, especially in the areas of crude oil and natural gas. In 2017, the EU imported 360 billion cubic meters (bcm) of gas mainly from Russia (43%), Norway (34%), Algeria+ Libya (11%) and the remaining gas (12%) was imported in the form of LNG.[52] It is clear that the share of Russia in the European market rose to 43%. Compared to 2015, Russia increased its share by around 5%.[53]

Norwegian gas feeds Northwestern part of the EU while Algeria and Libya feed Southwestern part of Europe. The remaining Central and Eastern parts of Europe are fed Russian gas, so Russia supplies gas to more European countries than Norway and African countries supply. That is why the country has the highest share in the European Union market. It is clear that the EU does not have many trading partners in natural gas like in crude oil. The main reason for that, as stated above, is because natural gas is mostly transferred through pipelines to the EU. Even though the EU imports natural gas in the form of Liquefied Natural Gas (LNG), the share of imports via pipelines are much higher than LNG imports of the Union since Russia supply cheap gas to Europe. The issue will be elaborated in the last chapter.

Statistics in the table below demonstrate that 10 out of 28 countries imported crude oil from Russia along with more than 50% share. As shown above, member states' dependency on Russia varies. Even though around 1/3 of the EU member states imported oil from Russia, the EU countries can diversify crude oil imports by increasing the number of countries that export crude oil. Hence, here it should be noted that import dependency on oil is not as crucial as the import dependency of natural gas. The reason for this is because pipelines create import dependency on the exporter countries. In the case of interruptions in gas supplies, it is harder to find an alternative quickly. Thus, this affects the energy security of the importing country.

explained/index.php?title=File:ExtraEU28_imports_of_natural_gas_(liquefied,_gaseous_state),_shares_(%25)_of_main_trading_partners,_2015_.png&oldid=305799

[52] "Quarterly Report on European Gas Markets." Market Observatory for Energy, 4th ser., 10, no. 4 (2018). Accessed April 8, 2018. Retrieved from https://ec.europa.eu/energy/sites/ener/files/documents/quarterly_report_on_european_gas_markets_q4_2017_final_20180323.pdf

[53] "Quarterly Report on European Gas Markets.", 2018

Country	Share (%) of Russia in national extra-EU28 imports	
	Petroleum oils	Natural gas
Belgium	25-50	0-25
Bulgaria	75-100	75-100
Czech Republic	50-75	75-100
Denmark	0-25	0-25
Germany	25-50	50-75
Estonia	75-100	75-100
Ireland	0-25	0-25
Greece	0-25	50-75
Spain	0-25	0-25
France	0-25	0-25
Croatia	50-75	0-25
Italy	0-25	50-75
Cyprus	0-25	0-25
Latvia	0-25	75-100
Lithuania	75-100	75-100
Luxembourg	0-25	0-25
Hungary	75-100	75-100
Malta	0-25	0-25
Netherlands	25-50	25-50
Austria	0-25	75-100
Poland	75-100	75-100
Portugal	0-25	0-25
Romania	25-50	75-100
Slovenia	0-25	75-100
Slovakia	75-100	75-100
Finland	75-100	75-100
Sweden	50-75	0-25
United Kingdom	0-25	0-25

Sources: Eurostat database (Comext) and Eurostat estimates

Table 5: The Share of Russia in National Imports[54]

Natural gas is the energy source that is imported by the EU in higher volumes. Again, Russia takes the lead in the natural gas market of Europe. According to Eurostat statistics in 2015, 12 of the EU states depend on Russian gas between 75%-100%. (Bulgaria, Czech Republic, Estonia, Latvia, Lithuania, Hungary, Austria, Poland, Romania, Slovakia, Slovenia and Finland). Also, 3 EU countries depend on Russian gas between 50%-75% (Germany, Greece, and Italy). It is evident in the statistics that 15 out of 28 members imported natural gas from Russia with more than 50% share.

Compared to crude oil, natural gas coming from Russia dominates the EU market because more than half of the European states imported natural gas from Russia. Interestingly, many countries in the statistics that are highly dependent on Russian energy were once under the influence of the Soviets. Consequently, it can be inferred that Russia today continues to control the former Soviet zone by the means of energy resources. In order to depict a clear picture of the gas trade of the EU, current and planned pipelines will be explained in the next part.

[54] "Share (%) of Russia in Extra-EU28 Imports of Individual Member States, 2015, Trade in Value" Eurostat, 2015. Accessed April 14, 2018. Retrieved from http://ec.europa.eu/eurostat/statistics-explained/index.php?title=File:Share_(%25)_of_Russia_in_extra-EU28_imports_of_individual_Member_States,_2015,_trade_in_value.png&oldid=305127

Figure 2: Current and Future Pipelines of the EU[55]

1.4. Current Pipelines

The EU has currently 14 pipelines that import natural gas from different countries. There are four pipelines from South-Western corridor, four pipelines from North-Eastern corridor, five pipelines from the North- Western corridor and one interconnector from South-Eastern corridor.

1.4.1. North- Eastern Corridor

[55] Zaslavskiy, Ilya. "GGP: The Kremlin's Gas Games In Europe: Implications For Policy Makers." Natural Gas World. May 31, 2017. Accessed May 08, 2018. Retrieved from https://www.naturalgasworld.com/ggp-the-kremlins-gas-games-in-europe-implications-for-policy-makers-37890

1.4.1.1. Yamal Pipeline

One of the oldest natural gas pipelines between Russia and Europe was built in 1996 named Yamal-Europe. It starts in Russia passes through Belarus and Poland and finally ends in Germany. The length of the pipeline is over 2000km, and it can carry 33 bcm of natural gas.[56] After the Ukrainian crisis, new pipeline routes were planned and are still being built. These new pipelines aim to bypass transit countries and deliver natural gas directly to Europe. Yamal gas fields are the biggest fields in the world, so the pipeline carries gas from this fields to Europe.

1.4.1.2. Nord Stream

Nord Stream pipeline was built to reach the European market directly. The construction of the pipeline started in 2010 and ended in 2012.[57] The pipeline has the capacity to transfer 55 bcm of natural gas per year.[58] It starts in Russia and ends in Germany. The length of the pipeline is around 1300km, and the main targeted markets are Germany, Netherlands, Denmark, France and other EU countries.[59] With the Nord Stream, Russia bypasses transit countries, and it supplies gas directly to Europe. Direct supply is vital for the continuous supply of gas. In two Ukrainian crises, European countries which were taking gas via Ukraine transit pipelines severely affected from gas disruptions to Ukraine while gas supplies continued to Germany. To bypass Ukraine and to increase direct supply, the EU and Russia agreed for the construction of Nord Stream 2 pipeline which is identical with the first pipeline.

[56] "Transportation." Gazprom Export. 2018. Accessed April 06, 2018. Retrieved from http://www.gazpromexport.ru/en/projects/transportation/
[57] "The pipeline". Nord Stream. Accessed April 06, 2018. Retrieved from https://www.nord-stream.com/the-project/pipeline/
[58] "Transportation.", 2018
[59] "Transportation.", 2018

1.4.1.3. Brotherhood Pipeline

The oldest natural gas pipeline between Russia and Europe was built in 1967 named as Brotherhood Pipeline. The pipeline has the capacity to transfer 100 bcm of gas per year, and its length is more than 4500 km.[60] The pipeline starts in Russia passes through Ukraine and reaches to Slovakia. In Slovakia, the pipeline split into two branches. One branch goes to the Czech Republic, and the other branch goes to Austria. The Brotherhood pipeline is essential to supply Russian gas to Czech Republic, Austria, Slovakia, and Hungary. After the two Ukrainian crises, Russia has reduced its reliance on Ukraine as a transit country, and it looked for alternative routes to bypass Ukraine.[61] Also, the infrastructure of this pipeline requires new investments and improvements since it is becoming outdated. Hence, Russia is not able to use the whole capacity of the pipeline.

1.4.1.4. Trans-Balkan Pipeline

The pipeline was constructed in 1986, and it has the capacity to transfer 6 bcm of gas per year in the initial phase.[62] The pipeline starts in Russia and passes from Ukraine, Moldova, Romania, Bulgaria and finally reaches Turkey. The length of the pipeline is over 1000km. With the construction of the second phase, the total capacity of this pipeline rose to around 14 bcm of gas per year.[63] Since this pipeline is also using Ukraine as a transit, Russia will decrease supplies from this route in 2019. After 2019, Russia aims to

[60] Hays, Jeffrey. "Russian Oil and Natural Gas Pipelines." Facts and Details. 2013. Accessed April 06, 2018. Retrieved from http://factsanddetails.com/russia/Education_Health_Transportation_Energy/sub9_6c/entry-5152.html
[61] "Transportation.", 2018
[62] “Turkey”. Gazprom Export. 2017. Accessed March 09, 2018. Retrieved from http://www.gazpromexport.ru/en/partners/turkey/
[63] "Country Analysis Brief: Turkey." February 2, 2017: 12. The U.S. Energy Information Administration. Accessed March 8, 2018. Retrieved from https://www.eia.gov/beta/international/analysis_includes/countries_long/Turkey/turkey.pdf

connect Turkish stream to Trans- Balkan pipeline, and it aims to reverse the existing pipeline, so that it can continue to supply gas to Southeast European countries.[64]

1.4.2. North- Western Corridor

1.4.2.1. Europipe 1

The pipeline started its operations in 1995, and it was designed to supply gas from Norway to Germany. The length of the pipeline is 620km, and it has 16 bcm of gas carrying capacity per year.[65]

1.4.2.2. Europipe 2

The pipeline is the second route for Norway to supply its gas to Germany. Europipe 2 was commenced in 1999. The capacity of the pipeline is 25 bcm of gas, and the length of the pipeline is 658km.[66] Europipe 1 and Europipe 2 have total 41 bcm of gas carrying capacity to Germany.

[64] "Bulgaria's PM Borissov Confirms Turkish Stream Pipeline to Europe to Pass Through Bulgaria." Central European Financial Observer. December 15, 2017. Accessed April 23, 2018. Retrieved from https://financialobserver.eu/recent-news/bulgarias-pm-borissov-confirms-turkish-stream-pipeline-to-europe-to-pass-through-bulgaria/

[65] "European Gas Atlas 2015." FluxEnergie. 2015: 15. Accessed June 14, 2018. Retrieved from https://www.fluxenergie.nl/wp-content/uploads/2015/11/European-gas-atlas-2015.pdf

[66] "European Gas Atlas 2015.", 14

1.4.2.3. Norpipe

Norpipe commenced in 1977 which was designed to supply gas from Norway to Germany and Netherlands. The length of the pipeline is 443km, and it has 11 bcm of gas capacity to transfer these two countries.[67] In 2016, Norway supplied 3,9 bcm of gas from this pipeline.[68]

1.4.2.4. Franpipe

The pipeline designed to supply gas from Norway to France. Gas flows started in Franpipe in 1998. The pipeline can carry 19 bcm of gas per year, and the length of the pipeline is 840km.[69] Considering that France imported 46,4 bcm[70] and the country imported 16,6 bcm of gas from this pipeline in 2016[71], Norwegian gas accounts for around 36% of French gas imports.

1.4.2.5. Zeepipe

Zeepipe is a direct pipeline between Norway and Belgium. The operations of the pipeline started in 1997. Zeepipe can carry 15 bcm of gas, and the length of the pipeline is

[67] "European Gas Atlas 2015.", 15
[68] "Exports of Norwegian Oil and Gas." Norwegianpetroleum.no. May 16, 2018. Accessed June 14, 2018. https://www.norskpetroleum.no/en/production-and-exports/exports-of-oil-and-gas/
[69] "European Gas Atlas 2015.",14
[70] "Gas Trade Flows in Europe" International Energy Agency. 2018. Accessed June 12, 2018. Retrieved from https://www.iea.org/gtf/#
[71] "Exports of Norwegian Oil and Gas.", 2018

814km.[72] In 2016, Belgium imported 18,3 bcm in total[73], and the country imported 14,4 bcm of gas from Norway.[74] This means that Norwegian gas accounts for around 79% of Belgian gas imports.

1.4.3. South-Eastern Corridor

1.4.3.1. Interconnector Turkey-Greece-Italy (ITGI)

In 2007, the representatives of Turkey, Greece, and Italy signed the new pipeline project that interconnects natural gas systems of these countries. The EU gave particular attention to the pipeline and supported its construction.[75] The pipeline starts in Turkey, passes through Greece and reaches Italy. The capacity of the pipeline is around 11.3 bcm of gas. In 2016, Turkey exported 0.6 bcm of gas to Greece.[76] The length of the pipeline is around 300 km. Turkey- Greece interconnector started its operations in 2007, but there is little progress has been made on the part of Greece and Italy.[77] Currently, the Trans Adriatic Pipeline (TAP) is under construction. The pipeline will connect gas infrastructures of Greece, Albania, and Italy.

1.4.4. South-Western Corridor

[72] "European Gas Atlas 2015.",15
[73] "Gas Trade Flows in Europe", 2018
[74] "Exports of Norwegian Oil and Gas.", 2018
[75] "Interconnection Turkey Greece Italy (ITGI) Pipeline" Hydrocarbons Technology. 2017. Accessed March 09, 2018. Retrieved from https://www.hydrocarbons-technology.com/projects/turkeygreeceitalypip/
[76] "Gas Trade Flows in Europe", 2018
[77] "Interconnection Turkey Greece Italy (ITGI) Pipeline", 2017

1.4.4.1. Maghreb- Europe Pipeline

The pipeline aims to transfer Algerian natural gas to Europe. The construction of the pipeline started in the 1990s, and the pipeline was ready for service in 1996. The pipeline is around 1600 km, and it passes from territories of Algeria and Morocco, and then reaches Spain. Between 2002-2005, the capacity of the pipeline was expanded. Now, the pipeline has the capacity to transfer 12 bcm of gas per year.[78] Algeria is one of the most important gas exporting countries to Europe. However, Algerian gas production is not efficient due to lack of investments and sufficient infrastructure. It is expected that Algeria will turn to a gas importer country if it does not make necessary investments and improvements.[79]

1.4.4.2. Medgaz

Medgaz pipeline is a pipeline between Algeria and Spain. The pipeline started its operations in 2007. The pipeline has a capacity of 8 bcm of gas, and the length of the pipeline is 210km.[80] Together with Maghreb- Europe Pipeline, Algerian gas is transported to the European continent.

[78] "The Gas Pipeline." Europe Maghreb Pipeline Limited (EMPL). Accessed April 06, 2018. Retrieved from http://www.emplpipeline.com/en/the-gas-pipeline/
[79] Clemente, Jude. "Will Algeria Be Able To Export More Natural Gas And LNG?" Forbes. May 05, 2016. Accessed March 08, 2018. Retrieved from https://www.forbes.com/sites/judeclemente/2016/05/04/will-algeria-be-able-to-export-more-natural-gas-and-lng/#63daf54747dc
[80] "Technical Summary." MEDGAZ. Accessed April 06, 2018. Retrieved from https://www.medgaz.com/medgaz/pages/datos_significativos-eng.htm

1.4.4.3. Trans-Mediterranean Pipeline

The construction of the pipeline was completed in 1983, and in the same year, deliveries started to Italy. The pipeline is around 1500 km.[81] It starts in Algeria, passes from the territories of Tunisia and reaches Italy. The initial capacity of the pipeline was 12 bcm of gas. In 1996, the capacity was expanded to 20 bcm which is also the current capacity of the pipeline today.[82]

1.4.4.4. Greenstream

Libya was able to export natural gas to Europe in 2004 with the completion of the Greenstream project. It is a direct pipeline between Libya and Italy. The pipeline is around 600km, and it has the capacity to transfer 8 bcm of gas per year.[83] The civil war in 2011 gave massive damage to production and exports of natural gas. Libya increased its production after the war, but it is still low compared to the pre-war era.[84]

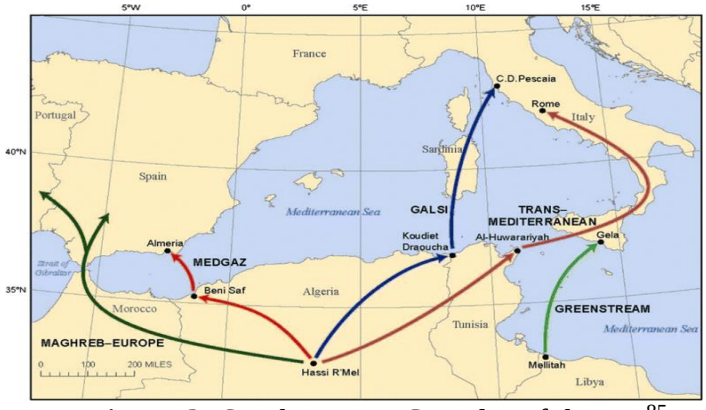

Figure 3: Southwestern Corridor of the EU[85]

[81] "Focus Snam." Enipedia. Accessed April 06, 2018. Retrieved from https://www.eni.com/enipedia/en_IT/news-archive/events/focus-snam.page
[82] "ENI in Algeria." ENI in the World. 2017. Accessed April 06, 2018. Retrieved from https://www.eni.com/en_IT/eni-world/country.shtml#algeria
[83] "Country Analysis Brief: Libya." The U.S. Energy Information Administration. November 19, 2015: 10. Accessed March 8, 2018. Retrieved from http://www.iberglobal.com/files/2016-2/libia_eia.pdf
[84] "Country Analysis Brief: Libya.", 10
[85] Attanasi, Emil D., and Philip A. Freeman. "Role of Stranded Gas from Central Asia and Russia in Meeting Europe's Future Import Demand for Gas". 2012. Natural Resources Research 21 (2): 206.

1.5. Planned Pipeline Projects

In the European continent, new pipelines were decided to be constructed to meet the gas demand. In North-Eastern Corridor, Russia decided to build Nord Stream 2 to bypass Ukraine and to supply gas directly to the European market. In South-Eastern Corridor, four pipelines were decided to build by the Union to bring gas from the Caspian and Mediterranean regions. However, to respond to the diversification efforts of the EU, Russia is now building Turkish Stream in the same corridor to protect its domination. Besides, one pipeline is decided to be initiated by the EU in South-Western corridor to bring gas from North Africa. All these demonstrate that the Community concentrates on its South-Eastern corridor to diversify Russian gas.

1.5.1. North-Eastern Corridor

1.5.1.1. Nord Stream 2

To bypass Ukraine and to supply gas directly to Europe, Russia decided for the construction of Nord Stream 2. The project is designed in order to meet the gas demands of the EU customers. Also, the project is inspired by the success of the first version of the pipeline. The route of the second pipeline is identical with the first pipeline. This means that the project starts in Russia and ends in Germany. The length and capacity of the pipeline are also the same as the first pipeline which means that it has a length of 1300km and it will carry 55 bcm of natural gas. Construction of the project started in 2017, and it is projected to be completed end of the year 2019.[86] The importance of the pipeline is that

[86] "Nord Stream 2". Gazprom. Accessed April 06, 2018. Retrieved from http://www.gazprom.com/about/production/projects/pipelines/built/nord-stream2/

more gas will be supplied to Germany and other European countries and the pipeline will contribute to Germany's efforts of becoming an energy hub. However, the project caused divergence among the members of the Union. Poland and the Baltic countries fear from increasing dependency on Russian gas while Germany and the other Western European countries claim that the pipeline will contribute to the energy security of the European Union.[87] Detailed analysis of the issue will be made in the last chapter.

1.5.2. South-Eastern Corridor

1.5.2.1. Trans Adriatic Pipeline (TAP)

The construction of the TAP project started in 2016. The operations of the pipeline are expected to start in 2020. The capacity of the pipeline is around 10 bcm of gas, but it can be expanded to over 20 bcm with additional investments.[88] The length of the pipeline is around 880km. The pipeline will start in Greece, passes through Albania and reaches to Italy.[89] This project will be the expansions of Trans Anatolian Pipeline (TANAP) and South Caucasus Pipeline (SCP). This means that Azeri gas will be carried via Turkey to Greece and Italy. The pipeline is vital for the energy security of the European Union. Azeri gas has a potential to compete with Russian gas, so that it can break Russian domination in the EU market.

[87] Keating, 2018
[88] "Trans Adriatic Pipeline" TAP. 2018. Accessed March 09, 2018. Retrieved from https://www.tap-ag.com/the-pipeline
[89] "Trans Adriatic Pipeline", 2018

1.5.2.2. Ionian Adriatic Pipeline (IAP)

The pipeline is proposed to connect gas infrastructures of Croatia, Bosnia and Herzegovina, Montenegro and Albania. The pipeline is designed to connect to TAP, so that Azeri gas will be carried to Adriatic countries. The length of the pipeline is around 500km.[90] The construction of the project is expected to start after 2019, and it will carry 5 bcm of gas to four Adriatic countries.[91] The importance of the pipeline is that it will carry Azeri gas and these countries will able to switch to Azeri gas. Besides obtaining gas from the TAP, the project can also carry LNG to Adriatic countries with the completion of LNG facility in Croatia.

Figure 4: Trans Adriatic and Ionian Adriatic Pipelines[92]

[90] "Ionian Adriatic Pipeline." Energy Community. 2017. Accessed May 10, 2018. Retrieved from https://www.energy-community.org/regionalinitiatives/infrastructure/PLIMA/Gas16.html

[91] "Time of Building Permit for IAP's Croatian Sections Announced." AzerNews. September 18, 2017. Accessed May 10, 2018. Retrieved from https://www.azernews.az/oil_and_gas/119125.html

[92] Kurani, Edison. "Balkan Countries Agree on the Construction of the Ionian Adriatic Pipeline." Independent Balkan News Agency. August 30, 2016. Accessed May 10, 2018. Retrieved from http://www.balkaneu.com/balkan-countries-agree-construction-ionian-adriatic-pipeline/

1.5.2.3. Eastring Pipeline

Eastring Pipeline is developed to help Central European and Balkan countries to diversify their natural gas resources. The project will connect the gas infrastructures of Turkey, Bulgaria, Romania, Hungary, and Slovakia. In phase one, the annual capacity will be 20 bcm of gas per year. With the initiation of the second phase, the annual capacity is expected to rise to 40 bcm per year.[93] The length of the pipeline is around 1000 km. The construction of the project has not started yet, but it is planned to finish in 2022.[94] The pipeline can be connected to Turkish stream or TANAP in Turkey. If it is connected to TANAP, the project can play a substantial role to increase the energy security of Southeast European countries. As stated before, Azeri gas will compete with Russian gas in Europe with the realization of the new pipelines. In the case that Azerbaijan will produce and supply more gas to Europe via TANAP in the future, Azeri gas has a potential to decrease import dependencies of Southeast European countries on Russian gas. If it is connected to Turkish Stream, then Russian dominance in Southeast Europe will continue.

1.5.2.4. Eastern Mediterranean Pipeline (EMP)

The pipeline is designed to carry Israeli gas to Europe. EMP will start in Israel, it will pass from the island Cyprus and Greece, and finally, it will reach Italy. The Eastern Mediterranean Pipeline (EMP) will have the capacity to transfer around 12-16 bcm of gas, and the length of the pipeline is around 2000km.[95] Although the pipeline has both financial and technical difficulties because of its undersea route, in 2017, three countries signed a memorandum for the construction of the pipeline by 2019. The parties set a target

[93] "Eastring Pipeline." Eastring. 2018. Accessed April 06, 2018. Retrieved from http://www.eastring.eu/downloads/eastring_booklet_2018.pdf
[94] "Eastring Pipeline to Be Open for Every Source, including Caspian Gas." Azernews. September 07, 2017. Accessed April 06, 2018. Retrieved from https://www.azernews.az/oil_and_gas/118616.html
[95] "Cyprus, Greece, Italy and Israel back natgas pipeline to Europe." CyprusMail. December 5, 2017. Accessed March 8, 2018. Retrieved from http://cyprus-mail.com/2017/12/05/cyprus-greece-italy-israel-back-natgas-pipeline-europe/

to 2025 for the completion of the project.[96] However, technical and financial difficulties decrease the likelihood of the construction of the pipeline. Considering that the capacities of the newly discovered reserves in the Mediterranean are low compared to the high gas demand in Europe, who will finance the pipeline is the biggest question. The prospects of the construction of the pipeline will be analyzed in the latter parts.

1.5.2.5. South Stream-Turkish Stream

South Stream pipeline was a proposed pipeline that was suspended by the EU. The pipeline designed to start in Russia, and it has two branches. The one goes to Bulgaria and reaches to Adriatic countries, and the other branch goes to Romania and reaches Central European countries.[97] It was planned to transfer 63 bcm of natural gas per year. Even though it was started to be built in 2013, "The European Commission put pressure on Bulgaria to freeze South Stream, citing breaches of the EU law in the intergovernmental agreement for the construction of the pipeline."[98]The reason for the EU to be skeptic about South Stream project is that it may favor Bulgaria over the other European states because Bulgaria would get income through transit fees which can violate competition rules of the EU. On the other hand, Bulgaria insisted on the construction of the South Stream project because the country is 100% dependent on Russian gas.[99]

In 2014, by seeing intense debates in the EU, Russia replaced South Stream project with Turkish stream project. This means that the South stream project failed. The new project starts in Russia and ends in Turkey.[100] With this project, Turkey will transfer Russian gas to the EU and Turkey can import more gas from Russia for its domestic consumption. The pipeline has a length of 900km, and the construction of the pipeline started in 2017.

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[96] "Cyprus, Greece, Italy and Israel back natgas pipeline to Europe.", 2017.
[97] "Barroso warns Bulgaria on South Stream". Euractiv. May 28, 2014. Accessed March 9, 2018. Retrieved from http://www.euractiv.com/section/energy/news/barroso-warns-bulgaria-on-south-stream/
[98] Gotev, Georgi. "EU-Gazprom deal clears Bulgaria of South Stream cancellation claims" Euractiv. March 13, 2017. Accessed March 7, 2018. Retrieved from https://www.euractiv.com/section/energy/news/eu-gazprom-deal-clears-bulgaria-of-south-stream-cancellation-claims/
[99] "Share (%) of Russia in Extra-EU28 Imports of Individual Member States, 2015, Trade in Value", 2015
[100] Gotev, 2017

It is expected to finish in late 2019.[101] There will be two identical pipelines built alongside. The first one will provide gas to Turkey, and the other one will provide gas to Europe. The two lines have a total capacity of around 32 bcm of gas.[102]

Even though Turkey and Russia agreed on the construction of the project in 2014, the construction started in 2017. The main reason for this delay is because of a short-term dispute between Turkey and Russia. In 2015, Turkey shot down a Russian plane. As a consequence, Russia suspended Turkish stream project. The relations normalized in 2017 when Turkey apologized for shooting the jet.[103] The project will strengthen the position of Turkey in the region since Turkey will get transit fees and it will become a transfer station for transferring Russian gas to the EU. For Europe, around 2 bcm additional gas will be supplied by Russia to the EU since Trans-Balkan pipeline will be replaced by Turkish Stream. This demonstrates that Russia tries to consolidate its domination over Southeast European countries.

