EXAMINING THE TRANSFORMATION OF SOUTH STREAM TO THE TURKSTREAM: AN ANALYSIS FROM ENERGY SECURITY PERSPECTIVE

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EXAMINING THE TRANSFORMATION OF SOUTH STREAM TO THE TURKSTREAM: AN ANALYSIS FROM ENERGY SECURITY PERSPECTIVE

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ABSTRACT

EXAMINING THE TRANSFORMATION OF SOUTH STREAM TO THE TURKSTREAM: AN ANALYSIS FROM ENERGY SECURITY PERSPECTIVE

KOLCU, ONAT

Master of Arts

In

Sustainable Energy

Supervisor: Assoc. Prof. Dr. Mehmet Efe Biresselioğlu

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Energy is a prerequisite to survive and maintain power for countries. Every single state needs an energy source to operate factories, its military, and provide security and welfare to its citizens. The lack of energy sources creates an insecure environment for states. For that reason, states concentrate on the importance of energy security. Energy security is a high priority topic since 1973, when the world faced the first global energy crisis. The security of supply is the pillar of energy security studies. However, varying approaches on states' energy production, logistic, and consumption behaviors developed new perspectives which magnified the energy security concept.

Currently, the most attention keeping phenomenon in energy security studies is climate change. The increasing precariousness of climate change has been forcing states to consume less dirty energy sources, like natural gas. The European Union, which is the pioneer in war against climate change and the third biggest natural gas consumer of the world, works on its security of natural gas supply. The downside of natural gas is the lack of availability for all states. Thus, the EU is highly dependent on imports. For that reason, the undisrupted flow of natural gas to the EU is significant to keep itself secure. The main objective of the thesis is to analyze the benefits and drawbacks of the shift from the South Stream Gas Pipeline into the TurkStream Gas Pipeline, with both transferring Russian gas to EU. To achieve that aim, an energy security framework based on content analysis of the literature of energy security is created. According to the results of the content analysis, the most cited and acceptable articles in energy security mostly mentioned the security of supply. The mentioned pipelines are analyzed from the perspective of the security of supply. As a result, both pipelines have positive and negative sides from different perspectives, but the TurkStream is a more reasonable project for the EU and Russia.

Keywords: Energy Security, Security of Supply, Natural Gas, European Union, Russia, South Stream Gas Pipeline, TurkStream Gas Pipeline.

ÖZET

GÜNEY AKIM DOĞALGAZ BORU HATTI PROJESİ'NİN TÜRKAKIM GAZ BORU HATTI PROJESİ'NE DÖNÜŞÜMÜNÜN ENERJİ GÜVENLİĞİ BAKIŞ AÇISI ÜZERİNDEN İNCELENMESİ

KOLCU, ONAT

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MAYIS 2019

Enerji devletler için varolmak ve güçlerini devam ettirmek için bir gerekliliktir. Her devlet fabrikalarını işletmek, ordularını kullanmak ve halkını güven içinde tutmak ve onlara gereken refahığı sağlamak için enerjiye kaynağına ihtiyaç duyar. Enerji kaynağının olmaması devletler için bir güvensizlik ortamı yaratır. Bu yüzden her devlet enerji güvenliğine büyük bir önem ile yaklaşır. Enerji güvenliği 1973 yılında yaşanan küresel enerji krizinden beri devletlerin gözünde önem arz etmeye başlamıştır. Enerji güvenliğinin en önemli parçasını arz güvenliği oluşturur. Ancak, devletlerin değişen üretim, ulaştırma ve tüketim alışkınlıkları enerji güvenliği konseptine bakış açılarını değiştirerek yeni perspektifler ile gelişmesini sağlamıştır. Günümüzde, çokça konuşulan iklim değişikliği buna bir örnektir. İklim değişikliği tehditi ilerledikçe devletleri doğalgaz gibi daha az kirli olan enerji kaynaklarını tüketmeye yönelmektedir. Avrupa Birliği, iklim değişikliğine karşı öncü ve en büyük üçüncü doğalgaz tüketicisi, doğalgaz arz güvenliği üzerinde çalışmaktadır. Doğalgazın kötü yanı ise her

bulunabirliliğinin düşük olmasından kaynaklanmaktadır. Avrupa Birliği doğalgaz ithalatına bağımlıdır. Bu sebeplerden ötürü, Avrupa Birliği güevnliğini sağlamak için kesintisiz doğalgaz akışına muhtaçtır. Bu tezin ana amacı, ikiside Rus gazını Avrupa'ya taşıyan Güney Akım Doğalgaz Boru Hattı Projesi'nin TürkAkım Gaz Boru Hattı Projesi'ne dönüşümünün olumlu ve olumsuz yönlerini Avrupa Birliği ve Rusya açısından değerlendirmektedir. Bu sonuçlara ulaşmak için enerji güvenliği literatürü baz alınarak bir enerji güvenliği sistemi oluşturulmuştur. Bahsi geçen boru hattı projeleri bu sistem tarafından analiz edilmiştir. Sonuç olarak, her boru hattı projesinin artı ve eksileri olmasına rağmen TürkAkım projesini Avrupa Birliği ve Rusya için daha iyi alternatif olduğu ortaya çıkmıştır.

Anahtar Kelimeler: Enerji Güvenliği, Arz Güvenliği, Doğalgaz, Avrupa Birliği, Rusya, Güney Akım Doğalgaz Boru Hattı Projesi, TürkAkım Gaz Boru Hattı Projesi.

To My Family

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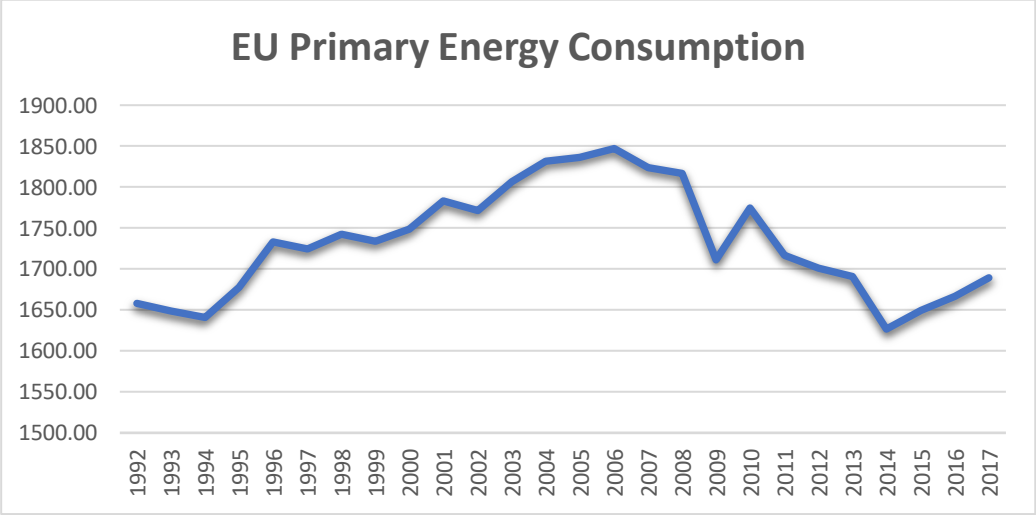
CHAPTER 1

Introduction

Since the 1973 OPEC Crisis, energy security has been a priority for states. The earliest energy security studies (Yergin, 1988; Nye, 1982; Deese, 1979; Miller, 1977) mostly focused on the supply security of oil which was the primary energy source for the global market. Diversification, geopolitics and reliability of the supplier were the biggest issues for scholars. Since then, the concept of energy security grew. The definition of energy security by IEA is "*Adequate, affordable, and reliable access to energy fuels and services, it includes availability of resources, decreasing dependence on imports, decreasing pressures on the environment, competition and market efficiency, reliance on indigenous resources that are environmentally clean, and energy services that are affordable and equitably shared"* (Sovacool, 2011). According to this definition, fundamentals of energy are; availability, affordability, reliability, self-sufficiency, acceptability, and liberalized market.

Table 1. EU Primary Energy Consumption between 1992-2017



Source: BP Statistical Review of World Energy

The European Union (EU) is the third largest energy consumer in the world (BP, 2018). With 28 member states, the EU consumed 12.5% of the world energy in 2017. As seen in Table 1, the EU's primary energy consumption increased until 2006. After that, EU's energy consumption falls, especially after the 2008 economic crisis. The EU's energy production has been decreasing too. The Dutch government announced that it stops production in Groningen which currently supplies 21.6 bcm of gas to Europe (Reuters, 2018). In 2017, the EU spent 21.7 billion euros per month to

energy imports (Eurostat, 2018). Its energy dependency rate was 53.6% in 2016 compared to 45.7% in 1992. The highest dependency on a single supplier is in natural gas with 40% dependency on Russia.

Natural gas consumption started to grow in 2016 in Europe (BP, 2018). The main reason for that is the EU's environmental targets which caused the decrease of coal consumption and promoted less dirty energy sources such as natural gas. According to the European Commission (2018), to catch 2020 targets EU member states should decrease their gas emission of 20%, renewable energy output should be 20% and energy efficiency development should represent 20%. To decrease emissions EU members, started to phase-out from coal. However, coal represents a reliable and cheap power source which renewable energy sources can currently not supply. For example, solar power could not support the whole demand steadily (Lofthouse et al., 2015). To satisfy energy demand in stable line hydrocarbons are a necessity. To meet with future demand, the EU has two options: natural gas or nuclear energy.

According to the IEA (2018), natural gas demand of the world will increase by 17% in 2025 and 56% in 2040 and price will rise by 75% in 2050. Lindholt and Glomsrød (2017) study shows that electricity generation from coal (28%) and natural gas (26%) will continue in 2050 but renewable energy will represent 45% of world electricity. In both scenarios, natural gas will still be consumed in the future. For that reason, the EU should secure natural gas supply via diversification.

Diversification of energy sources is mentioned by many scholars (Yergin, 2006; Bielecki, 2002; Chester, 2010; Vivoda, 2010; Daojiong, 2006). Diversification is an economic term which is justified through the following reasoning: *'an investor will diversify their portfolio of investments as a number of different investments is less likely to fail than one large investment"*. Diversification of energy sources is essential to maintain security and a country should diminish dependency to one source, one supplier, and one route (Donev et al., 2016). The three pillars of diversification should be undertaken by energy importer states. EU is highly dependent on oil and natural gas which, combined, represented 64.3% of primary energy consumption in 2016 (BP, 2017). The dependency rate of the total petroleum products was 86.7% and natural gas dependency rate was 70.4% in 2016 (Eurostat, 2018). The diversification of natural gas is much harder than oil because of transportation method. Natural gas is mostly

transported through pipelines. However, it the near future liquefied natural gas (LNG) will be the primary traded gas type in the world (IEA, 2018). LNG is the liquid form of the natural gas which is transformed by a special cooling process to store and transport it easily (Shell, 2014). The natural gas is a new chapter in the geopolitics of energy because until recently countries were unable to transport natural gas to the long-distance markets. This will change with LNG (Paltsev, 2015).

Thanks to its geographical position the EU is close to major natural gas exporter countries such as Norway, Russia, Algeria, Nigeria, Azerbaijan, Turkmenistan, Iran, and Qatar. These are the biggest natural gas suppliers in Eurasia, Africa and the Middle East. However, the European Union has currently only access to Norwegian, Russian, Algerian and Azerbaijani gas through pipelines (European Commission, 2018). The EU wants to increase the number of gas suppliers but the lack of good relations and distance to other gas exporters make it difficult to build new pipelines. In 2016, the EU satisfied 40.2% of its natural gas demand from Russia (European Commission, 2018). The EU tries to decrease the volume of Russian gas. For this reason, the EU proposed the Nabucco Pipeline in 2002, which aimed to transfer gas from the Caspian Sea and the Middle East to Europe. The project failed due to political reasons but even if Nabucco would have succeeded, it could have only satisfied 6.5% of the EU's gas demand in 2002 (BP, 2018). The key point of the Nabucco Pipeline was that the EU showed its diversification aim to suppliers. Meanwhile, Russia tried to topple Nabucco with an alternative plan called South Stream Gas Pipeline (SSGP). The pipeline offered to bypass Ukraine and pass through the Black Sea to connect Bulgaria which would carry 63 bcm gas per year (South Stream Transport B.V., 2013). The project was important for both the EU and Russia but the political crisis between Ukraine and Russia, annexation of Crimea and US pressure sank the project (Euractiv, 2014). However, the project has been called off by Russia and not directly by the EU. The Nabucco project changed into TurkStream Natural Gas Pipeline. This pipeline project modifies the first connection country and the route of the existing Trans-Balkan Pipeline which carry the gas to Bulgaria, Greece and Northern Macedonia (TurkStream, n.d.; ICIS, 2019). The TurkStream will carry 15.5 bcm gas to Southern Europe and another 15.5 bcm will be consumed in Turkey (Gazprom, 2018).

The security of natural gas supply has always been complicated for the EU because of the reliability of suppliers, availability of gas and geopolitics. The main concern of the EU is clearly Russia which could use energy as a political tool against importer and transfer countries (Collins, 2017; Stegen, 2011; Smith, 2006; Rutland, 2008; Goldthau, 2008). This study aims to assess the consequences of the so-called Russian energy weapon. The South Stream Gas Pipeline and TurkStream Gas Pipeline are selected as main cases for this study. The pipelines are analyzed with the security of supply indicator which procures the theoretical framework. The content analysis method is selected to create a framework of study to find out the most cited indicators of energy security. According to the framework result, the security of supply indicator is the most cited indicator in 65 energy security articles which are cited more than a hundred times. This framework will enable this study to answer the following research question from an energy security perspective: "What will be the benefits and drawbacks of the shift from the South Stream Gas Pipeline to the TurkStream Gas Pipeline for the European Union and Russia?"

The dissertation includes seven parts. The first part is the introduction which started with the fundamentals of energy security. After that, the European Union's short energy profile and energy security perspective are explained by focusing on natural gas targets of the EU.

The second chapter is the literature review and the methodology which explains the methodological framework of the study. Energy security is an interdisciplinary area which includes political science, economics, business, law, environmental, physics, electrical, mechanical, nuclear engineering, architecture, and many more disciplines. However, this study focuses on the political science aspect of energy which is called politics of energy (Hughes and Lipscy, 2013). The main methodology of the dissertation is a content analysis which helps to analyze energy security concepts. After that, the most common indicators are found in 65 energy security articles which are cited more than a hundred time. The methodological framework is used in Chapter 5 to find out answers to major questions asked in Chapter 1.

The third chapter describes the EU's energy profile. European Union's natural gas, coal, nuclear energy, renewable energy and hydroelectric sectors are examined

one by one. The data for different energy sectors is taken from Eurostat, BP, and IEA. The data of Eurostat is dated from 2016 while BP and IEA have 2017 data.

The fourth chapter describes energy security and natural gas supply of the European Union. The European Commission's energy security definition and reports are examined. The chapter continues with the security of natural gas supply which provides information about the Third Energy Package, the historical background of the South Stream, the TurkStream, and other related pipelines.

In the fifth chapter, the South Stream and TurkStream gas pipelines are carefully analyzed based on six sub-indicators of security of supply. Here, the main aim is to find an answer to the major questions of the study. To reach the desired results, information from the historical background of the pipelines are used several times.

Chapter Six explains the results of the framework used in the fifth chapter. The reasons for the shift from the South Stream Gas Pipeline to the TurkStream and the impact of this change for Russia and the European Union are offered.

The seventh chapter concludes the study by offering a short overview of the findings and the potential benefits and drawbacks of the pipeline projects for the EU.