1.5.3. South-Western Corridor

1.5.3.1. Galsi Pipeline

After the Ukrainian crises, Algeria and Italy agreed on the construction of the new pipeline. The pipeline will directly transfer Algerian gas to Italy. The construction of the pipeline commenced in 2014, and it is expected to be in service in 2018. The length of

[101] "Gazprom begins Turkish Stream pipeline construction". RT. May 8, 2017. Accessed April 23, 2018. Retrieved from https://www.rt.com/business/387528-gazprom-turkish-stream-start-construction/
[102] İdil, Merve, and Kazım Ataer. "Over 50 Percent of Construction on First Turkish Stream Pipeline Completed." Hürriyet Daily News. January 29, 2018. Accessed April 17, 2018. Retrieved from http://www.hurriyetdailynews.com/over-50-percent-of-construction-on-first-turkish-stream-pipeline-completed-126444
[103] "Gazprom begins Turkish Stream pipeline construction", 2017

the project is 900km, and it has the capacity to carry 8 bcm of gas per year.[104] Galsi pipeline will be the fourth pipeline between Algeria and Europe.

1.6. The European Union, 2006 and 2009 Ukrainian Crises

As noted above, the turning point in energy relations between Russia and the EU was 2006 and 2009 Ukrainian crises. In both crises, the European Union was not part of the conflict. However, the dispute between Russia and Ukraine led to gas disruptions to the European countries. Since Russia is the biggest gas supplier to the EU and Ukraine is the main transit country to carry Russian gas to Europe, the conflict between the two parties affected European countries especially Southeast European countries severely. After the two crises, the Community has taken the necessary measures for securing its energy supply.

In 2004, Russia announced that it raised gas prices to European levels and demanded Ukraine to pay European prices which is 160-230$ mcm. Before this proposal, Ukraine paid 50-80$ mcm for Russian gas. The deterioration of the relations between Ukraine and Russia coincided with a period that gas and oil prices were on the rise.[105] This means that Russia intended to increase its revenues coming from energy sales. Ukraine was reluctant to pay higher prices for gas because they did not have enough financial capacity to pay higher prices.

Russian company Gazprom came with two offers. The company offered to give a loan, or if Ukrainians accepted the new price, the new price would be suspended for three months. Both of the proposals were rejected by Ukraine.[106] On the 1st day of 2006, Russia

[104] "Sonatrach and Edison in Talk Again about Shelved GALSI Pipeline Project." 2b1stconsulting. September 5, 2014. Accessed April 6, 2018. Retrieved from https://www.2b1stconsulting.com/sonatrach-and-edison-in-talk-again-about-shelved-galsi-pipeline-project/
[105] Stern, Jonathan. "The Russian-Ukrainian Gas Crisis of January 2006." January 16, 2006: 6. Accessed April 08, 2018. Retrieved from https://www.oxfordenergy.org/wpcms/wp-content/uploads/2011/01/Jan2006-RussiaUkraineGasCrisis-JonathanStern.pdf
[106] Stern, 7

cut gas supplies to Ukraine. The dispute ended three days later, and the two parties signed a contract.[107] The crisis told Europeans that it was not wise to be overdependent on a single supplier. Even though European countries were not part of the conflict, they were severely affected by the dispute. Besides, the EU only watched the developments and called parties for the resolution of the dispute.[108]

The tensions between Ukraine and Russia increased again with the 2009 Ukrainian crisis. At the end of 2008, Russia and Ukraine needed to renew their contract because the old contract had expired. At that time, Russia insisted on applying higher prices while Ukrainians were reluctant to pay higher prices because they were in economic crisis and they had huge debts to Russia.[109] In order to sign a gas contract, first, two parties need to agree on a price. However, they could not agree on a price. Afterward, the Russian side warned Ukraine that if no agreement would be reached, the supplies could be cut off.[110] The crisis started when Russian officials claimed that Ukraine stole the gas that goes to Europe. At the same time, Ukrainian officials declared that they required technical fuel which is essential for the operation of the gas industry in order to supply gas to Europe.[111] For this reason, Ukrainians refused to pay for non-delivered gas. On the other side, Russian officials argued that they sent correct volumes of gas and warned Ukrainians to pay their debts. When Ukrainians declared that they refused to pay their debts, Russians decreased the gas supply in the middle of winter.[112]

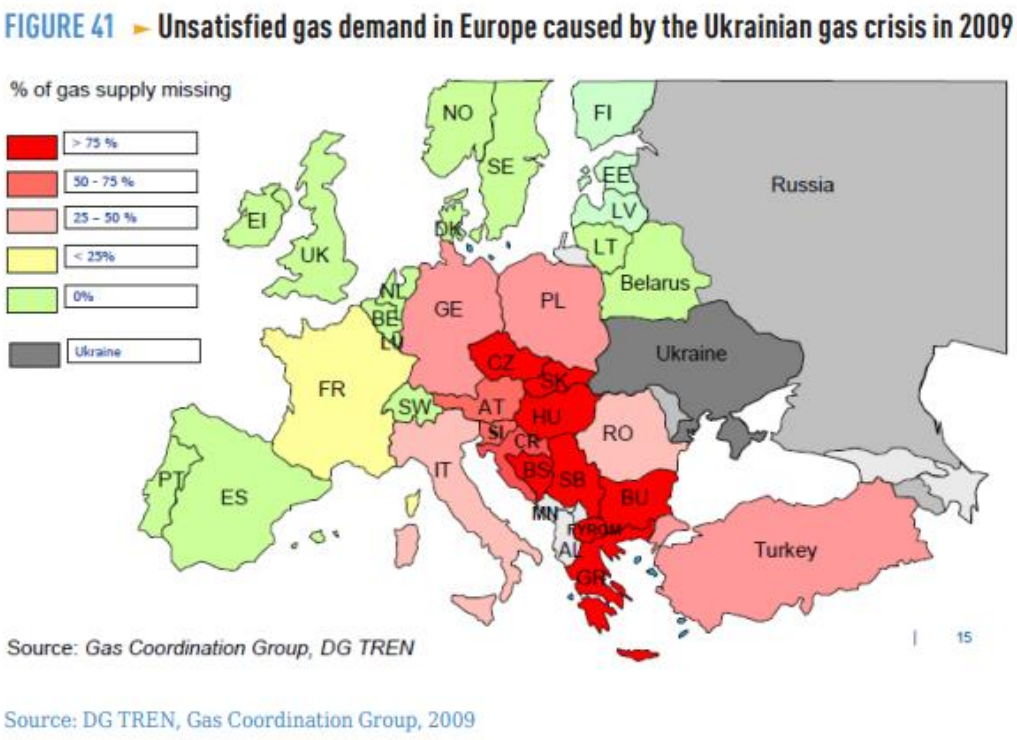
In the following day, Russia completely cut off the gas supply to Ukraine.[113] Russian gas was transmitted to Europe through Ukraine. For this reason, with this crisis, the European countries remained gasless, and they were affected severely in the middle of winter. At the peak of the crisis, the EU established a monitoring mission which consists of experts from both Ukraine and Russia to solve the dispute immediately. However, "The EU has the little technical capability, has little political credibility or leverage with either Ukraine or Russia and it was unable or unwilling to provide the financial resources to resolve the

[107] Stern, 9
[108] Pirani, Simon, Jonathan Stern and Katja Yafimava, "The Russo-Ukrainian Gas Dispute of January 2009: A Comprehensive Assessment." February 2009:46. Accessed April 16, 2018. Retrieved from https://www.oxfordenergy.org/wpcms/wp-content/uploads/2010/11/NG27-TheRussoUkrainianGasDisputeofJanuary2009AComprehensiveAssessment-JonathanSternSimonPiraniKatjaYafimava-2009.pdf
[109] Pirani, 16-17
[110] Pirani, 16
[111] Pirani, 19
[112] Pirani, 19
[113] Pirani,19

crisis."[114] As a result, the involvement of the EU in the dispute made no difference, and it did not solve the conflicting issue. The dispute ended when Russia and Ukraine reached a new agreement on supply and transit tariffs after 20 days of the beginning of the conflict.[115] After solving the dispute, Russia started to resupply gas to Ukraine and Europe.

The crisis pushed Russia to use alternative routes to supply its gas to Europe. In 2017, Ukraine remained the main transit route for carrying Russian gas to the EU. The route carried around 40% of Russian gas to Europe. On the other hand, Nord Stream carried around 35% and the remaining 25% Russian gas supplied through Belarus transit pipelines.[116] Even though Ukraine transit pipelines has the highest share among the Russian supply routes to Europe, its share has decreased. On the contrary, the shares of Belarus transit pipelines and Nord Stream have increased.[117] Russia declared that it would decrease gas supplies over Ukraine transit pipelines by 2019.[118] To bypass Ukraine, Turkish Stream and Nord Stream 2 pipelines were developed, and they are now under construction.

[114] Pirani,49
[115] Pirani,25
[116] "Quarterly Report on European Gas Markets.", 2018
[117] "Quarterly Report on European Gas Markets.", 2018
[118] Pirani, Simon and Yafimava Katja. "Russian Gas Transit Across Ukraine Post-2019: Pipeline Scenarios, Gas Flow Consequences, and Regulatory Constraints." February 2016: 4. Accessed April 23, 2018. Retrieved from https://www.oxfordenergy.org/wpcms/wp-content/uploads/2016/02/Russian-Gas-Transit-Across-Ukraine-Post-2019-NG-105.pdf



Source: DG TREN, Gas Coordination Group, 2009

Figure 5: 2009 Ukrainian Crises and Shortcoming Gas Supplies[119]

The dispute showed the Europeans not to depend on one country because it affects the member states seriously even though they were not involved in the dispute. It can be observed from the figure that Southeast European countries received the greatest harm in the 2009 crisis. As stated earlier, Northwestern European countries import gas from Norway and Southwestern European countries import gas from North African countries, so these countries were not affected severely by the gas disruptions. Besides, since Russia directly supplies its gas to the Baltics, these countries were not also affected seriously by the crisis. On the contrary, more than 75% of the gas supplies were disrupted to European countries which were taking gas from Ukraine transit pipelines. Russia's cut off gas seriously harmed these states because these countries do not have any other option than importing Russian gas.

Besides, the crisis showed that Russia could use its energy as a weapon against Ukraine and Europe. Although this decreases the reputation of Russia as a reliable supplier, the European countries still rely heavily on Russian energy. This is because the European energy companies signed long-term contracts (15-25 years) with Russia.[120] For this reason, it is hard for the European states to reduce the volumes of gas that is taken from

[119] Evin, Ahmet. The EU Energy Policy: Regulation and Energy Security. May 7, 2018. Lecture Presentation, Sabancı University.
[120] Pirani,63

Russia because they signed long-term contracts with Russia. Consequently, Russia has been able to remain as the greatest supplier of gas to Europe.

It is argued by some scholars that with Ukrainian crisis, Russia aimed to destabilize Ukraine economically and politically, punish Ukraine because of its pro-EU and pro-NATO policies and force Ukraine to support itself in the conflict with Georgia.[121] This shows that Russia can use its energy resources as political leverage to gain support for its actions. The European countries realized that Russia could use its energy as a political tool. For this reason, after the two Ukrainian crises, the Union took several important decisions and measures to prevent the same thing from happening again. For short and medium term, the EU formed European Energy Strategy and Energy Union, and it started to look for alternative gas supply routes. For the medium and long term, the EU developed 2020,2030 and 2050 strategies to increase energy efficiency, to reduce greenhouse gas emissions and its import dependency.

Conclusion

Energy has an essential place in the EU politics. Because energy production of the Union is low, the Community relies on imports of energy. Even though the EU imports crude oil, natural gas and coal from other countries, the attention was given to the natural gas. The primary objectives of the energy policy of the EU are the security of supply, developed internal energy system, sustainability, energy efficiency and competitiveness. To reach its objectives, the EU has made several reforms. From 1998 to 2009, the EU adopted three energy packages, and these packages are about the liberalization of the electricity and gas markets. From 2007 to 2014, 2020, 2030 and 2050 strategies were adopted. These strategies are essential for the transition to low carbon economy, increase efficiency and to secure the energy supply. In 2014, the EU established Energy Security Strategy, and in 2015, the Energy Union was founded. These developments accelerated

[121] Pirani,34

after the 2006 and 2009 Ukrainian crises. 2006 crisis lasted for three days while the 2009 crisis lasted for 20 days. Gas disruptions with these two crises affected the EU and Southeast European countries severely. After the crises, the EU accelerated its reforms, and it started to look for alternative suppliers.

The EU has currently 14 pipelines that import natural gas from different countries. There are four pipelines from North-Eastern corridor, five pipelines from North-Western corridor, four pipelines from South-Western corridor and one interconnector from South-Eastern corridor. In the European continent, new pipelines were decided to be built to meet the gas demand. In North-Eastern Corridor, Russia decided to build Nord Stream 2 to bypass Ukraine and to supply gas directly to the European market. In South-Eastern Corridor, four pipelines were decided to be built by the Union to bring gas from the Caspian and Mediterranean regions. However, to respond diversification efforts of the EU, Russia is now building Turkish Stream in the same corridor to protect its domination. Furthermore, one pipeline is decided to build by the EU in South-Western corridor to bring gas from North Africa. All these demonstrate that the Community concentrates on its South-Eastern corridor to diversify Russian gas.

In the next chapter, nine energy producing countries from different regions will be examined to investigate the possibility of these countries to become alternative gas suppliers to the EU through pipelines. There are three countries from the Caspian region (Turkmenistan, Azerbaijan, Iran), three countries from Africa (Egypt, Algeria, Libya) and three countries from the Middle-East& the Mediterranean regions (Iraq, Israel, Republic of Cyprus) will be analyzed. Besides, Turkey is included since the country is at the transaction between the counties in the Caspian, the Middle-East and the Mediterranean regions and Europe.

CHAPTER 2: ENERGY SECURITY OF THE EU: POSSIBLE ALTERNATIVES TO RUSSIAN GAS

Introduction

The 2006 and 2009 Ukrainian crises showed the EU that energy security of the Community needed to be strengthened. With the gas delivery disruptions, European countries remained without gas in the middle of the winter. As noted in the previous chapter, after the two crises, the European Union decided to take measures against gas disruptions to ensure the free flow of gas and to strengthen energy security of the Community. The EU decided to construct new pipelines to diversify its supply sources and routes. A significant decline in gas production led imports of the Union to increase each year. Since import dependency of the Community is growing, consolidating energy security by diversifying gas suppliers became one of the priorities for the Union. To this end, Southern Gas Corridor (SGC) was formulated by the EU to bring gas from the Caucasus, Middle-East and Mediterranean regions.

The primary aim of this chapter is to analyze nine countries to determine whether they can serve as alternatives for Russian gas supplies for the European Union through pipelines. Three countries from Caspian Region (Turkmenistan, Azerbaijan, Iran), three countries from North Africa (Egypt, Algeria, Libya) and four countries from the Eastern Mediterranean region (Iraq, Israel, Republic of Cyprus, and Turkey) will be analyzed.

Turkey is included since the country is at the center between Caspian, the Middle-East and Mediterranean regions and Europe.

Among the selected countries, in the short term, Azerbaijan will supply gas to the EU with the Trans Anatolian Pipeline (TANAP) and Trans Adriatic Pipeline (TAP). The country will make significant contributions to the energy security of both Turkey and the European Union. Azeri gas will be carried to Europe via Turkey, so Turkey becomes a critical strategic partner for the EU in the field of energy. With the help of Turkey, European countries can secure their energy supply independently Russian gas and pipelines. Additional to Azeri gas, this chapter argues that in the medium term and long term, Iraq has a potential to supply gas to Europe from SGC which will increase competition in the European market. Besides, Iran, Egypt, and Israel will be LNG suppliers to the European gas markets in the medium term and long term.

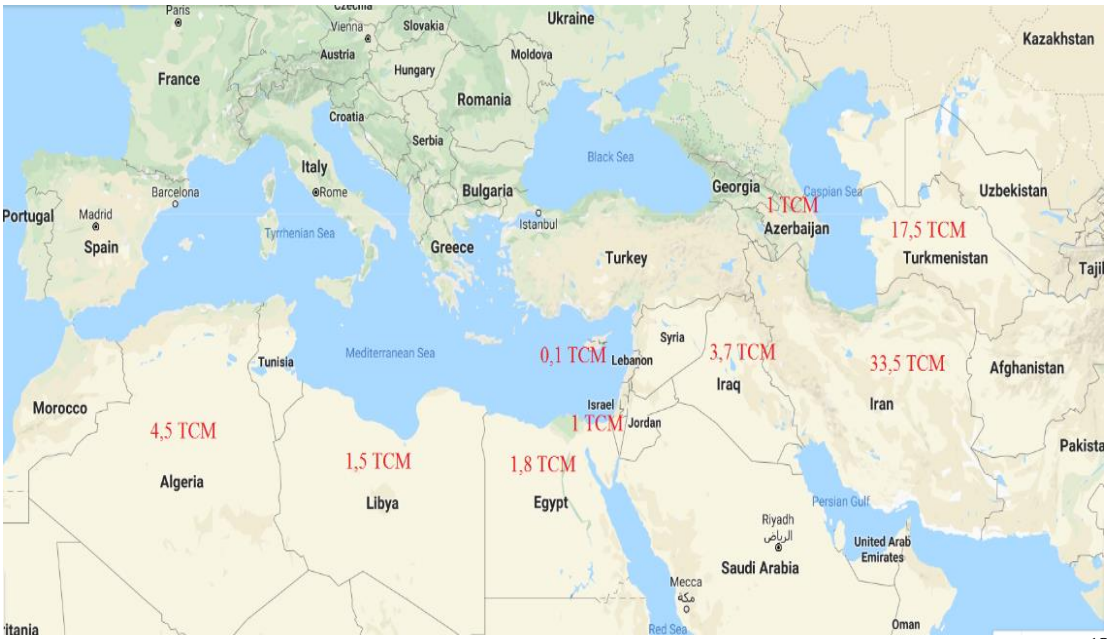


Figure 6: Reserve Capacities of Selected Countries in Trillion Cubic Meters (Tcm)[122]

[122] "BP Statistical Review of World Energy 2017", 26-29

2.1. The Caspian Region

2.1.1. Turkmenistan

Turkmenistan is one of the essential countries in the Caspian region that can export gas to Europe. In 2016, the proven reserves of Turkmenistan were 17.5 trillion cubic meters (tcm), making the country with the fourth-largest gas reserves, even larger than that of the U.S. The country produced 66.8 bcm, and it consumed 29.5 bcm of gas in 2016.[123] Based on the new policies scenario of IEA, Turkmenistan will produce 86 bcm in 2025 and 141 bcm of gas in 2040.[124]

Even though Turkmenistan has a gas surplus and it can export significant volumes of gas to other countries, geographical constraints limit the potential of Turkmenistan. In 2016, the country only exported 29.4 bcm to China, 6.7 bcm to Iran and 1.1 bcm to Kazakhstan.[125] From 2014 to 2016, Russia has gradually decreased its imports from Turkmenistan, and it totally ceased imports from the country in 2016. Iran also decreased its imports from Turkmenistan to increase domestic production. When Russia and Iran decreased their imports, Turkmenistan started to look for alternatives to export its gas.[126] As a result, the country shifted its export strategy to China, so more Turkmen gas started to flow to the Chinese market. Since Turkmenistan is a landlocked country, it cannot utilize from its potential of selling gas to other countries. For this reason, neighboring countries play a decisive role in shaping the export strategy of Turkmenistan. The country focused on selling its gas to China since it is not able to supply its gas to Turkey and then to Europe for several reasons.

In 2015, Turkey, Azerbaijan, and Turkmenistan established trilateral energy cooperation to strengthen their energy ties. With the cooperation, Turkmen gas was planned to connect

[123] "BP Statistical Review of World Energy 2017", 28-29
[124] "World Energy Outlook." International Energy Agency. 2017: 346.
[125] "BP Statistical Review of World Energy 2017", 34
[126] Konarzewska, Natalia. "Turkmenistan advances westward natural gas export." The Central Asia- Caucasus Analyst. March 25, 2016. Accessed March 10, 2018. Retrieved from https://www.cacianalyst.org/publications/analytical-articles/item/13345-turkmenistan-advances-westward-natural-gas-export.html

with the Southern Corridor system of Europe.[127] The proposed Trans-Caspian Pipeline (TCP) is designed to get connected with Southern Caucasus Pipeline (SCP) and to carry 30 bcm annually Turkmen gas to Europe.[128] Even though Turkmen gas can be an alternative for Europe, the status of the Caspian is a formidable obstacle blocking the project.

The recognition of Caspian as sea or lake is the primary source of the disagreement between five Caspian littoral states; namely Russia, Azerbaijan, Turkmenistan, Iran, and Kazakhstan. If the Caspian would be recognized as a lake, then five littoral states would need to share the wealth equally according to a "condominium" approach. If the Caspian would be recognized as a sea, then five littoral states could freely use the resources that are within their maritime borders.[129] The absence of agreement on the status of the Caspian has prevented the construction of TCP because at least two of the littoral states, Russia and Iran, object to TCP, the former because such a pipeline can dilute its dominant position as the EU's gas supplier, the latter because it can reduce Turkmenistan's dependency on Iran.

In order to bypass the Caspian problem, in 2010, ENI proposed compressed gas (CNG) project between Turkmenistan and Azerbaijan. With the project, significant volumes of high-pressure gas were designed to be transported to Azerbaijan by vessels and then it was planned to be transported to other destinations with the existing pipelines. At that time, Azerbaijan was reluctant for the realization of the project because the country did not want to compete with Turkmen gas.[130] As a result, Turkmenistan is not able to supply its gas to Azerbaijan either via pipeline or via CNG.

[127] Konarzewska, 2016
[128] Konarzewska, 2016
[129] Pannier, Bruce. "Russia Says Caspian Legal Status Resolved, Agreement Ready For Signing." Radio Free Europe/ Radio Liberty. December 7, 2017. Accessed March 8, 2018. Retrieved from https://www.rferl.org/a/qishloq-ovozi-caspian-status-resolved-russia-says/28903729.html
[130] Tagliapietra, Simone. "Energy Relations in the Euro-Mediterranean." 2017: 77. A Political Economy Perspective. Springer International Publishing.

Figure 7: Caspian Region Oil and Natural Gas Infrastructure[131]

Other than the status of Caspian, the direct transfer of Turkmen gas to Europe through the Southern Gas Corridor can reduce the market share of Russian gas in Europe. The European gas demand was higher before the 2009 Ukrainian crisis. At that time, Russia profited from the gas sales by selling Turkmen gas to the EU countries at higher prices and paying Turkmenistan lower prices.[132] After a while, Gazprom announced that it was willing to pay European prices to Turkmenistan which was around $360 per thousand cubic meters in order to increase its relations with post-Soviet energy-rich Caspian countries. Before this announcement, Russia had paid $150 per thousand cubic meters to the country. [133]

With the decline in oil prices, in which gas prices are indexed, and a decline in gas demand in Europe in 2009, Gazprom could not keep its promise to Turkmenistan that is paying European prices to the country and the company looked for alternatives to decrease imports from Turkmenistan to compensate its losses.[134] In 2009, the Davletbat-Dariyalyk pipeline was exploded. Then, Gazprom asked Turkmenistan to reduce gas deliveries by

[131] "Oil and Natural Gas Production Is Growing in Caspian Sea Region." U.S. Energy Information Administration (EIA). September 11, 2013. Accessed May 08, 2018. Retrieved from https://www.eia.gov/todayinenergy/detail.php?id=12911
[132] Vasánczki, Luça Zs. "Gas exports in Turkmenistan." Paris: Institut Français des Relations Internationales. November 2011:8. Accessed June 20, 2018. Retrieved from https://www.ifri.org/sites/default/files/atoms/files/noteenergielvasanczki.pdf
[133] Vasánczki, 9
[134] Vasánczki, 10

90%. After this incident, Turkmenistan continued gas deliveries to Russia but in lower levels.[135] This shows that Gazprom was able to decrease its imports from Turkmenistan. In 2016, as noted above, Russia completely ceased its imports from Turkmenistan.

Since Turkmenistan has been threatened by Russia which also stopped importing Turkmen gas, the country cannot export gas to EU through Russia. Besides, Turkmenistan has a strict pipeline policy that does not allow Turkmenistan to build external pipelines, so Turkmenistan will not build the proposed pipeline, TCP, on its own. In fact, there is no investment made by Azerbaijan and Turkey for the construction of the pipeline.[136]

Another route for Turkmen gas to reach Europe is through Iran. Currently, Turkmen gas is carried to Turkey through Iran. However, the Iranian pipelines have low capacities due to infrastructural constraints.[137] Moreover, the pipeline between Turkmenistan and Iran started its operations in 1997. Korpeje-Kordkuy pipeline has a capacity to transfer 13 bcm of natural gas per year.[138] Also, the pipeline between Iran and Turkey, Tabriz-Dogubayazit pipeline, has the capacity to transfer 14 bcm of gas per year. This demonstrates that infrastructural investments are needed in Iran to transfer Turkmen gas to Europe. In fact, Iran is interested in supplying its gas as LNG rather than pipelines since the country's biggest gas reserves, South Pars Gas fields, are located in the southern part of the country. As a result, Turkmenistan cannot be an alternative for Europe firstly because of lack of agreed status of Caspian, secondly Russian threat and lastly infrastructural constraints in Iran and unwillingness of Iran to bring Turkmen gas to Europe.

[135] Vasánczki, 10-12
[136] Konarzewska, 2016
[137] Evin, Ahmet, Emre Hatipoğlu, and Peter Balazs. "Turkey and the EU: Energy, Transport and Competition Policies." *Chapter 3: Turkey's Energy Policy and The EU's Energy Demand*. 2016: 87. Vol. 9. Claeys & Casteels Publishing.
[138] "Emerging global energy security risks." United Nations Economic Commission for Europe. 2007: 48. United Nations Publications.

2.1.2. Azerbaijan

Azerbaijan is one of the countries that is strategically vital for the diversification plans of the EU. Azerbaijan has 1.1 tcm of proven natural gas reserves. In 2016, Azerbaijan produced 17.5 bcm, and it consumed 10.4 bcm of gas. According to the forecasts of the World Energy Outlook, gas production of Azerbaijan will be 37 bcm in 2025 and 55 bcm in 2040.[139]

Azerbaijan has been producing its gas from Shah Deniz fields. Shah Deniz Stage 1 began its operations in 2006 with the capacity of producing 10 bcm of gas per year. With the completion of Shah Deniz Stage 2 in 2018-2019, the further 16 bcm capacity will be added over the production from Shah Deniz Stage 1, so the production capacity of Azerbaijan will rise to around 26 bcm of gas per year.[140] Other than Shah Deniz fields, with the development of Umid, Babek, Nakhchivan, Apsheron, Zafer-Meshel, Araz-Alov- Sharq, Asiman- Shafaq and Azeri-Chirag-Gunashli gas fields in the medium-term and the long-term, which have been estimated to total around 3 tcm, more Azeri gas will be able to flow to Europe, so that competition will increase in the European market. Besides, with the increase in gas supplies from Azerbaijan to Europe in the envisioned future, some volumes of Azeri gas can be diverted to Southeast Europe which will decrease import dependency of Southeast European countries on Russian gas and increase the energy security of these countries.

One of the reasons why Azerbaijan will supply its gas to Italy rather than Southeast Europe stems from the fact that gas prices in Southeast Europe are around 10% lower compared to gas prices in Italy.[141] Therefore, since supplying gas to Italy means more revenues to Azerbaijan, the country targets supply its gas to Italy.

Since 2006, Azerbaijan has been supplying gas to Turkey with the South Caucasus Pipeline (SCP). With the completion of TANAP, TAP, and expansion of SCP projects, Azerbaijan will be able to export its gas to Europe through the territory of Turkey in the

[139] "World Energy Outlook.", 346
[140] Israfilbayova, Sara. "SOCAR President reveals Shah Deniz gas output." Azernews. September 20, 2017. Accessed March 4, 2018. Retrieved from https://www.azernews.az/oil_and_gas/119227.html
[141] Rzayeva, Gulmira. "The Outlook for Azerbaijani Gas Supplies to Europe: Challenges and Perspectives." The Oxford Institute for Energy Studies. 2015: 27. Accessed June 05, 2018. Retrieved from https://www.oxfordenergy.org/wpcms/wp-content/uploads/2015/06/NG-97.pdf

short-run. Considering that the EU consumed around 463 bcm of gas in 2016[142], 10 bcm of gas is a very low volume for the Union. However, 10 bcm of gas is significant for the Southeast European countries. The detailed analysis of this point will be made in the last chapter.

2.1.3. Iran

According to the BP Statistical Review 2017, Iran has 33.5 tcm reserves of natural gas. In 2016, Iran produced 202.4 bcm while it consumed 200.8 bcm of gas.[143] IEA predicts that gas production of Iran will be 243 bcm in 2025 and 338 bcm in 2040.[144]

In 2016, Iran consumed what it produced, and a little amount remained for export which accounts for 1.6 bcm. Iran exported 7.7 bcm to Turkey. At the same time, Iran imported 6.7 bcm from Turkmenistan and 0.2 bcm from Azerbaijan. In total, Iran imported 6.9 bcm while it exported 7.7 bcm.[145] The remaining 0.8 bcm deficit in the export was supplied from domestic production. Based on the intergovernmental negotiations between Turkey and Iran, Iran is obliged to export 10 bcm gas to Turkey per year.[146] Iran was able to export natural gas to Turkey with the help of Turkmen gas, and they could not supply the agreed amount of gas to Turkey since Iran's domestic consumption was high. This shows that Iran lacks adequate gas for export to Europe.

For more than ten years, there were international sanctions on Iran because of its nuclear activities. In 2016, Iran agreed to decrease its nuclear activities, and international sanctions were lifted. The deals enabled Iran to turn back into the international community.[147] In 2017, Iran signed a deal with the French oil company Total to develop

[142] "World Energy Outlook.", 339
[143] "BP Statistical Review of World Energy 2017", 26-29
[144] "World Energy Outlook.", 346
[145] "BP Statistical Review of World Energy 2017", 26-29
[146] "Natural Gas Pipelines and Projects" Republic of Turkey Ministry of Energy and Natural Resources. Accessed May 01, 2018. Retrieved from http://www.enerji.gov.tr/en-US/Pages/Natural-Gas-Pipelines-and-Projects
[147] Naji, Kasra. "Iran nuclear deal: Five effects of lifting sanctions." BBC News. January 18, 2016. Accessed March 5, 2018. Retrieved from http://www.bbc.com/news/world-middle-east-35342439

South Pars gas fields in order to make production. It is estimated that the production will start in 2021.[148]

The prospects of Iran for developing its natural gas resources further, however, are growing dimmer as a result of the Trump administration's repudiation of the nuclear accord and its intention to reimpose sanctions on Iran. the new U.S. administration may well drill, among the others, Iran's energy development projects.[149] As of this writing, the French energy company Total has announced the termination of its involvement in South Pars project as a result of the U.S. sanctions that could affect its lucrative investments in the U.S. as well as joint ventures with the U.S. firms.[150]

Even so, Iran plans to increase its production entailed to development its fields in the South across from the those of Qatar. These fields are far distant from the North to invest in new infrastructure to connect these resources to the Southern Gas Corridor. Therefore, there are infrastructural constraints that Iran needs to make investments to carry its gas from South to North in order to supply gas to the European corridor.[151]

Moreover, there is little reason for Iran to make a considerable investment to carry its gas to the Northern part of the country. This is because Iran can easily export its gas in the form of LNG through Strait of Hormoz. In fact, the first target of the country will be supplying its gas to the profitable Asian markets given its geographical proximity. As a result, even if political constraints were resolved with Iran, the infrastructural constraints still remain with respect to pipeline exports from South Pars to Europe. For this reason, Iran cannot realistically be considered as an alternative gas supplier to the EU through gas pipelines.

[148] Gilchrist, Karen. "What Total's $4.8 billion investment means for Iran." CNBC. July 3, 2017. Accessed March 1, 2018. Retrieved from https://www.cnbc.com/2017/07/03/iran-to-sign-new-ipc-gas-deal-with-total-for-south-pars.html
[149] "Factbox: How Trump Is Reimposing Iran Sanctions After Ditching Deal." Reuters. May 09, 2018. Accessed June 20, 2018. Retrieved from https://www.reuters.com/article/us-iran-nuclear-sanctions-factbox/factbox-how-trump-is-reimposing-iran-sanctions-after-ditching-deal-idUSKBN1I93CI
[150] "France's Total Says Unable to Continue Iran South Pars Project." Reuters. May 16, 2018. Accessed June 20, 2018. Retrieved from https://www.reuters.com/article/iran-nuclear-france-total/frances-total-says-unable-to-continue-iran-south-pars-project-idUSFWN1SN0VE
[151] Evin, 87

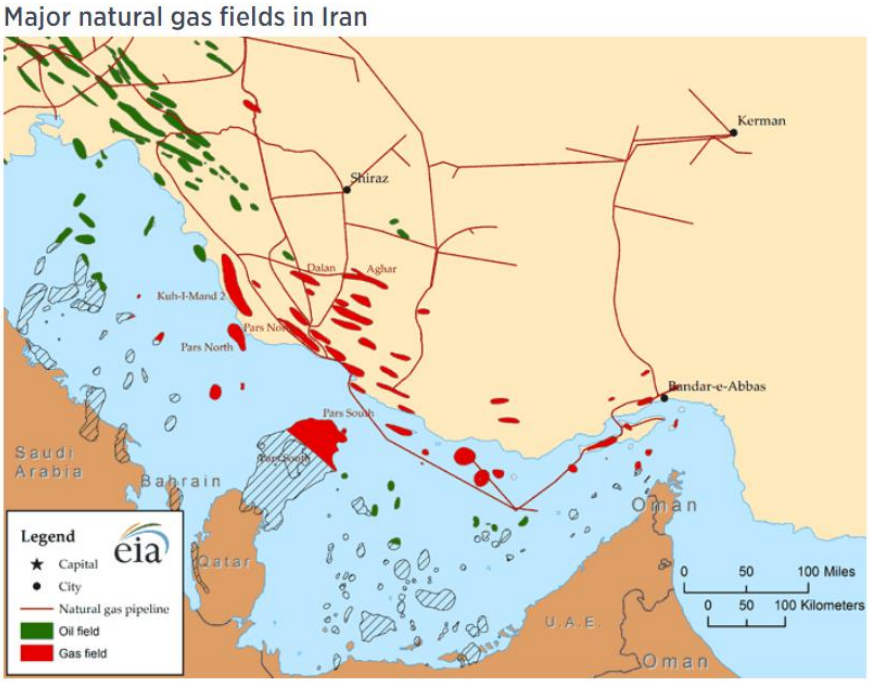


Figure 8: Oil and Natural Gas Fields in Iran[152]

2.2. The Middle East& the Mediterranean

2.2.1. Iraq

The presence of international companies in Iraq helps the country to explore and produce natural gas. In 2016, Iraq had 3.7 tcm proven gas reserves.[153] The country produced and consumed 7.04 bcm of gas in 2016.[154] According to the projections of IEA, gas production in Iraq is estimated to increase from less than 10 bcm to around 90 bcm in 2035 with the development of the gas fields in the country.[155] However, in the current situation, political instability inhibits investments, construction of storages and pipelines.[156] Iraq is an

[152] DiChristopher, Tom. "A Western Oil Giant Looks Set to Return to Iran and Its Huge Gas Fields." CNBC. November 07, 2016. Accessed May 08, 2018. Retrieved from https://www.cnbc.com/2016/11/07/persian-gulf-oil-giant-total-signs-deal-to-develop-iranian-natural-gas-field.html
[153] "BP Statistical Review of World Energy 2017", 26-29
[154] "World Gas and Renewables Review 2017". ENI. 2017: 10-19. Accessed March 5, 2018. Retrieved from https://www.eni.com/docs/en_IT/enicom/company/fuel-cafe/WORLD-GAS-AND-RENEWABLES-2017-Volume-2.pdf
[155] "Iraq Energy Outlook" International Energy Agency. 2012:70.
[156] Chyong et al., 2015

unstable country because of terrorism, poor governance and internal conflict between the Iraqi government and the Kurdish Regional Government (KRG).

Turkey's relations with the Iraqi government and KRG is one of the sources of divergence between the two governments. Until 2009, Turkey successfully increased trust and cooperation with the Iraqi government. Besides, Ankara attempted to build a common stance with the Iraqi government against PKK terrorism.[157] However, after 2009, Turkey started to focus on its relations with the Kurdish regional government (KRG) and came to ignore Baghdad. This increased hostility between Turkey and the Iraqi government.[158] The relations between the Iraqi government and KRG was also problematic since the KRG began exporting oil to Turkey for the first time in 2009 without the consent of the central government. Besides, energy deals between Turkey and the KRG have been approved neither by the Turkish nor Iraqi Parliament which contradicts the legal basis of the energy trade between Turkey and KRG.[159]

Different interpretations regarding the Articles 111 and 112 of the Iraqi constitution by the central Iraqi government and the regional government is one of the sources of discord. According to Article 111, "oil and gas are owned by all the people in Iraq in all the regions and governorates."[160] This article interpreted by KRG as Iraqi people who live in the regions or governorates own the resources within their region and governorates while central government interprets the article as resources in every region or governorate are owned by Iraqi people.[161] Secondly, Article 112 states that:

> The federal government, with the producing governorates and regional governments, shall undertake the management of oil and gas extracted from present fields, provided that it distributes its revenues in a fair manner in proportion to the population distribution in all parts of the country, specifying an allotment for a specified period for the damaged regions which were unjustly deprived of them by the former regime, and the regions that were

[157] Müftüler-Baç, Meltem, and Yaprak Gürsoy. "Is There a Europeanization of Turkish Foreign Policy? An Addendum to the Literature on EU Candidates." 2010:418. Turkish Studies 11, No. 3.
[158] Pamir, Necdet. Enerjinin İktidarı. HayyKitap, 2017: 552.
[159] "Turkey Expands Influence In Kurdish Energy Sector." OilPrice.com. August 16, 2017. Accessed July 02, 2018. Retrieved from https://oilprice.com/Energy/Oil-Prices/Turkey-Expands-Influence-In-Kurdish-Energy-Sector.html
[160] Aresti, Maria Lasa. "Revenue Sharing Case Study: Oil and Gas Revenue Sharing in Iraq." Natural Resource Governance Institute. August 2, 2016: 10. Accessed March 8, 2018. Retrieved from https://resourcegovernance.org/analysis-tools/publications/revenue-sharing-case-study-oil-and-gas-revenue-sharing-iraq
[161] Aresti, 10

damaged afterwards in a way that ensures balanced development in different areas of the country, and this shall be regulated by a law.[162]

In the article, it is stated that federal and regional governments are responsible for the management of resources. However, there is uncertainty about how this is carried out. Besides, the terms "fair distribution" and "damaged regions" are open to interpretation. The absence of clarity in these articles leads to a difference in interpretation and leads to an increase in claims on a larger share on the revenues from different groups.[163]

It is true that mineral resources are considered as national assets in most countries of the world, including Iraq. Accordingly, Baghdad's claim to be compensated for all hydrocarbon exports is considered legitimate by international organizations. KRG, however, claims that it is not fairly compensated by the Iraqi government for payments for exports from its region. As a result, KRG prefers to export energy directly to Turkey and be compensated directly in return. The Iraqi government in return blames KRG for stealing resources of Iraqi people.[164]

In the light of these disputes, political stability is one of the most critical components for attracting substantial investments. In the case of Iraq, political tensions between the Iraqi government and KRG raises the question of whether it is wiser to invest in Iraq or not. Even if investments would be made, there is uncertainty about the operation of the pipelines without interruption.

The prospects of Iraq to supply its gas to Turkey and then to Europe depends on the settlement of the disputes between KRG and Iraq.[165] In 2015, Genel Energy Chairman and the KRG Minister of Natural Resources declared that Iraq would deliver 10 bcm of gas to Turkey in 2020 and 20 bcm of gas could be supplied after 2020.[166] In the short-term, Iraq cannot be a reliable supplier to Europe, even if there has been a substantial investment made by Genel Energy with a view to exporting oil and gas from KRG to

[162] Aresti, 10
[163] Aresti, 10
[164] Pamir, 553-554
[165] Evin, Ahmet, "Energy and Turkey's Neighborhood: Post-Soviet Transformation and Transatlantic Interests.", Turkey and Its Neighbors: Foreign Relations in Transition, Linden, Ronald H. and Evin, Ahmet and Kirişci, Kemal and Straubhaar, Thomas and Tocci, Nathalie and Tolay, Juliette and Walker, Joshua W. (eds.), Boulder, Colorado: Lynne Rienner Publishers 2012: 107.
[166] Hafner, Manfred, and Simone Tagliapietra "The European Gas Markets: Challenges and Opportunities". 2017:338. Springer.

Turkey and beyond.[167] Major security issues need to be resolved which are the main obstacles for Iraq to export its gas to Turkey and Europe.

2.2.2. Israel

With the discovery of Yam Tethys reserve, natural gas started to be used in Israel in 2004. The capacity of the reserve is around 30 bcm of gas. From 2004 to 2008, the reservoir was used for electricity generation in Israel. In 2008, The El-Arish-Ashlekon pipeline was built between Egypt and Israel. The pipeline is a branch of the Arab Gas pipeline, and it has the capacity to transfer 7 bcm of gas per year.[168] Between 2008 and 2012, 60% of natural gas was domestically produced by Israel while 40% was imported from Egypt. In 2012, the supplies from Egypt decreased significantly because of the Arab uprisings, damage to the pipelines and economic problems in Egypt. As a result, Israel built LNG facilities to import LNG.[169]

In 2009, Tamar reserve was discovered. It has a capacity of 310 bcm of natural gas and the supplies from Tamar started to flow Israel in 2013.[170] More than 90% of the gas demand of Israel was supplied from the Tamar field after 2013. In 2017, Israel consumed around 10 bcm of natural gas. 94% of gas was supplied through the Tamar field while 6% was supplied by LNG.[171]

In 2010, Leviathan field was discovered, and it has a capacity of 621 bcm. It is expected to start its operations in 2020. In 2012-2013, Karish/Tanin fields were discovered, and

[167] "Genel Energy to Drive Iraq Gas Production in 2021." Hydrocarbons Technology. March 05, 2018. Accessed June 21, 2018. Retrieved from https://www.hydrocarbons-technology.com/comment/genel-energy-drive-iraq-gas-production-2021/

[168] "The Natural Gas Sector in Israel." Ministry of Energy. Accessed March 08, 2018. Retrieved from http://archive.energy.gov.il/English/Subjects/Natural%20Gas/Pages/GxmsMniNGEconomy.aspx

[169] Bar, Yaniv. "The Natural Gas Sector in Israel An Economic Survey." The Natural Gas Sector in Israel. January 2017: 3. Accessed March 8, 2018. Retrieved from https://english.leumi.co.il/static-files/10/LeumiEnglish/Leumi_Review/NaturalGasinIsraelacc.pdf

[170] Herzog, Chen, Norden Shalabna, and Guy Maor. "Israel Natural Gas Demand Forecast 2017-2040." July 2, 2017:85. Accessed March 8, 2018. Retrieved from https://www.delek-group.com/wp-content/uploads/2017/09/BDO-Gas-Market-Forecast-2-07-2017-for-Delek-Group-with-final-letter-1.pdf

[171] Herzog et al., 90

the capacities of these fields are 67 bcm. It is expected to start its operations in 2020.[172] With the discoveries, the total natural gas capacity of Israel is around 1 tcm. The country produced 9.04 bcm and consumed 9.39 bcm of gas in 2016.[173] It is foreseen that gas production will rise to 23 bcm in 2025 and around 28 bcm in 2040. At the same time, gas consumption is expected to increase to 15 bcm in 2025 and to 25 bcm in 2040.[174] Therefore, there will be no significant volumes remain for export.

The Israeli government has not decided whether to supply gas to European or Asian markets. If they decide to export to the European market, then pipelines need to be constructed. If Asian markets are targeted, then LNG infrastructures are required. In the European context, Israel has not many options. It can export gas together with the Republic of Cyprus as LNG, or it can build a pipeline to Greece via Cyprus or pipeline to Turkey.

Figure 9: Export Options for the Eastern Mediterranean Gas[175]

In 2012, Israel, Republic of Cyprus, and Greece signed a negotiation to set up eastern Mediterranean energy corridor. The corridor can be set up either through a joint Republic

[172] Herzog et al., 85
[173] "World Gas and Renewables Review 2017", 10-19
[174] Akyener, Oğuzhan. "Future Of Israel Gas Export Up To 2050 & Turkey". 2016: 40-41. Energy Policy of Turkey, Issue 2. Retrieved from http://dergipark.gov.tr/download/issue-file/6569
[175] "The Export Options and Challenges for East Med Gas Was Presented by IENE's Executive Director at Israel's Annual Energy and Business Convention." Institute of Energy of South-East Europe. November 22, 2016. Accessed May 08, 2018. Retrieved from http://www.iene.eu/the-export-options-and-challenges-for-east-med-gas-was-presented-by-ienes-executive-director-at-israels-annual-energy-and-business-convention-p3181.html

of Cyprus-Israel LNG plant or a pipeline from Israel to Greece via Cyprus.[176] The Republic of Cyprus was in favor of building LNG facilities which would have 7 bcm of gas capacity.[177] However, the Greek Cypriot administration looked for Israeli financial support to cover the costs. Due to the hesitant Israeli attitude, financial support was not given to Nicosia government.[178] In 2017, the Greek Cypriot project became eligible for Connecting Europe Facility (CEF), and the EU covered 60% of the costs of a feasibility study of the project. The CEF is a funding instrument of the EU, and it makes feasibility studies and investments in infrastructure. The main aim of the CEF is to link energy, transport and telecom areas of the EU by strengthening the infrastructure.[179] The feasibility of the project will end in 2020.[180] The decision to build LNG facilities will depend on the conclusion of this feasibility study.

Another option for Israel is to construct a pipeline between Israel and Greece via Cyprus. The proposed Eastern Mediterranean Pipeline (EMP) would have the capacity to transfer 12-16 bcm of gas. Although the pipeline has both financial and technical difficulties because of its undersea route, in 2017, three countries signed a memorandum for the construction of the pipeline by 2019. The parties set a target to 2025 for the completion of the project.[181] However, the agreement does not guarantee the construction of the pipeline. Financing the pipeline is the most important aspect of the project, so there is a question mark regarding the construction of the pipeline.

Besides, Israeli law prevents Israel to export gas below the domestic gas price. Considering that domestic gas price in Israel is $5.2/MMBtu and European countries pay around $4.8/MMBtu for imported gas, there is no commercial incentive for energy companies to make a costly investment to bring Israeli gas to Europe. On top of that, Israeli gas prices to Europe likely to remain high since Russia has the ability to make

[176] De Micco, Pasquale. "The prospect of Eastern Mediterranean gas production: An alternative energy supplier for the EU?" Directorate-General for External Policies. European Parliament. April 2014: 14. Accessed March 8, 2018. Retrieved from http://www.europarl.europa.eu/RegData/etudes/briefing_note/join/2014/522339/EXPO-AFET_SP%282014%29522339_EN.pdf
[177] De Micco, 14
[178] De Micco, 14
[179] "Connecting Europe Facility." Innovation and Networks Executive Agency. European Commission. Accessed March 08, 2018. Retrieved from https://ec.europa.eu/inea/en/connecting-europe-facility
[180] "CYnergy". Innovation and Networks Executive Agency. European Commission. Accessed March 7, 2018. Retrieved from https://ec.europa.eu/inea/en/connecting-europe-facility/cef-energy/projects-by-country/cyprus/2016-eu-sa-0009
[181] "Cyprus, Greece, Italy and Israel back natgas pipeline to Europe." CyprusMail. December 5, 2017. Accessed March 8, 2018. Retrieved from http://cyprus-mail.com/2017/12/05/cyprus-greece-italy-israel-back-natgas-pipeline-europe/

price cuts.[182] More elaborately, Russia wants to protect its share in the European Union market. Therefore, when the EU finds alternative routes to import gas, Russia can decrease its gas prices to keep its market share in the EU. Thus, since the Israeli gas will not be cheap because of the infrastructure costs, it can be argued that the Israeli gas cannot be able to compete with Russian gas.

Moreover, in 2013, the Israeli government put a 40% limit on natural gas exports from the newly discovered gas reserves in order to supply more gas to the domestic market.[183] This means that Israel can export only 400-500 bcm. Therefore, with the export quota, it can be argued that significant volumes of gas cannot be transmitted to Europe.

Furthermore, Israel- Turkey direct pipeline is more profitable than the joint LNG plant and the pipeline between Israel, Cyprus, and Greece. The direct pipeline has a potential to supply over 10 bcm of gas to Turkey.[184] With the realization of the new pipelines in Turkey, Israeli gas can be transported easily to Europe. However, one of the major problem in Israel- Turkey route is the maritime boundaries in the East Mediterranean. United Nations Convention on the Law of the Sea (UNCLOS) was established in 1982 to define rules on the use of resources within maritime borders.[185] Egypt, Lebanon, and the Republic of Cyprus signed the convention while Turkey, Israel, and Syria have not signed the convention. If claims on Exclusive Economic Zone (EEZ) clashes between the countries, they can be solved with bilateral negotiations. For instance, in 2010, Israel and the Republic of Cyprus signed an agreement to define their EEZ's.[186]

Israel planned to build a gas pipeline from its Leviathan field to the Southern part of Turkey. It was planned that the pipeline would be extended and attached to TANAP, so that Israeli gas would reach Europe through Turkey. However, the pipeline needs to pass from the EEZ of the Republic of Cyprus. The Greek Cypriot administration is reluctant to permit such a project to cross from its EEZ because of its tense relations with Turkey. Alternatively, the pipeline can pass from the EEZ's of Syria and Lebanon, but the hostile relations between Israel and these Arab states made pipeline less possible to cross from

[182] Rzayeva, Gulmira. "Gas Supply Changes in Turkey." The Oxford Institute for Energy Studies. January 2018: 12. Accessed March 09, 2018. Retrieved from https://www.oxfordenergy.org/wpcms/wp-content/uploads/2018/01/Gas-Supply-Changes-in-Turkey-Insight-24.pdf
[183] "Israeli Government Approves 40 Pct Limit on Natural Gas Exports." Reuters. June 23, 2013. Accessed June 21, 2018. Retrieved from https://www.reuters.com/article/israel-natgas/israeli-government-approves-40-pct-limit-on-natural-gas-exports-idUSL5N0EZ0BQ20130623
[184] Rzayeva, 12
[185] De Micco, 8
[186] De Micco, 10

that route.[187] Moreover, Russia tries to protect its monopoly in the European market. Therefore, it can be said that Russian support on Nicosia government against Turkey prevents the construction of the pipeline.

The regional export potential of Israel increased with the natural gas discoveries. If the feasibility study gives the green light to the joint LNG with the Republic of Cyprus, then two countries can export gas in the form of LNG to Europe after 2020. The pipeline between Israel, Cyprus, and Greece is the most expensive one among the available options. Besides, it has technical difficulties due to its long undersea route. However, in 2017, the parties agreed on the construction of the EMP. If the construction of the pipeline will begin in 2019, then there is a possibility that the pipeline becomes operational in 2025. Joint agreement for the construction of the pipeline does not guarantee that it will be built. Due to the high costs and difficulties, financial constraints are the main impediments of the project.

All in all, if the EU wants to diversify its imports of natural gas, then the most cost-efficient way is to import gas from Israel- Turkey pipeline. However, the dispute over the EEZ, the relations between Turkey and the Republic of Cyprus, and Russian influence in the region are the main obstacles for the construction of the pipeline. There are commercial and geopolitical constraints for Israel to export its gas to Europe through pipelines. Hence, it can be said that Israeli gas will be transported to the EU as LNG in medium to long terms.

2.2.3. Republic of Cyprus

After the Israeli discoveries, Noble Energy and its partners found natural gas in 2011 in the Aphrodite field of Republic of Cyprus. The capacity of the field is around 120-129 bcm. The energy mix of the Republic of Cyprus does not include natural gas. The field

[187] De Micco, 16

was discovered in 2011, but it has not been developed yet.[188] The reason for this is because a single platform will be used for two drillings. One for Leviathan and the other one for Aphrodite. With a single platform, costs will be lowered. As a result, the Cypriot reserve will become operational in 2020.[189] Currently, the island of Cyprus does not have the natural gas infrastructure. The Republic of Cyprus prefers to build LNG facilities if and when the volumes available permit financing, and it wants to export its gas after the necessary developments.[190]

Besides, in 2017, the Nicosia government started negotiations with Egypt to build a pipeline from the Aphrodite field to Egypt. With the negotiation, the Republic of Cyprus aims to export natural gas to Egypt, and the country will export Cypriot gas in the form of LNG to the Asian and European gas markets.[191] However, building a pipeline to Egypt is more expensive than building LNG facilities in Cyprus.[192] Other than exporting gas to Egypt, in 2017, Israel, Republic of Cyprus and Greece signed a memorandum for the construction of Eastern Mediterranean Pipeline (EMP) by 2019. The parties planned to finish construction of the project in 2025, and the capacity of the project will be around 12-16 bcm of gas.[193] However, it is not easy to finance such an expensive and challenging pipeline. As noted above, the Greek Cypriot administration also has a desire to export its gas as LNG.

The continuing problem of Cyprus is that the island is politically divided. Turkish Cypriots argue that they have rights on natural resources of the entire island while Greek Cypriots argue that natural resources were found in the EEZ of the Republic of Cyprus and thus it could be utilized by the only Republic of Cyprus.[194] Besides, Turkey has a reasonable argument that the Republic of Cyprus cannot make a unilateral decision for the development of the resources of the island.[195] Although Greek Cypriots and Turkish Cypriots have been negotiating for the reunification of the island since decades, the result

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[188] Ratner, Michael. "Natural Gas Discoveries in the Eastern Mediterranean." August 15, 2016: 5. Accessed March 8, 2018. Retrieved from https://fas.org/sgp/crs/mideast/R44591.pdf
[189] Gorodeisky, Sonia. "Cyprus set to sign Egypt gas export deal." Globes. February 21, 2018. Accessed March 8, 2018. Retrieved from http://www.globes.co.il/en/article-cyprus-set-to-sign-egypt-gas-export-deal-report-1001224905
[190] Ratner, 5
[191] "Glimmer of hope for Cyprus to export its gas to Egypt." CyprusMail. December 3, 2017. Accessed March 8, 2018. Retrieved from http://cyprus-mail.com/2017/12/03/glimmer-hope-cyprus-export-gas-egypt/
[192] Ratner, 5
[193] "Cyprus, Greece, Italy and Israel back natgas pipeline to Europe.", 2017
[194] Psyllides, George. "Anastasiades calls on Turkey to end gas standoff, return to talks." CyprusMail. February 21, 2018. Accessed March 8, 2018. Retrieved from http://cyprus-mail.com/2018/02/21/anastasiades-calls-turkey-end-gas-standoff-return-talks/
[195] Tagliapietra, Simone. "Towards a New Eastern Mediterranean Energy Corridor? 2013: 14. Natural Gas Developments Between Market Opportunities and Geopolitical Risks."

is a stalemate. Also, Turkey does not recognize the EEZ of the Republic of Cyprus. Turkey blocked offshore drilling of Italian energy giant ENI by stating that the area is a part of the EEZ of Turkey.[196]

Under these circumstances, political problems are likely to emerge between Greek Cypriots and Turkish Cypriots as well as between the Nicosia government and Turkey regarding the exportation of Cypriot gas. Considering that the EU consumed 463 bcm in 2016, reserves of around 120 bcm of Cypriot gas is insignificant for Europe to make a costly investment. This shows Cypriot gas cannot be an alternative for Europe. Consequently, it can be argued that rather than exporting, Cypriot gas can be used by the two countries in the island, so that natural gas can decrease import dependency of these two countries to other fossil fuels such as oil.