CHAPTER 2

Literature Review and Methodology

Energy is a crucial element for maintaining the existence of states in the world. Without energy, factories could not operate, or armies could not take a countermeasure against enemy attacks. Even, people could not perform their daily activities which causes anarchy and lead to the collapse of the state. Energy is an indispensable part of states for surviving. The importance of energy sources was not widely accepted until the 1973 OPEC crisis. After the first OPEC crisis, western countries led by the United States acknowledged the seriousness of energy sources (in that time oil was the primary energy source) as a crucial root for economic development, national security and the maintenance of the global order. The historical background of energy security is crucial for the understanding of today's energy affairs.

In the 1900s, Winston Churchill as First Lord of Admiralty, and Sir John Fisher worked to shift the primary energy source of the Royal Navy from coal to oil which was expected to create supremacy over to German Navy but the lack of oil source in the mainland caused oil shortages and did not increase the power of the Royal Navy (Yergin, 1988; Dahl, 2000). The reasons behind this failure were investigated by a Royal Commission. The commission findings suggested that oil storage is a necessity to keep running the Royal Navy in wartime (Dahl, 2000). The result of the commission clearly demonstrated that Churchill and Fisher neglected the capacity of oil sources inside the mainland and did not calculate disruptions of oil shipments or security of oil fields. The wars for oil fields during World War 2 took place to secure the primary energy resources of the army (Cherp and Jewell, 2011). Also, Churchill pointed out that the "safety in oil lies in variety and variety alone" to underline diversification which is a component of the security of supply (Yergin, 1988). The emergence of energy as a security concern has started with Churchill and Fisher, and clearly, they were already focusing on one of today's energy security phenomenon: supply security.

In 1973, the OECD members energy consumption were more than two times higher than the rest of the world (BP, 2018). Also, in the same year, OECD members consumed 41303 thousand barrels (daily) oil which is almost 75% of the total oil consumption. However, OECD countries only produced 14530 thousand barrels (daily) which did not satisfy the demand. The dependence of OECD members to non-OECD

(mostly OPEC members) countries restrained their actions in the world. In 1973, OPEC countries used energy as a weapon against the western countries which were supporting Israel in the Yom Kippur War (Stephens, 2008). This created fluctuation in oil prices which were tripled (BP, 2018). According to Rustow (1974), oil exporter countries which include Canada and the USSR, obtained a bigger piece of the pie while some third world countries were negatively affected due to a diminution of aids which were coming from western countries.

After the 1973 OPEC oil crisis, western countries diversify their oil sources through other American continent countries, the USSR and China which caused a decline of the share of OPEC in the global oil market (Issawi, 1978). One of the most important results of the 1973 crisis is the introduction of energy security in academia (Willrich, 1975, 1976; Chapman, 1975; Deese, 1979; Nye, 1980) and governments agendas[1]. The US faced some disruptions on its supply system before and during the Korean Conflict and the Suez Crisis (Hamilton, 2011). In addition to academia's interest, governments of OECD established the IEA-International Energy Agency to be ready for the next crisis and take the necessary steps. IEA suggested to countries to secure their oil supply with increasing oil stocks, to make emergency regulations for the demand side, and to be ready to transport oil among member states (Keohane, 1978). Also, the IEA tried to create an understanding between producer and consumer countries which aimed to end tensions as both sides needed each other to maintain their existence and wellbeing (Lantzke, 1975). Energy independence has also become a key topic with the oil supply crisis. Fox suggested that energy independence must include today and tomorrow with affordable prices for consumers (Cox and Wright, 1975). The results of the 1973 Oil crisis show that governments who suffer from oil embargo took necessary steps to protect their supply with diversification and stocking.

In 1979, crude oil spot prices were increased due to the Iranian Revolution (1978-79). Iran produced 5302 thousand barrels per day which satisfied the more than a quarter of the US' oil consumption[2](BP, 2018). The revolution caused doubled oil

[1] In 1973, State of Secretary Kissinger went to Saudi Arabia to negotiate with King Faisal on oil embargo. In 1975, Energy Policy and Conservation Act (Pub.L. 94-163, 89 Stat. 871) enacted for decreasing demand, increasing energy efficiency and energy production. In 1977, U.S. Department of Energy was established to maintain American interests on energy.

prices. The downward of production in Iranian refineries in 1980, the rise of oil prices by Libya (4 American Dollars), and the incoherence of other OPEC states caused high prices (Parisi 1979). The fourth quarter of 1980, the Iran-Iraq war took place. It was followed by the First Persian Gulf War in 1990. Between these two wars, oil prices saw the lowest price tag in 1986 which was 13.10 $/bbl (BP, 2018; S&P Global Platts, 2018). The prices of the crude oil kept under the 25 $/bbl until 2005. World oil consumption rose dramatically, and high demand was beneficial for the oil exporter countries. Developing Asian countries which were called as 'Asian Tigers' growth their economy thanks to the low oil prices (Hamilton, 2011). Since 1993, China became a net oil importer and had been increasing the amount of oil to meet internal demand. According to Leung (2010), China supports its economic growth model via more oil and natural gas usage but faces energy insecurity. The high demand in oil continued even the price of oil rose to 100 $/barrel levels. Also, the world oil consumption keeps reaching a peak but the total consumption decreases.

In 2011, the nuclear power plant accident in Fukushima, Japan created a global campaign against nuclear power plants. Before the accident, nuclear power plants were considered as an environment-friendly and high concentrate energy source for electricity production. Japan represented one-fifth of China's total energy consumption (BP, 2018). The lack of diversification in electricity generation for considerable energy consumers like Japan forced them to consume natural gas which is considered as the cleanest type of fossil fuel. The lack of diversification and limited internal energy sources increases the dependency of Japan to external sources. After the disaster, Japan closed nuclear power plants and shifted to natural gas, not renewable energy. Renewable energy was not supported by citizens due to high cost which shows the significance of affordability (Vivoda, 2012). The natural gas desire of Japan increased the prices of the liquefied natural gas (LNG) 3.82 $/million BTU[3] (BP, 2018; S&P Global Platts, 2018). Today, although Japanese energy highly depends on natural gas exports, the number of LNG suppliers is 18 which increases the gas supply security of Japan.

[2] In 1978, the US represented 23% of the total consumption (18756 thousand barrels per day) which was more than Europe countries (16410 thousand barrels per day) total.

[3] Japan Korea Market (KKM) rose almost doubled at the same year. 10.91 7.72 $/million BTU to 14.02 $/million BTU.

The historical background of energy security shows that energy security issues mostly refers to the supply security which includes diversification of sources and routes, affordability of the sources, and reliability of the supplier. In addition to the historical background of energy security, the literature review will contribute to the aim of this thesis.

The literature has been focusing on energy security since the 1973 OPEC oil embargo. However, the literature changes with new technologies, new aspects to the security concept and emerging problems such as climate change. The Fukushima Daiichi accident findings by Vivoda (2012) shows that after a vast disaster people still think about the cost of energy sources. Different perspectives or working areas approach energy cases in different ways. For that reason, energy security studies should develop its own framework for adding new approaches to the literature.

Energy security has always been a hot topic for academia but its complexity due to its multi-disciplinary[4] environment makes it difficult to conduct research from a specific perspective. Many scholars analyze energy security to create an energy security index, categorize energy security indicators or conceptualized energy security phenomenon. The studies of Kruyt et al. (2009); Vivoda (2010); Chester (2010); Sovacool and Brown (2010); Sovacool and Mukherjee (2011); Winzer (2012); Sovacool (2011); Ren and Sovacool (2014); Månsson et al. (2014); Ang et al. (2015) are highly accepted in the literature. For example, Sovacool and Mukherjee (2011) reviewed energy security and found out that "Energy security should consist of five dimensions related to availability, affordability, technology development, sustainability, and regulation". Also, Kruyt et al. (2009) offered 10 simple indicators and five indexes to energy security studies. Winzer (2012) conceptualized energy security and underlined the most comprehensive energy security studies as the ones include all risk factors that have a direct or indirect effect on supply sequences. This dissertation creates its own distinctive framework to be added in the literature.

A *"content analysis*" method will be used to create the methodological framework. Content analysis is defined as "*a research method that uses a set of procedures to make valid inferences from text. These inferences are about the sender(s)*

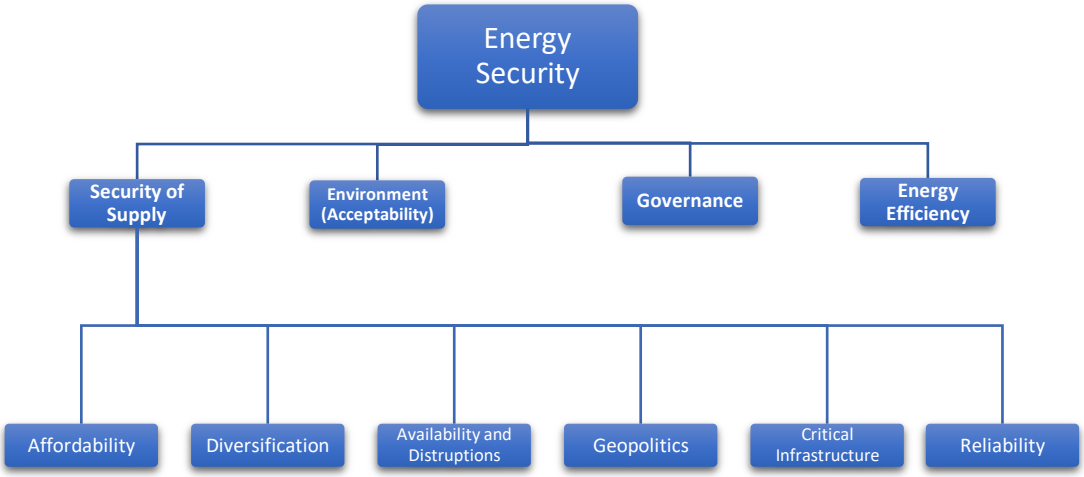
[4] Månsson et al. (2014) said that, energy security is a multi-disciplinary and implementation of different approaches to energy security with no connection is support that.

of the message, the message itself, or the audience of the message. The rules of this inferential process vary with the theoretical and substantive interests of the investigator…" (Weber, 1990). The main purpose of the content analysis is the categorize the significant amount of data into the smaller and workable data sets (Krippendorff, 2004). In this study, content analysis will help to categorize energy security indicators and with this indicator or indicators, the subjects of the study will be examined. South Stream Gas Pipeline and TurkStream Gas Pipeline are both already studied by scholars (Dastan, 2018; Chyong and Hobbs, 2014; Baev and Øverland, 2010; Stern et al., 2015; Baran, 2008; Kim and Blank, 2015; Hafner and Tagliapietra, 2015).

The articles used for the content analysis are taken from Google Scholar and Science Direct by searching the 'energy security' keywords. The total number of data is enormous to conduct a reasonable content analysis. For this reason, the articles limited to citation number. Articles which are cited more than a hundred times are taken for analysis. The findings of the literature review show that there are 18 indicators. The 18 indicators are categorized based on their topics. In 65 articles which could be found in Appendix, four main[5] and 18 sub-indicators were indicated.

[5] To expected as main indicator, it should be existed more than 10 times in 65 articles. To keep findings clearer, indicators which are cited less than 10 times and could not expect as sub indicator of main indicators did not count into final findings.

Figure 1: Indicators of Energy Security



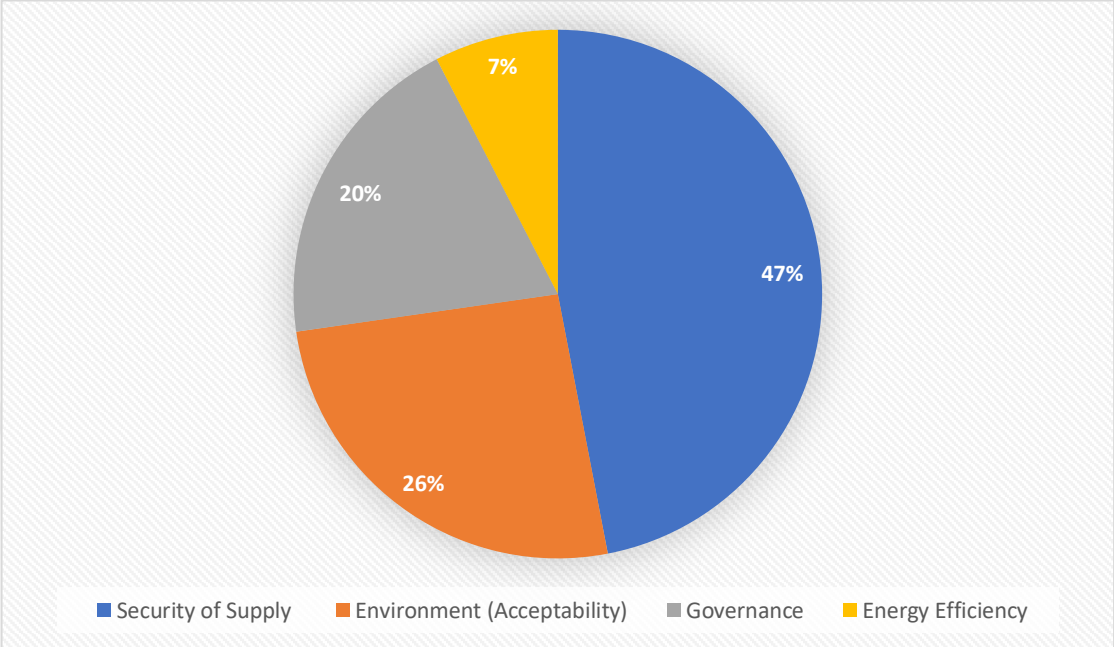
As seen in Figure 1. these are 1. Supply Security which includes affordability, diversification, geopolitics, availability, critical infrastructure, reliability, and disruptions; 2. Environment (also known as Acceptability) which includes renewable energy, carbon emission, climate change, and energy storage; 3. Governance which includes, policy making, regulations, international or internal laws, institutions, and power purchase agreement (PPA); 4. Energy Efficiency which includes energy intensity. The comprehensive literature review of energy security is given above.

The total number of main indicators in 65 articles are 128 which indicates that every article must mention at least 2 or more indicators. As mentioned before, the energy security concept is a multi-disciplinary field. To reach more accurate results sub-indicators are counted as main indicators. For example, let's suppose that an article mentions affordability, geopolitics, and renewable energy. The article mentions two different Security of Supply (SOS) and one environment (acceptability) sub-indicators. In the end, the article mentions SOS and Environment main indicators. If there is more than one sub-indicator which belongs to the main indicator, the only the main indicator is taken into account.

In 65 articles Security of Supply (SOS) is mentioned 59 times, Environment (Acceptability) 34 times, Governance 24 times, and Energy Efficiency is referred to

11 times. The highest mentioned indicator is SOS followed by Environment, Governance and Energy Efficiency.