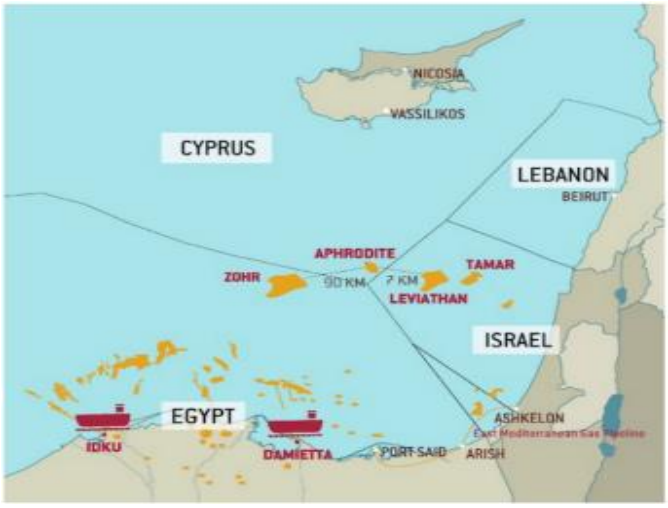

Figure 10: Natural Gas Discoveries in the Eastern Mediterranean[197]

2.3. North Africa

2.3.1. Egypt

[196] Psyllides, 2018

[197] "Egypt and Cyprus Reach Preliminary Agreement on Natural Gas Pipeline." Energy Egypt. December 3, 2017. Accessed May 08, 2018. Retrieved from https://energyegypt.net/2017/12/03/egypt-and-cyprus-reach-preliminary-agreement-on-natural-gas-pipeline/

Egypt is one of the vital energy producers in the region. However, Arab Uprisings and political instabilities decreased production in Egypt. Due to the political situations in Egypt after the Arab Revolutions, it was unlikely for the Egyptian government to adopt provocative measures such as increasing energy prices.[198] With the low energy prices, domestic demand has increased and caused 9.5 bcm deficit between production and consumption. The country produced 41.8 bcm while it consumed 51.3 bcm of gas in 2016.[199] IEA gas market report predicts that Egyptian gas production will be 69 bcm of gas in 2022 while gas demand will be 65 bcm of gas in the same year.[200]

In 2015, the Italian energy company ENI discovered gas reserves in the Zohr region. The estimated capacity of the reserve is 850 bcm. Considering that the proven reserve of Egypt is 1.8 tcm, discovered reserves accounts for around 47% of the proven reserves of the country.[201] The production in Zohr region started in December 2017, and it is expected to work in full capacity at the end of 2019.[202] In June 2018, ENI announced that around 2.5 tcm of gas was discovered in the Noor field which makes it the greatest gas field of Egypt. Drillings in the field are expected to start in the same year.[203] The Zohr and Noor gas reserves will be used for increasing domestic needs as well as for export. Even though Egypt plans to export its discovered gas, in the current context, it is very hard to predict the export capacity of Egypt.

Arab Gas Pipeline was designed to carry Egyptian gas to Jordan, Lebanon, Syria, and Turkey. It was designed to carry around 10 bcm of gas per year.[204] Until 2008, four phases were completed, and Egyptian gas reached Syria. Even though it was planned to extend the pipeline to Turkey and then to Europe, the outbreak of Arab Spring in 2010 and the Syrian civil war in 2011 prevented the construction of the pipeline.[205] Besides, conflicts and sabotages in Egypt decreased Egyptian exports. If the pipeline were extended to

[198] Chyong et al., 2015
[199] "BP Statistical Review of World Energy 2017", 26-29
[200] "Gas Market Report Series 2017." 2017:121-123. International Energy Agency.
[201] "BP Statistical Review of World Energy 2017", 26-29
[202] "Zohr: Production Underway in Record Time." ENI. Accessed March 08, 2018. Retrieved from https://www.eni.com/en_IT/operations/upstream/exploration-model/zohr-egypt.page
[203] "Exploration Digging in Noor Field to Start in August." EgyptToday. June 27, 2018. Accessed June 30, 2018. Retrieved from https://www.egypttoday.com/Article/3/52895/Exploration-digging-in-Noor-field-to-start-in-August-Source
[204] "Strategic Pipelines: Arab Gas Pipeline" Arab Republic of Egypt Ministry of Petroleum. 2010. Accessed March 09, 2018. Retrieved from http://www.petroleum.gov.eg/en/ProjectsandActivities/StrategicProjects/Pages/GasPipeline.aspx
[205] "Strategic Pipelines: Arab Gas Pipeline", 2010

Turkey, Turkey would have received 10 bcm of natural gas per year. Until today, no progress has been made in the pipeline.[206]

After the gas discoveries, Egypt started to perceive its role as an exporter country. Egypt has two LNG facilities and Egyptian state-owned company SUMED is now building new large LNG terminal on the Gulf of Suez which is expected to finish at the end of 2018.[207] The main reason why Egypt invested in LNG is that it wants to utilize from its geographical location. Egypt is at the center of the trade routes and thanks to the Suez Canal, Egypt can easily export its gas with LNG tankers. However, the potential of Egypt to export gas to Europe cannot be calculated given its rising domestic demand and the fact that domestic demand continues to rise. Consequently, since Arab Gas Pipeline could not be extended to Turkey and Europe, Egypt will supply its gas in the form of LNG in medium to long terms.

2.3.2. Algeria

Algeria is an essential energy partner for the European Union. It had 4.5 tcm of natural gas reserves in 2016. In the same year, Algeria produced 91.3 bcm while it consumed 40 bcm of gas. Algeria supplied 17.2 bcm to Italy, 11.8 bcm to Spain and 3.5 bcm to other European countries.[208] In total, Algeria supplied 32.5 bcm of gas to Europe via pipelines. It also supplied around 10 bcm LNG to Europe.[209] Although Algeria now exports its gas to different countries, some analysts even argue that it may evolve into a gas importer country on account of inefficiencies and inability to attract investments. Inefficient production, bureaucratic obstacles for the approval of new projects, the lack of investment and technical infrastructure are specifically cited.[210] Due to its distinct and complex

[206] "Country Analysis Brief: Turkey.", 12
[207] Butler, Nick. "A power shift in the Middle East." Financial Times. January 15, 2018. Accessed March 8, 2018. Retrieved from https://www.ft.com/content/7caf1d7a-f620-11e7-88f7-5465a6ce1a00
[208] "BP Statistical Review of World Energy 2017", 26-29
[209] "BP Statistical Review of World Energy 2017", 26-29
[210] Clemente, Jude. "Will Algeria Be Able To Export More Natural Gas And LNG?" Forbes. May 05, 2016. Accessed March 08, 2018. Retrieved from https://www.forbes.com/sites/judeclemente/2016/05/04/will-algeria-be-able-to-export-more-natural-gas-and-lng/#63daf54747dc

taxation system as well as technical difficulties for the investment, Algeria is not able to attract foreign investment. Nevertheless, the World Energy Outlook 2017 foresees an increase in Algeria's gas production.[211]

The country used almost half of its gas for power generation. Gas is mostly used to generate electricity in Algeria, and the country produces around 90% of its electricity from natural gas.[212] Low efficiency in the energy usage combined with weak infrastructure led gas demand to rise every year while overall exports have decreased in the recent years.[213] As a result, Algeria, the third biggest gas supplier of the EU, has been struggling to increase the production. For this reason, it can be argued that Algeria can lose its position as a major supplier of gas to Europe in the near future if it cannot increase its production.

2.3.3. Libya

The proven gas reserve of Libya is 1.5 tcm.[214] In 2016, Libya produced 11.36 bcm, consumed 6.53 bcm and exported 4.83 bcm of gas.[215] Libya started to export gas in 2004 to Italy with Greenstream Pipeline. The capacity of the pipeline is 8 bcm, but Libya supplied 4.4 bcm of gas in 2016.[216] Libya also owns one LNG facility. The capacity of the LNG is 3.5 bcm. LNG exports of Libya have remained low because of infrastructural and technical constraints.[217] After the civil war in 2011, production and exports of natural gas have recovered, but it is still low compared to the pre-war era. During the war, the only LNG plant of Libya was heavily damaged, and it could not be repaired. Therefore, the facility has been in operation since 2011.[218] Neither political stability nor democracy

[211] "World Energy Outlook.", 346
[212] Clemente, 2016
[213] Clemente, 2016
[214] "BP Statistical Review of World Energy 2017", 26-29
[215] "ENI in Libya." ENI. Accessed March 08, 2018. Retrieved from https://www.eni.com/en_IT/eni-world/country.shtml#libya
[216] "BP Statistical Review of World Energy 2017", 34
[217] "Country Analysis Briefs: Libya." The U.S. Energy Information Administration. February, 2011:6. Accessed March 8, 2018. Retrieved from https://grist.files.wordpress.com/2011/03/pdf.pdf
[218] "Country Analysis Brief: Libya.", 10

has been restored in Libya. Thus, it can be asserted that since Libya was unable to produce and export much gas to Europe, the Union cannot rely on Libya.

2.4. Turkey

Turkey is an important country for the Community that can serve as a bridge between different regions and the EU in transfer gas to the EU. The proven natural gas reserve of Turkey is only, 5 bcm, an insignificant volume.[219] As a result, Turkey is heavily dependent on imports of natural gas like the EU. After the two Ukrainian crises, energy security has become vital for the Community. To increase the energy security, Southern Gas Corridor (SGC) was developed by the Union in which Turkey will play a vital role in transmitting energy from different regions to Europe. By bringing gas to Europe, Turkey will also strengthen its energy security.

It is argued in this chapter that Turkey can play a decisive role in decreasing the EU's dependence on Russian gas. Development of the Trans Anatolian Pipeline (TANAP), the Trans Adriatic Pipeline (TAP) and the Southern Caucasus Pipeline (SCP) demonstrate that Turkey can be an essential and strategic energy partner for the EU and it can play an essential role for the energy supply diversification efforts of the Community. When Azeri gas reaches Europe, competition between the gas suppliers will increase. Therefore, it can be said that on the one hand, the Union will ensure competition for affordable gas prices and on the other hand, the Community will able to decrease its high dependency on Russian gas.

In this energy trade, Turkey either can be an energy transit or an energy hub. To understand the strategic importance of Turkey to the EU, a detailed analysis is required and will be made in the next chapter. In the analysis, Turkey's energy structure, energy policy, pipelines that pass from its territory and the planned pipeline projects will be

[219] "Country Analysis Brief: Turkey.", 7

considered. Then, Turkey's possible role in the energy trade as an energy transit state or an energy hub will be analyzed.

COUNTRY	RESERVE CAPACITY (TCM)	PRODUCTION (BCM)	CONSUMPTION(BCM)
TURKMENISTAN	17,5	66,8	29,5
AZERBAIJAN	1,0	17,5	10,4
IRAN	33,5	202,4	200,8
IRAQ	3,7	7,0	7,0
EGYPT	1,8	41,8	51,3
ISRAEL	1,0	9,0	9,3
REPUBLIC OF CYPRUS	0,1	N/A	N/A
ALGERIA	4,5	91,3	40,0
LIBYA	1,5	11,3	6,5

Table 6: Reserve Capacity, Production, and Consumption of the Countries in 2016[220]

Conclusion

The conflicts between Russia and Ukraine in 2006 and 2009 pushed the EU to take effective measures against gas disruptions from Russia. Therefore, SGC was formed to reach gas sources of the Caspian, the Middle-East, and the Mediterranean regions. In this chapter, nine different countries were analyzed which possibly supply natural gas to Europe via pipelines, and thus help the EU to diversify its gas imports. In this context, the emphasis was given to Turkmenistan, Azerbaijan, Iran, Egypt, Algeria, Libya, Republic of Cyprus, Israel, and Iraq. Besides, Turkey was included since the country is at the intersection between the majority of these countries and Europe.

Turkey is one of the strategically important countries that can serve as a bridge in transmitting gas from different regions to Europe. The EU and Turkey have overlapping interests in security of supply and diversification efforts. Both parties import gas mostly from Russia, try to diversify their energy composition and try to ensure the security of supply. These factors made Turkey and the EU natural strategic and inseparable partners in the field of energy. As a result, they can increase their energy security by strengthening their energy ties.

[220] Complied by the author from "World Gas and Renewables Review 2017", 10-19 and "BP Statistical Review of World Energy 2017", 26-29

Forecasts of IEA demonstrates that gas production in the selected countries will increase up to 2040. However, not all these countries will be able to supply gas to Europe. Therefore, the chapter concludes that Azerbaijan will supply its gas to Europe in short-term and Iraq has a potential to supply gas to Southern Gas corridor of Europe in the medium to long-term. Moreover, Iran, Egypt, and Israel are likely to provide LNG to the European gas market in the medium to long-term. On the contrary, Turkmenistan and the Republic of Cyprus will not be able to supply their gas to Europe, the former because of external factors and the latter because of both internal and external factors. Furthermore, due to the decline in their gas exports and rising gas consumption, the Union cannot increase its reliance on Algeria and Libya.

The cheapest way to bring Azeri and Iraqi gas to Europe is to carry it via Turkey, so Turkey is strategically vital for the European Union. In the energy trade between the EU, Azerbaijan, and Iraq, Turkey either can be an energy transit or an energy hub. Detailed analysis will be made in the next chapter about Turkey's possible role as being an energy transit state or an energy hub.

CHAPTER 3: ENERGY POLICY OF TURKEY AND ITS ROLE IN THE ENERGY TRADE

Introduction

In the long history relations between the EU and Turkey, energy has played a significant role. Both Turkey and the EU are highly dependent on Russian gas, both have a desire to decrease the share of Russian gas and both aim to ensure the security of their energy supplies. These commonalities have made Turkey and the EU strategic and inseparable partners in the field of energy. Cooperation between these two parties can increase the energy security of both sides and it is believed that Turkey can be a potential game-changer in the EU's future gas security.[221] With the realization of the new pipelines in Turkish territories, some analysts argue that Turkey can turn to a competitive gas hub in its region while the others do not agree with that. Therefore, the prospects of Turkey to become an energy hub is needed to be analyzed.

In order to understand Turkey's role in the energy security of the EU, it is worth mentioning Turkey's energy structure, energy policy, pipelines that pass from through territory and planned pipeline projects. Well-planned and effective energy policy can decrease higher import dependencies.

[221] Tagliapietra, Simone, and Georg Zachmann. "Designing a New EU-Turkey Strategic Gas Partnership." No. 2015/10: 3. Bruegel Policy Contribution.

Turkey's energy policy prioritizes energy supply security, diversification of energy resources and changing the energy mix of Turkey by decreasing the share of natural gas.[222] Currently, Turkey has four gas pipelines, and there are six planned gas projects. Among these projects, two pipeline projects are under construction in the Turkish territory (Trans Anatolian Pipeline (TANAP) and Turkish Stream) and two other pipeline projects will be connected to pipelines in the Turkish territory (South Caucasus Pipeline (SCP) and Trans Adriatic Pipeline (TAP)). The remaining two pipelines are now idled. These pipelines will enable Turkey to play an essential role in its region.

In energy trade between Europe and Turkey, Turkey can be either an energy transit state or an energy hub in its region when the gas transmission is considered. The country has a desire to evolve into a physical energy hub in its region.[223] By becoming an energy hub, Turkey would define the terms and conditions for the transfer of energy to Europe.

In the first section, the energy structure of Turkey will be presented. In the second section, the energy policy of Turkey will be explained. In the third section, current pipelines and planned pipeline projects will be described. In the fourth section, the role of Turkey in the energy security of the European Union and the obstacles for Turkey to become an energy hub will be discussed.

This chapter argues that in order for Turkey to become a physical energy hub, it needs to deal with four critical obstacles. The first obstacle is the price of gas in its long-term gas agreements. The second one is the "take or pay" clause in the long-term gas agreements and the third obstacle is natural gas storage capacity. Finally, and the most significant obstacle is, as analyzed in the previous chapter, the amount of gas available in its immediate neighborhood for Turkey to ensure the flow of significant volumes to Europe. If Turkey can successfully tackle the obstacles mentioned above, the probability of Turkey becoming a physical energy hub will increase in the near future provided that new sources from the region will become available. Rather than being a physical hub, a virtual hub is more feasible to Turkey. However, the country has a desire to become a physical energy hub. With these obstacles, Turkey cannot go further than being an energy transit

[222] "Energy Policies of IEA Countries: Turkey 2016 Review." International Energy Agency. 2016: 28.
[223] "Strategic Plan 2015-2019". Republic of Turkey Ministry of Energy and Natural Resources. 2015: 18. Accessed March 09, 2018. Retrieved from http://www.enerji.gov.tr/File/?path=ROOT%2F1%2FDocuments%2FStrategic%20Plan%2FStrategicPlan2015-2019.pdf

country. Therefore, as a transit country, Turkey will have a limited ability to affect energy dynamics in its region.

The amount of energy Turkey is capable of importing represents only as a small fraction of gas. Turkey imports via pipelines for domestic consumption or for transit. Its LNG imports, therefore, will not be considered in the context of Turkey as an energy transit country or an energy hub.

3.1. Turkey's Energy Structure

There is a strong relationship between economic growth and energy demand, so Turkey's energy demand has been following the upward trend because of its growing economy. Energy demand increases not only because of the economic growth but also increases when population increases. Therefore, there is also a strong relationship between population and energy demand.

Years	Population (1000)	GNP/ capita ($)	Total GNP	Total energy demand (Mtoe)	Energy/ capita (Kep)	Energy intensity
1973	38,072	1991	75,915,568	24.60	646	81
1990	56,098	2674	150,006,052	53.70	957	50
1995	62,171	2861	177,871,231	64.60	1039	44
2000	67,618	3309	223,342,254	82.60	1218	40
2010	78,459	5366	421,010,994	153.90	1962	35
2020	87,759	9261	812,736,099	282.20	3216	33

Table 7: Population, Economy and Energy Demand[224]

Table 7 shows the relationship between population, economy and energy demand. According to this table, from 1990 to 2000, the population increased by around 11 million people, GNP per capita increased by $635, and total energy demand increased by 28.9 Million tonnes oil equivalent (Mtoe). From 2000 to 2010, the population increased by around 11 million people, GNP per capita increased by $2057, and total energy demand

[224] Bilgin, Mert, "Energy Policy in Turkey: Security, Markets, Supplies and Pipelines." 2011. Turkish Studies 12 (3): 401.

increased by 71.3 Mtoe. From 2010 to 2020, the population is expected to increase by 9 million people, and GNP per capita by $3895, and total energy demand by 128.3 Mtoe.

This shows that economic and population growth has increased energy demand of Turkey. When economies of countries grow, the demand for energy increases to bolster economic growth. Other than economic growth, the demand for energy increases when more and more people are able to afford middle-class lifestyles including modern dwellings and appliances. As a result, economic Turkey energy demand is expected to increase to sustain economic growth and to respond to demands coming from various segments of Turkish society. Another reason why Turkey needs more energy is that the considerable gap between energy production and demand. Unable to satisfy its energy demand from domestic sources, Turkey relies on energy imports, which represent 99% of its gas consumption and 90% of its oil consumption.

KEY INDICATORS								
	1973	1980	1990	2000	2010	2014	2015	2016p
Energy Production(Mtoe)	15,5	17,1	25,8	25,9	32,4	31,4	31,7	33,7
Net Imports(Mtoe)	8,9	14,4	28,1	50,9	75,1	93,7	103,6	105,8
Total Primary Energy Supply(Mtoe)	24,4	31,5	52,7	75,9	106,7	121,5	128,8	134,6

Table 8: Energy Production, Imports, and Tpes[225]

According to the International Energy Agency (IEA) indicators, in 1990, energy production of Turkey was 25.8 Million tonnes oil equivalent (Mtoe). In 2000, energy production increased very little to 25.9 Mtoe. In the following decade, energy production was 32.4 Mtoe. Finally, in 2016 Turkey's energy production was 33.7 Mtoe. This shows that energy production in Turkey increased 30,6% from 1990 to 2016. Considering its economic growth and population, energy production has remained insufficient. Turkey needs more energy to satisfy its energy demand. According to the table, in 1990, net imports were 28.1 Mtoe. In 2000, imports increased to 50.9 Mtoe. This year coincides with an economic boom for Turkey. Then, in 2010, imports increased to 75.1 Mtoe. Finally, in 2016, net imports reached 105.8 Mtoe. Energy import of Turkey increased 276.5% from 1990 to 2016.

Compared to a 30.6% increase in energy production, energy imports of Turkey have increased drastically. Turkey's energy production in 2015 was 31.7 Mtoe. Among the domestic production, fossil fuels, chiefly coal, account for 51.1% while renewable energy

[225] "World Energy Balances.", 199

accounts for 48.9%.[226] This shows that renewable energy has an essential place in Turkey's domestic energy production. However, the share of renewables has a small place in Turkey's overall energy mix. The share of renewables in the energy mix of Turkey was 12.1% while the share of fossil fuels was 87.9% in 2015.[227] Turkey's energy demand is vital to understand the energy dynamics of the country.

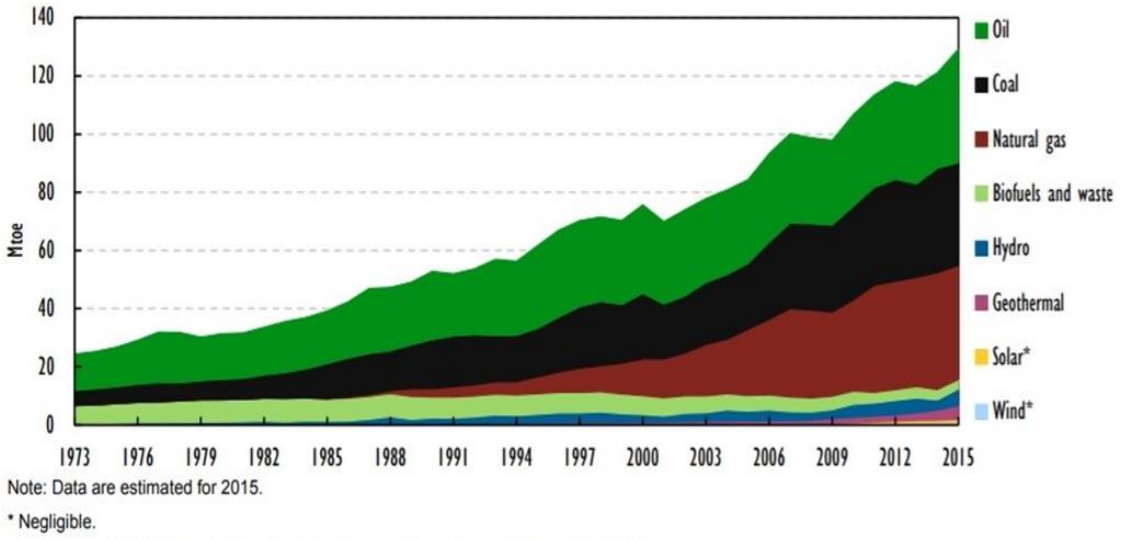

Figure 11: Tpes 1973-2015[228]

IEA report indicates total primary energy supply (TPES) of Turkey. As shown in Table 8, TPES of Turkey in 2015 was 128.8 Mtoe. Among the TPES, "Fossil fuels totaled 113.6 Mtoe in 2015, an increase of 53.2% from 74.2 Mtoe in 2005… Over the past decade, natural gas and coal supply increased by 72.1% and 56.2%, respectively, while oil supply increased by 35.8% during that period."[229] This shows that in ten years, the share of fossil fuels increased dramatically. According to Figure 11, in the energy mix of Turkey, the highest share was taken by oil. Natural gas and coal took the second and the third place respectively after oil. Even though oil has the highest share in the energy composition of Turkey, the highest increase occurred in natural gas with 72.1%, and coal followed it with 56.2% and with oil 35.8% covering the years between 2005-2015. The reason why the highest increase occurred in natural gas is that Turkey used 55% of its imported natural gas for power production.[230] Power production from natural gas is the most expensive

[226] "Energy Policies of IEA Countries: Turkey 2016 Review." ,23
[227] "Energy Policies of IEA Countries: Turkey 2016 Review.", 23
[228] "Energy Policies of IEA Countries: Turkey 2016 Review.", 23
[229] "Energy Policies of IEA Countries: Turkey 2016 Review.", 22-23
[230] Bilgin, Mert, "Energy and Turkey's Foreign Policy: State Strategy, Regional Cooperation and Private Sector Involvement." 2010. Turkish Policy Quarterly 9 (2): 83.

way of generating electricity while there are less expensive other options available for Turkey, such as renewables or nuclear.[231]

Total Final Consumption (TFC) of Turkey amounted to 93.5 Mtoe in 2015.[232] Among TFC, the highest energy consuming sector is an industry with 26.1 Mtoe. The transportation sector is the second biggest energy-consuming sector that consumed 24.3 Mtoe in 2015. The housing sector followed the transportation sector by consuming 20.1 Mtoe in the same year. Finally, the Service sector used 12.1 Mtoe. The remaining 10.9 Mtoe was used in other sectors of the Turkish economy.[233] TFC is essential to point out which sectors consume the most significant amount of energy in Turkey.

According to the 2016 IEA report, Turkey imported 25.1 Mtoe of crude oil in 2015, which represented 90.6% of its consumption. Oil from Iraq represented 45.5%, from Iran 22.3%, from Russia 12.4%, from Saudi Arabia 9.5% of the imports while smaller quantities were imported from other countries.[234] This indicates that Turkey imported its oil mainly from the Middle-East and Turkey is highly dependent on imports of oil.