Table 2: Main Indicators in 65 Articles

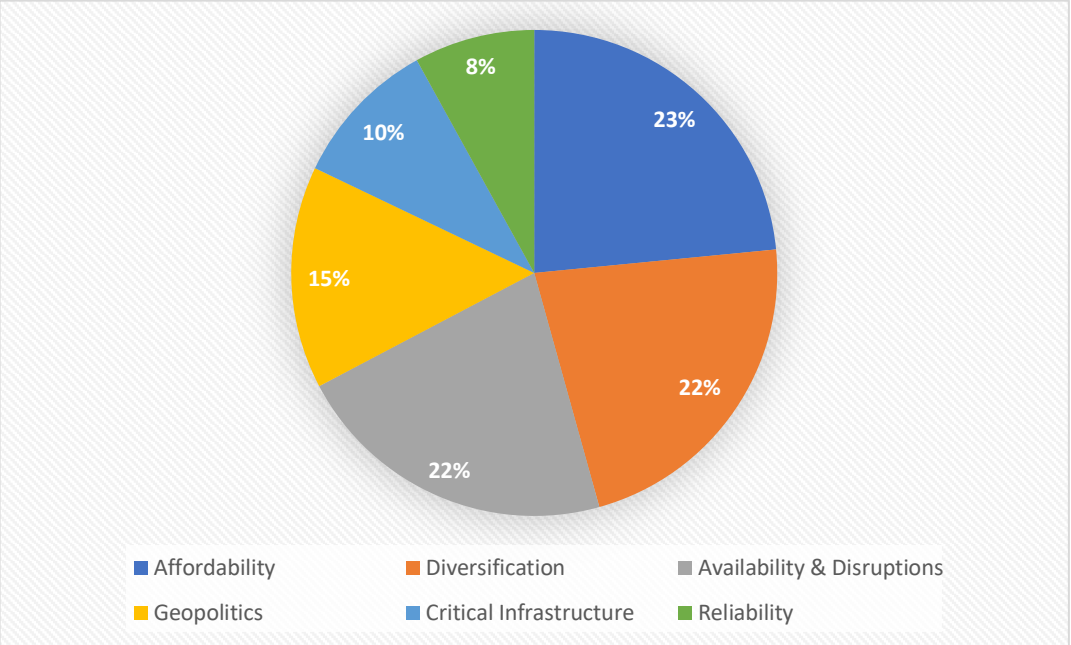


2.1. Security of Supply

Security of supply (SOS) is the highest indicator and is cited 62 times (Yergin, 2006; Asif and Muneer, 2007; Zweig and Jianhai, 2005; Field et. al., 2008; Kruyt et al., 2009; Winzer, 2012; Correljé and Linde, 2006; Chester, 2010; Downs, 2004; Umbach, 2010; Shahidehpour et al., 2005; Sovacool and Mukherjee, 2011; Sovacool and Brown, 2010; Bielecki, 2002; Helm, 2002; Cherp and Jewell, 2011; Ang, 2015; Yergin, 1988; Vivoda, 2010; Bahgat, 2006; Coq and Paltseva, 2009; Costantini et. al., 2007; Ciută, 2010; Löschel et. al., 2010; Baran, 2007; Rasul, 2014; Leung, 2011; Cherp and Jewell, 2014; Daojiong, 2006; Jansen and Seebregts, 2010; Bang, 2010; Sovacool et. al., 2011; Vivoda, 2009; Cohen et. al., 2011; Johnson and Boersma, 2013; Greene, 2010; Li, 2005; Vivoda, 2012; Belkin, 2008; Farrell et al., 2004; Månsson et. al., 2014; Johansson, 2013; Bollen et. al., 2010; Farrell and Brandt, 2006; Deese, 1979-80; Jewell et. al., 2014; Sovacool, 2011; Zhao, 2008; Lesbirel, 2004; McCollum et. al., 2013; Lilliestam and Ellenbeck, 2011; Bauen, 2006; Verrastro and Ladislaw, 2007; Johansson, 2013; Hayashi and Hughes, 2013; Garg and Shukla, 2009; Teräväinen et.

al., 2011)[6]. The main reason for SOS to be the most cited indicator is that it has existed since the earliest energy security studies (Frankel 1953; Lubell, 1961; Adelman 1972; Deese, 1979; Deese and Nye, 1981; Ebinger 1982; Yergin, 1988) and it consists of six more complex sub-indicators than the other main indicators. There is no clear definition for the security of supply because it could be available to use in different areas which include transportation of a good. From an energy studies perspective, the security of supply could be described as "trade most available and concentrate energy sources with reasonable price from reliable suppliers via using the safer route and necessary protection without cause any damage to national security or global order." The simple definition of security of supply includes availability, affordability, reliability, the security of infrastructure, geopolitics and indirectly disruption which happens because of supplier, route, lack of protection of infrastructure or diplomatic problems. To understand the aim of this thesis, the security of supply has vital importance. For that reason, each SOS sub-indicator will be carefully explained.

Table 3: Sub-indicators of Security of Supply



[6] The articles are sorted accordingly to the number of citation, highest to lowest.

2.1.1. Affordability

Affordability is mentioned 38 times as part of the security of supply. Affordability is a critical figure in supply security and energy security studies. The article of energy security (Yergin, 2006) which cites it the most states that *"fifteen years later, prices are high, and fears of shortages dominate energy markets*." Yergin put importance on the price of oil for importer countries and on shortages which are the results of the high energy prices. There is a direct relationship between energy usage and economic growth (Kraft and Kraft, 1978).

In many articles, affordability refers to the economy of the state which could be essential to define resources and supplier selection and to plan investments (Deese, 1979; Downs, 2004; Kruyt et al., 2009; Johnson and Boersma, 2013). The study of Cherp and Jewell, 2014, analyzes affordability by asking "*Affordability for whom?*" and says energy user expect low prices accordingly to their income to keep balance but the sellers want high prices for more profit. The dilemma of affordability of energy prices depends on different approaches. For example, energy importers could decrease the level of production to increase the price which would cause a capital shift from importer to the exporter (Lesbirel, 2004; Greene, 2010). The consumer could also increase or decrease energy prices. After the Fukushima accident, the price of LNG rose, but the price of uranium fell because Japan shut down nuclear power plants and focused on natural gas (Vivoda 2012; Hayashi and Hughes; 2013). On the other hand, too high energy prices could decrease the demand and increase the potential of new investments in the energy sector. The protection from high prices leans on diversification of energy sources which would minimize the risk of price volatility.

2.1.2. Diversification

Diversification is the second highest sub-indicator and is cited 36 times. Diversification can be explained with the well-known idiom "*Do not put all your eggs in one basket*." The main idea is if the basket will fall all your eggs will be broken. In energy studies, diversification is mentioned many times. Many scholars suggest that more diverse energy source, routes, and suppliers provide more security to the states (Yergin, 2006, 1988; Vivoda 2009, 2019; Cohen et al., 2011; Correljé et. al., 2006; Shahidehpour et al., 2005). Also, diversification of clients increases the security of

exporter countries. According to Yergin (2006) diversification has started with Churchill's decision on oil and is still a core element of energy security. For Sovacool and Brown (2010), diversification includes three dimensions, first the diversification of sources, second the diversification of suppliers which protects from domination or using energy as a weapon by the exporter and the third one is the diversification of the energy infrastructures inside the country which provide an extra defense line against hostile attacks.

The diversification of energy sources is limited. Vivoda (2009) argues that there are 6 limitations on oil diversification for an importer country which are

- its geographical position which could increase shipment prices or causes hijacking
- its political relationship with exporter countries
- the availability of suppliers
- the existence of adequate infrastructure for satisfying demand
- the refining capacity of the importer shift it to more suitable sources
- the power to boost investment -or FDI- in the oil sector in exporter countries to increase the availability and ability to support oil exporter countries with political, military, and other ways (Vivoda, 2009).

The study of Vivoda (2009) focusses on oil, but the results are practicable for other energy sources such as natural gas or uranium. Kruyt et al. (2009), argues that diversification of energy sources could protect countries from disruptions.

Electricity generation should be diversified for more security. In 2017, 23% of the total electricity generation in the world was produced from natural gas and 38% was produced from coal (BP, 2018). The accelerating share of natural gas in electricity generation increases the dependency of exporter countries. The diversification of natural gas is a key for energy security and has been repeatedly argued by scholars in recent years (Cohen et al., 2011; Vivoda 2019; Biresselioglu et al., 2015; Belkin, 2008). In addition to natural gas, environmental concerns push states towards renewable energy sources which increases fee and causes reliability issues (Sovacool et al., 2011). At the bottom, diversification is a significant part of supply security which shapes states' policies in the international area.

2.1.3. Availability and Disruptions

The availability of the energy source means to reach the source without any substantial physical disruption and consume or transform that energy into usable goods such as gasoline, electricity etc. (Ang et al., 2015; Cherp and Jewell, 2014; Winzer, 2012; Yergin 2006, 1988; Sovacool and Mukherjee, 2011). Sovacool and Brown (2010)'s study considers dependency on foreign suppliers as part of the availability sub-indicator. The argument of Sovacool and Brown (2010) is a logical one because of the high level of dependency on the foreign supplier or energy source jeopardize the security of the state. The importance of the availability of energy sources in an emergency which causes deficiency of sources, and able to use that available energy source are also part of the availability indicator (Löschel et al., 2010; Turton and Barreto, 2006).

In 1973, oil importer countries could not get a shipment from OPEC member states which endangered their national security (Yergin 1988; Deese, 1979-80). This oil embargo of OPEC verifies Löschel et al., (2010) and Turton and Barreto (2006) because if the importer countries had sufficient regional sources, the price of oil would not have escalated that much. Another example was in 2006 in Ukraine which is a gas transit country between Russia and Europe. The insecurity of gas supply has been addressed by scholars since then (Coq and Platseva, 2009; Löschel et al., 2010; Baran, 2007; Belkin 2008). Baran (2007), argues that there is a lack of availability of gas sources other than Russia due to the absence of transformation methods. However, he suggests investing into Caspian gas and transferring it via Turkey and the Black Sea to Europe for increasing energy security. In 2008, Belkin started discussing the importance of LNG (liquefied natural gas) and focusing on North Africa to diversify the sources of energy.

2.1.4. Geopolitics

Geopolitics is the third sub-indicator which explains the relationship between exporter and importer countries as well as transit countries. Geopolitics of energy is defined by Skeet (1996) as "*the effect that the location of resources has on the politics of states"*. As mentioned earlier on Vivoda's (2009) limitation of diversification, geographical position of the countries increases the price of the energy sources which

could change the approach of the states. The political stability of the exporter country and its position in the international area are important. Kruyt et al. (2009) linked geopolitics to acceptability which is also stated in the Asia Pacific Energy Research Centre's (APERC) energy security report in 2007. In the report, geopolitics refers to the lack of access to oil producers into oil fields because of political instability (APERC, 2007). For example, Venezuela has the world largest oil reserves, yet political instability of the country limits its oil trade and foreign direct investments. In addition to that, Umbach (2010) suggests that exporter countries should promote stability in importer and transit countries or regions to ensure supply security. Kruyt et al. (2009), mentions geopolitics as a hard to analyze and suggests focusing on energy or economic perspectives which in turn could help to identify geopolitical issues.

2.1.5. Critical Infrastructure

Critical infrastructure is the fifth sub-indicator of supply security which is cited 16 times in 65 articles. According to the US Department of Homeland's "Homeland Security Presidential Directive 7", the energy sector has 16 critical infrastructures. The Directive states that "*Critical Infrastructure Security and Resilience advances a national policy to strengthen and maintain secure, functioning, and resilient critical infrastructure"* (DHS, 2019). Helm (2002) argues that energy infrastructure has significant importance for the security of supply of energy sources which includes electricity, gas and oil infrastructure. According to Farrell et al. (2004), oil is more secure than natural gas and natural gas more secure than electricity. The study of Farrell et al. (2004), shows that attacks on oil increase the prices, but it could be hedge by national stocks or diversification. The vulnerability of natural gas comes from its form which is not easy to transport or stock like oil.

On the other hand, electricity is open to hostilities, and electricity infrastructures can be attacked via physical or virtual means. This can be prevented by diversifying electricity companies (Farrell et al., 2004). Nuclear energy is the less vulnerable but more exciting target for hostile agents. The reactors should be secured against terrorist attacks and even plane crashes which is the biggest nightmare of the US after 9/11 terrorist attacks (Holt and Andrews, 2009). In 2017, 148 successful terrorist attacks happened against energy infrastructure in the world.

Natural disasters are also a danger to the energy infrastructure, e.g. Hurricane Catarina, The Great East Japan Earthquake (Yergin, 2006; Hayashi and Hughes, 2013; Vivoda 2012). Månsson et. al. (2014) gives three dimensions of infrastructure security; reliability of infrastructure which is being well operated in long-run, vulnerability and robustness of infrastructure which is the durability level of the system against instability or external disturbance, and resilience of infrastructure which is the speed of reaction of the system against instability. Winzer (2012) offers three different risks; technical risk, personal risk, and natural risk. These three risks against supply security cover security of critical infrastructure, poor governance and lack of availability of energy sources because of exhaustion or natural disaster.

2.1.6. Reliability

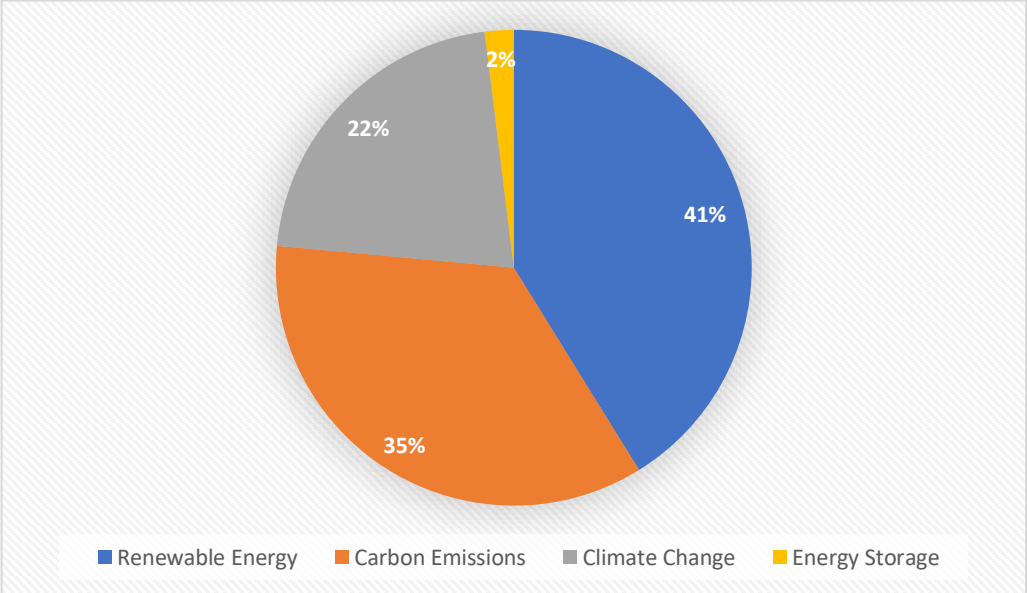
In 1973 when energy security has attracted attention, states put more effort to find reliable suppliers because oil embargo showed that reliability is more important than affordability. The academia focused on the reliability of the supplier inside the security of supply and mostly mention it as "*reliable energy, supply or supplier, and access or infrastructure"* (Bielecki,2002; Florini, 2010; IEA, 2006; IIASA, 2009; Kalicki and Goldwyn, 2005; Muller-Kraenner, 2007; Omorogbe, 2004; Sovacool, 2007; Yergin, 2006) . Sovacool (2011), classifies reliability as "*robust, diversified, energy value chain; adequate reserve capacity, protection from terrorist attacks and political disruptions; adequate information about global energy markets*". According to his categorization, reliability includes critical infrastructure security, diversification, availability, and geopolitics. The multi-disciplinary of energy security studies force scholars to compound different aspects into main indicators (Winzer, 2012; Cherp and Jewell, 2014; Hughes, 2009). For reliability, there is no clear definition. The explanation of reliability could be "getting energy sources from a supplier without political or physical disruptions."

2.2. Environment (Acceptability)

The second main indicator analyzed in this study is the environment (acceptability). The environment is referred to 34 times in 65 articles. The sub-

indicators of the environment are Renewable Energy, Carbon Emissions, Climate Change and Energy Storage. As seen in Table 3 Renewable Energy and Carbon Emissions have the highest citation rates. The acceptability is an energy security indicator for environmentally friendly use. The acceptability term has been suggested by APERC and is part of the 4A's energy security phenomenon (APERC, 2007). Early studies of energy security (Deese, 1979; Bohi and Quandt, 1984; Miller, 1977; Krapels, 1980; Lieber, 1980; Ebinger, 1982) did not mention environmental aspects of it. The pollution due to fossil fuels was already visible in the 1950s in London. The Great Smoke of London was responsible for the death of 12.000 people (Corton, 2017). This event pushed lawmakers to pass of Clean Air Act 1956 which is accepted as a milestone in environmental preservation (Brimblecombe, 2006). The only comprehensive study on energy security concerning environment has been conducted by D. Yergin. In this study (1988), environmental issues such as climate change and pollution are presented as new crucial parts of the energy topic around the world. Also, he gives the Chernobyl Disaster as an example of nuclear energy's negative effect. He argues that energy efficiency and natural gas could be a good alternative.

Table 4: Sub-indicators of Environment (Acceptability)



The linear relationship between economic growth and energy usage will increase the risk for the environment (Asif and Muneer, 2007; Yergin, 1988). The increasing demand for energy could be satisfied with renewable energy. Jacobson (2009), argues that renewable energy sources are enough for the world's total energy

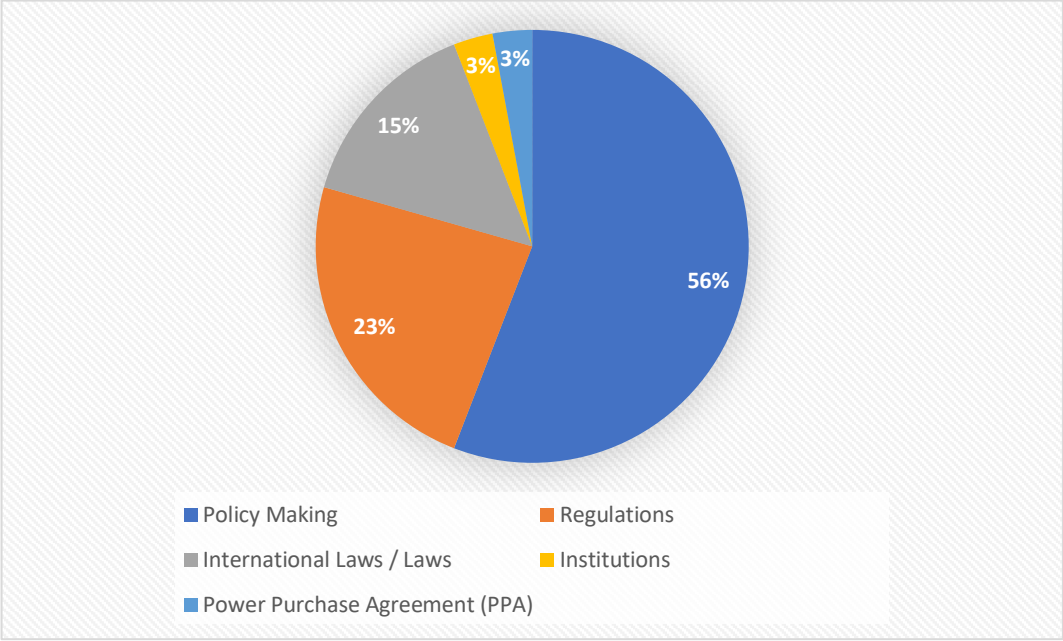
demand without any harmful effect on the environment and it could prevent or delay climate change. Also, Reedy et al., (2008) argue that the biomass would help to increase energy security and the preservation of the environment. The consumption of renewable energy increased by 69.4 mtoe in 2017, but not as much as the use of natural gas did: 84.9 mtoe (BP, 2018). The literature agrees that environmentally friendly sources should be a part of energy security but the level of it is still an on-going debate (McCollum et. al.,2013; Bauen, 2006; Karp and Richter, 2011; Teräväinen et al., 2011). Bollen (2010), suggests that the combination of environmental protection and energy security policies will decrease the level of dependency on imported energy sources. The availability of renewable energy in every state makes it easier to implement these technologies, but the affordability of renewable energy sources is challenging (Bauen, 2006). Nuclear energy lost its credibility after the Fukushima Daiichi accident in Japan. However, the increasing level of emission and climate change keep nuclear energy on the agenda of states. The study of Teräväinen et al. (2011), analyzes the position of nuclear energy in three European countries (the UK, France, and Finland) and all countries see nuclear energy as saver from foreign dependency. This study shows that climate change could boost renewable energy consumption but in the eyes of the state economically feasible and security promoter projects like nuclear power plants are still more valuable. The main problem in front of renewable energy sources is that the current infrastructure is designed for fossil fuels which provide low-cost energy to consumers. The implementation of renewable energy plants will be feasible when energy demand and fossil fuel prices will sharply rise (Verrastro and Ladislaw, 2007).

2.3. Governance

Governance is the third main indicator and is referred to 25 times. Its most cited sub-indicators are Policymaking and Regulations. Policymaking is a similar concept to energy governance but also includes indirect policies such as forest preservation. The regulations represent a small portion of the state energy usage policies. In Table 5, the percentage of all sub-indicators, which can be international or internal laws, institutions, power purchase agreement, and market liberalization are given.

Energy security is a part of energy governance and national security because the deterioration in energy security is caused by energy governance but jeopardizes national security. According to Correlje and Linde (2006), energy policy includes 'low supply cost', 'security of supply and dispersion of risks', and 'environmental considerations'. Scholars suggest that energy policy is interrelated with foreign relations, national security policies, trade agreements, and environmental policies (Correlje and Linde, 2006).

Table 5: Sub-indicators of Governance



In this thesis, foreign relations are examined under geopolitics and is assessed separated from the environment. Conservation of energy in a case of emergency is an excellent example of the governance indicator. In1973, the western countries tried to decrease demand with conservation policies (Yergin, 1988; Deese, 1979). Shutting down the nuclear power plants after the Fukushima Daiichi accident and shifting to natural gas (LNG) is another example of energy governance (Hayashi and Hughes, 2013; Vivoda 2012). The study of Teräväinen et al. (2011) shows that energy governance is not only affected by state-designed policies but also by necessary energy policies which are decided by governments, introduced or sale to citizens with other components such as environmental preservation and national security.

2.4. Energy Efficiency

As seen in Table 2, energy efficiency is the least referred indicator in the literature. Energy Efficiency has one sub-indicator which is energy intensity and is cited in one article. Energy intensity always coexisted along energy efficiency. For that reason, there no need to separate them as main and sub-indicator. Most of the studies mentions energy efficiency with energy conservation or part of the solution in fight against climate change or dependency (Yergin, 2006; Sovacool and Brown, 2010; Ang et. al, 2015; Leung, 2011; Daojiong, 2006; Sovacool et. al., 2011; Hughes, 2009; Farrell and Brandt, 2006; Bauen, 2006; Verrastro and Ladislaw, 2007). The DOE states that energy efficiency "*improves when a given level of service is provided with reduced amounts of energy inputs or services are enhanced for a given amount of energy input*." Energy efficiency is to do the same or more task with less, or the same amount with the help of regulations or policies such as replacing different energy sources or just changing routines (Sovacool and Brown, 2010; Ang et al., 2015; Hughes 2009).

The energy efficiency regulations require capital to implement policies and support long-term energy security (Hughes, 2009). Daojiong (2006), argues that energy efficiency could start with new policies and efficiency will decrease the level of foreign energy which also supports the economy of China. Another study (2010) argues that technological improvements would promote energy efficiency. Abu-Sharkh (2006), states that micro-grids would increase efficiency by decreasing the level of unusable heat. Yergin (2006), focuses on conservation and argues that energy efficiency helps to gain more economic power for the state. This is a rational thought because the efficiency of energy sources decreases energy consumption. Energy intensity is "the amount of energy used in producing a given level of output or activity" (DOE, 2019). The impairments in energy efficiency will decrease energy intensity. Ang et. al. (2015), claims that diminution of energy intensity will promote the economy of the state and openly supports Yergin's claims.

The indicators identified in this study and part of the methodological framework, are used to analyze the two cases of this study: the South Stream Gas Pipeline and the TurkStream Gas Pipeline. However, the application of all indicators is not necessary to reach a sufficient conclusion. Thus, only security of supply

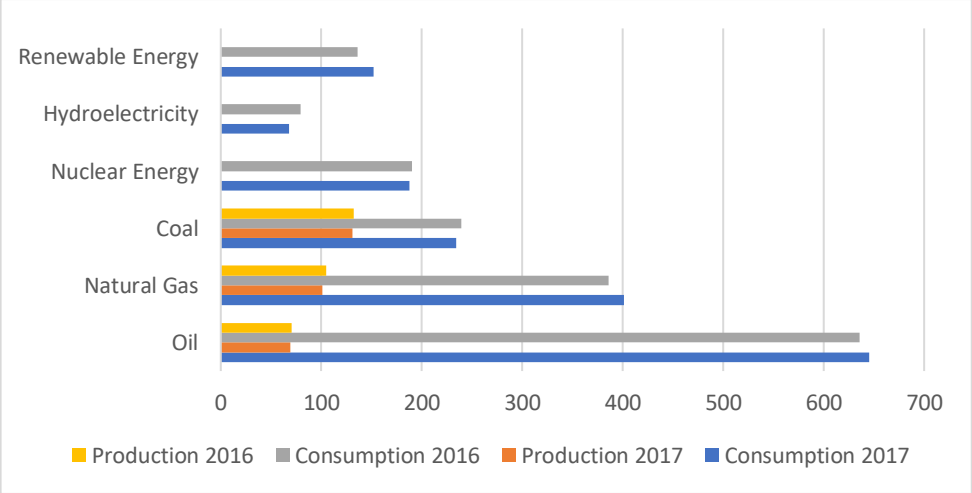
indicators, with its 6 sub-indicators, will be used for our analysis of the two pipeline projects.

CHAPTER 3

European Union's Energy Profile

The European Union (EU) is the third biggest energy consumer in the world after China and the United States (BP, 2018). The journey for an integrated Europe started with six European countries: France, Germany, Italy, Belgium, the Netherlands, and Luxembourg. In 1952, the Europe Coal and Steel Community (ECSC) which is the root of the EU has been established. The ECSC was established to limit the risks for the use of coal and steel by a single country to wage war on others (McNamara and Meunier, 2007).

Table 6: EU's Energy Production and Consumption in 2016 and 2017.



Source: BP Statistical Review of World Energy

The rising number of member states has an exponential effect on the EU's economy, its industrial outcome, its population but also raised its energy consumption. In 2017, the EU's primary energy consumption was 1689,2 mtoe which rose 1,6% from 2016. As seen in Table 6, the EU consumed 645.4 mtoe of oil, 401.4 mtoe of natural gas, 234.4 mtoe of coal, and 187.9 of nuclear energy in 2017 (BP, 2018). They were the second biggest consumer of oil, natural gas and nuclear energy in the world. However, the EU has an energy deficit in terms of self-sufficiency. According to the 2017 data of BP, the EU, imported 90% of its oil demand, 80% of the natural gas, and 64% of the coal (Eurostat, 2018). The consumption of oil, natural gas, nuclear energy and renewable energy increased in 2017 (BP, 2018). The IEA (2018) forecasts that, based on current policies, the demand for oil, natural gas, and coal will have risen

globally and reach a peak in 2040. The forecast also shows that with current policies the share of the fossil fuels in the world will decline from 81% to 78% between 2017 to 2040 while primary energy consumption will rise by 27,6%. The demand in the EU for fossil fuels will slightly decrease (IEA, 2018). The main outcome of the forecast is, that the EU will still be a key fossil fuel consumer in 2040.

The main consumers in the EU are Germany, France, the UK, Spain, Italy, Poland, and the Netherlands. Expect Poland all countries are developed western European countries which also aim to shift from fossil fuel to renewable energy sources (EU Commission, 2018).

The tremendous energy consumption requires a significant level of energy supply to satisfy demand. The hydrocarbon production of the EU is not enough to satisfy its own demand. According to BP's data, only 0.1% of oil, 0.4% of natural gas, and 0.5% of coal consumed in the EU are internally produced. As seen in Table 6, the production of oil and natural gas fall slightly in 2017. The notable fossil fuel producers of the EU are the Netherlands which produces natural gas; and the UK which produces oil and natural gas. However, neither the Netherlands nor the UK could export its fossil fuels and maintain fossil fuel importer positions. The EU Commission (2018) said that the energy dependency rate of the EU was 53,6 % in 2016. However, some member states have a better position than the EU in terms of energy dependency. The UK (35,3%) and Netherlands (45,8%) have the lowest dependency rates in the EU.

Thanks to its geographical position, the EU has access to substantial hydrocarbon producers such as Russia, Algeria, Libya, Middle Eastern countries, Azerbaijan, and other Eurasian countries. The main agenda of the EU's energy security should be the security of supply of fossil fuels, especially natural gas as its share increases since 2000 (BP, 2018; EEA, 2019). The main reason behind this suggestion is that the EU will still be dependent on fossil fuel in future and securing hydrocarbon imports will also mean securing EU member states (Bahgat, 2006; IEA, 2018). However, reaching these sources is not always easy.

Energy disruptions could happen due to economics, politics, security and many more different variables. Also, the reliability of energy suppliers is another concern growing in the EU. The Russian Federation and Norway are the biggest fossil fuel suppliers of the EU. 31,9% of the crude oil, 40,2 % of the natural gas, and 30,2% of

the coal came from Russia in 2016 (Eurostat, 2018). Also, 12,4 % of the imported crude oil and 24,9 % of the natural gas came from Norway in the same year (Eurostat, 2018). As a democratic country with common values, Norway is not perceived as a threat to the EU.

On the other hand, the critical dependence on Russia is the primary concern of the EU's energy security policies. To understand the core perspective of this study, the EU's energy profile has vital importance. The following part is separately providing EU's hydrocarbon resources and its energy policy.

3.1. Oil

According to the data from BP, oil is the primary energy source of the EU, as well as the world. The total oil consumption in the EU was 624,1 mtoe in 2016. The oil consumption of the EU decreased by almost 11% since 2000. Environmental policies in the EU has a positive effect on reducing its energy dependency. Investment in the energy efficiency sector, from production to consumption, decreased energy consumption.

The dependency rate of the EU on oil was 86,7% in 2016 (Eurostat, 2018). The biggest dependent member state was Latvia with %109,1; and Malta, Cyprus, Slovenia, and Luxembourg were following it. On the other hand, the lowest dependence rate was seen in Denmark with 2.8%, followed by the UK, Estonia, and Romania. Other member states which are not mentioned by name, have a dependency rate between 50% to 100%. According to Eurostat (2018), the primary oil suppliers of the EU are Russia (31,9%), Norway (12,4%), Iraq (8,3%), Saudi Arabia (7,8%), Kazakhstan (6,8), and Nigeria (5,7).

The most prominent oil consumer/importer is Germany which consumed 114,7 million tons and imported 91.1 million tons in 2016 (BP, 2018; Eurostat, 2018; BMWi, 2019). Russia with 35%, Norway and the UK were the three biggest oil suppliers in Germany. France, Spain, and Italy are the other noticeable oil importer inside the EU. The German BMWi (2019) argues that the influence of the OPEC was not as strong as in the 1970s. Other biggest oil consumers were France which consumed 46,9 million

tons, the UK which consumed 73,2 million tons, Spain which consumed 63,6 million tons, and Italy which consumed 58,6 million tons of oil in 2017 (BP, 2018).

The largest oil consumer sector in the EU is transportation with 47,8% of the total consumption in 2016. Non-energy usage (13,9%), aviation (9%), and shipping (8,2%) were the other most significant oil consumer sectors. The energy sector only used 5,6% of the total oil consumption. To decrease the share of oil in transportation EU Commission's Department for Mobility and Transport (DG MOVE) is working on alternative energy sources, energy efficient vehicles, and public transportation projects with member states (DG MOVE, 2019). With the decreasing amount of oil in transportation, the EU energy dependency will also decrease.