Secondly, Turkey has indigenous coal production, so that the country uses the majority of its domestic coal for power production. In 2015, the country produced 12,8 Mtoe of coal which accounts for 37% of the consumption.[235] The remaining 63% was imported from Colombia, Russia, South Africa, Australia and other countries.[236]

In 2015, Turkey imported 99% of the natural gas it consumed which amounted to 48.2 bcm of gas. Russia accounted for 55.1% of its gas imports, Iran 16.2%, Azerbaijan 12.3%, Algeria 8.1% and small amounts from Nigeria.[237] In 2016, Turkey imported around 5% less natural gas which added up to 46.3 bcm. The share of Russia in Turkey's imports decreased to 52.9% while there was an increase in the share of imports from other countries such as Iran (16.6%), Azerbaijan (13.9%), and Algeria (9.2%).[238]

Among the imported fossil fuels, the dependency of natural gas is the highest one with 99%. As a consequence, with imports representing 90.6% of oil, and 99% of natural gas consumption, Turkey's high energy dependency to creates vulnerability to external

[231] Bilgin, 83
[232] "World Energy Balances.",147
[233] "World Energy Balances.",147
[234] "Energy Policies of IEA Countries: Turkey 2016 Review.", 72
[235] "BP Statistical Review of World Energy 2017", 38-39
[236] "Energy Policies of IEA Countries: Turkey 2016 Review.", 95
[237] "Energy Policies of IEA Countries: Turkey 2016 Review.", 104
[238] "Turkish Natural Gas Market Report 2016". Energy Market Regulatory Board. 2017: 8.

pressures. This situation requires that Turkey find a way to decrease its high dependency on imports. As a result, the importance for Turkey to attract greater volumes of gas becomes clear, a point which will be considered next.

3.2. Turkey's Energy Policy

Turkey's energy policy is shaped mainly by the Ministry of Energy and Natural Resources (MENR) which has the sole authority in the formation and implementation of the energy policies and programs. The ministry's primary responsibilities include the drafting of the strategic plans for energy. This means that the Ministry sets a variety of goals and objectives to be met in a projected timeline. The strategic plan covers four years. Currently, the 2015-2019 strategic plan is being implemented.[239]

In the drafting of Turkey's energy strategies, the Ministry identified seven fundamental values and principles and formulated the key pillars of Turkish energy policy in line with these values and principles. They are; **Transparency** (It is about the accessibility of activities with relevant parties and the public.), **Reliability** (The activities are carried out with the purpose of trust in national and international platforms.), **Environmentally consciousness and respect to life** (The activities are carried out in accordance with the protection of the environment and respect to human life.), **Participation** (To give importance to stakeholder's opinions, suggestions, and expectations and to include stakeholders in the policy-making process.), **Innovativeness and leadership** (To support innovation and the use of new technologies.), **Efficiency** (To give importance productivity and efficiency by using public resources.), **Consistency and predictability** (To carry out stable activities as well as taking care of national benefits with medium and long-term planning.)[240]

[239] "Energy Policies of IEA Countries: Turkey 2016 Review.", 26
[240] "Strategic Plan 2015-2019", 18

The Ministry has built its strategic plans on these seven critical fundamental values and principles. These values and principles are essential to understand how the Ministry operates and perceives the world of energy. The Ministry set 8 themes, 16 goals and 62 objectives which are defined in very detailed fashion. All themes and goals are shown in Table 9:

Theme 1: Security of Supply	**Theme 2:** Energy Efficiency and Energy Saving	**Theme 3:**Good Governance and Stakeholder Interaction	**Theme 4:** Regional and International Effectiveness	**Theme 5:** Technology, R&D and Innovation	**Theme 6:** Improvement of the Investment Environment	**Theme 7:** Raw Material Supply Security	**Theme 8:** Efficient and Effective Use of Raw Material
Goal 1: Strong and Reliable Energy Infrastructure	Goal 4:Turkey Making Use Of Its Energy in the Most Efficient Way	Goal 6:The Ministry with a Strong Corporate Capacity	Goal 9: Turkey Integrated with Regional Energy Markets	Goal 11: Indigenous Technology in Energy and Natural Resources	Goal 13: Competitive and Transparent Markets	Goal 15: Security of Non-Energy Raw Material Supply	Goal 16:Efficient and Effective Use of Non-Energy Natural Raw Materials
Goal 2: Optimum resource diversity	Goal 5:Improved Capacity for Energy Efficiency and Saving	Goal 7: The Ministry Using Information Technologies Effectively	Goal 10: A Powerful Actor in the International Arena	Goal 12: A Result-Oriented R&D Approach	Goal 14: Improved Investment Processes		
Goal 3:Effective Demand Management		Goal 8: A Well-Coordinated Ministry					

Table 9: Themes and Goals of the 2015-2019 Strategic Plan[241]

Since Turkey is close to major energy producing and energy consuming countries, it wants to utilize its geographic location for the energy trade. Therefore, Turkey has the ambition to become an energy hub in its region. In the inauguration ceremony of TANAP, President Recep Tayyip Erdogan said that "Our country is now one step closer to its vision to become a hub of energy lines thanks to TANAP."[242] The new pipelines have reawakened Turkey's ambition to evolve into an energy hub.[243]

Apart from the Strategic Plan of MENR, key objectives for energy policy is identified in 10th National Development Plan (2014-2018). The development plan includes strategic sectoral objectives which enable the government to make wiser investments, and it serves as a guideline for the government and ministries.[244] In the national development plan, strategic objectives for the field of energy are defined, and these objectives overlap with the goals of MENR. Overall, the primary objectives of Turkish energy policy which are defined in the Strategic Plan of MENR and 10th National Development Plan are the following:

[241] "Strategic Plan 2015-2019", 20-21
[242] Ayasun, Abdullah. "With TANAP, Turkey Takes a Big Step Toward Becoming Energy Hub." Globe Post Turkey. June 14, 2018. Accessed June 17, 2018. Retrieved from https://turkey.theglobepost.com/turkey-tanap-energy-hub/
[243] "Strategic Plan 2015-2019", 23
[244] "Energy Policies of IEA Countries: Turkey 2016 Review.", 28

THE MAIN OBJECTIVES OF TURKISH ENERGY POLICY
Increase the domestic supply of sources
Increase energy efficiency and renewable energy
Expand and construct natural gas storage facilities
Improve competitiveness on electricity and natural gas markets
Diversify supply sources and routes
Realize natural gas and oil pipeline projects
Decrease import dependence
Decrease consuption of fossil fuels
Start up the operation of nuclear power plants

Table 10: The Main Objectives of Turkish Energy Policy[245]

3.3. Current Pipelines and Planned Pipeline Projects

In the first section (Energy Structure of Turkey), it is shown that Turkey has 99% import dependency on natural gas and it imports its natural gas mostly from Russia, Iran, and Azerbaijan. Gas coming from these countries are transmitted through pipelines to Turkey. This creates a dependency on the exporter countries. For this reason, the priority is given to energy security, decreasing the share of natural gas in the energy mix and diversification of resources in Strategic Plan of MENR and 10th National Development Plan of Turkey. In this part, first current pipelines and then planned pipeline projects will be presented.

[245] "Energy Policies of IEA Countries: Turkey 2016 Review.", 28

Figure 12: Natural Gas Pipeline System in Turkey[246]

3.3.1. Current Pipelines

Currently, Turkey has four natural gas pipelines in which supplies come from Russia, Iran, and Azerbaijan and it has one interconnector with Greece. The first pipeline was built in 1986, and the last pipeline was built in 2007. With these pipelines, Turkey is able to import more or less 50 bcm of gas per year, as noted mostly from Russia.

3.3.1.1. Trans-Balkan Pipeline

With the intergovernmental agreement signed between the Soviet Union and Turkey in 1986, the first pipeline of Turkey was constructed between the Soviet Union and Turkey. The pipeline has the capacity to transfer 14 bcm of gas per year and the agreement

[246] Wald, Ellen R. "Turkey – An Unstable Energy Hub." TalkMarkets. July 19, 2016. Accessed March 12, 2018. Retrieved from http://www.talkmarkets.com/content/us-markets/turkey--an-unstable-energy-hub?post=100700

between two countries signed for 25 years.[247] The pipeline starts in Russia and passes from Ukraine, Moldova, Romania, and Bulgaria. The length of the pipeline is over 1000km. The total capacity of this pipeline is around 14 bcm of gas per year.[248] As noted earlier, Russia announced that it would stop supplying gas via Ukraine by 2019, and thus it developed new and alternative routes to supply gas to Turkey and Europe.[249] For Turkey and Southeastern Europe, the Turkish Stream and for Europe Nord Stream 2 pipelines are being built. After 2019, Russia aims to connect Turkish stream to the Trans- Balkan pipeline, and the latter will be reversed, so that Russia will continue to supply gas to Southeast European countries.[250]

3.3.1.2. Tabriz- Dogubayazıt Pipeline

The pipeline enables natural gas flow from Iran to Turkey. The pipeline started its operations in 2001, and it has the capacity to transfer around 14 bcm of gas per year. The length of the pipeline is around 2500 km.[251] Based on the negotiations between two countries, Iran is obliged to supply 10 bcm gas to Turkey.[252] In Erzurum, the pipeline connects with the South Caucasus Pipeline (SCP), and then it extends from Doğubeyazıt to Ankara via Erzurum.[253]

[247] "Turkey". Gazprom Export. 2017. Accessed March 09, 2018. Retrieved from http://www.gazpromexport.ru/en/partners/turkey/
[248] "Country Analysis Brief: Turkey.", 12
[249] Pirani, Simon and Yafimava Katja. "Russian Gas Transit Across Ukraine Post-2019: Pipeline Scenarios, Gas Flow Consequences, and Regulatory Constraints." February 2016: 4. Accessed April 23, 2018. Retrieved from https://www.oxfordenergy.org/wpcms/wp-content/uploads/2016/02/Russian-Gas-Transit-Across-Ukraine-Post-2019-NG-105.pdf
[250] "Bulgaria's PM Borissov Confirms Turkish Stream Pipeline to Europe to Pass Through Bulgaria." Central European Financial Observer. December 15, 2017. Accessed April 23, 2018. Retrieved from https://financialobserver.eu/recent-news/bulgarias-pm-borissov-confirms-turkish-stream-pipeline-to-europe-to-pass-through-bulgaria/
[251] "Country Analysis Brief: Turkey.", 12
[252] "Natural Gas Pipelines and Projects.", 2018
[253] "Natural Gas Pipelines and Projects.", 2018

3.3.1.3. Blue Stream

In 2003, a new pipeline was built between Russia and Turkey. In this pipeline, there are no transit countries which means that there is a direct natural gas connection between Russia and Turkey. The annual capacity of the pipeline is around 16 bcm, and the length of the pipeline is around 1200 km.[254] The pipeline has the highest capacity among the existing pipelines in Turkey. Besides, Trans- Balkan pipeline and Blue Stream enable Russia not only to export more significant volumes of gas to Turkey but also to keeps its dominant position in the Turkish market. After the completion of Turkish Stream, Russian dominance in the Turkish gas market will be consolidated.

3.3.1.4. South Caucasus Pipeline (SCP)

The pipeline was commissioned in 2006, and it started deliveries in the next year. The pipeline starts from Azerbaijan, passes through Georgia and reaches to Turkey. The capacity of the pipeline is around 7 bcm of gas per year. The length of the pipeline is around 700km.[255] This pipeline has been essential for Turkey to break Russian dominance. However, the capacity of the pipeline is low compared to Russian pipelines. After the capacity expansion, Azerbaijan will able to supply more gas to Turkey, so that it can compete with Russian gas and increase Turkey's energy security.

[254] "Country Analysis Brief: Turkey.", 12
[255] "Country Analysis Brief: Turkey.", 12

3.3.1.5. Interconnector Turkey-Greece-Italy (ITGI)

In 2007, the representatives of Turkey, Greece, and Italy signed the new pipeline project that interconnects natural gas systems of these countries. The EU gave particular attention to the pipeline and supported its construction.[256] The project starts in Turkey, passes through Greece and reaches Italy. The capacity of the interconnector is around 11.3 bcm. The length of the ITGI is around 300 km.[257] Turkey- Greece interconnector started its operations in 2007, but there is little progress has been made on the Greece and Italy leg.[258] The Trans Adriatic Pipeline (TAP) is now being built to connect gas infrastructures of Greece, Albania, and Italy.

3.3.2. Planned Pipeline Projects

Planned pipeline projects are designed for securing Turkey's energy supply, and they will serve to diversify its energy suppliers. Also, these new projects will enhance Turkey's role and influence in the region. There are six planned projects. Among them, two pipeline projects are under construction in the Turkish territory (TANAP and Turkish Stream) and two other pipeline projects will be connected to pipelines in the Turkish territory (SCP and TAP). The remaining two pipelines are now idled. The four significant projects will finish in 2020. With the new projects, Turkey will increase the share of Azeri and Russian gas in its domestic consumption. Besides, Turkey will able to transmit greater volumes of Azeri and Russian gas to Europe.

[256] "Interconnection Turkey Greece Italy (ITGI) Pipeline" Hydrocarbons Technology. 2017. Accessed March 09, 2018. Retrieved from https://www.hydrocarbons-technology.com/projects/turkeygreeceitalypip/
[257] "Interconnection Turkey Greece Italy (ITGI) Pipeline", 2017
[258] "Interconnection Turkey Greece Italy (ITGI) Pipeline", 2017

3.3.2.1. South Caucasus Pipeline (SCP) (expansion)

South Caucasus pipeline started its operation in 2007 starting from Azerbaijan and reaches to Turkey through Georgia. Currently, the pipeline is being expanded, and it will finish in 2018-2019. With the expansion, the pipeline capacity will be increased to over 20 bcm per year.[259] Currently, SCP has around 7 bcm capacity. The expansion is needed to supply gas to both Turkish and European markets. Therefore, Azerbaijan will able to supply around 12 bcm of gas to Turkey and 10 bcm of gas to Europe. With the expansion, Azeri gas will compete with Russian gas in both markets. Also, it will contribute to the diversification efforts of Turkey and the EU.

3.3.2.2. Trans Anatolian Pipeline (TANAP)

The construction of TANAP started in 2015, and it finished in June 2018. It has 16 bcm capacity to carry natural gas per year. 6 bcm of gas will be delivered to Turkey, and the remaining 10 bcm will be delivered to Europe. The capacity of the pipeline is planned to increase to 24 bcm and then to 31 bcm with additional investments.[260] The length of the pipeline is around 1900km. The pipeline starts in Azerbaijan, passes through Georgia and reaches Turkey.[261] First, Azeri gas will be carried to Turkey with expanded South Caucasus Pipeline (SCP), and it will be linked to TANAP project in Turkey. Then, the TANAP project will be linked to another project called Trans-Adriatic Pipeline (TAP).[262] This means that the TANAP project is an intermediary between SCP and TAP. TANAP is the cornerstone for the energy security of the EU as well as of Turkey. The shareholders

[259] "South Caucasus Pipeline (SCP)" Socar Midstream. 2018. Accessed March 09, 2018. Retrieved from http://www.socarmidstream.az/project/scp/#cover
[260] "Trans- Anatolian Natural Gas Pipeline" TANAP. 2018. Accessed March 09, 2018. Retrieved from http://www.tanap.com/tanap-project/why-tanap/
[261] "Trans- Anatolian Natural Gas Pipeline", 2018
[262] "Trans- Anatolian Natural Gas Pipeline", 2018

of the project are SOCAR (58%), BOTAŞ (30%) and BP (12%).[263] This means that Turkey is part of the construction team and it will have a say in the project.

3.3.2.3. Trans Adriatic Pipeline (TAP)

The construction of the TAP project started in 2016. The operations of the pipeline are expected to start in 2020. The capacity of the pipeline is around 10 bcm, but it can be expanded to over 20 bcm with additional investments.[264] The length of the pipeline is around 880km. The pipeline will start in Greece, passing through Albania and reach Italy.[265] This project will be the extension of TANAP and SCP, carrying Azeri gas to Italy. It will also make a substantial contribution to the EU's energy security.

3.3.2.4. Turkish Stream

In 2014, Russia replaced South Stream project with Turkish stream project. The new project starts in Russia and ends in Turkey.[266] With this project, Turkey will transmit Russian gas to the EU. The pipeline has a length of 900km, and the construction of the pipeline started in 2017, and it will finish in late 2019. The construction is carried out by South Stream Transport BV which is owned by Gazprom.[267] Therefore, the pipeline will be owned by Gazprom and Turkey is isolated from the construction of the pipeline. The

[263] Rzayeva, 25
[264] "Trans Adriatic Pipeline" TAP. 2018. Accessed March 09, 2018. Retrieved from https://www.tap-ag.com/the-pipeline
[265] "Trans Adriatic Pipeline", 2018
[266] "Gazprom begins Turkish Stream pipeline construction." RT International. May 8, 2017. Accessed March 09, 2018. Retrieved from https://www.rt.com/business/387528-gazprom-turkish-stream-start-construction/
[267] Gurbanov, Ilgar. "Perspective for 'Turkish Stream' Project: Possible Scenarios and Challenges." Natural Gas World. January 21, 2017. Accessed July 05, 2018. Retrieved from https://www.naturalgasworld.com/perspective-for-turkish-stream-project-possible-scenarios-and-challenges-35401

implication of this exclusion is that, unlike TANAP, Turkey will not be able to control the gas that will be traded from its territory. The capacity of the two strings of the pipeline that is under construction will be 32,5 bcm of gas annually.[268] The political aspect of the pipeline is that Russia will protect its dominant share in the European market and it will undermine the diversification efforts of the EU. Besides, Russia will remain the greatest gas supplier of gas to Turkey in addition to the EU.

3.3.2.5. Iraq-Turkey Pipeline

Turkey has been working on transmitting Iraqi gas to Turkey. Even though negotiations were made between the Kurdish Regional Government (KRG), Iraqi government and Turkey, no agreement was reached. The pipeline is designed to carry 10 bcm to 20 bcm of natural gas per year.[269] Besides the stalemate in negotiations, terrorism, conflict, and instability in Iraq pose major obstacles to the construction of the pipeline. One of the aims of Turkey is to build a new pipeline between Iraq and Turkey and to connect that pipeline to TANAP.[270] However, the project has come to standstill although Iraq has the potential to supply gas to Turkey.

3.3.2.6. Arab Gas Pipeline

The project is one of the significant natural gas projects that includes five countries. The pipeline designed to carry Egyptian gas to Jordan, Syria, Lebanon, and Turkey. It was

[268] "Country Analysis Brief: Turkey.", 13
[269] "Country Analysis Brief: Turkey.", 13
[270] Yorucu, Vedat, and Ozay Mehmet. “The Southern Energy Corridor: Turkey's Role in European Energy Security.” 2018: 66-67. Springer.

designed to carry around 10 bcm of gas per year.[271] The first phase was completed in 2003 between Egypt and Jordan. The pipeline starts in Arish in Egypt to Aqaba in Jordan. The second phase completed in 2007 and it was the extension of the first phase. The pipeline was extended to Aqaba port to El Rehab in Jordan. The third phase completed in 2008 and the pipeline was extended to El Rehab in Jordan to the Jordan-Syria borders. The fourth phase completed in 2008 and the pipeline again extended to Jordan-Syria borders to Homs. In 2009, another extension was built between Syria and Lebanon.[272] Even though it was planned to extend the pipeline to Turkey and then to Europe, the outbreak of Arab Uprisings in 2010 and the Syrian civil war in 2011 prevented the construction of the pipeline.[273] Besides, conflicts and sabotages in Egypt decreased Egyptian exports. If the pipeline were extended to Turkey, Turkey would have received 10 bcm of gas per year. No further work on the pipeline extension has been made since 2009.[274]

3.4. The Role of Turkey in Energy Security of the European Union

Turkey, considering its geographical location, is at the center of energy trade of multiple regions namely the Middle-East, Mediterranean, Caucasus, and Europe. Standing at the intersection between energy producing countries and energy consuming countries raises the question of whether Turkey can contribute to the energy security of the European Union. In the Eurasia nexus, Turkey can be potentially an energy transit state or an energy hub. Each of these concepts attributes a different meaning to Turkey's role in the field of energy.

[271] "Strategic Pipelines: Arab Gas Pipeline" Arab Republic of Egypt Ministry of Petroleum. 2010. Accessed March 09, 2018. Retrieved from http://www.petroleum.gov.eg/en/ProjectsandActivities/StrategicProjects/Pages/GasPipeline.aspx
[272] "Strategic Pipelines: Arab Gas Pipeline", 2010
[273] "Strategic Pipelines: Arab Gas Pipeline", 2010
[274] "Country Analysis Brief: Turkey.", 12

> ***An energy transit state*** refers to a state where the energy pipelines are laid to connect an energy-producing state with an energy-consuming state. Agreements are made between the energy producer and the transit state by which the latter collects transit revenues for allowing hydrocarbons to be transported across its territory.[275]

By being an energy transit state, Turkey's role would be limited since the country just receive transit fees from exporter countries, and it would not be able to re-export energy sources that pass from its territories.

> ***An energy hub*** is a country that buys energy in its borders and then re-exports them to other purchasers. In doing so, it sets the selling conditions (theoretically) independently from the original producers and final buyers. An energy hub requires a more sophisticated physical and virtual environment for the producers and consumers to meet and interact using the facilities provided by the host country. It is also essential to have a well-developed financial and legal environment for the trade to take place in a safe and secure environment.[276]

By becoming an energy hub, Turkey would be able to define the terms and conditions of transfer of energy as well as able to re-export energy sources. Becoming an energy hub requires not only sufficient storage capacity for energy in the host country, but it also requires a sophisticated environment in which buyers and sellers get together, so that Turkey would facilitate trade between energy producing and consuming countries. It is stated in the Strategic Plan of the Ministry of Energy and Natural Resources (MENR) that Turkey has the vision to become an energy hub in its region. As an energy hub, Turkey would get both economic and political benefits. Compared to becoming an energy transit country, Turkey would earn more money by becoming an energy hub since it would be able to define independent selling conditions for energy. Besides, Turkey's political bargaining would increase as an energy hub since it would facilitate trade between energy producing and consuming countries and it would be able to set its terms and conditions in energy trade.

[275] Altundeger, Nurettin. "A Dream Coming True? Turkey Becoming an Energy Hub." 2015: 3. West East Institute.
[276] Altundeger, 3

A hub can be a physical or virtual. The physical hub is a physical intersection of the pipelines and gas is traded according to point to point basis and only agreed the amount of gas is traded. On the contrary, the virtual hub serves as a trading platform for multiple participants and gas is traded regardless of point of extraction and different quantities can be traded.[277] Therefore, physical hubs are implemented in the specific locations while virtual hubs are implemented in trans-regional zones. Besides, gas trade is more flexible in virtual hubs.[278] In Turkey's case, the country is more suitable for being a virtual hub than a physical hub.

Even though Turkey aspires to evolve into a physical energy hub, the European Union's perception is quite different. After the two Ukrainian crises in which the EU witnessed gas disruptions, the Southern Gas Corridor (SGC) was developed by the EU. In this project, the EU perceived Turkey as an energy transit country rather than a hub.[279]

SGC is designed to improve the energy infrastructure of Southeast European countries by bringing gas from the Caucasus, Middle-East and Mediterranean regions.[280] The main aims of SGC are to break the European dependency on Russia with the diversification of gas routes and to secure the European energy supply. The gas corridor will start its operations until 2020. In the beginning, around 10 bcm of gas per year will be flown to Europe via Turkey with TANAP. In the future, the EU aims to increase the capacity to 80-100 bcm of gas per year.[281] SCG has the potential to supply 20% of Europe's gas needs.[282] For this reason, SGC is at the heart of energy security of the Community. In SCG, the emphasis was put on Turkey's role as a transit country. Other than the EU's vision of Turkey as a transit country, four obstacles prevent Turkey from becoming an energy hub. These obstacles are the price of natural gas, "take or pay" clauses, gas storage capacity and availability of gas.

[277] "Southeast Europe Energy Outlook 2016/17". 2017:914. Institute of Energy for SE Europe.
[278] "Southeast Europe Energy Outlook 2016/17", 914
[279] "EU and Turkey Strengthen Energy Ties" European Commission. 2016. Accessed March 09, 2018. Retrieved from https://ec.europa.eu/energy/en/news/eu-and-turkey-strengthen-energy-ties
[280] "Gas and Oil Supply Routes". European Commission. 2017. Accessed March 09, 2018. Retrieved from https://ec.europa.eu/energy/en/topics/imports-and-secure-supplies/gas-and-oil-supply-routes
[281] "Gas and Oil Supply Routes", 2017
[282] "EU and Turkey Strengthen Energy Ties", 2016

3.5. The Obstacles for Turkey to Become a Physical Energy Hub

The main natural gas exporters to Turkey are Russia, Iran, and Azerbaijan. Turkey's lack of bargaining power caused gas contracts to be in favor of energy exporter countries. Consequently, Turkey has paid higher prices compared to European countries and it is not allowed to re-export gas due to the restriction of gas sales in the "take or pay" clause in the contracts. Therefore, one of the fundamental obstacles for Turkey to become an energy hub is the non-flexible conditions in the gas contracts. Price and "take or pay" clause in the contracts inhibit Turkey to become an energy hub. Other than contractual terms, another critical obstacle for Turkey is its low gas storage capacity. Moreover, the most important obstacle for Turkey is the inability of neighboring countries to supply significant volumes of gas to Turkey.

3.5.1. Price of Natural Gas

Natural gas import price is a determinant factor for Turkey to export gas to other countries in the region. Lower gas prices increase the possibility of Turkey becoming an energy hub since Turkey would make a profit by re-exporting the gas.

Turkey's lack of bargaining power caused natural gas prices to remain high to Turkey. Although Russia made around 10% discount for the gas price in 2015, the price of gas is still high.[283] Figure 13 shows the natural gas price for Turkey. In the 3rd quarter of 2017, Turkey paid around 210$ million cubic meters (mcm) to Russian gas. Compared to the same quarter of the previous year, natural gas prices rose significantly. Since those gas prices are indexed to oil prices, rising gas prices can be attributed to "the rise in oil prices

[283] Rzayeva, Gulmira. 2018: 9. "Gas Supply Changes in Turkey." The Oxford Institute for Energy Studies. Retrieved from https://www.oxfordenergy.org/wpcms/wp-content/uploads/2018/01/Gas-Supply-Changes-in-Turkey-Insight-24.pdf

caused by lower stock levels, a stronger demand outlook and continued OPEC and non-OPEC production cuts."[284]

In February 2016, the oil price was $34 per barrel. At the end of 2017, oil price rose to around $60 per barrel.[285] Therefore, Turkey's energy bills increased. In 2016, the country paid around $27 billion for energy imports while it paid around $37 billion in 2017.[286] Another reason for the increase in energy bills is that the increase in gas consumption in the country. On top of that, Gazprom wants to increase its revenues to fill the gap between its revenues and expenditures, so Russia increased gas prices to Turkey.[287]

In 2016, Turkey made complaints to the International Court of Arbitration (ICA) by claiming that Iran charged higher prices for its gas compared to other gas producers in the region between 2012 and 2016. The court ruled in favor of Turkey. The decision directed Iran to either pay $1.9 billion to Turkey or to make a 10-15% discount on future gas prices.[288] Iranians chose to make a discount on the gas prices. As a result, gas prices for Turkey decreased in 2016. However, in 2017, the gas prices rose again. As shown in Figure 13, in the 3rd quarter of 2017, Turkey paid above 200$/mcm for Iranian gas. The increase in gas prices stems from fluctuations in gas demand and changing oil prices.

Thanks to ethnic, cultural and historical ties between Turkey and Azerbaijan, Azerbaijan is the only gas exporter country which charges lower prices and does not have price conflicts with Turkey[289] In the first quarter of 2016, Azeri gas was cheaper compared to Russian and Iranian gas. However, the gas prices of Azerbaijan rose in line with an increase in oil prices, to which gas prices are linked.[290] In the 3rd quarter of 2017, Turkey paid slightly above 200$/mcm, which is similar to the price paid to Iranian gas.

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[284] Rzayeva, 8
[285] "Crude Oil Prices." Investing.com. Accessed May 13, 2018. Retrieved from https://www.investing.com/commodities/crude-oil
[286] Şengül, Ebru. "Turkey's Energy Import Bill Up by 37% in 2017." Anadolu Ajansı. February 1, 2018. Accessed May 25, 2018. Retrieved from https://www.aa.com.tr/en/energy/finance/turkeys-energy-import-bill-up-by-37-in-2017/18644
[287] Austvik, Ole Gunnar, and Gulmira Rzayeva. "Turkey in the Geopolitics of Natural Gas." September 2016: 9. Accessed June 17, 2018. Retrieved from https://www.hks.harvard.edu/sites/default/files/centers/mrcbg/files/66_final.pdf
[288] "Iran Clears 40% of Gas Fine to Turkey." Financial Tribune. June 13, 2017. Accessed March 09, 2018. https://financialtribune.com/articles/energy-economy/66369/iran-clears-40-of-gas-fine-to-turkey
[289] Austvik, 9
[290] Rzayeva, 9

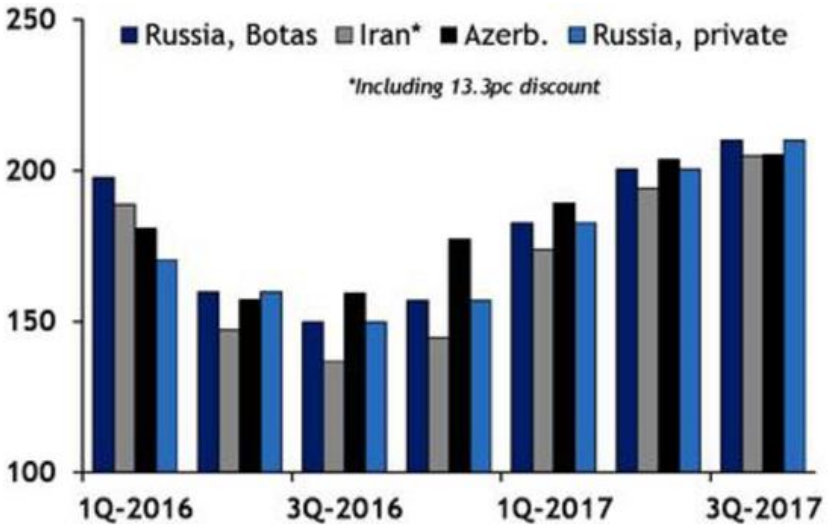

Figure 13: Natural Gas Price for Turkey[291]

Thus overall, gas exporting countries charged higher prices to Turkey. Turkey paid over 200$/mcm for Russian, Iranian and Azeri gas. At the same time, in the first quarter of 2016, Russia charged 180$/mcm on average to its European customers.[292] This means that Turkey spent a greater amount of money for the imported natural gas compared to European countries. Becoming an energy hub would provide an opportunity for re-exportation of the gas. However, in the current context, Turkey has paid more than Europeans, so it is not possible for Turkey to re-export gas. Therefore, it is not possible for Turkey to become a competitive hub. For this reason, Turkey needs to be able to attract lower-priced natural gas. Because of its close geographical proximity to energy producing countries compared to European states, Turkey is theoretically capable of accessing cheaper natural gas by using its bargaining power.

3.5.2. "Take or Pay" Clause

Take or pay clauses are generally included in long-term natural gas contracts. With this clause, the customer either pays the price of natural gas agreed upon between buyer and

[291] Rzayeva, 10
[292] Bochkarev, Danila. "The Depoliticization of the European Gas Market." EnergyPost. January 24, 2017. Accessed March 09, 2018. http://energypost.eu/depoliticization-european-gas-market/

seller regardless of whether it is delivered or not or takes agreed upon quantities of natural gas.[293] The reason for this is because once natural gas is extracted, the seller country needs to ensure that buyers will take the extracted amount. Otherwise, natural gas is wasted.

Turkey is subject to several "Take or Pay" clauses. In the Trans- Balkan Pipeline, Turkey needs to take at least 80% of an agreed amount of gas with a make-up period for five years. In the Blue Stream, the country needs to take at least 80% of gas, and there are 25 years for the make-up period which is more beneficial for Turkey. In the South Caucasus pipeline, Turkey needs to take at least 75% of an agreed amount of gas with a make-up period for four years. In the Tabriz- Dogubayazıt pipeline, Turkey needs to take at least 80% of an agreed amount of gas with a make-up period for five years.[294] Make-up periods are an integral part of "take or pay" clauses that enable buyers to make-up gas that has paid but not taken. Long make-up periods give flexibility to the gas importing countries.

The problem with "take or pay" clauses is that generally, these agreements are combined with restriction of resales of the gas. As a result, importer country cannot re-export gas to other countries.[295] Natural gas consumption peaks in winter and it is minimum in summer. This is called seasonal demand fluctuations.[296] In this situation, since Turkey lacks sufficient gas storage capacity, it has difficulties in balancing high gas supply with low demand in summer and the country is not able to re-export gas because of the restrictions in the gas contract. Therefore, the country paid the price of the agreed upon amount of natural gas without delivery. Besides, shorter make-up periods raise difficulties for Turkey to receive gas that is paid for gas exporting countries. Being an energy hub requires the right of re-exportation of gas with no "take or pay" clause. This means that Turkey needs flexibility in the long-term gas contracts.

[293] Moussas, Nicholaos D. "Take or Pay Clauses in Gas Supply Agreements." Moussas & Partners. June 06, 2016. Accessed March 09, 2018. http://www.moussaspartners.gr/take-or-pay-clauses-in-gas-supply-agreements/
[294] Rzayeva, 9
[295] Talus, Kim. Long-term natural gas contracts and antitrust law in the European Union and the United States. Journal of World Energy Law and Business, 2011, 4.3: 275-276.
[296] Rzayeva, 9

3.5.3. Natural Gas Storage Capacity

Natural gas storage is essential to balance seasonal demand fluctuations. Besides, gas storages increase the energy security of the countries since countries can use the deposited gas in the case of gas disruptions. In the Strategic Plan, it is stated that Turkey aims to increase natural gas storage capacity to a level in which 10% of annual gas consumption can be supplied from these capacities.[297] Currently, as seen in Table 11, Turkey has four operational natural gas storages in which two of them are Liquefied Natural Gas (LNG) storages. The natural gas capacity of Turkey is 3.84 bcm and LNG capacity is 0.32 bcm. The total natural gas capacity of Turkey is 4.16 bcm. Considering that Turkey consumed 46.3 bcm in 2016, the total natural gas capacity accounts for around 8% of its natural gas consumption.

The storage capacities of some European countries in 2016 were Germany (23,9 bcm), Italy (17,2 bcm), the Netherlands (14,3 bcm), France (11,7 bcm) and Austria (8,4 bcm).[298] In the same year, the total gas storage capacity of the EU is around 120 bcm which accounts for around 22% of total gas demand.[299] It is evident that Turkey's gas storage capacity is low compared to European countries. Turkey needs more capacity than its current target of 10%. Capacity building in natural gas is necessary to become an energy hub, to deal with seasonal demand fluctuations and to strengthen energy security of the country. Turkey has been working on increasing its storage capacity, and it is likely for Turkey to reach its aim of building 10% capacity in the near future. With the completion of the Tuz Gölü project, total underground storage capacity will increase to 9.24 bcm. The MENR also plans to build new gas storages in different places in Turkey in the future.[300] Until the completion of these infrastructures, it is hard for Turkey to become an energy hub.

[297] Strategic Plan 2015-2019", 25
[298] Cornot-Gandolphe, Sylvie. "Underground Gas Storage in the World – 2017 Status" Cedigaz Insights. July 2017:7. Accessed June 19, 2018. Retrieved from http://www.cedigaz.org/documents/2017/Overview%20of%20underground%20gas%20storage%20in%20the%20world%202017%20v1.pdf
[299] "Gas Storage Map." Gas Infrastructure Europe. December 2016. Accessed April 23, 2018. Retrieved from https://www.gie.eu/index.php/maps-data/gse-storage-map
[300] "Energy Policies of IEA Countries: Turkey 2016 Review.", 114

COMPANY	TYPE	LOCATION	CAPACITY (BCM)	STATUS
BOTAŞ	LNG	Marmara Ereğlisi/Tekirdağ	0.15	Operational
EgeGaz A.Ş.	LNG	Aliağa/İzmir	0.17	Operational
BOTAŞ	Under Ground Storage	Sultanhanı/İstanbul	1,00	Operational
TPAO	Under Ground Storage	Silivri/İstanbul	2,84 (4,60)	Operational (Expansion by 2020)
BOTAŞ	Under Ground Storage	Tuz Gölü/Ankara	5,40	Under Construction 2023

Table 11: Natural Gas Storage Capacity of Turkey[301]

3.5.4. Availability of Gas

Turkey has geographical proximity to the biggest proven gas reserves. However, as noted in Chapter 2, except Azerbaijan, the Caspian, the Mediterranean, and the Middle-Eastern countries cannot supply gas to Turkey and Europe in the short-run via pipelines either because of internal or external factors. Availability of gas is a prerequisite to becoming a physical energy hub. In the concept of physical energy hub, natural gas from different countries are gathered in the hub country through pipelines and the country which is a hub re-exports the gas that was imported from different countries. Since there are no significant additional volumes of gas coming from the immediate neighborhood of Turkey, it is hard for Turkey to become a physical energy hub. With the realization of the new gas projects, import capacity of Turkey will rise to around 100 bcm of gas. However, the country will only transfer 16 bcm of Russian gas and 10 bcm of Azeri gas to Europe. In fact, as noted above, Turkey has low or no shares in the new pipelines that are under construction in its territory (TANAP and Turkish Stream). Consequently, distant from being a physical energy hub, Turkey will have even limited capabilities as a transit country with respect to affecting the energy trade in its region.

[301] "Country Analysis Brief: Turkey.", 10-11

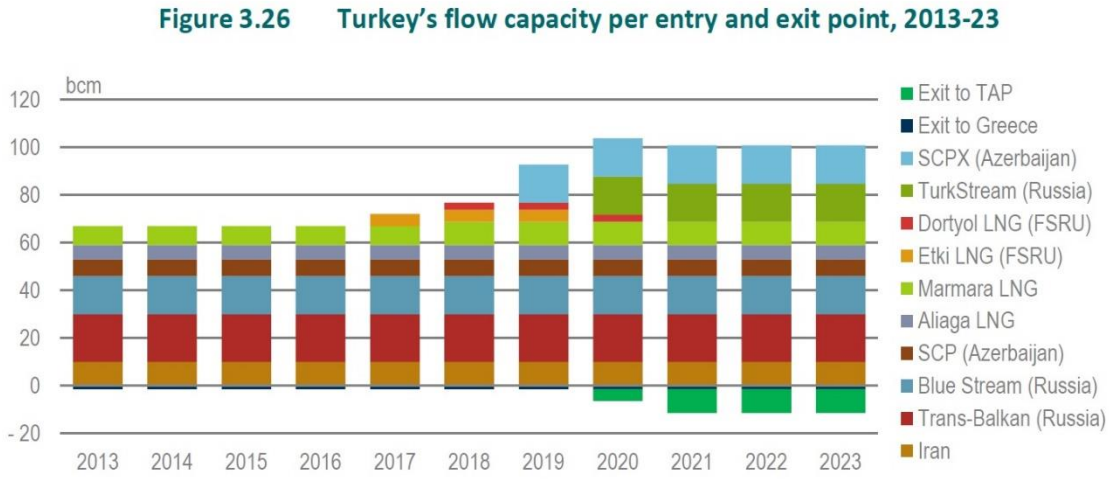

Figure 14: Turkey's Flow Capacity (2013-2023)[302]

Conclusion

Turkey has essential and long-lasting relations with the EU. Standing at the intersection between energy producer and consumer countries raises the possibility of whether Turkey can contribute to the energy security of the EU. At this point, it is essential to know about Turkey's energy structure, energy policy, pipelines that pass from its territory and the planned pipeline projects in order to understand whether it can contribute to the energy security of the EU or not. Turkey is dependent on imports of fossil fuels over 90%. A high dependency on foreign countries in the energy sector creates vulnerability to external pressures. This can be decreased with a well-planned and feasible energy policy.

The energy policy of Turkey prioritizes to energy security, diversification of energy resources and changing the energy mix of Turkey with decreasing the share of natural gas. Currently, Turkey has four pipelines, and there are four pipelines are still building. These pipelines will enable Turkey to play an active role in its region.

In the Eurasia nexus, Turkey can be an energy transit or an energy hub. By becoming an energy transit state, Turkey would receive transit fees from energy-exporting countries. This means that energy importing and exporting countries would agree with each other.

[302] "Gas Market Report Series 2018." 2018:135. International Energy Agency.

By becoming an energy hub, Turkey would be able to define the terms and conditions for the transfer of energy. However, it needs to provide sufficient gas storage capacity and sophisticated environment that buyers and sellers can meet, so that energy trade would be facilitated between energy producing and consuming countries.

Becoming a physical energy hub is essential for Turkey because it would have both economic and political benefits to Turkey. It has economic benefits since Turkey would set the price and terms of carrying energy to the European Union. It has political benefits since the political bargaining power of Turkey would increase. This stems from the fact that the country would facilitate trade between energy producing and consuming countries and it would be able to set its selling terms and conditions of energy.

This chapter argues that in order for Turkey to become a physical energy hub, it needs to meet with four critical challenges. These are the price of the gas in the long-term gas agreements, "take or pay" clauses, low natural gas storage capacity and availability of gas. If Turkey is able to tackle these issues successfully, the probability of Turkey to become a central energy hub in the near future will increase. Other than tackling these issues, Turkey needs to provide sophisticated physical and virtual environment as well as well-developed financial and legal environment if it wants to become an energy hub. The virtual hub is more practical for Turkey to facilitate trade between the energy producing and consuming countries. However, Turkey has a desire to evolve into a physical energy hub than a virtual hub. As long as the above-mentioned obstacles remain, Turkey cannot go further than being an energy transit country. As a transit country, it will also have limited capabilities since it has low or no shares in the new pipelines that transport Azeri and Russian gas to Europe.

In the next chapter, the diversification efforts of the European Union will be analyzed. Even though Turkey is away from being a physical energy hub, it can still contribute to the diversification efforts of the Union as an energy transit country.

CHAPTER 4: ENERGY SECURITY OF THE EUROPEAN UNION WITH THE DIVERSIFICATION OF SUPPLY SOURCES AND ROUTES

Introduction

Natural gas is the second most demanded commodity for the European Union after crude oil. The future projections of the International Energy Agency (IEA) demonstrate that the world will use more natural gas than before. Both production and consumption are expected to increase in the coming decades. In the European context, IEA predicts that natural gas demand of the EU will fall around 2% while natural gas production will fall around 40% until 2040.[303] The decline in consumption can be attributed to an increase in efficiency and renewable energy as a result of 2020, 2030 and 2050 Strategies of the Union. The decline in production can be attributed to lack of natural resources. In this situation, the EU will import more natural gas to fill the gap between production and consumption.

Russia is the biggest natural gas supplier to the EU with the share of 43% in 2017. IEA foresees that gas production and exports of Russia will increase up to 2040. Increase in export capacity means that Russia will continue to supply a vast amount of gas to Europe.[304] After two Ukrainian crises, the EU started to reconsider its dependency on Russia, and it has aimed to diversify its suppliers and sources to ensure the security of

[303] "World Energy Outlook.", 339
[304] "World Energy Outlook.", 361

energy supply. Liquefied Natural Gas (LNG) is one of the sources that can lower the gas import dependency of the Community on Russia and it can contribute to the energy security of the EU. Even though the EU had import capacity of 210 bcm, it imported only 43 bcm of gas as LNG in 2017.[305] This is because Russia lowered its gas prices to compete with LNG from other sources, thus keeping its market share.

Besides LNG, shale gas also has the potential to increase the security of supply of the Union. With the shale revolution, the export capacity of the U.S. is growing significantly. This has increased competition among the exporter countries. The price of U.S. gas will be decisive for the European customers. When all costs are added, it is predicted by IEA that Russian pipeline gas will be cheaper compared to the U.S. shale gas in 2025.[306] Consequently, it can be said that Russia will keep its share in the European market at around 40% in the future.

Another source that can contribute to the energy security of the Union is renewable energy. Currently, the share of renewables is around 17%, and the share will increase by carrying out 2020, 2030 and 2050 Strategies. In 2016, 11 out of 28-member states reached the target of increasing the share of renewables by 20%.[307] Since increasing the share of renewables is a long-term target, the transformation of the energy mix of the European countries will take time.

Even though Russia will continue to supply tremendous volumes of gas to Europe in the future, developments in LNG, renewables and shale gas compel Russia to lower its gas prices. Before these developments, Russia applied higher prices to European countries. The EU and Russia have interdependence in the field of energy. The EU needs Russian gas to maintain its domestic consumption, and Russia needs revenues to feed its economy.[308] Although the EU started to reconsider its dependency on Russian gas after the two Ukrainian crises, the construction of Nord Stream 2 and Turkish Stream pipelines demonstrates that the share of Russian gas in the EU market will remain at the same levels.

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[305] "LNG Investment Database." Gas Infrastructure Europe. January 2018. Accessed April 23, 2018. Retrieved from https://www.gie.eu/index.php/maps-data/lng-investment-database

[306] "World Energy Outlook.", 381

[307] "Renewable Energy Statistics." Eurostat. February 2, 2018. Accessed April 23, 2018. Retrieved from http://ec.europa.eu/eurostat/statistics-explained/index.php/Renewable_energy_statistics

[308] Yermakov Vitaly and Kirova Daria. "Gas and Taxes: The Impact of Russia's Tinkering with Upstream Gas Taxes on State Revenues and Decline Rates of Legacy Gas Fields." October 2017: 5. Accessed April 23, 2018. Retrieved from https://www.oxfordenergy.org/wpcms/wp-content/uploads/2017/10/Gas-and-Taxes-The-Impact-of-Russias-Tinkering-with-Upstream-Gas-Taxes-on-State-Revenues-and-Decline-Rates-of-Legacy-Gas-Fields-Insight-20.pdf

These two pipelines consolidate Russian domination in the EU market and create fragmentation inside the Union. The construction of Nord Stream 2 is a clear indication of how national interests dominate the decisions of member states. Southeast European and Baltic countries are against the pipeline because they believe that the pipeline jeopardizes the energy security of the Union while Germany is in favor of the construction of Nord Stream 2 because it believes that Germany needs gas for its domestic consumption and Russian gas can decrease gas prices in Germany.[309] To bypass Ukraine, Russia developed the Turkish Stream to bring its gas to Europe while Southeast European countries are concerned about the pipeline and their continuing dependency on Russian gas.[310]

As noted before, Western European countries consume greater gas volumes compared to Southeast European countries. Therefore, 10 bcm of Azeri gas is not a significant volume for Western European countries considering their gas demand while the same volume of gas makes a serious difference in Southeast Europe.

Considering that five Southeast European countries (Greece, Bulgaria, Hungary, Slovakia, and Slovenia) imported 21,1 bcm of gas, consumed 22,6 bcm and Russian supplied 15,8 bcm to these countries in 2016, Russian share in these countries' gas imports were more than 70%. Therefore, if Azerbaijan will increase its gas production and it will supply more gas to Europe, there is a chance that the country will supply its gas to Southeast European market, so that the energy security of these countries will be consolidated.

4.1. Future Natural Gas Projections

[309] Russell, Martin. "Gazprom's Controversial Nord Stream 2 Pipeline." European Parliamentary Research Service. European Parliament. July 2017: 1-2. Accessed April 23, 2018. Retrieved from http://www.europarl.europa.eu/RegData/etudes/ATAG/2017/608629/EPRS_ATA(2017)608629_EN.pdf
[310] Pourzıtakıs, Stratos. "The Energy Security Dilemma of Turkish Stream." Carnegie Europe. July 28, 2015. Accessed April 23, 2018. Retrieved from http://carnegieeurope.eu/strategiceurope/60861?lang=en

Natural gas is one of the essential energy resources for the Union. Future projections in natural gas are essential to predict and future trends in the natural gas markets. The New Policies Scenario includes both current energy policies of countries and the evaluation of possible outcomes from the implementation of announced new policies.[311] It is developed by International Energy Agency (IEA), and it provides a realistic scenario for the future gas trends.

Table 8.1 ▷ Natural gas demand by region in the New Policies Scenario (bcm)

							2016-40	
	2000	2016	2025	2030	2035	2040	Change	CAAGR*
North America	800	961	1 045	1 068	1 109	1 143	182	0.7%
United States	669	779	834	846	867	880	101	0.5%
Central & South America	97	166	183	205	237	271	106	2.1%
Brazil	9	36	38	43	55	64	28	2.4%
Europe	606	590	604	618	633	631	41	0.3%
European Union	487	463	461	467	469	454	- 8	-0.1%
Africa	57	134	177	211	251	306	171	3.5%
South Africa	1	4	5	7	8	10	6	3.8%
Middle East	174	477	568	657	737	795	318	2.2%
Eurasia	471	575	583	593	615	636	61	0.4%
Russia	388	456	452	456	463	470	13	0.1%
Asia Pacific	314	732	998	1 167	1 331	1 472	740	3.0%
China	28	210	397	482	554	610	401	4.6%
India	28	55	97	126	155	183	128	5.2%
Japan	82	123	95	100	106	107	- 16	-0.6%
Southeast Asia	88	170	195	216	244	269	99	1.9%
Bunkers**	0	0	16	26	37	51	51	n.a.
World	2 518	3 635	4 174	4 545	4 950	5 304	1 669	1.6%

* Compound average annual growth rate. ** LNG used as an international marine fuel.

Table 12: Natural Gas Demand by Region in the New Policies Scenario (Bcm)[312]

It can be inferred from Table 12 that natural gas demand will rise throughout the world in 2040 compared to 2016 levels. One of the reasons for the rise in gas demand stems from the fact that natural gas is the cleanest type of fossil fuel, so it burns cleanly and efficiently. Besides, natural gas prices are competitive. Moreover, those European countries which have closed their nuclear power plants began relying more on natural gas and renewables. Therefore, their demand for gas increased. Even though natural gas can be substituted by renewable energy, renewables require backup plant for power production.[313] In this case, natural gas can be used to back up renewables. For this reason, natural gas will not lose its importance, and it will be used in the future.

[311] "World Energy Outlook.", 35
[312] "World Energy Outlook.", 339
[313] Royal, Todd. "What Is Holding Back Renewable Energy?" EnergyPost. January 18, 2017. Accessed April 23, 2018. Retrieved from http://energypost.eu/holding-renewable-energy-back/

The table shows that the EU consumed 463 bcm of gas in 2016. In 2040, the demand of the Union is expected to fall to 454 bcm. The fall of the European demand can be attributed to 2020, 2030 and 2050 Strategies and the EU's aim of increasing energy efficiency. By increasing efficiency, the Union plans to decrease its energy imports.

Table 8.3 ▷ **Natural gas production by region in the New Policies Scenario** (bcm)

	2000	2016	2025	2030	2035	2040	2016-40 Change	2016-40 CAAGR*
North America	763	960	1 166	1 212	1 282	1 338	379	1.4%
Canada	182	174	159	165	190	222	49	1.0%
Mexico	37	37	35	38	48	58	21	1.9%
United States	544	749	971	1 009	1 043	1 058	309	1.4%
Central & South America	102	175	178	207	242	279	104	2.0%
Argentina	41	42	53	70	90	104	62	3.9%
Brazil	7	24	28	43	60	77	53	5.0%
Europe	337	285	244	238	236	236	- 49	-0.8%
European Union	264	134	91	85	80	76	- 58	-2.3%
Norway	53	121	105	101	99	100	- 22	-0.8%
Africa	124	205	273	330	392	460	254	3.4%
Algeria	82	92	97	102	107	113	21	0.8%
Mozambique	0	5	13	32	49	64	59	11.6%
Nigeria	12	41	46	45	56	70	29	2.2%
Middle East	198	585	703	832	931	1 003	418	2.3%
Iran	59	190	243	301	332	338	149	2.4%
Qatar	25	165	182	214	240	256	91	1.8%
Saudi Arabia	38	90	107	120	131	142	52	1.9%
Eurasia	691	842	935	978	1 035	1 095	252	1.1%
Azerbaijan	6	19	37	44	51	55	36	4.6%
Russia	573	644	718	730	752	788	144	0.8%
Turkmenistan	47	80	86	102	124	141	61	2.4%
Asia Pacific	290	568	675	749	832	894	326	1.9%
Australia	33	88	149	162	188	195	107	3.4%
China	27	137	222	261	298	336	199	3.8%
India	28	31	42	59	72	84	53	4.3%
Indonesia	70	77	70	73	80	90	13	0.6%
Rest of Southeast Asia	89	146	128	131	131	127	- 19	-0.6%
World	2 506	3 621	4 174	4 545	4 950	5 304	1 683	1.6%
Unconventional	196	780	1 180	1 320	1 486	1 654	874	3.2%

* Compound average annual growth rate.

Table 13: Natural Gas Production by Region in the New Policies Scenario (Bcm)[314]

Table 13 shows the natural gas production by regions. It can be understood from the table that global natural gas production will rise by around 40% from 2016 to 2040. The gas production of the EU will decline significantly until 2040. In the given time interval, production of the EU will show a declining trend, and it is expected to fall around 43%. This is because Europe is not an energy-rich continent.

Compared to the expected fall in gas demand in the EU which is around 2%, the production will fall much more significantly up to 2040. Gas production in Norway, which is the second biggest gas supplier to the EU, has been decreasing. On the contrary, gas production in other regions such as North America, the Middle East, Eurasia especially Russia, are expected to rise significantly.

[314] "World Energy Outlook.", 346

Table 8.4 ▷ Natural gas trade by region in the New Policies Scenario

Net importing regions in 2040	Net imports (bcm)			As a share of demand		
	2016	2025	2040	2016	2025	2040
European Union	-329	-374	-389	71%	80%	84%
China	-73	-177	-278	35%	44%	45%
Other Asia Pacific	52	-47	-178	17%	16%	40%
Japan and Korea	-165	-150	-181	98%	98%	99%
India	-24	-55	-99	43%	57%	54%
Other Europe	24	9	-18	16%	6%	10%
Net exporting regions in 2040	**Net exports (bcm)**			**As a share of production**		
	2016	2025	2040	2016	2025	2040
Russia	188	265	314	29%	37%	40%
North America	-1	119	192	0%	10%	14%
Middle East	108	134	201	18%	19%	20%
Caspian	80	87	140	40%	40%	46%
Australia	45	100	137	49%	64%	68%
Sub-Saharan Africa	29	48	106	48%	54%	50%
North Africa	42	49	47	29%	26%	19%
Central & South America	10	-6	5	6%	3%	2%

Notes: Positive numbers denote net exports and negative numbers denote net imports. Import and export totals should sum to zero; the difference in 2016 is due to stock changes.