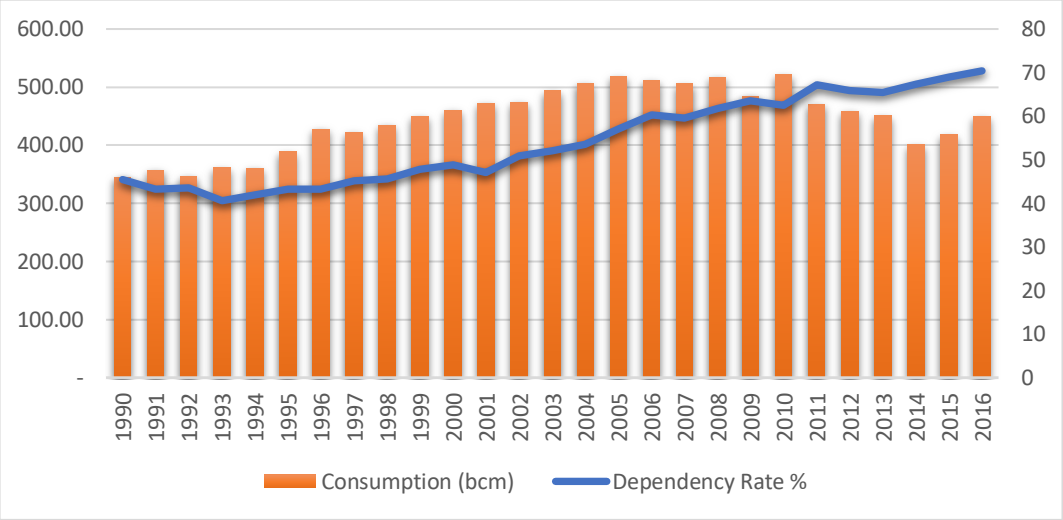
In 2016, the EU produced 69,2 million tons of oil which is almost 10% of the total oil consumption in the EU (BP, 2018). Four member states of the EU have a substantial amount of oil production. These are the UK, Denmark, Italy, and Romania. The UK produced 46,6 million tons, Denmark 6,7 million tons, Italy 4,1 million tons, and Romania 3,6 million tons of oil in 2017. Oil production inside the EU decreased by nearly 60% since 2000. Despite the high amount of dependence on imported petroleum products, the EU reduced its oil production. The main reason behind this situation is the decreasing oil reserves of the EU. The reserves-to-production ratio of the EU was nine years in 2017 (BP, 2018).

3.2. Natural Gas

The total natural gas consumption of the EU was 466,8 bcm in 2017 which is equal to 401,4 mtoe (BP, 2018). Thus,12,7% of the world gas consumption came from the EU. As mentioned above, the EU is an energy dependent. The natural gas dependency is not as high as oil, but still significant. The EU natural gas dependency rate was 70,4% in 2016 (Eurostat, 2018). As seen in Table 7, natural gas dependency has been increasing rapidly. In 1990, the dependency rate was 40,6%. The highest dependency rate has been seen in Belgium and Latvia which was 100,6%. Other highly dependent countries are, Estonia with 100%, Finland with 99,7%, Slovenia with 99,4%, Luxembourg with 99,3%, Sweden with 99,2%, Greece with 99,2%, and Portugal with 99,1%. The least dependent member states were the Netherlands with -32,7%, Romania with 13%, Croatia with 33,5%, Ireland with 40,1%, and the UK with 46,5%.

The biggest natural gas importer was Russia which exported 40,2% of the EU's 2016 natural gas. Russia is followed by Norway with 24,9%, Algeria with 12,1%, and Qatar with 5,5% of the total natural gas import of the EU in 2016 (Eurostat, 2018).

Table 7: EU Natural Gas Dependency Rate and Consumption



Source: Eurostat (2016); BP (2018)

The natural gas consumption of the EU was highest in 2010 which was 521 bcm. After 2010, natural gas consumption swiftly fell to 470,3 bcm and keep decreasing to hit the bottom in 2014. After that year natural gas consumption has been increasing rapidly and it was 466,8 bcm in 2017. The biggest natural gas consumer is Germany which consumed 84,9 bcm natural gas in 2016. The following countries are the UK with 81 bcm, Italy with 68 bcm, France with 44,6 bcm, and Spain with 29,1 bcm (BP, 2016). The average price of natural gas for household consumers in the EU id 0.0670[7] EUR per kwh and the highest price is in Sweden with 0.1223 EUR per kwh. The cheapest natural gas id sold in Hungary with 0.0347 EUR per kwh (Eurostat, 2019). The highest natural gas taxes and levies are in Denmark, Netherlands, and Sweden. The lowest natural gas taxes and levies are in the UK, Luxembourg, and Bulgaria. The average price of natural gas for non-household consumers in the EU was 0.0373 EUR per kwh in 2018's second half. People in the UK have access to cheap natural gas but other major natural gas producer of the EU, such as the Netherlands, keep prices high with taxes due to environmental targets (Eurostat, 2019).

[7] The prices shows 2018 second half and included all taxes and levies.

On the other hand, the EU has more natural gas reserve than oil. According to BP (2018), the EU has %0,6 of the world natural gas reserve and it equals to 1,2 trillion cubic meters. EU consumed 0,466 trillion cubic meters of natural gas in 2017. If the EU stops importing natural gas and does not increase its consumption, it would have natural gas reserves for only three years. The reserves-to-production ratio was 10 years for the EU. The considerable natural gas producers of the EU are, the UK with 41,9 bcm; the Netherlands with 36,6 bcm, and Romania with 10,3 bcm production in 2017. Germany, Italy, Denmark, and Poland also have natural gas production which represented 20,8 bcm in 2017.

The imported natural gas comes to the EU in two ways: via pipeline or via ships as liquefied natural gas (LNG). Germany imported 94,8 bcm natural gas via pipeline in 2017. Spain imported more than half of its imported natural gas via LNG shipments[8] from Nigeria (4,4 bcm), Peru (3,6 bcm), Qatar (3,5 bcm) and Algeria (2,4 bcm). Spanish natural gas dependency to Algeria[9] was %45. Germany's natural gas dependency on Russia was more than 60% (Eurostat, 2018; BP, 2018). Although the dependency rates are close, Spain has more alternative in terms of supply security. According to Biresselioglu et al. (2015), Spain was the most second secure state and was placed between Italy and France.

3.3 Coal and Nuclear Energy

The total share of coal in the EU's primary energy mix was %14 in 2017. The coal consumption has been decreasing since 1985 and the lowest amount was observed in 2017 with 234,3 mtoe. 6,3% of the total coal consumption is produced in the EU. The coal phase-out plan of the EU to satisfy environmental target is questioned by coal-dependent member states such as Poland. On the other hand, Germany, France, Italy, Netherlands and the UK already announced their phase-out dates (Simon, 2018; Beyond Coal, 2018).

[8] Spain also imported natural gas via LNG from various different suppliers which were the US, Trinidad and Tobago, Norway, Angola, Egypt, and other European countries.

[9] There is a 1400 km long pipeline between Algeria and Europe called as Europe Maghreb Pipeline (EMP) which passes from Morocco and reacing Spain, and distrupted to Portugal and France via internal pipelines. Spain exported 11,8 bcm natural gas via EMP.

The biggest coal consumer was Germany which consumed 71,3 mtoe of coal in 2017 and it was followed by Poland with 48,7 mtoe of coal (BP, 2018). Despite the decreasing popularity of coal among wealthy member states, developing members prefer it because it is an available resource and it is cheaper than natural gas while having the same reliability.

The total production of coal in the EU was not enough to satisfy its demand. The EU imported coal mainly from Russia, Colombia, Australia, and the US (Eurostat, 2018). EU's solid fuel dependency rate was 40,2% in 2016 and the biggest coal consumer Germany's rate was 49,6%. The dependency rate to coal helps to decide phase-out plans but countries like Poland which were not dependent or less dependent still want to consume more coal (Eurostat, 2018). Total production of the EU was 130,8 mtoe coal in 2017 which equates to more than half of the consumption (BP, 2018).

Nuclear energy has an important place in the EU. In terms of electricity production, the EU relies more on nuclear energy than coal and natural gas (BP, 2018). However, in primary energy consumption, nuclear energy was the fifth fuel resource. After the Fukushima disaster in 2011, countries promised to phase-out from nuclear energy too. According to data from BP (2018), there was no clear evidence about whether the EU will quit nuclear energy soon. Since Fukushima, Germany decreased %30 of its nuclear energy consumption which was the biggest cut among the member states (BP, 2018). The World Nuclear Association and the European Atomic Forum claims that the EU cannot achieve low carbon targets if nuclear power plants will shut down (WNA, 2018). The IEA (2018) argues that many of the nuclear power plants are too old and needs to be restored but the low electricity prices, low investment, and inexpensive operational cost of renewable energy sources make it difficult to shift funds to nuclear power plants. The IEA (2018), expects that Germany will close down all its nuclear power plants by 2022 and that other countries will follow.

3.4 Renewable Energy and Hydroelectric

The European Union has a leadership position in the fight against climate change. The EU has been decreasing the share of hydrocarbons and its carbon emission, it supports renewable energy with subsidies, and works on energy efficiency in various

sectors, including electricity generation. 31,3% of the total energy consumption of the EU is from renewable energy and 7,4% is from hydroelectric energy.

In 2017, the EU consumed 152,3 mtoe of energy from renewable energy sources which represent 9% of the total energy consumption of the EU and 67,8 mtoe from hydroelectric energy sources which represent %6 of the total energy consumption of the EU (BP, 2018). In total, renewable and hydroelectric energy contributed more than coal or nuclear energy (BP, 2018). Renewable energy consumption increased by 125% from 2010 to 2017. On the other hand, hydroelectric energy fell by %20 from 2010 to 2017. The most significant renewable energy consumer is Germany with 44,8 mtoe renewable energy consumption (24,4 mtoe from wind, 11,7 mtoe from biomass, and 9 mtoe from solar). France is the primary hydroelectric consumer in the EU with 11,1 mtoe in 2017 but fell by 17,8% since 2016. In electricity generation, renewable energy was the third energy source after nuclear energy and coal in 2017. With increasing investments and low-carbon targets, renewable energy could be the first electricity source in the future. According to the IEA (2018), more countries are announcing to promote renewable energy sources and in 2017 investments on low carbon was more than on fossil fuel.

CHAPTER 4

EU's Energy Security Strategy and Natural Gas Pipeline Projects

The EU is a weighty player in the energy market. In 2017, 12,5% of global energy was consumed by the EU (BP, 2018). EU's energy dependence rate was 53,6% and Eurozone's energy dependency rate was 61,9% which make them valuable to energy exporter or transporter countries (Eurostat, 2018). The EU has a leadership role in the fight against climate change. Adopting new policies, improving energy efficiency, and developing an awareness of the seriousness of climate change are the main targets of the EU. It is safe to declare that the presence of the EU for the energy market and energy-related areas is vital.

European Commission and the European Parliament reports show that the EU has two main energy targets which are linked to each other. Firstly, the EU wants unshakeable energy security which includes security of supply, diversification, and low energy dependence. The second goal in their agenda is shifting to a low-carbon economy with promoting renewable energy, energy efficiency, and technological breakthroughs. The second target, directly and indirectly, promotes the first one. More renewable energy and energy efficiency investments decrease energy consumption and give a chance to decrease energy dependency.

According to the European Commission, energy security means '*Uninterrupted physical availability of energy products on the market at an affordable price for all consumers'* (Sovacool, 2011). This definition underlines the four sub-indicators given in the methodology part. These are availability, the security of critical infrastructure, disruptions, and affordability. In 2014, European Commission published its European Energy Security Strategy which focused on energy source dependency, lack of diversification on natural gas and electricity supply, economic burden of energy imports, and effects of the increasing energy demand in the world. (European Commission, 2014)

All action plans point out the security of supply. The plan of the EU was to increase diversifications of source, accessing type and supplier, increasing availability of energy source in case of emergency such as disruptions with stocking or boosting production, replanning energy demand inside the country, supporting technological

developments for decreasing energy dependency, and more intensive integration of member states in energy union.

The importance of security of supply is repeatedly highlighted by the EU. In 2015, the EU established an Energy Union to ease the access of citizens of the EU to "*secure, sustainable, competitive and affordable energy*". The Energy Union shares the EU's energy security goals which are diversification of resources, integrated energy market, energy efficiency, low-carbon economy, supporting innovation and promoting supranationalism in energy-related topics. The final report on Energy Union (2019), focused on climate change targets of the member states and security of supply of gas and electricity in the EU. The European Commission defines the purpose of their energy policies as enabling European citizens to "*access secure, affordable and sustainable energy supplies"* (2019). The objectives of the energy strategy are identical with the ones of the Energy Union and the European Commission. The EU's energy strategy relies on three pillars which are called 2020, 2030, and 2050 energy targets. The main ideas behind the targets set by the European Commission are to reduce carbon emission, increase the share of renewable energy and energy efficiency.

The reports about energy strategy and the definition of energy security of the European Commission and the energy strategy of the EU show that security of supply is an established goal. The importance of the security of supply for the EU comes from its high energy dependency rate in hydrocarbons, especially natural gas. The importance of natural gas to shift to the low-carbon economy is undeniable. Several scholars (Dong et al,2017, 2018; Levi, 2013; Zhang et al, 2016; Pierce, 2012) and reports (Weissman, 2016; Frank et. a., 2009; McGlade et. al., 2014) underline the importance of natural gas to decrease carbon emission. On the other hand, some scholars (McJeon et al, 2014; Howarth, 2014) and reports (Loomis, 2018; Muttitt and Stockman, 2017) argues that natural gas is not a bridge for shifting to low-carbon because of the high carbon emission when extracting natural gas. Moreover, the decreasing price of renewable energy makes natural gas less preferable. Yet, IEA (2018) and BP (2018) energy reports show that natural gas and coal will still be consumed in future.

The security of supply of natural gas is the main priority in the security of supply agenda of the EU. During the EU-US energy forum in 2019, EU Climate Action

and Energy commissioner Miguel Arias Cañetea says that "*natural gas will remain an important component of the EU's energy mix in the near future as we move towards cleaner sources of energy"* (European External Action Service, 2019). He emphasized the importance of US LNG for Europe to improve the diversification of sources for a more secure supply.

The importance of natural gas is an undeniable fact for Europeans. High dependency on a single supplier jeopardizes the national security of member states. Scholars (Yergin, 1988, 2006; Lesbirel 2006; Li 2005; Cohen et al, 2011; Vivoda, 2009) underline the importance of diversification of energy sources. Security of gas supply of the EU leads them to diversify supplier. The EU tried to reach abundant natural gas fields in the Caspian Sea and the Middle East. The main motive behind this act was the Russian domination in the EU gas market.

To understand the main aim of this study the historical background of the EU natural gas supply security will be explained in the next part. Section 3 will include the analysis of the reasons behind the shift from the South Stream Project into the Turkstream.

4.1. EU's Natural Gas Supply Security

The EU natural gas production has never been enough to satisfy the demand of member states (BP, 2018). In 1992 when the Maastricht Treaty was signed, the EU imported 58% of its natural gas (BP, 2018). Since 1992, natural gas demand in the EU has been increasing and the EU is still significantly dependent on Russia and Norway. According to Maltby (2013), EU energy policy has four vital topics: dependency, affordability, acceleration in dependency because of the addition of new members which were post-Soviet states, and natural gas disruptions. The security of supply is one of the EU's energy policy pillars.