Table 14: Natural Gas Trade by Region in the New Policies Scenario[315]

In 2016, the European Union was the biggest importer of natural gas in the world by importing 329 bcm of gas while Russia was the biggest exporter by exporting 188 bcm of gas. From 2016 to 2040, the imports of the EU are expected to increase based on the New Policies Scenario. In 2016, the share of natural gas imports was 71%. The share is anticipated to increase to 80% in 2025 and then to 84% in 2040 because there will be a sharp decline in gas production in the EU while demand will fall to minimal amounts. Increase in import share means becoming more and more dependent on foreign countries. Therefore, the issue of the energy security will become more significant given the Community's rising gas import dependency. Since Russian exports will grow from 2016 to 2040, the country will able to supply significant volumes of gas to the European countries.

[315] "World Energy Outlook.", 361

4.2. LNG

Up to 2040, the EU will need more and more gas for its domestic consumption and Russia will produce more and more amounts of gas for export. Therefore, it can be said that Russia aims to remain as the leading supplier to Europe in the future. In 2017, the EU imported 360 bcm of gas mainly from Russia (43%), Norway (34%), Algeria+ Libya (11%) and the remaining gas (12%) was imported in the form of LNG.[316] As stated in the previous chapters, after the two Ukrainian crises, the European Union has shifted its attention to the security of supply and diversification processes. To decrease the share of Russian gas and to increase competition, the EU has increased its LNG imports.

LNG has several benefits, and the share of the LNG is growing in the world markets. LNG is flexible compared to pipelines because it can be shipped to any part of the world. This means that it can play an essential role in the diversification efforts of countries and it provides energy security for countries since it eliminates pipeline dependencies. In 2012, around 340 LNG ships were in operation. Four years later the number of vessels increased to 460. The total capacity of the vessels were around 70 million cubic meters. Until 2025, more than 120 vessels are expected to be delivered.[317] Therefore, the share of LNG trade will grow throughout the world and in Europe in the coming decades, so LNG has transformed the gas industry. The costs of transportation and storage of LNG have decreased, so LNG becomes competitive against pipeline transportation.[318] Besides, LNG prices decreased thanks to an increase in global supply and fall in oil prices.[319]

In the EU in 2016, 65% of the gas is traded according to gas-to-gas competition, mostly in Western Europe, while 35% of the gas traded based on oil-indexation, mostly in Southern Europe. In the world LNG trade, oil indexation is the dominant pricing method.

[316] "Quarterly Report on European Gas Markets." Market Observatory for Energy, 4th ser., 10, no. 4 (2018). Accessed April 8, 2018. Retrieved from https://ec.europa.eu/energy/sites/ener/files/documents/quarterly_report_on_european_gas_markets_q4_2017_final_20180323.pdf
[317] "World Energy Outlook.", 364-365
[318] "Significance and Advantages of LNG." Polskie LNG. 2016. Accessed April 23, 2018. Retrieved from http://en.polskielng.pl/lng/significance-and-advantages-of-lng/
[319] "Quarterly Report on European Gas Markets.", 2018

Up to 2040, it is foreseen by IEA that both in pipeline and LNG trades, gas-to-gas competition will prevail.[320]

Oil indexation is used in gas trades to predict revenues and to make investments in gas projects by energy producing countries. However, the gas industry has been evolving.[321] Therefore, in the competitive gas markets, gas needs to compete with gas in various sources rather than being subject to oil prices in order to react properly to changes in gas supply and demand. In fact, the European gas market is moving away from oil indexation method to gas-to-gas competition method.

In 2017, the EU imported around 43 bcm of gas in the form of LNG. LNG carried to Europe mainly from Qatar (41%), Nigeria (19%), Algeria (17%), Peru (7%), Norway (7%), the U.S. (4%), and Trinidad and Tobago (3%). Compared to previous years, LNG imports of the Union has been increasing.[322] Up to 2040, IEA predicts that the Union will import around 80 bcm of gas as LNG. Therefore, the share of LNG in the European market will rise from 12% to around 20%.[323]

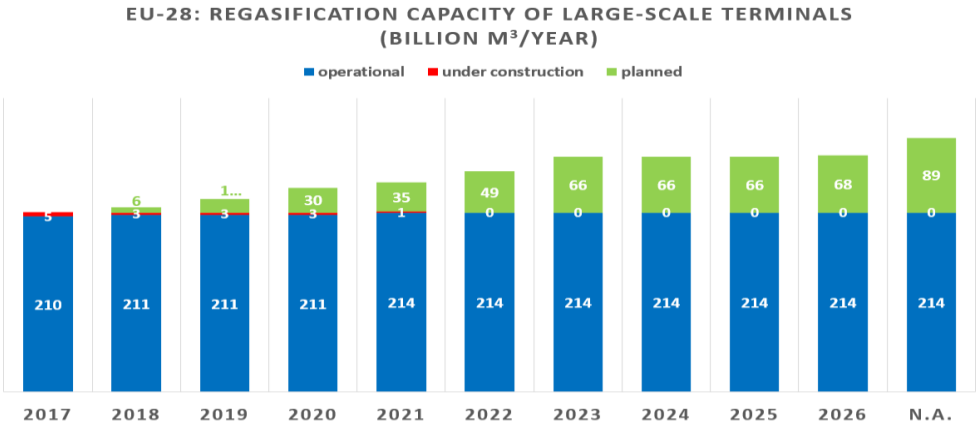

Figure 15: Regasification Capacity of the European Union[324]

In 2017, the EU had 210 bcm of regasification capacity, and it rose only by 1 bcm in 2018. With the new plans, there will be additional constructions in the regasification capacities, so the new capacity of the European Union will be 214 bcm in 2026. In other words, in the coming nine years, the operational capacity will rise only by 4 bcm.

Even though the EU has a capacity of 210 bcm for LNG imports, as noted above, the Community imported around 43 bcm of gas. The main reason why the EU imported a

[320] "World Energy Outlook.", 382
[321] "World Energy Outlook.", 385
[322] "Quarterly Report on European Gas Markets.", 2018
[323] "World Energy Outlook.", 362
[324] "LNG Investment Database.", 2018

small amount of LNG while they had more capacity is due to the price of LNG. LNG and pipeline gas have competitive prices, and they traded to the EU around $4.8/MMBtu in 2016.[325] Russia is selling its gas at spot prices, so that it can compete with LNG from other sources. Besides, Russia offered flexibility in its contracts with European customers.[326] Consequently, Western European countries prefer to buy Russian gas in greater volumes rather than LNG from other sources because Russia can respond quickly to demand fluctuations in Europe because of its supply capacity and geographical proximity to Europe.

Moreover, on December 8, 2017, the first LNG cargo shipped from Yamal peninsula which means that Russia is becoming an important player in LNG trade. Since 2009, the country has two LNG facilities in Sakhalin, but these facilities provide gas to the Asian markets. With the LNG facility in Yamal, the main target of the country is the European market.[327] Therefore, Russia keeps up with changing gas trade patterns in the world as well as in Europe.

Currently, 11 out of 28 EU members have a total of 24 LNG facilities. Spain has seven facilities, France has four facilities, the UK and Italy 3 facilities, Belgium, Greece, Lithuania, Malta, Netherlands, Poland and Portugal have one facility.[328] Thus, as it can be seen, Southeast European countries, except Greece, do not have access to LNG. Therefore, they are vulnerable to gas disruptions due to their higher import dependencies on Russian gas. The EU is trying to consolidate gas accessibility of each country in the Union including LNG by supporting infrastructure development projects through PCI.[329] Among the projects, LNG projects in Greece and Croatia will enable these countries to bring gas to Southeast European countries. The main impediment of Southeast countries to reach LNG is that they are landlocked countries and they do not have robust and connected gas infrastructures to bring LNG from Greece.

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[325] "BP Statistical Review of World Energy 2017", 33

[326] Henderson, James and Jack Sharples. "Gazprom in Europe – two "Anni Mirabiles", but can it continue?". March 2, 2018: 10. Accessed March 3,2018. Retrieved from https://www.oxfordenergy.org/wpcms/wp-content/uploads/2018/03/Gazprom-in-Europe-%E2%80%93-two-Anni-Mirabiles-but-can-it-continue-Insight-29.pdf

[327] Mazneva, Elena, Anna Shiryaevskaya, and Mathew Carr. "Russia to Rescue as Europe Draws More Gas in Siberian Chill." Bloomberg. March 02, 2018. Accessed July 03, 2018. Retrieved from https://www.bloomberg.com/news/articles/2018-03-02/russia-to-the-rescue-as-europe-draws-more-gas-in-siberian-chill

[328] "LNG Map." Gas Infrastructure Europe. December 2017. Accessed April 23, 2018. Retrieved from https://www.gie.eu/index.php/maps-data/lng-map

[329] Itkonen, Anna Kaisa, and Nicole Bockstaller. "Liquefied Natural Gas and Gas Storage Will Boost EU's Energy Security." European Commission. February 16, 2016. Accessed April 23, 2018. http://europa.eu/rapid/press-release_MEMO-16-310_en.htm

Greece has already one LNG terminal. The Greek government decided on the construction of a new LNG terminal in Alexandroupolis. The estimated capacity of the LNG facility will be around 6 bcm. The project was included in the lists of PCI by the Union.[330] The facility will be in service in late 2020. The importance of the facility is that it is designed to work together with the Trans Adriatic Pipeline (TAP) and an interconnector between Greece and Bulgaria.[331] At present, Greece has 5 bcm capacity in Revithoussa LNG terminal.[332] With the completion of new LNG facility, LNG import capacity of Greece will rise to around 11 bcm. As stated before, Southeast European countries do not have access to LNG, with the completion of interconnectors between the member states and LNG facilities in Greece and Croatia, Southeast European countries will have access to LNG.

Croatia does not have an LNG terminal. The country decided to build LNG facility in Krk Island. The project has two phases.[333] In the first phase, the floating storage and regasification unit (FSRU) will be built. In the second phase, a land-based LNG import facility will be built. The facility will start its operations in 2020, and it will have 2.6 bcm of gas capacity.[334] The project was included in the lists of PCIs.[335] After the completion of Ionian Adriatic Pipeline (IAP) in 2019 and the interconnectors between the member states, the country will able to both import and distribute LNG to other Southeast European countries.

[330] Koutantou, Angeliki. "New $438 Million LNG Terminal Planned for Northern Greece." Inspectioneering. October 13, 2017. Accessed May 13, 2018. Retrieved from https://inspectioneering.com/news/2017-10-13/7010/new-438-million-lng-terminal-planned-for-northern-greece
[331] Elliott, Stuart. "New Greek LNG Project FID Slips to Late 2018: Partner GasLog." S&P Global Platts. February 19, 2018. Accessed May 13, 2018. Retrieved from https://www.platts.com/latest-news/natural-gas/london/new-greek-lng-project-fid-slips-to-late-2018-26894120
[332] Elliott, 2018
[333] Duran, Mirza. "Croatia Moving Forward with Krk LNG Import Project." LNG World News. February 1, 2018. Accessed June 11, 2018. Retrieved from https://www.lngworldnews.com/croatia-moving-forward-with-krk-lng-import-project
[334] Duran, 2018
[335] Duran, 2018

4.3. Shale Gas

Shale is a rock formation that contains a vast amount of gas which is trapped inside the rock.[336] Shale gas is a type of unconventional gas, so it requires special techniques, tools, and capital to extract the resource inside the rock. With the technological advances, extraction of shale gas has become cost competitive.[337] The shale revolution started in the United States, and it has spread throughout the world. The importance of the shale revolution is that it changed the world gas market dynamics.

First of all, the most significant benefit of shale gas for the U.S. is that as a result of an increase in significant shale production in the U.S., imports of the U.S. have decreased drastically. Shale revolution not only decreased imports of the U.S. but it also enabled the U.S. to evolve into a gas exporter country. According to natural gas production by New Policies Scenario (Table 13), gas production of the U.S. will rise around 42% between 2016 and 2040. As a result, shale will make the United States both self-sufficient and a gas exporter country.

Secondly, the shale revolution inspired other countries. For example, China, Canada, and some Latin American countries have started to consider producing and exporting shale gas.[338] With the increase in shale production, gas trade is moving from pipeline to LNG.

Thirdly, with the shale revolution, gas availability in the world gas market has increased. This led to a decrease in gas prices, and it also increased competition between the exporter countries. Thus, it can be stated that the possibility of the U.S. gas to be used in Europe strengthened the hands of the European Union against Russia because the U.S. LNG can decrease dependency of the Union on Russia.

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[336] "Where Our Natural Gas Comes From." U.S. Energy Information Administration (EIA). October 25, 2017. Accessed April 23, 2018. Retrieved from https://www.eia.gov/energyexplained/index.cfm?page=natural_gas_where

[337] Mäkinen, Hanna. "The Future of Natural Gas as the European Union's Energy Source –Risks and Possibilities." Pan European Institute. September 2010: 47. Accessed April 23, 2018. Retrieved from https://www.utu.fi/fi/yksikot/tse/yksikot/PEI/raportit-ja-tietopaketit/Documents/M%C3%A4kinen_final.pdf

[338] "Gazprom Keeping Track of Shale Gas Industry and LNG Prospects Worldwide." Gazprom. October 18, 2016. Accessed April 23, 2018. Retrieved from http://www.gazprom.com/press/news/2016/october/article289075/

Shale can break the dominance of Russia in the EU's gas market but the decisive factor for the Europeans is the price of the U.S. gas. Last year, Trump administration called European countries to buy the U.S. gas. However, currently, the U.S. LNG remains more expensive than Russian pipeline gas.[339] Moreover, when all costs are included, the price of the U.S. LNG will be around 9$/MMBtu to European customers while Russian gas will cost around 6$/MMBtu in 2025. This means that the U.S. LNG will not be competitive compared to Russian pipeline gas.

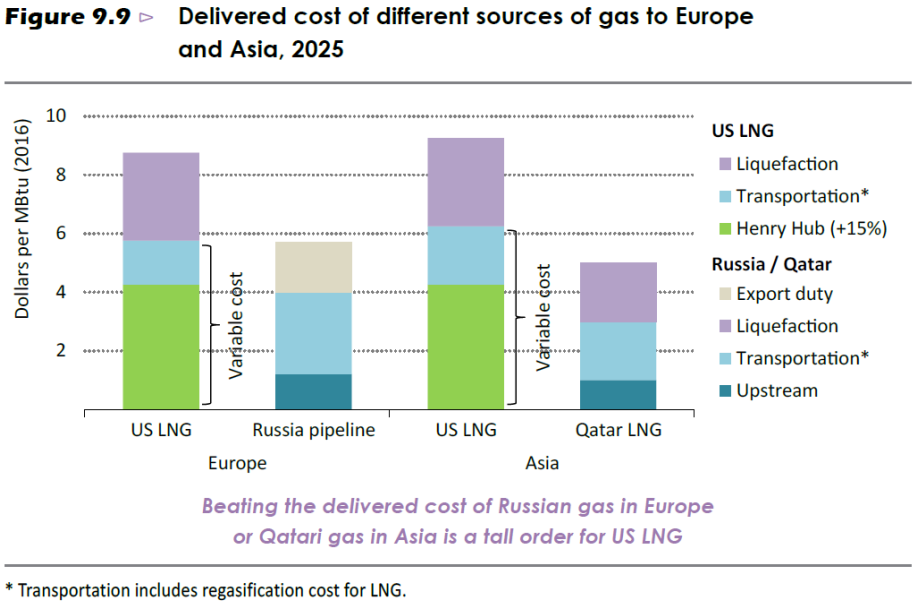


Figure 16: Delivered Cost of Different Sources of Gas to Europe and Asia in 2025[340]

It is predicted by the IEA that to keep gas prices at a sustainable level, Russia will accommodate a small amount of the U.S. LNG to the European market. Until 2030, the share of the U.S. LNG is anticipated to reach around 12% in Europe which is 4% in 2017, but then the U.S. exports to Europe are expected to fall since the U.S. will export more gas to profitable Asian markets.[341] As stated before, the most significant benefit of the U.S. LNG to Europe is that it had increased competition and compelled Russia to lower its gas prices.

[339] Skalamera, Morena. "Transformed Gas Markets Fuel US-Russian Rivalry, But Europe Plays Key Role Too." Russia Matters. May 30, 2018. Accessed July 02, 2018. Retrieved from https://www.russiamatters.org/analysis/transformed-gas-markets-fuel-us-russian-rivalry-europe-plays-key-role-too
[340] "World Energy Outlook.", 381
[341] "World Energy Outlook.", 384

4.4. Renewables

Renewables also have a potential for reducing dependency on Russian energy. From 2004 to 2016, the share of renewable energy rose from around 8.5% to around 17%.[342] The share of renewables has increased steadily, and this growth attributes to the 2020 Strategy of the Union. Among the renewables, the most used sources in the European Union are biofuels (49.4%), hydropower (14.3%), wind power (12.4%) and solar power (6.3%).[343]

In 2016, the Union consumed 179 Mtoe of renewables. Based on the New Policies Scenario, the EU will consume 232 Mtoe in 2025 and 305 Mtoe in 2040.[344] In fact, the European Union put targets to increase the share of renewables with the 2020,2030 and 2050 Strategies. These strategies are long-term targets of the Union, and renewable energy will strengthen the energy security of the Union in the long-term.

4.5. Russia and the European Union

The EU and Russia have interdependence in the field of energy. The EU needs Russian gas to maintain its domestic consumption, and Russia needs revenues to feed its economy. Figure 16 demonstrates the share of oil and gas revenues in the federal budget of Russia. In 2016, the share of Russian oil and gas revenues were 36% of the federal budget. Compared to previous years, the share of energy revenues in the federal budget shows a declining trend.

[342] "Renewable Energy Statistics.", 2018
[343] "Renewable Energy Statistics.", 2018
[344] “World Energy Outlook.”, 299

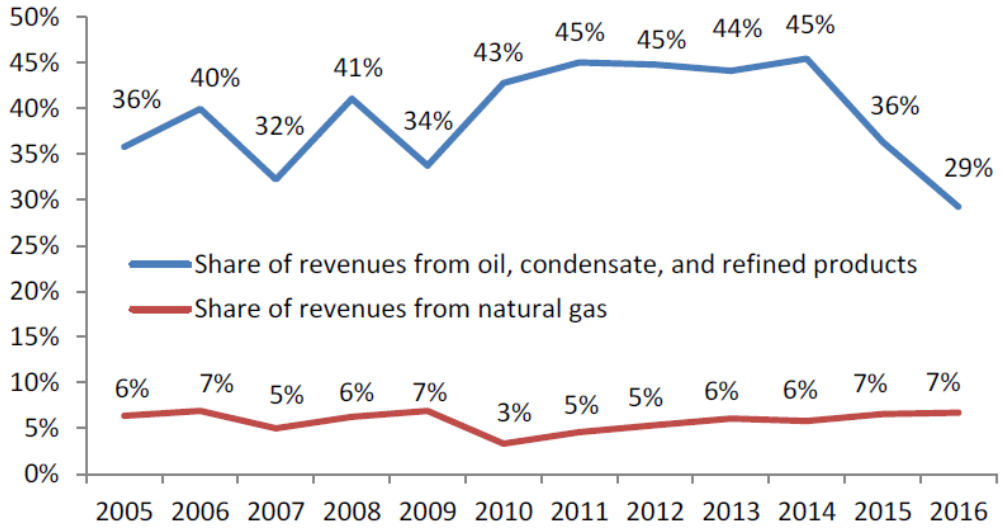


Figure 17: Oil Vs Gas: Shares of Russia's Federal Budget[345]

The rising trend in natural gas revenues, especially after 2010, can be explained by the Russian energy export strategy. To protect its market share in the EU and to compete with LNG from other sources, Russia lowered its gas prices. Even though gas revenues remained low compared to revenues from oil, the market share of Russia rose to 43% in the EU thanks to lower gas prices. This stems from the fact that Russia was able to sell its gas at lower prices.

Russia has two options for determining the price of its gas. In the first option, Russia can lower gas prices which leads to growth in Russian market share in the EU, but there will be less revenue for Russia. In the second option, Russia can raise gas prices which leads to a decline in the Russian market share of the EU, but there will be more revenues for Russia. Among these options, Russia chose the first option because it does not want to lose its strategic superiority in the field of energy against the EU and it wants to remain as a competitive supplier. Natural gas production in the EU is declining while imports of gas are rising. In this context, Russia wants to remain a strategic partner in supplying gas to the EU. Geopolitics of energy is central to Russian politics and economy.

When Putin came to power in 2000, one of his first aims was to keep energy sector under state control. As a result, Russian energy companies were nationalized, and liberal policies were put away. After that moment, Russia started to use energy as a tool of its

[345] Yermakov Vitaly and Kirova Daria. "Gas and Taxes: The Impact of Russia's Tinkering with Upstream Gas Taxes on State Revenues and Decline Rates of Legacy Gas Fields." October 2017: 5. Accessed April 23, 2018. Retrieved from https://www.oxfordenergy.org/wpcms/wp-content/uploads/2017/10/Gas-and-Taxes-The-Impact-of-Russias-Tinkering-with-Upstream-Gas-Taxes-on-State-Revenues-and-Decline-Rates-of-Legacy-Gas-Fields-Insight-20.pdf

foreign policy.[346] Russian energy companies sign long-term contracts with European energy companies to transfer energy to Europe. The problem for the EU is that Russian energy companies are state-led companies, so they act along with the Russian foreign strategy. In contrast, the EU energy companies are private companies, and they consider commercial interests.[347]

With three energy packages, the EU liberalized its energy market. In the context of free and fair competition, it is easy for Russian energy companies to integrate into the EU energy market. For instance, Russia co-owns and co-operates the gas pipelines, it makes investments in gas transmission systems and infrastructures in Europe. Other than that, Russia holds shares in gas storage facilitates throughout Europe. The reason why Russia did all these is to control the transfer of gas to the EU.[348]

Inside the Union, European countries have different levels of gas demand and they hold their right to select their gas suppliers. Since natural gas is traded to the EU at the national level, Russia applied different prices to different European countries based on the depth of its relationship with these countries. As shown in the figure below, in 2013, Belarus paid under $200 per thousand cubic meters, and it is the only country in Europe that paid such a low price. Germany, Austria, Hungary, Finland, Moldova paid around $323-$400 per thousand cubic meters; Italy, Romania, Slovakia, Estonia, Latvia, Turkey paid around $400-$475 per thousand cubic meters and Lithuania, Poland, Ukraine, Czech Republic, Denmark, Bulgaria, and Greece paid the highest price that is over $475 per thousand cubic meters for Russian gas.

[346] Lauren Goodrich and Marc Lanthemann. "The Past, Present and Future of Russian Energy Strategy". 2013. Accessed April 23, 2018. Retrieved from https://www.stratfor.com/weekly/past-present-and-future-russian-energy-strategy
[347] Ülger, İrfan Kaya. "Putin'in ülkesi: Yeni yüzyıl eşiğinde Rusya federasyonu analizi: [siyasal sistem, ekonomi, güvenlik, dış politika]" 2015. Seçkin Yayıncılık.
[348] Łoskot-Strachota, Agata. "Gazprom's expansion in the EU: Co-operation or domination?". October 2009: 14. Accessed April 23, 2018. Retrieved from https://www.osw.waw.pl/sites/default/files/gp_eu_10_09_en.pdf

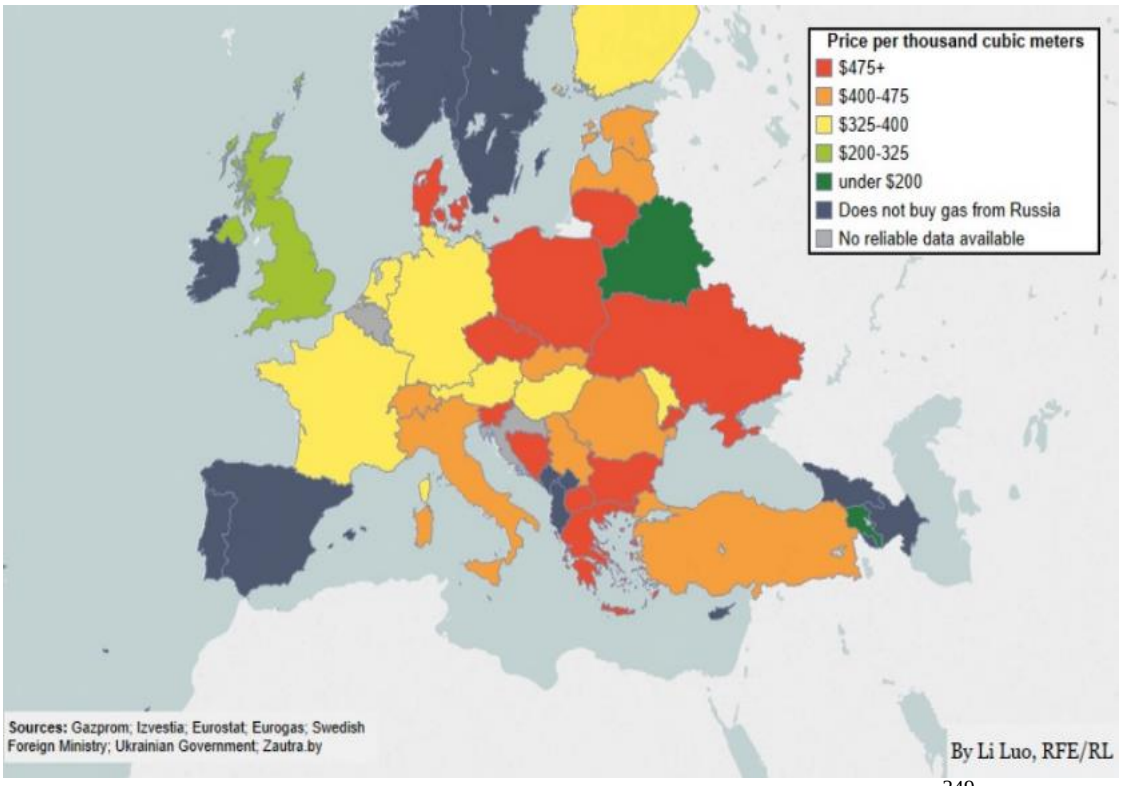


Figure 18: Russian Gas Prices to European Countries in 2013[349]

It can be inferred that Russia rewarded countries which have close ties with it by applying low prices like Belarus and it punished countries which do not have close relations with it by applying high prices like Poland, Ukraine, and the others. This situation creates problems within the EU because Russia has applied different prices to the member states. Therefore, for the same gas, some European countries pay lower prices while some European countries pay higher prices. Consequently, it can be asserted that the country abused its dominant position in the European market by overcharging some member states. With the developments in LNG and Shale Gas, Russia had to lower its gas prices across the board.

[349] Kovacevic, Aleksandar. "Towards a Balkan Gas Hub: The Interplay Between Pipeline Gas, LNG and Renewable Energy in South East Europe." February 2017. Accessed April 23, 2018: 18. Retrieved from https://www.oxfordenergy.org/wpcms/wp-content/uploads/2017/02/Towards-a-Balkan-gas-hub-NG-115.pdf

	Year ended December 31				
	2012	2013	2014	2015	2016
RUB/1,000 m^3	11,969.8	12,137.9	13,487.2	15,057.3	11,763.3
USD/1,000 m^3	385.1	380.5	349.4	245.6	176.0
EUR/1,000 m^3	299.8	286.3	264.5	221.5	159.0

The data were not derived from financial statements and were calculated based on exchange rates as of the end of the relevant period.