In 1998, the EU Gas Directive was signed. The aim of the directive was to liberalize the natural gas market of member states. According to the Directive (1998), gas production and gas transportation could not exist under the same roof. In 2000, the UK had a totally open gas market and other member states promised a higher level of liberalization in their gas market in the future (Directorate General for Energy and

Transport, 2000). The aim of liberalization was to increase competition and strengthen the gas supply of the EU by adding new suppliers into the system (Finon and Locatelli, 2002). The authors (2002), claims that the liberalization process of the EU helped Russia to gain power in the EU gas market. Yet, the lack of long-term deals clashed with the Russian interest. The Treaty on The Functioning of the European Union (2012) defines EU's energy policy aims as:

a) *"ensure the functioning of the energy market;*
b) *ensure the security of energy supply in the Union;*
c) *promote energy efficiency and energy saving and the development of new and renewable forms of energy; and*
d) *promote the interconnection of energy networks."*

This article stresses out the integrated aspect and security of the energy network inside the EU. However, energy security is seen as a part of national security and EU member states have different agenda for energy security. Here, a good example is the variances of member states energy mix. For example, EU energy policy requires low-carbon energy use which causes coal phase-out but Poland highly depends on coal in its energy mix (IEA, 2018). On the other hand, Germany consumes more natural gas than other members and rely on Russian gas which led them to closer relations with Russia (BP, 2018). The examples can be multiplied but the main argument is that the energy policy rests on particular interests rather than the Union. One point is certain. The EU is a natural gas dependent and almost all member states need natural gas as a bridge or main energy source of energy in the future.

4.2 European Union Natural Gas Pipeline Projects

4.2.1 Nabucco Gas Pipeline Project

To acquire a more secure gas supply, the EU started the Nabucco Pipeline Project in 2002. The main idea of the pipeline was the transfer Caspian and Middle Eastern gas to the European market (Erdogdu, 2010). The pipeline project has been signed by partner countries which they were also transit countries Turkey (BOTAS), Bulgaria (Bulgargaz), Romania (Transgaz), Hungary (MOL) and finished at Austria (OMV Edsgas) (Aras and İşeri, 2009). The planned capacity of Nabucco was 31 bcm

per year which covers only 6.5% of the EU's gas demand and represented 13.2% of its imported gas (BP, 2018). The pipelines main aim was clearly diversification and decreasing the domination of Russia in European natural gas (Aras and İşeri, 2009; Erdogdu, 2010).

According to Erdogdu (2010), newly found gas reserves in Turkmenistan and the rejection of Russian influence in this country and in Azerbaijan increase the feasibility of the Nabucco project. However, the author (2010) underlines that the instability in Iraq, the political situation of Iran and Russian hostility against Nabucco project, jeopardized the financing of the project and instead the South Stream project was proposed by Russia. On the other hand, Barysch (2010), says that Turkmenistan was not ready to jump into the Nabucco because of China looking to buy gas from them. The author states that the alternative projects to Nabucco were ITGI (Azeri Gas), TAP (Azeri Gas), White Stream (Azeri Gas) and CNG and LNG (2011). The main objective of all alternative plans was to reach Azeri gas and transfer it via the Black Sea by bypassing Turkey or via Turkey. For instance, the TANAP project which is the Turkish part of the Southern Gas Corridor, was finalized and have been supplying gas since 2018 to Turkey (Temizer and Erdogan, 2018). The TANAP connected with ongoing TAP project which will transfer Azeri gas to Italy via Turkey (Socar, 2018).

Map 1 Nabucco Gas Pipeline Project (Source: Gulf Oil and Gas; Available from: www.gulfoilandgas.com/webpro1/projects/3dreport.asp?id=102885)

In addition to Erdogdu's (2010) hopeful reasons for Nabucco, the ongoing Ukraine-Russian natural gas dispute increase the importance of the diversification of gas supply. In 2008, Russia increased the price of natural gas to Ukraine around 40%, which caused disputes between the two states (Pirani et al., 2009). The unsuccessful negotiation between Putin and Yushchenko led Russia to decrease the pressure of the pipeline gas of Ukraine. After that, Ukraine threatened Russia of cutting the gas pipelines going to Europe, which was passing over Ukraine (Pirani et al., 2009). The reality was that Ukraine's gas consumption relied on Russian import and Russia depended on Ukraine, Belarus and Moldova for exporting gas to Europe (Nygren, 2008; Stern, 2006).

The natural gas dispute between Ukraine and Russia has been existing since 1990s because of Ukraine's unpaid gas bills and the cuts in Ukraine's gas (Stern, 2006). For instance, serious disruptions occurred in 2004 and 2006 which caused shortages in Europe (Stern, 2006; Kovacevic, 2009). The results of this crisis are a good example of the lack of diversification of suppliers and routes. After that crisis, the EU turned its face to the security of supply.

In 2000, Russia proposed an alternative gas pipeline to Europe which was bypassing Ukraine. However, because of the fact that there would be no change in Europe's import volume and Russia's export capacities, Russia did not want to handle all costs of the pipeline (Stern, 2006). In 2012, the Nabucco pipeline project has been agreed upon. However, the influence of Russia in alternative supplier countries, which were CIS members, and the disagreements between Nabucco shareholders led to the suspension of the project. Also, Azerbaijan and Shah Deniz Consortium announced that the 10 bcm gas to Nabucco project could be supply in 2017 but Turkey's wish to transfer Shah Deniz gas through own soil and pressure about it to Azerbaijan affected the Nabucco project as the EU did not want to invest money in the project until exporters gave the guarantee to supply enough gas (Sidar and Winrow, 2011). Despite some negativities, Nabucco would still be a secure gas route for the EU. Barysch (2010), also argues that Nabucco should remain as a priority for more a secure and less dependent Europe. After that, Nabucco shrink and turn to the Southern Gas Corridor project (SGC).

4.2.2. Southern Gas Corridor (SGC)

Southern Gas Corridor (SGC) is the common name of the three gas pipelines which provide transformation of Caspian natural gas to Europe. The natural gas is extracted from the Azerbaijani part of the Caspian Sea by BP. The gas field is known as 'The Shah Deniz' which has been discovered in 1999 and is in operation since 2006. There are three pipelines in SGC and two of them were constructed to transfer Caspian gas to Europe. The first one is the South Caucasus Pipeline (SCPX) which links Azerbaijan and Georgia. The second one is called the Trans Anatolian Natural Gas Pipeline (TANAP) and passes over Turkey and ends at the Greek border. The third pipeline project is called the Trans Adriatic Pipeline (TAP) and will connect Turkey, Greece, Albania and Italy. The pipeline construction is currently ongoing under the Adriatic Sea and will be completed in 2020.

Map 2 Southern Gas Corridor (Source: Trans Adriatic Pipeline AG; Available from: www.tap-ag.com/assets/07.reference_documents/english/maps/southern_gas_corridor.png)

The South Caucasus Pipeline (SCP) is operating since 2007 and transfers 6.6 bcm of natural gas to Turkey. The existing pipeline which is also known as Baku-Tbilisi-Erzurum Gas Pipeline expanded its capacity to 20 bcm (Republic of Turkey Ministry of Energy and Natural Resources, 2017). Turkey has a key role in SGC because the longest part of the project passes through Turkey (BP, 2019). The TANAP agreement signed in 2011 guarantees 6 bcm of gas supply to Turkey. Its construction finished in 2018 (TANAP, 2019). Turkey has played a vital role to create a political understanding between involved parties in the SGC (Morningstar, 2018).

Turkey aims to be the only energy trading hub which has the geopolitical advantage, has a liberalized energy market and a functional natural gas trade system (EPIAS, 2018). In addition to the gas pipelines, Turkey has four LNG terminals, two of them floating storage and regasification units (FSRU). Turkey has also access to Russian and Iranian piped gas without disruption. Yesevi (2018) argues that Turkmen gas could be transferred by TANAP to Europe. TANAP is more attractive to the EU than Nabucco because there is no enormous number of parties and negotiations without Russia will decrease Russian influence in the Caspian (Cain et al., 2012).

As mentioned in the Nabucco part, the most reliable partner of the Caspian region is Azerbaijan but it is questioned by Russia about its gas reserve capacity. According to BP (2018), Azerbaijan owns 1.3 tcm which will be consumed in 74 years[10]. The significance of the Azeri gas is incontrovertible for the EU. The negotiation of TAP began in 2002 and aims to transfer 10 bcm gas to Europe[11]. For the EU, SGC will help to reduce dependency on Russia. Yet, the TAP will satisfy only 2% of the EU's gas demand (Weiss, 2014; BP, 2018). However, the Caspian Sea contains the world third biggest natural gas and oil reserves which create future opportunities for the EU to achieve greater gas deals from the Caspian (SOCAR). Biresselioğlu (2011) claims that the Caspian Sea is an opportunity for EU's energy security but the lack of presence and influence in Caspian states decrease the chance of it. The EU needs the SGC to establish a more secure, diversified and competitive energy market. The SGC requires a tighter relationship with Turkey which could benefit from the EU to achieve its energy hub goal (Aykın et al., 2017).

The SGC is publicly supported by the European Commission. The Budget and Human Resources Commissioner Oettinger said Azerbaijan is accepted as a strategic partner and that the EU wishes to increase the capacity of the SGC (Gotev, 2019). Sartori (2013) argues that Azerbaijan is gaining more power in the EU gas market. He also claims that Russia keeps its favored position in Southeastern Europe because the SGC did not endanger its position. The Nabucco project was a real threat to Russia. In addition to the positive position of Azerbaijan, at the beginning of 2019, BP announced

[10] The reserves-to-production ration is 74.4 years according to 2017 reserves and consumption.
[11] The total capacity of the system was 16 bcm but the 6 bcm consumed by Turkey.

they found a new gas field which could bring new cards to table (Mammadova, 2019; Shiryaevskaya and Gilblom, 2019).

4.2.3 Nord Stream Gas Pipeline

Meanwhile, Russia suggested another pipeline to Europe which is Nord Stream Gas Pipeline. The Nord Stream transfers Russian gas to Europe without passing any transit countries. The pipeline starts from Russian Baltic Sea town Vyborg, passes through Finland's, Sweden's, and Denmark's exclusive economic zones and finishes in Germany's Greifswald town (Energy Charter, 2009). The biggest natural gas consumer and importer country of the EU, Germany, can finally reach Russian gas without disruptions. However, some parties argue that through the project Europe increases its dependency on Russia in terms of natural gas supply (Cameron, 2007) [12]. The author also (2007) states that "Russia's reputation as a reliable energy supplier would be fatally damaged if there was any attempt to use the BSGP for political security purposes. The EU is already looking to diversify its energy supplies." According to Whist (2008), Russia gained two options with Nord Stream. It can use Nord Stream as political leverage or in case of tensions with the EU, Russia can easily keep transferring gas to Germany while cutting other member states' gas. Nygren (2008) argues that "Putin used energy and transit dependency and Russia's state-controlled energy companies as foreign policy instruments against neighboring countries." The Nord Stream start transferring gas to Europe in 2011 via the first string (Gazprom, 2017). The second line of the Nord Stream under construction and expected to finish in end of 2019.

4.2.4. South Stream Gas Pipeline

In 2007, the Italian ENI and Gazprom announced the South Stream Gas Pipeline, which will transfer 31 bcm natural gas to Europe via the Black Sea to Bulgaria (Socor, 2007). According to Gazprom (2013), the shareholders of the South Stream Pipeline Project are the Russian Gazprom (50%), the Italian ENI (20%), the

[12] Directorate-General for Internal Policies, European Parliament's Committee on Petitions - The Nord Stream Gas Pipeline Project and its Strategic Implications.

German Wintershall Holding (15%) and the French EDF (%15). There were four different route alternatives for after the pipeline connects to Bulgaria. The first one goes through Serbia and Hungary, and Austria; the second one goes through Serbia, Hungary and Slovenia; the third one's first part goes through Serbia, Hungary and Austria, and the other part goes through Greece and Italy; the fourth route landed in Romania rather than Bulgaria and went to Serbia (Baran, 2008). According to an announcement of Gazprom (2012), South Stream Gas Pipeline will be connected to Bulgaria from the Black Sea and goes through Serbia, Hungary, Slovenia, and Italy. The pipeline will also extend to Bosnia and Herzegovina and Croatia. As seen at Map 3., Greece, Romania, and Austria are dismissed from the pipeline route. Baran (2008) argues that Russia could use energy as a weapon against Europe and South Stream will strengthen their hand.

Map 3 South Stream Gas Pipeline (Source: Euractiv; Available from: www.euractiv.com/section/energy/news/eu-us-promote-alternative-projects-following-south-stream-failure/)

Dempsey (2014), argues that there are three main motivations behind the South Stream: firstly, to bypass Ukraine, secondly to strengthen the primary gas suppliers' position in Southeastern and Central Europe, and thirdly the failure of the Nabucco Gas Pipeline project. The South Stream project is economically questionable. The

main reasons behind it are political (Dempsey, 2014). According to Barysch (2010), the most vital opponent of Nabucco was South Stream rather than the TAP, and Europeans had been thinking to make Russia a partner of Nabucco or combine Nabucco and South Stream, but it was impossible due to the number of countries. Socor (2007) claims that Turkey wanted to join the South Stream project via an extension of the Blue Stream, which is a direct gas pipeline from Russia to Turkey. However, Russia's primary objective was to bypass Ukraine and Turkey. In May 2009, Italy and Russia signed the South Stream deal. Russia also signed a deal with Greece, Serbia, and Bulgaria, which led them to start construction of the pipeline (Euractiv, 2009). In the following days Putin questioned the availability of natural gas for Nabucco and stated that "for starters, before investing billions of dollars in a pipeline, burying the money in the ground, they need to understand where the gas will come from for this pipeline" (Euractiv, 2009). Ukrainian prime minister, Mykola Azarov underlined that Ukraine was against the South Stream and claimed that Ukraine was a trustworthy transit country which had a greater gas supply capacity than Russia's upcoming projects (Euractiv, 2010).

In September 2009, the EU published the Third Energy Package which was seen as a threat to the South Stream project by Russia. With the new energy market legislation, the EU created a concept of 'unbundling'. The core of the unbundling is the separation of energy supplier from the energy network operator. For example, X company could not sell or generate energy while operating the transmission of energy. The reason for that is to prevent monopolies in the energy market (European Commission, 2011). According to the Third Energy Package, there are three different unbundling models. The first model is 'Ownership Unbundling' which forces to supplier company to sell its transmission operation and no company can own the majority of the shares of the transmission company. The second one called as 'Independent System Operator' and in this model, energy supplier company could own the transmission network but could not run the business, it has to find another company. The final model is 'Independent Transmission System Operator' and this model allows to own the transmission but it has the let it under the control of a subsidiary which has to be independent of the parent company (European Commission, 2011). The legislation was important for the South Stream project because Gazprom was the owner of the imported gas and the transmission network (De Micco, 2015).

The other significant change is the 'Third-Party Access' principle which gives the right to any energy suppliers to reach the transmission grid (European Commission, 2011). Third-Party Access threatens Gazprom's unchallenged position (De Micco, 2015). However, the legislation gave an exemption chance for future projects including these areas: unbundling, third-party access, and regulated tariffs (European Commission, 2011). Gotev (2012), argues that the European Commission did not support the South Stream because of no gain for EU's supply security. Stoyanov (2013), claims that Russia will not start the project without exemption is guaranteed by the European Commission. Bulgarian prime minister Boyko Borissov criticized the EU for being a hypocrite because it did not oppose Germany's Nord Stream project (Euractiv, 2012). Inter-governmental agreements (IGA) have been signed among the six EU member states affected from the Third Energy Package and Russia. These member states also asked the European Commission to solve the legal dispute (Euractiv and Reuters, 2014). The European Commission warned the member states on these IGA's which were breaches to the EU legislation (Stern, 2015). In addition, the European Commission highlighted the corrupt companies in South Stream which endanger Serbia's EU membership (Vihma and Turksen, 2015).

In March 2014, Russia annexed Crimea which caused the holding of the South Stream Gas Pipeline. Energy Commissioner Oettinger stated that the EU will not help the six members of the EU for negotiating on bilateral agreements with Russia (Euractiv, 2014c). Brussels warned Bulgaria about the South Stream project because of violation of EU rules and Barroso asked member states to be unified in energy security (Euractiv, 2014b). To accelerate the project, Bulgaria and Austria publicly supported it but Italy changed its position from necessary to not a priority in November 2014 (Natural Gas World, 2014). The next month, Gazprom chief executive Alexei Miller announced that the South Stream Gas Pipeline was cancelled due to lack of guarantees from Bulgaria and the European Commission (BBC News, 2014; Gotev, 2015).

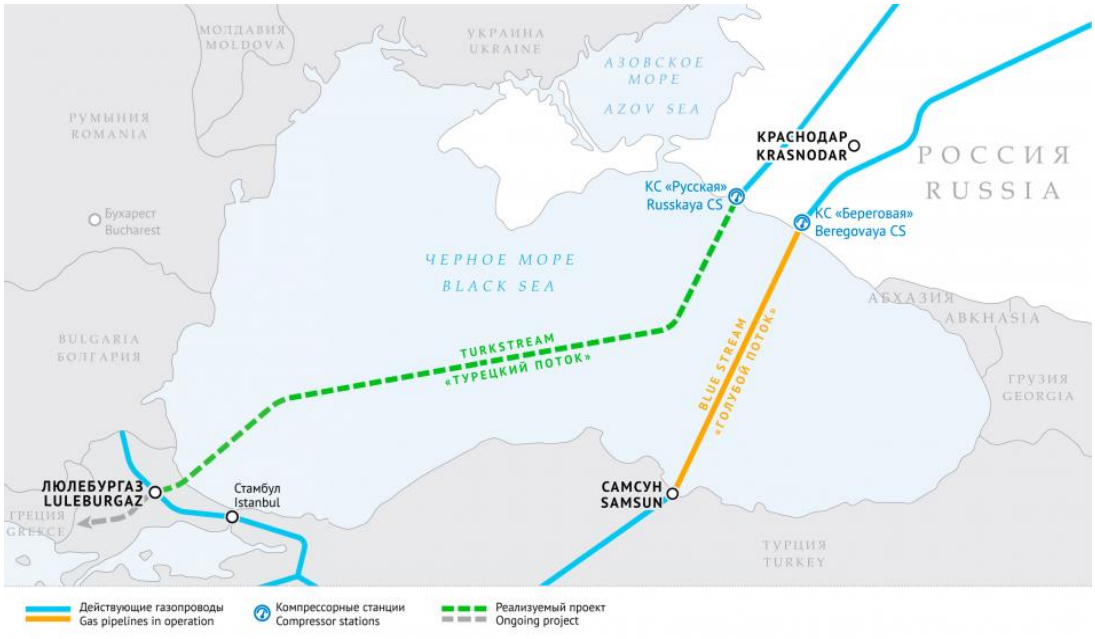
Stern et al. (2015), argues that before these natural gas disputes, Russia was accepted as a reliable supplier but its actions towards Ukraine decreased its credibility in the eyes of the EU. Several authors argue that the EU has to protect Ukraine's role as a transit country. The South Stream project has never been economically wise (FT, 2014). Thorpe (2014), claims that the EU did not need an extra pipeline from the same

supplier and the economic burden of the project was too much to handle while oil prices were decreasing. Russia lost its chance to gain more political power in Europe (Kozáková and Jirušek, 2016)

4.2.5. TurkStream Gas Pipeline

After the South Stream project was cancelled, Russia started to build a new gas pipeline to Turkey called the Turkstream. The memorandum of understating to construct the gas pipeline was signed in December 2014. However, the tense relationship between Russia and Turkey, especially over Syria, caused delays in the project. In November 2015, Turkey shut down a Russian jet which was breaching its airspace which stopped the natural gas project (Borger, 2015). A few months later, the decreasing tension between the two states and a meeting between President Putin and President Erdoğan in China helped to restart the negotiations on Turkstream (AA, 2016). In October 2016, an intergovernmental agreement was signed. The construction of the pipeline will be completed by the end of 2019 (Saglam, 2019).

Map 4 TurkStream Gas Pipeline (Source: Gazprom; Available at: www.gazprom.com/projects/turk-stream/)



Turkstream Pipeline project includes two pipelines (TurkStream, 2019). According to Tunçalp (2015) and Yesevi (2018), initially TurkStream had four gas pipelines each of them carrying 15.75 bcm with total capacity is 63 bcm. However,

Russia decreased the number of lines to two (Gurbanov, 2017). Also, Erşen (2016), said in a television interview, that Russia decreased the number of lines because the EU did not want to increase the share of Russian gas in the market. There are already two natural gas pipelines between Turkey and Russia, Blue Stream and West Line[13]. Blue Stream is a direct gas pipeline which supplies 16 bcm of Russian gas to Turkey. On the other hand, West Line carries 14 bcm and pass through Ukraine, Romania and Bulgaria (Ministry of Energy and Natural Resources, n.d.). The first line of the TurkStream will be a rerouting of the West Line. The purchasing agreement of gas through West Line will end in 2019. Yet, Turkey will consume the same amount of natural gas without risk of disruptions from transit countries. According to TurkStream's website (n.d.), the older West Line is unreliable and inefficient, therefore TurkStream will be a key pipeline for Turkey, and South and Southeastern European countries. According to Gurbanov (2017), Turkstream faces economic difficulties such as sanctions of Russian companies, and low oil prices. This situation put Gazprom into a difficult situation because the construction of Turkstream's first line will cost around 6 billion euros. The author highlights the importance of Turkey for Russia and Europe as an energy route. This could help Turkey achieve its energy hub target (Gurbanov, 2017).

TurkStream's second line is connected to Europe. Gazprom's plan is to transfer gas through Turkey, Bulgaria, Serbia and Hungary (Reuters, 2019). However, as mentioned above, the Third Energy Package is a problem for Russia to conclude the second phase of TurkStream. After the demise of the South Stream Gas Pipeline, Russia chose Turkey as an entry point to Southeastern and Central Europe. In addition to legal walls, the EU and the US do not want Balkan states to consume more Russian gas via the TurkStream (Kalan, 2017). US Energy Secretary Rick Perry said to parties of the TurkStream to dismissing the project because it will increase the Russian political power in the region (Gotev, 2018). In 2019, US Ambassador Richard Grenell sent a letter to 'several businesses' in which the US sanctions to companies working with Gazprom in pipeline construction was mentioned (Gotev, 2019). According to Serbian Gas, TurkStream will respect EU laws (Spasic, 2018). The then Russian Prime Minister Medvedev underlined the importance of the EU allowing TurkStream to take

[13] Trans-Balkan Pipeline called as West Pipeline by Republic of Turkey Energy and Natural Resources Ministry.

the next steps (Hurriyet Daily News, 2019). Russia does not want another failed project in Southeastern Europe.

CHAPTER 5

Analysis of South Stream Gas Pipeline and TurkStream Gas Pipeline by Security of Supply Indicator

In this section, SSGP and Turkstream gas pipelines will be analyzed through a security of supply perspective, the most cited indicator in energy security articles. The security of supply main indicator includes 6 different sub-indicators which are affordability, diversification, geopolitics, availability and disruptions, critical infrastructure, and reliability. The pipelines will be examined under each sub-indicator.

In 2007, Memorandum of Understanding for SSGP was signed between Russia and Italy. However, the projects have been dismissed by Russia due to Bulgarian ineffective politics in the EU and political situation between Russia and the West. The annexation of Crimea by Russia created a reason for the EU to turn down Russia and to put pressure on shareholders. After that, Russia started the TurkStream as the next project over SSGP. This analysis will demonstrate which project is the most favorable for the EU in terms of security of supply.

5.1. Affordability

The first indicator is the affordability. In this section affordability is the hardest sub-indicator to be analyzed. The main reason is the price of gas is not shared with the public and is accepted as a trade secret. For that reason, the results of the analysis will be an approximation based on the available data.

Affordability for whom? ask by Cherp and Jewell (2014) and the answer is for consumers: *"Low enough to ensure the energy import bill is small compared to export earnings"*. On the other hand, the answer is different for the supplier: "*High enough to ensure sufficient profitability for energy companies and investors*" (Cherp and Jewell, 2014). Affordability is important for both sides and should be equally beneficial for further relations. The suppliers want to earn more while consumers want to pay as low as possible.

The estimated cost of the SSGP was 15.5 billion euros while TurkStream's estimated cost was announced as 6 billion Euro (Gazprom, 2010; Balkan Energy,

2018). TurkStream' cost will be less than half of SSGP's. The main reason could be SSGP's offshore length which would be 931 km while TurkStream offshore length is 901 km (Yesevi, 2018; Gazprom, n.d.). However, the number of pipelines in SSGP would be four meaning total pipeline laid underwater would have reached 3724 km. The Turkish Stream will only have two lines (Allseas, 2019). The reason for both projects was the Russian goal to bypass Ukrainian exclusive economic zone which could decrease the length and cost.

South Stream and Turkstream both plans to sell Russian gas but Turkstream has one more transit country which is Turkey. The SSGP pipeline would link directly to Bulgaria but Turkstream pipeline connects to Turkey and then transits to Bulgaria. The estimated cost could increase because of Turkey. At the end of 2014 when South Stream was cancelled the oil prices were decreasing and natural gas prices are linked to oil. In 2017 when the Turkstream construction started shale boom decreased the oil and natural gas prices in the world. Also, an increasing number of LNG terminals and the entrance of US as an LNG importer strengthen consumer countries hand which happened in 2014 with Lithuania looking LNG to diversify sources which led to Russian natural gas discount in piped gas (Elliot and Reale, 2017). In addition, Ukraine earns around 2 billion euros per year from gas transition and bypassing Ukraine should decrease the price of gas (Euractiv, 2014).

To sum up, the gas coming through the TurkStream will be more affordable due to low gas prices in the world. However, this argument is just a well-thought guess and the reality of affordability of natural gas changes from states to states.

5.2. Diversification

Diversification is the second sub-indicator of security of supply. The significance of diversification is mentioned since the earliest energy security studies (Yergin, 1988; Deese, 1980). Diversification can be defined with the phrase "*Don"t put all your eggs in one basket*'. Diversification in energy studies has three parts, diversification of source, diversification of supplier, and diversification of energy infrastructure in soil (Sovacool and Brown, 2010). However, there should be a fourth pillar which is diversification of route. Reaching energy sources from different routes will increase the strength of supply security. For example, China tries to diversify its

energy routes due to security concerns at the Malacca Strait. Another example is, Russia diversifying its gas routes to Turkey rather than increasing the capacity of its pipelines.

Diversification is the main aim of the EU's energy security policy (European Commission, n.d.). Diversification of the source should be a key element against disruptions but the shift to low carbon economies resulted in coal phase-outs which increased the dependency on natural gas. Diversification of supplier is another important aim of the EU but the lack of sufficient suppliers in the region results in dependency to Russia. For example, the Nabucco project failed due to political situations of importer countries and Russia's pressure in the Caspian region. Also, Russia proposed the SSGP which is diversification of supply route. However, the 2009 Ukraine-Russia dispute showed that disruptions happen and the lack of diversification leads the detrimental effects.

SSGP and TurkStream have only one difference in terms of diversification which is Turkey. Turkey has a vital position for the EU to transfer gas from Azerbaijan, Iran, Iraq, Eastern Mediterranean and even Russia. The ongoing crisis between Ukraine and Russia is the origin of the TurkStream project. Russia wants to diversify route options to Europe while Ukraine tries to maintain an energy transit position. However, as mention in section 3, Nord Stream is diminishing the importance of Ukraine in the eyes of Germany. On the other hand, the elevation of renewable energy sources in the EU decreased the natural gas consumption by 45 bcm since 2010 (BP, 2018). The 45 bcm lost in gas consumption is higher than TurkStream's annual capacity which would be 31.5 bcm (Gazprom, n.d.).

Turkey already transfers Azeri gas to Europe and as a democratic state, Turkey has good credit in Europe. However, the tense relationship between Europe and Turkey in recent years created a security risk for the EU. Turkey is a reliable country but adding one more country to pipeline project increase the risks. SSGP had a direct connection to Bulgaria from Black Sea which makes it more secure for the EU.

TurkStream offers two secure gas pipelines to Europe. The first one is TANAP which connect to TAP in Greece. TANAP is already in use for transferring Azeri gas to Greece, Albania and Italy. The second pipeline is West Line which is also already

in use but pumps gas from north to south. With Turkstream, Turkey offers a third pipeline to Europe.

The project chose Bulgaria because the main aim of the SSGP was to improve political power and market share of Russia in Southeastern and Central Europe. On the other hand, the main aim of TurkStream is diversification of the Trans-Balkan gas pipeline (West Line). For that reason, both pipeline projects had their own agendas which affect the route selection.

5.3. Availability and Disruptions

Availability of energy resources is the main idea of energy security. IEA's definition of energy security is "*the uninterrupted availability of energy sources at an affordable price*" (IEA, 2019). According to IEA, there are two main characteristics of energy security; availability and affordability. The availability of the energy sources also attached a lack of disruptions.

Since the 1990s, Europe has been facing natural gas disruptions caused by Ukraine (Stern, 2006). The 2006 and 2009 disruptions in transit pipelines resulted in the acceleration of other pipeline projects such as Nord Stream and Nabucco. The European Commission Staff Working Document on the security of gas supply highlighted that the disruptions decreased the reliability of Russia and Ukraine. The EU did not have a plan against unexpected gas disruptions. Interconnections between states should decrease the effects of disruptions and a united approach to the crisis could be more beneficial to solve face problems.

SSGP was proposed to solve the disruption problems of the EU which was similar to Nord Stream's aims. With SSGP, EU would reach to Russian gas without a threat from Ukraine. However, the 2014 Crimea annexation caused the demise of the project in the eyes of the EU (Euractiv, 2014). The low credibility of Russia and the upcoming political pressure from the US decreased the importance of Russian projects. Germany was already consuming gas from the Nord Stream since 2012 and was planning to construct a second line to it. However, the US and Denmark tried to prevent the making of Nord Stream 2 with sanctions (Reuters, 2019b; Stevens, 2019).

Regarding the TurkStream, disruptions from Ukraine are eliminated but Turkey is added to the project. However, Turkey and Ukraine have different approaches in terms of energy. Ukraine continues to be a transit country but Turkey wants to be an energy trading hub. As mentioned above, Turkey owns extra pipelines, more gas flow than Bulgaria including Russia; Azerbaijan and Iran pump natural gas into Turkey, and with high regasification capacity Turkey will serve as a giant gas hub. If disruptions happen Turkey can offset the gas flow with additional sources. In addition, future developments in the Eastern Mediterranean Sea could increase the gas flow through Turkey.

5.4. Geopolitics

Geopolitics is a significant sub-indicator for energy security studies. In this framework geopolitics mostly refers to political stability and accessibility of energy sources. APERC's energy security report (2007), mentioned the accessibility problems like political and geographical ones. The political one is the well-known geopolitics; countries political instability prevent access to energy fields which cause high energy prices. The geographical restrictions are deep sea hydrocarbon reserve and environmental concern of extracting these resources.

The aim of the SSGP and the TurkStream is to transfer Russian Gas to Europe. While the SSGP prefers to directly connect to Bulgaria, the TurkStream prefers to transfer the gas via Turkey. The political stability of sources for both pipelines is identical because both carry Russian gas, and pass through the Black Sea. The political stability of the supplier is similar but the political stability of the linked states is varying.

As mentioned in the diversification part, the different aims of the pipelines cause different route selection. Turkey could export gas from SSGP via Bulgaria. In this case, Bulgaria would become an energy transit country for Southeastern Europe and Turkey. However, lack of infrastructure, pressures from the European Commission and weak political power in Bulgaria lead Russia to cancel the project. On the other hand, Turkey has more chances to transfer Russian gas to Europe because there are already two operating pipelines in the country. Additionally, Turkey's aim to become an energy trading hub increases the credibility of Turkey for suppliers and consumers. The

political stability of Bulgaria and Turkey was similar in Paula Review 2016 (CountryWatch, 2016).

The SSGP was created against the Nabucco project which aimed to transfer gas from Caspian Region and Middle Eastern countries. However, the political instability in the Middle East and Turkmenistan provoked the project cancellation. The SSGP could not be completed because of political instability in Bulgaria which was under the pressure of the European Commission.