Table 15: Average Gas Selling Prices to Europe[350]

In 2012, Russian gas prices were around $385 per thousand cubic meters, and it gradually decreased to around $350 per thousand cubic meters in two years. After 2014, Russian gas prices sharply decreased until 2016. The main reason for this significant decline in gas prices is because natural gas prices are indexed to oil prices. Therefore, the decline in oil prices led to the decline in natural gas prices.

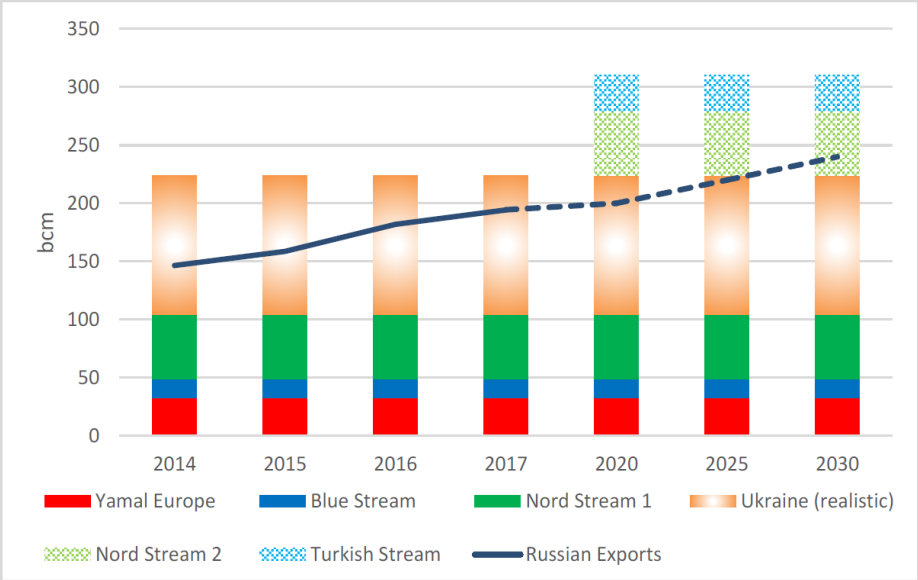
Moreover, the EU increased its LNG imports, and it has invested more in renewables and infrastructure development projects. In order to protect its market share in the EU and to compete with LNG, Russia lowered its gas prices significantly. In 2016, Russia sold its gas around $176 per thousand cubic meters. This shows that oil-indexed natural gas prices pulled down Russian gas prices. Besides, the shale revolution and LNG increased competitiveness throughout the world, so these developments also contributed to a fall in gas prices. As a result, Russia was not able to charge higher prices to its European customers like in the previous years.

Russia and the EU have long-lasting energy trade, and they are tightly bonded to each other, so it is not easy for the EU to sever its energy ties with Russia. Although the EU started to reconsider its dependency on Russian gas, the construction of Nord Stream 2 and Turk Stream pipelines demonstrates that Russian share in the EU market can remain at the same levels. In 2017, Ukraine was the main route in transferring Russian gas to Europe. With the expiration of transit contract between Russia and Ukraine in 2019, Nord Stream 2 and Turk Stream pipelines will take the place of the Ukraine transit pipelines, so that Russia can bypass Ukraine in the transfer of energy to Europe.[351] This shows that

[350] "Gas Marketing in Europe." 2017. Gazprom. Accessed April 23, 2018. Retrieved from http://www.gazprom.com/about/marketing/europe/

[351] Pirani, Simon and Yafimava Katja. "Russian Gas Transit Across Ukraine Post-2019: Pipeline Scenarios, Gas Flow Consequences, and Regulatory Constraints." February 2016. Accessed April 23, 2018: 4. Retrieved from

supply routes are being changed. Even though Ukraine Transit pipelines (includes the Trans-Balkan pipeline and Brotherhood pipeline) have around 115 bcm of gas carrying capacity, the pipelines do not operate at full capacity due to infrastructural constraints.



Source: Gazprom, Author's analysis (NB: Realistic Ukraine capacity assumed to be 120 Bcm. Nameplate capacity

Figure 19: Russian Pipeline Gas Export Capacity to Europe[352]

It is expected that Russian exports to the European Union will increase in the coming decades. To maintain gas trade, sufficient gas infrastructure and capacity is needed. The total capacity of Nord Stream 2 and Turkish Stream is roughly around 70 bcm. In this context, there will be possible physical constraints for Russia to supply its cheap gas to Europe if the capacity problem is not resolved in the near future. Especially after 2020, Russian exports will increase substantially, so additional infrastructures and capacities need to be built to supply gas to Europe other than Ukraine transit pipelines.[353]

4.5.1. Nord Stream 2

https://www.oxfordenergy.org/wpcms/wp-content/uploads/2016/02/Russian-Gas-Transit-Across-Ukraine-Post-2019-NG-105.pdf

[352] Henderson, 17

[353] Henderson, 17

The construction of Nord Stream 2 pipeline demonstrates, as noted, that national interests dominate the community interests and it fueled fragmentation inside the Union. Among the member states, countries which are hostile to Russia such as Poland and the Baltics (Estonia, Lithuania, Latvia, Finland and Sweden) and countries which are transit countries such as Hungary and Slovakia were against the construction of the pipeline. The governments of the eight countries voiced their concerns and stated that the pipeline has a potential to harm the European energy security.[354] Other than these countries, Southeast European countries have a cogent argument that Germany's support on the pipeline not only jeopardizes the energy security of Southeast European countries, but it also undermines the development of internal energy system inside the Union.[355]

Germany is the strongest and biggest country inside the European Union, and it is in favor of the construction of the Nord Stream 2 pipeline. Germany wants to become a hub for Russian gas, so that Germany can supply gas to other European countries such as France, the Czech Republic, and Poland. Considering that gas production in Norway and the Netherlands have been declining, Germany has a desire to increase its imports from Russia to satisfy its domestic gas demand. Moreover, German officials stated that the pipeline can lower gas prices in Germany, so the pipeline is good for Germany.[356]

Germany and Russia have long-lasting relations, and Russia has supplied gas to Germany without any interruption even during the Cold-War, so it is unlikely for Russia to reduce gas flow to Germany. If Russia would reduce or cut gas supplies to Germany, it could lose its market dominance in the European Union since Germany is the leading power of the European Union. Economic and political power of Germany made it the de facto leader of the European Union. This is because the country played an essential role in the Eurozone crisis by giving funds to member states and it played an essential role in the migrant crisis by accommodating migrants to resolve the crisis.[357] After the success in dealing with the two crises, Germany emerged as a leader of the European Union. It is known that Russia wants to protect its market share in the EU, so gas disruption to Germany is least likely.

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[354] Russell, 1-2
[355] Riley, Alan. "Nordstream 2: How Germany Lets Down Europe." The Globalist. February 28, 2018. Accessed April 17, 2018. Retrieved from https://www.theglobalist.com/germany-nordstream2-energy-security-european-union/
[356] Riley, 2018
[357] Kamkin, Alexander. "Germany's European Leadership: Hegemony Against One's Will?" Russian International Affairs Council (RIAC). October 24, 2016. Accessed April 23, 2018. Retrieved from http://russiancouncil.ru/en/analytics-and-comments/analytics/germanskoe-liderstvo-v-evrope-gegemoniya-ponevole/

From the Russian perspective, Gazprom claims that Nord Stream 2 pipeline will end transit uncertainties and compared to Ukraine transit pipelines, the new route will be cheaper and shorter. Since the new pipeline is directly between Russia and Germany, it eliminates transit fees that Russia has given to transit countries.[358] This demonstrates that Russian arguments are based on economic interests, but the pipeline created tensions and divided the Union. Southeast European and Baltic countries, as well as Poland, are against while Germany is in favor of the construction of Nord Stream 2. For many years, the EU has worked for completion of its internal market and speaking as one voice. However, national interests always dominated the community interests in the field of energy. Consequently, it can be said that Nord Stream 2 pipeline will enable Russia to protect its market share in the Community.

4.5.2. Turkish Stream

As noted before, Russia announced that it would not supply gas over Ukraine by 2019, so it developed new and alternative routes to supply its gas to Europe. Turkish stream is the new pipeline that will carry Russian gas. The pipeline will carry 16 bcm of gas to Europe while TANAP will carry 10 bcm. Therefore, more Russian gas will be supplied to Europe in this corridor. With the Turkish stream, Russia will kill multiple birds with one stone. This means that Russia will be able to protect its market share in the European Union, it will continue to earn revenues from energy export, so that its economy will not be damaged, and it will keep its sphere of influence in the countries that are highly dependent on itself especially in Southeast Europe.[359]

It is known that Russia tries to protect its market share in the EU. One of the tools of Russia to protect its dominance is Turkish Stream. The project will contribute to the consolidation of Russian stance in Southeast Europe. Currently, Russia supplies gas to Turkey together with the Blue Stream and Trans-Balkan pipeline. The latter starts in

[358] Russell, 1-2
[359] Pourzıtakıs, Stratos. "The Energy Security Dilemma of Turkish Stream." Carnegie Europe. July 28, 2015. Accessed April 23, 2018. Retrieved from http://carnegieeurope.eu/strategiceurope/60861?lang=en

Russia and passes from Ukraine, Moldova, Romania, and Bulgaria. The capacity of the pipeline is around 14 bcm. After the realization of the Turkish Stream, the pipeline will be connected to the Turkish Stream, and it will be reversed with interconnector between Bulgaria and Turkey. Therefore, Russian continue to supply its gas to Southeast European countries.

Moreover, the interconnector between Bulgaria and Turkey is expected to be in service in July 2018. In the initial plans of the Turkish Stream, it was envisaged that Russian gas would reach the EU over Greece.[360] The country had a desire to connect Turkish Stream to TAP to supply its gas to Europe. However, this option is not possible because TAP has 10 bcm capacity and Azerbaijan will supply that amount of gas, so there will be no enough capacity for Russian gas. Besides, TAP does not allow third-party accession for 25 years, so it has no room for Russian gas.[361] Consequently, the only viable option for Russia is to carry its gas to Greece- Turkey border and deliver its gas to Bulgaria. With the construction of the interconnector between Bulgaria and Turkey, Trans-Balkan pipeline will be reversed, so that Russia will supply its gas to Southeast European countries via Turkey. These developments not only undermine energy security of Southeast European countries, but it also increases the import dependency of Turkey on Russian gas.

4.6. Turkey& Southeast European Countries

Turkey and the European Union have commonalities in the energy sector. Both of them have import dependency on Russia, and both of them try to diversify their energy mix and ensure the security of supply. These factors made Turkey and the EU natural strategic and inseparable partners in the field of energy. In the previous chapter, Turkey's desire to become a physical energy hub and obstacles to become an energy hub such as price,

[360] "Bulgaria's PM Borissov Confirms Turkish Stream Pipeline to Europe to Pass Through Bulgaria." Central European Financial Observer. December 15, 2017. Accessed April 23, 2018. Retrieved from https://financialobserver.eu/recent-news/bulgarias-pm-borissov-confirms-turkish-stream-pipeline-to-europe-to-pass-through-bulgaria/
[361] Henderson, 23

take or pay clause, capacity and availability of gas are analyzed. In the current context, it can be inferred that the possibility of Turkey to become energy hub is not viable. Other than a hub, Turkey can play an essential role for Europe as an energy transit country by transiting Azeri and Russian gas to the Union.

As noted before, Azeri gas has a potential to break the Russian dominance in the Southeast European market in the situation that Azerbaijan supplies more gas to TANAP in the future. Southeast European countries are dependent on Russian gas, and they do not consume significant volumes of gas. In 2016, Gazprom exported 15,8 bcm of gas to five Southeast European countries (Greece, Bulgaria, Hungary, Slovakia, and Slovenia). These countries are dependent on gas imports more than 85%, and imports from Russia account for 75%. To be more elaborate, among the imports of the five Southeast European countries, Russian share in the gas imports of these countries in 2016 was Greece (66%), Bulgaria (100%), Hungary (66%), Slovakia (84%), Slovenia (56%), Croatia (73%) and Romania (100%).[362] Among these countries, Croatia and Romania have domestic production. For this reason, they were not considered as dependent on Russian gas. In the same year, Croatia imported 40%, and Romania imported 10% of the gas that it consumed.[363]

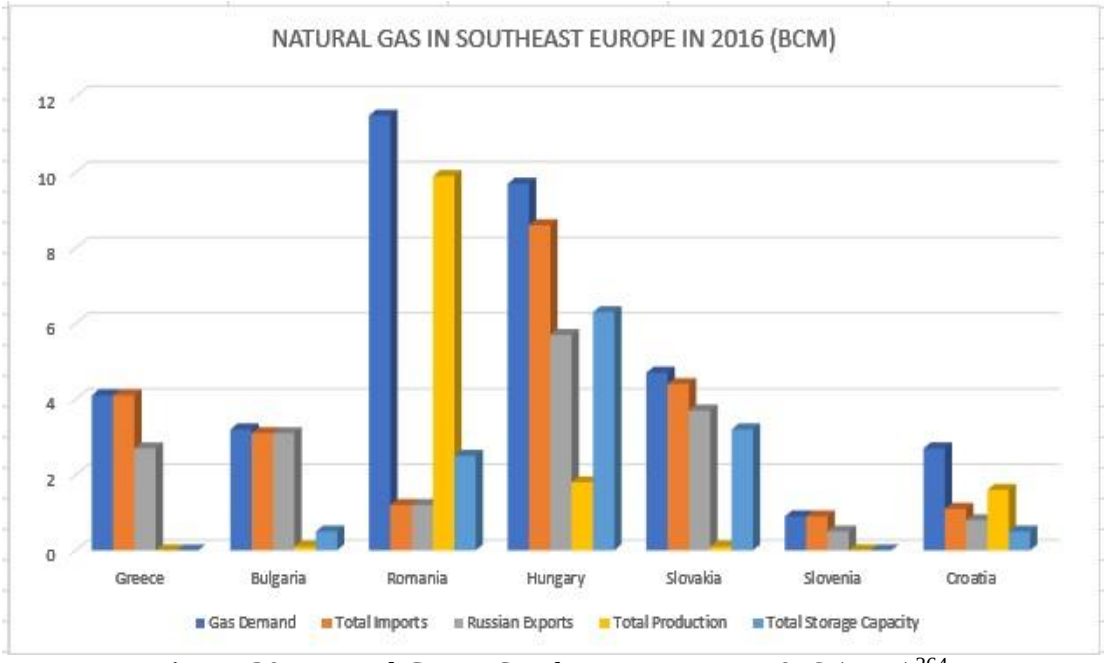

Figure 20: Natural Gas in Southeast Europe in 2016 (Bcm)[364]

[362] "Gas Trade Flows in Europe", 2018
[363] "Gas Trade Flows in Europe", 2018
[364] "Gas Trade Flows in Europe", 2018

There are considerable differences in energy infrastructure development levels between Western European and Southeast European countries. Compared to infrastructure in Western Europe, the infrastructure in Southeast Europe is weaker. Besides, the latter do not have LNG facilities except Greece and adequate gas storage capacities. Consequently, they are vulnerable to gas disruptions.[365] To diversify Russian gas in the Union and to deal with high rate dependencies of Southeast European countries, Southern Gas Corridor was formulated.

SGC is designed to improve the energy infrastructure of Central and Southeast Europe by bringing gas from Caucasus, Middle-East and Mediterranean regions.[366] The main aims of SGC are to break Russian dependency with the diversification of gas routes and to secure European energy supply. The gas corridor is especially vital for Southeast European countries which are dependent on Russian gas. In the beginning, around 10 bcm of gas per year will be delivered to Europe with TANAP and TAP projects from Azerbaijan to Italy via Turkey. In the future, the EU aims to increase the capacity to 80-100 bcm of gas per year.[367] SCG has the potential to supply 20% of Europe's gas needs.[368] TANAP and TAP will increase European supply security when the volumes of gas transported with these pipelines exceed the volumes provided by Russia in SGC.[369] For this reason, SGC has a great potential to secure the energy supply of the EU.

Trans Anatolian Pipeline (TANAP), was commenced in June 2018, will carry Azeri gas to Europe with 10 bcm capacity. The capacity of the pipeline can be increased with additional investments. In order to transport Azeri gas to the Southern countries of the Union, Trans Adriatic Pipeline (TAP) is developed. With this project, Azeri gas will reach to Greece and Italy. The Italian government has a desire to make Italy the energy hub for the Southeastern part of the Union, so TAP is strategically crucial for the Italian government.[370] When Azeri gas reaches Italy, it will be distributed to the Western part of the Union so that the project will contribute to a gas connection between Southern and Northern parts of the Community.

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[365] Austvik, Ole Gunnar. "The Energy Union and Security-of-Gas Supply." Energy Policy, 2016, 96: 379.
[366] "Gas and Oil Supply Routes". European Commission. 2017. Accessed March 09, 2018. Retrieved from https://ec.europa.eu/energy/en/topics/imports-and-secure-supplies/gas-and-oil-supply-routes
[367] "Gas and Oil Supply Routes", 2017
[368] "EU and Turkey Strengthen Energy Ties", 2016
[369] Kovacevic, 39
[370] "Italy: An Energy Hub in the Mediterranean- Bonino in Baku to Sign Azerbaijian-Europe Gas Pipeline Project." Farnesina. December 17, 2013. Accessed April 23, 2018. Retrieved from https://www.esteri.it/mae/en/sala_stampa/archivionotizie/approfondimenti/2013/12/20131217_bonino_baku.html

The interconnector Greece-Bulgaria was designed to link Greek and Bulgarian infrastructures. With the interconnector, Bulgaria will be able to decrease its high dependency on Russian gas. The interconnector will be linked to TAP, so that Azeri gas will be flown to Bulgaria.[371] The construction of the project is set to begin in 2018, and it is expected to finish in 2020. The initial capacity of the interconnector is 3 bcm, but it can be increased to 5 bcm with additional investments. The length of the project is 180km.[372] Also, thanks to LNG facilities of Greece, the interconnector can bring LNG to Bulgaria and Southeastern part of Europe.

To decrease the vulnerability of Southeast European countries, the Eastring pipeline is designed. The pipeline will carry gas from Turkey to Bulgaria, Romania, Hungary, and Slovakia. The pipeline can be connected to either the TANAP or Turkish Stream. If it is connected to TANAP, Azeri gas can decrease Southeast European countries import dependency on Russian gas significantly. The prospects of Azerbaijan to divert its gas to Southeast Europe is possible only if the country produces and supplies more gas to TANAP by developing its gas fields. Given the fact that these countries are almost entirely dependent on imports of gas, Azeri gas which will be transported via Turkey can play a decisive role by enabling these countries to switch to Azeri gas. Besides, it can contribute to the diversification efforts of the Union.

Ionian Adriatic pipeline which will be constructed after 2019, will carry 5 bcm of gas to Albania, Montenegro, Bosnia and Herzegovina and Croatia. This pipeline will be connected to TAP. This means that Azeri gas will reach to Adriatic countries. As a result, Southeast European countries, as well as Adriatic countries, will be able to switch to Azeri gas. In order to increase the energy security of the Southeast European countries, the EU planned for the construction of interconnector between Croatia and Slovenia. The interconnector will be in service in 2019, and it will have 5 bcm capacity.[373] With the completion of the interconnector, Azeri gas will reach to Slovenia. As noted above, Russian gas accounts for 56% of gas imports of Slovenia. Therefore, the interconnector and the IAP will increase the energy security of the country.

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[371] Bon, Sofroniy Le. "USA-EU and Russia Geopolitical Chess Fever Over Greece & Turkey's Energy Plans." Middle East News Service. October 27, 2015. Accessed May 10, 2018. Retrieved from https://middleeastnewsservice.com/2015/10/27/usa-eu-and-russia-geopolitical-chess-fever-over-greece-turkeys-energy-plans/

[372] Bon, 2015

[373] "Interconnection HR/SLO (Lučko-Zabok-Rogatec)" Plinacro. Accessed June 12, 2018. Retrieved from http://www.plinacro.hr/UserDocsImages/PCI/Interconnection%20Lucko-Zabok-Rogatec.pdf

Map 12.12 **An Expanded Southern Gas Corridor**

NB.: The TANAP and TAP gas pipelines as well as Turkish Stream are under construction, with IGB at an advanced planning stage with FID already taken. The IAP, the IGI Poseidon in connection with East Med pipeline and the Vertical Corridor are still in the study phase.

Source: IENE

Figure 21: An Expanded Southern Gas Corridor[374]

Perhaps 10 bcm of gas is a small amount for Western European countries, but it is vital for Southeast European and Adriatic countries since these countries do not consume excessive amounts of gas. Western European countries have developed gas infrastructure, LNG facilities and sufficient gas storage capacities, so they have alternatives to Russian gas, and they do not have energy security risks as in Southeast Europe.

In Southeast Europe, existing interconnectors work only in one way. With the realization of the reversible interconnectors, Southeast European countries will be able to share Azeri gas and LNG with each other, and their gas infrastructures will be connected. Reverse flow is vital to ensure developing energy links and infrastructures between the member states, and it is vital for the energy security of the European Union. The eagerness of Russia to build Nord Stream 2 and Turkish Stream shows that Russia tries to increase its market share in the European Union. However, reverse flow between member states can consolidate energy security of the EU, especially Southeast European countries.

[374] "Southeast Europe Energy Outlook 2016/17". 2017:902. Institute of Energy for SE Europe.

Conclusion

The future projections of IEA demonstrate that to meet its demand, imports of the European Union will increase up to 2040. Currently, Russia is the biggest supplier, and it is expected that Russia will keep its dominant position. To diversify Russian gas, the EU shifted its attention to LNG, renewable energy, and shale gas. Since Russia wants to keep its position in the European Union market, the developments in these sources urged Russia to lower its prices. Besides, Russian gas prices have decreased to oil-indexed natural gas prices. With lower prices, Russian gas became cheaper than LNG and shale gas of the U.S.

As stated before, Russia wants to protect its market share in Europe to ensure revenues coming from energy sales, so it developed the Nord Stream 2 pipeline and Turkish Stream pipeline to reach its aim. However, the pipelines divided member states. Some countries are concerned about the pipelines such as Southeast European and Baltic countries while Western European countries are in favor of the pipelines.

The primary motivation behind Russia's decision to build Nord Stream 2 and Turkish Stream pipelines is to consolidate its market share in the European Union, so that the EU will continue to be dependent on Russian gas. However, TANAP will strengthen the energy security of the EU. 10 bcm of Azeri gas is not a significant volume for Western European countries but it makes difference in Southeast Europe since these countries consumed only around 35 bcm and imported around 23 bcm of gas in 2016.

All in all, this chapter argues that besides Azeri gas which will be supplied to Europe in the short-run, LNG and renewables will make a significant contribution to the energy security of the Union in the medium to long-run. Moreover, the prospects of Azeri gas to consolidate energy security of Southeast European countries depends on Azerbaijan's ability to increase gas production and its ability to supply more gas to Europe, so that some volumes can be diverted to Southeast Europe which will decrease import dependency of these countries on Russian gas.

CONCLUSION

The energy plays a vital role for the daily services such as heating, transportation, and industry. Therefore, life without energy is unimaginable. Since the indigenous energy production of the European Union has been decreasing more than the fall in the energy consumption, the Community relies more on imports to satisfy its demand. This situation brings energy security to the forefront. Even though the EU imports oil, gas and coal from the abroad, the thesis focused on the issue pertaining to natural gas usage and trade.

The issue of energy security became more visible after the two Ukrainian crises. The two crises affected the Southeast European countries significantly since they receive their gas over the Ukraine transit pipelines. After the two crises, the EU focused on consolidating the energy security of the Union. For example, the EU developed 2020, 2030 and 2050 strategies and it increased its reliance on LNG. Other than these, the EU focused on diversification of supply routes.

The thesis analyzed nine countries which can be alternative to Russian gas. These countries are Turkmenistan, Azerbaijan, Iran, Egypt, Algeria, Libya, Iraq, Israel, and the Republic of Cyprus. After having elaborately explained the gas reserve capacities, internal and external factors, the thesis asserts that in short-run, Azerbaijan will be the alternative supplier via pipeline. In the medium to long-run, Iraq has a potential to supply gas to SGC. In fact, the prospects of Iraq to supply its gas to Turkey and then to Europe depends on the settlement of the disputes between KRG and Iraq. Besides, Iran, Egypt, and Israel are most likely to supply gas as LNG to Europe in medium to long-run. Consequently, gas competition in the European market will escalate which is vital for the energy security. Since Azerbaijan will supply its gas to Europe via Turkey, Turkey's energy role in its region will increase.

In the transfer of the energy, Turkey can be an energy transit country or an energy hub. The country targets to become an energy hub. By becoming a physical energy hub,

Turkey would define the terms and conditions for the transfer of energy to Europe, and it would facilitate trade between energy producing and consuming countries. However, in order for Turkey to become a physical energy hub, it needs to deal with four critical obstacles. These are the price of the gas in the long-term gas agreements, "take or pay" clauses, low natural gas storage capacity and availability of gas.

The virtual hub is more convenient for Turkey to facilitate trade between the energy producing and consuming countries. However, Turkey has a desire to evolve into a physical energy hub than targeting to become a virtual hub. As long as the above-mentioned obstacles remain, Turkey cannot go further than being an energy transit country.

The IEA foresees that imports of the European Union will increase while at the same time exports of Russia will increase up to 2040. To decrease the share of Russian gas, the EU has increased its LNG imports. Even though the EU has a capacity of 210 bcm, it imported around 43 bcm of gas. The main reason why the EU imported a small amount of LNG while they had more capacity is due to the price of LNG and Russia's ability to supply cheaper gas to the EU. Except for Greece, Southeast European countries do not have access to LNG. With the completion of LNG facilities in Croatia and an additional LNG facility in Greece, these countries will be able to import LNG. When these countries receive gas in the form of LNG, they can send it to other Southeastern European countries through reversible pipelines and interconnectors. Consequently, LNG will consolidate the energy security of the Union.

Shale gas has a potential to increase the energy security of the Union. However, the price of the U.S. LNG will not be competitive compared to Russian pipeline gas prices. However, the most significant benefit of the U.S. LNG to Europe is that it has increased competition and has compelled Russia to lower its gas prices.[375]

Renewables are the other sources that can strengthen the energy security. The share of renewables is expected to increase in the EU. However, these strategies are long-term targets, and it takes time.

The EU and Russia have interdependence in the field of energy. The EU needs Russian gas to maintain its domestic consumption, and Russia needs revenues to feed its economy.

[375] "World Energy Outlook.", 384

Therefore, the country tries to protect its share in the EU's energy market to ensure revenues coming from these countries. With the developments in LNG and Shale Gas, Russia had to lower its gas prices. Before these developments, Russia had applied astonishing prices to European countries.

To protect its domination and to punish Ukraine, Russia developed Nord Stream 2 and Turkish Stream pipelines. Since countries have different perceptions regarding Russian gas, the Union was divided regarding whether or not to obtain Russian gas. Russia aims to reverse Trans-Balkan pipeline, and it wants to connect Turkish Stream to that pipeline. Besides, the country is also eager to connect Turkish Stream to Eastering pipeline, so that Russian domination in Southeast Europe will prevail. The Eastring pipeline can be connected to either Turkish Stream or TANAP. If it is connected to TANAP, Azeri gas can play an important role in decreasing the import dependency of Southeast European countries on Russian gas significantly. The prospects of Azerbaijan to divert its gas to Southeast Europe is possible only if the country produces and supplies more gas to TANAP by developing its gas fields in the future.

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