5.5. Critical Infrastructure

According to Güney (2015), critical energy infrastructures are defined as "*those assets if undelivered [they are expected to make significant] impact on energy security and energy supply, as well as the overall social and economic well-being of the nation"*. The Federal Energy Regulatory Commission of the US (2018) states that critical energy infrastructures have a direct relationship with *"national security, economic security, public health or safety, or any combination of such matters*". The critical infrastructure of energy means the safety of energy-related utilities.

To analyze the safety of pipelines, this study uses the 'Global Terrorism Database' and compares Bulgaria and Turkey over terrorist attacks which were directed towards energy infrastructures between 2007 and 2017. According to the Global Terrorism Database Turkey[14] and Bulgaria faced terrorist attacks between those years. The results are that while Bulgaria did not face any terrorist attack to energy infrastructures, Turkey had one terrorist attack[15] in 2015 by PKK which targeted power substation in the Fatih district of Istanbul (GTD, 2018).

5.6 Reliability

Reliability of energy suppliers is significant since the 1973 OPEC Crisis. The explanation of reliability is, reaching the promised amount of energy sources without

[14] Between 2007 and 2017 1614 incidents occurred in Turkey according to the Global Terrorism Database but some of the attacks perpetrator group registered as unknown or suspected which showed the actual number of terrorist attacks could be much lesser than 1614.

[15] The attack found in database which occurred approximately 150 km far away from the TurkStream Pipeline's receiving terminal in Kıyıköy.

having disruptions or economic fluctuations. With the 2006 and 2009 gas disputes, the reliability of Russia and Ukraine decreased. The low reliability directed the EU to other routes or suppliers. Nabucco, Nord Stream, South Stream, and TurkStream are the results of the low reliability of Russia and transit countries.

SSGP and TurkStream have no difference in terms of reliability because both starts from Russia. However, Turkey's energy infrastructure and accessibility to the different source make it more reliable. On the other hand, Europe has more control over Bulgaria.

CHAPTER 6

Analysis and Findings

The main aim of this study is to determine the benefits or drawbacks of the transformation of South Stream Gas Pipeline into the TurkStream Gas Pipeline for importer and exporter countries. The topic is planned to be discussed from the perspective of energy security with the created methodological framework. However, the methodological framework shows that in energy security studies the security of supply is the most cited and accepted indicator. For that reason, in the fifth part of this study, gas pipelines were analyzed through the sub-indicators of security of supply. The background information on the European Union's gas pipeline history showed that the pipelines are the main pillars of EU's and Russia's approaches.

European Union and Russia are dependent on each other. EU needs Russian gas today and tomorrow and Russia needs customers to sell it natural gas. However, the EU strengthens its hands with LNG while Russia is missing the chance to develop sufficient LNG facilities and tankers (The Moscow Times, 2019). Russia established the biggest LNG facility in Yamal with participation of French Total (20%), Chinese CNPC (30%) and Silk Road Fund (10%) but geographical problems like -50 °C during winter, hard to transport gas to Asian and European Markets and existing market share of old players such as Qatar, Australia, and Malaysia make the market too competitive for Russia (Total, n.d.; Rutkowski, 2019). EU has a chance to use LNG against Russia to maintain diversification of gas supplier and route. Nevertheless, LNG still needs years and existing pipelines require less capital investment.

The findings of the framework showed that the European Union will be beneficial from the shift from SSGP into TurkStream. Russia will also profit from this transformation if the EU will permit to exempt the TurkStream. From the perspective of the affordability sub-indicator, Russia will invest less capital to TurkStream. For the EU, increasing the market share of LNG and additional supply from Azerbaijan will help to decrease the price of pipeline gas which is a drawback for Russia. In the big picture, TurkStream could be supplied with Iranian, Iraqi or even Turkmen gas in future. That could lead to a competition if these suppliers are convinced to take the necessary steps. Turkey's spot gas trading platform which is the only one in the region will invigorate regional suppliers to sell their gas via this platform to Europe which

lessens the economic burden of gas import (Temizer, 2019). Also, quitting from oil indexation will help the EU in terms of more flexibility and market binding prices. It is clear that TurkStream will increase the profits of the EU more than SSGP would have done. The diversification of gas suppliers is the key point of the EU's supply security targets. After analyzing SSGP and TurkStream through the security of supply perspective, both pipelines provide enough diversification in terms of route. However, the supplier of gas will be invariable for both pipelines. 40% of the EU's gas is already supplied by Russia and increasing the share of Russia will not help the EU (Eurostat, 2018). Both pipelines will plan to transfer gas Southeastern and Central European countries which were already dependent on natural gas. TurkStream only sells a quarter of what the SSGP would sell to these countries which make open other options to these countries. For example, AGRI LNG project which aims to sell Azeri gas to Europe via Georgia. The AGRI is a good change for Southeastern countries to decrease their dependency on Russia. TurkStream will be more understandable for the EU in the long run because of a lower amount of Russian gas will flow to the EU. However, the diversification of the source will not be guaranteed by both pipelines. The European Union should chase other options like the AGRI LNG project. In addition, Russia will decrease its dependency on the EU market with TurkStream. In short-run, Russia might lose its market share in the EU which would lead to economic difficulties. However, the rise of the Asian gas market and closeness of gas reserve to Asia will be much beneficial for Russia (Buchanan, 2018). Vatansever (2017) argues that adding a new pipeline to the network will increase the capability of Russia's negotiation power on Europe.

The geopolitics of the pipelines shows only one difference which is the connection country. While it was Bulgaria in SSGP, the TurkStream project prefer Turkey. Geographically, there is no big difference but TurkStream gives the option to connect the pipeline to Greece which is a good option for Russia. The availability of gas is much lower in TurkStream because of low capacity and Turkey. TurkStream is a reconstruction of the Trans-Balkan Pipeline (West Line) which provides gas to Bulgaria, Greece, and Northern Macedonia (ICIS, 2019). TurkStream will much likely cause the demise of the West Line and force the countries to buy gas via TurkStream. The low amount of gas of TurkStream could jeopardize the Southeastern European countries gas supply security. The SSGP would be a much greater chance for them to

secure gas availability. Also, TurkStream put an additional country which can cause disruptions in future. Russia and Turkey are close partners but four years ago Turkey shut down a Russian warplane. Even for Russia, TurkStream could lead to disruption problems in the future. The critical infrastructure sub-indicator analysis showed that there will be no important difference between pipelines. Turkey faces terrorist attacks mostly in the Southern part of the country. However, there are no clear data to claim that Turkey is a dangerous country for energy infrastructure. The reliability of both pipelines is the same because the supplier of both pipelines is Russia.

For transit countries like Ukraine and Moldova, both pipeline projects carried a risk of losing their position as a transit country and reduction of gas revenues as a transit country. According to Lee (2017), Russia also faces negatively from bypassing Ukraine because of the high economic cost of new pipeline investments. However, Russia expected the economic risk to set free itself from transit countries. From the perspective of supply security, transit countries will lose transit fees which will cause economic loss and their political power which will affect their geopolitical power above Russia and Europe. The main reason of shifting pipeline routes as explained above, but it is crucial to highlight that Russia will not want to see as an unreliable trade partner which could lead to an unwanted loss of market share in Europe gas market because of the dissension between transit countries (Graaf and Colgan, 2017).

The results show that overall the TurkStream has much to offer and the shift from the SSGP, create benefits for both sides and Turkey. Even though the study's aim is searching positive and negative effects of the shift from the SSGP into the TurkStream, there is a much more significant question to answer: "What will be the importance of Turkey for Russian pipeline projects and European diversification targets? Also, the findings show that Turkey's potential to be an energy trading hub will be beneficial for the EU, Russia and other players who trade gas in the region.

CHAPTER 7

Conclusion

The European Union and Russia have a delicate relationship in energy because Russia's political behavior is not acceptable by the European Union's criteria. The EU does not tolerate Russian behavior because of human rights violations, lack of freedom and transparency or high corruption. According to Transparency International, Russia had high corruption and ranked as 138th out of 180 states in 2018 (Corruptions Perceptions Index, 2019). The interest of the EU and Russia clashes in many different areas which cause the implementation of sanctions by the EU and its allies. Lastly as mentioned above, the US and the EU put sanctions on Russia because of the annexation of Crimea in 2014. The sanctions include assets freeze, visa ban, and arms embargo (EU Newsroom, 2014). However, these bans were never directly applied to the gas trade because of dependency. The EU highly depends on Russian gas and in the near future the dependency to Russia will not fall, despite the high level of renewable energy instalments and energy efficiency measurements. According to the IEA (2018), the EU will cut gas demand by 32 bcm in 2030 and by 74 bcm in 2040 if the new environmental policies are applied and the growth rate does not change. However, the same scenario study argues that the EU internal gas production will decrease by 51% in 2030 and by 87% in 2040. The Union will still import 373 bcm natural gas in 2040. The natural gas dependency of the EU will continue as supply security of gas on the agenda of the EU.

The European Union tries to establish the security of gas supply with new pipelines, and suppliers. In 2006 and 2009, the EU faced large scale gas shortages which affected many of the member states (Sauvageot, 2011). The problem was that the EU has never been responsible for the shortage which was caused by tensions between Ukraine and Russia. This dispute between Ukraine and Russia, lead the EU to diversify the routes of the pipelines, meaning bypassing transit countries and establish direct lines with Russia. However, escalating tensions between states ended up with the annexation of Crimea. EU fully supported Ukraine. Yet, the EU needs Russian gas because there is no feasible alternative in the region.

The EU advanced the Nabucco which could have diminished its concerns on Russia and security of gas supply. However, the EU did not calculate the influence of

Russia in Caspian states which move the project into a dead end. The important thing is that the EU is ready to take extra measurements if necessary, and even to face Russia which might require using coal in the state of war. However, high public appearance on climate change and renewable energy are making decisions harder for the EU[16]. The EU natural gas consumption will be high in future. For that reason, the EU should secure the gas supply by adding new suppliers, routes and methods.

On the other hand, Russia has some concern over the European energy market which includes decreasing consumption rate and increasing competition from LNG. Russia wants to maintain and expand its influence in Europe especially in ex-communist states to increase pressure. However, cutting the Trans-Balkan pipeline and shifting gas supply to TurkStream will give a message to Bulgaria and other states. With South Stream, Russia realized the growth of the European Commission influence in Bulgaria. Saravalle (2017) claims that Russia has a great power which is called pipelines. The author adds "*pipelines can reshape the flows and relations between affected countries for decades"*. Conversely, Trenin (2015) says that Russia does not use pipelines as a powerful political tool, it just tries to gain economic power with gas selling. Nevertheless, the EU did not see Russian pipelines as an economic move, they saw them as an agent which could be used as a pressure point by Russia. Russia also increases its dependency to Turkey which is already the second biggest Russian gas importer and now, a transit country for Russian gas. The increasing LNG regasification capacity of Turkey and the Southern Gas Corridor will be a threat to the capacity of the TurkStream project.

This study focused on SSGP and TurkStream gas pipelines to find out if results of a shift would be good or bad for both parties. This shift is mainly reported as a loss for Russia to gain influence in Southeastern and Central Europe. Firstly, Russia lost but it just changed the route of the pipeline and decrease the capacity. Also, the European Union would lose because more gas means more availability which will be needed in the future. In addition, the EU would have a direct connection to Russian

[16] According to Eurobarometer Survey: Climate Change (2017), 92% of citizens classified climate change as a serious problem, and 79% of citizens willing to pay more money to shifted to clean sources. Also, Poortinga et. al. (2018), argues that the EU citizens who participate the survey has knowledge about climate change and give high support to renewable energy and energy efficiency but taking individual responsibilities did not seen as a helpful. Also, Central and Eastern Europe still support to hydrocarbon sources.

gas without transit countries like Ukraine but TurkStream passes through Turkey before reaching Bulgaria. The examples show that the EU and Russia have both win and lose with TurkStream. However, the gains of both parties are much more significant than the losses. The main research question's answer is revealed thanks to the methodological framework of the study. Also, the study comes up with a new question for the EU and Russia: What will be the importance of Turkey for Russian pipeline projects and European diversification targets? The study finally suggests that the position of Turkey which have new market regulations, spot natural gas trade system, high regasification capacity and future pipeline projects, should be analyzed to better assess the geopolitics of energy in Europe.

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APPENDIX - A

Articles of Energy Security Framework

Authors, Years / Main Indicators	Security of Supply	Enviroment (Acceptability)	Governance	Energy Efficiency
D Yergin, 2006	0	-	-	0
M Jacobson, 2009	-	0	-	-
M.Asif & T.Muneer, 2007	0	0	-	-
D.Zweig and B. Jianhai, 2005	0	-	0	-
CB Field et. al., 2008	0	0	-	-
B Kruyt et al., 2009	0	0	0	-
C Winzer, 2012	0	0		-
A. Correljé & C. Linde, 2006	0	-	0	-
L. Chester, 2010	0	-		-
ES Downs, 2004	0	-	0	-
S. Awerbuch, 2006	0	0		-
F. Umbach, 2010	0	-	0	-
M. Shahidehpour et al., 2005	0	-		-
B.K.Sovacool & I. Mukherjee, 2011	0	0	0	-
BK Sovacool & MA Brown, 2010	0	0		0
J.Bielecki, 2002	0	-		-
D. Helm, 2002	0	0	0	-
A. Cherp & J. Jewell, 2011	0	-		-
B.W. Ang, 2015	0	-	0	0
D Yergin, 1988	0	-	0	-
V. Vivoda, 2010	0	0	0	-
G. Bahgat, 2006	0	-	0	-
C.L. Coq & E. Paltseva, 2009	0	-	-	-
V. Costantini et. al., 2007	0	-	-	-
F. Ciută, 2010	0	-	0	-
A Löschel et. al., 2010	0	-	-	-
Z Baran, 2007	0	-	0	-
G Rasul, 2014	0	-	-	-
G.C.K.Leung, 2011	0	-	-	0
A. Cherp & J. Jewell, 2014	0	-	-	-
Z. Daojiong, 2006	0		0	0
A. Goldthau & B.K. Sovacool, 2012	0	0	0	-
JC Jansen & AJ Seebregts, 2010	0	0		-
G Bang, 2010	0	0	0	-
BK Sovacool et. al., 2011	0	0	-	0
V Vivoda, 2009	0	-	0	-

G Cohen et. al., 2011	0	-	0	-
C Johnson & T Boersma, 2013	0	0	0	-
DL Greene, 2010	0	-	-	-
X Li, 2005	0	0	-	-
L. Hughes, 2009	0	-	0	0
V Vivoda, 2012	0	0	-	-
P Belkin, 2008	0	0	-	-
AE Farrell et al., 2004	0	-	-	-
N Lefèvre, 2010	0	0	0	-
A Månsson et. al., 2014	0	-	-	-
B Johansson, 2013	0	0	-	-
J Bollen et. al., 2010	0	0	-	-
AE Farrell & AR Brandt, 2006	0	0	0	0
DA Deese, 1979-80	0	-	-	-
J Jewell et. al., 2014	0	0	-	0
BK Sovacool, 2011	0	0	-	-
BVS Reddy et. al., 2008	-	0	-	-
S Zhao, 2008	0	-	-	-
SH Lesbirel, 2004	0	-	-	-
DL McCollum et. al., 2013	0	0	0	-
J Lilliestam & S Ellenbeck, 2011	0	0	-	-
A Bauen, 2006	0	0	-	0
A Karp & GM Richter, 105	-	0	-	-
F Verrastro & S Ladislaw, 2007	0	0	-	0
B Johansson, 2013	0	0	-	-
M Hayashi & L Hughes, 2013	0	0	0	-
A Garg & PR Shukla, 2009	0	0		-
DR Bohi & MA Toman, 1993	0	-	0	-
T Teräväinen et. al., 2011	0	0	0	-