

T.C.
ISTANBUL AYDIN UNIVERSITY
INSTITUTE OF SOCIAL SCIENCES



ENERGY SECURITY IN EUROPEAN UNION AND DIVERSIFICATION
STRATEGY

THESIS

Sinan Gürçağ SEZGENOĞLU

Department of Political Science and International Relations
Political Science and International Relations Program

Thesis Advisor: Assist. Prof. Dr. Filiz KATMAN

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T.C.
İSTANBUL AYDIN ÜNİVERSİTESİ
SOSYAL BİLİMLER ENSTİTÜSÜ MÜDÜRLÜĞÜ

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Sinan Gürçağ SEZGENOĞLU



Signature



***To my family,
(Aileme)***





FOREWORD

First of all, I would like to thank Istanbul Aydın University for providing me this opportunity and supporting me, especially my advisor Assist. Prof. Dr. Filiz KATMAN for her full support help in presenting this thesis, to my father and my mother, to my family, and to my friends for their valuable contribution and support; and I wish that it would be useful for further studies on related subjects.

The idea to study this subject was crystallized in Master of International Relations at Istanbul Aydın University in Istanbul. Energy has always been important issue in the world. Therefore, it is necessary to continuously take measures to resolve

The European Union (EU) is unique organization. It is not a federal state like the United States because its member countries remain independent sovereign nations. In this study, energy issue in the European Union will be discussed based on EU energy policies with a perspective of energy security, and diversification strategy will be analyzed.

May, 2016

Sinan Gürçağ SEZGENOĞLU

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ABBREVIATIONS

AMBO	: Albania, Macedonia, Bulgaria Organization
BP	: British Petroleum
BTC	: The Baku-Tbilisi-Ceyhan
BTE	: The Baku-Tbilisi-Erzurum
BCM	: Billion Cubic Meters
CPC	: Caspian Pipeline Consortium
DGXVII	: Directorate General
EAEC	: European Atomic Energy Community
ECU	: European Currency Unit
EU	: European Union
EUNAFOR	: European Union Naval Force Somalia
EEC	: European Economic Community
ECSC	: European Coal and Steel Community
EURATOM	: European Atomic Energy Community
ETS	: Emissions Trading System
GWE	: Gigawatt Electric
GCC	: Gulf Cooperation Council
GHG	: Green House Gas
INOGATE	: Interstate Oil and Gas Transport to Europe
IOC	: International Oil Companies
LNG	: Liquefied Natural Gas
Mtep	: Million ton
MWe	: Megawatt Electric
NSP	: Nord Stream Pipeline
NOC	: Nationalized Oil Companies
OECD	: Organization for Economic Co-Operation and Development
OEEC	: Organization European Economic Cooperation
R&D	: Research & Development
SCGP	: South Caucasus Gas Pipeline
TAP	: Trans-Adriatic Pipeline
TCM	: Trillion Cubic Meters
TENS	: Trans-European Networks
TCF	: Trillion Cubic Feet
TSGP	: Trans-Sahara Gas Pipeline
USA	: United States of America



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AVRUPA BİRLİĞİ'NİN ENERJİ GÜVENLİĞİ VE ÇEŞİTLENDİRME STRATEJİSİ

ÖZET

Bu tez üç ana bölümden oluşmaktadır. Birinci bölümde, güvenlik ve enerji güvenliği tanımı ve ilişkisi, enerji güvenliğine yönelik tehditler, enerji kaynaklarının boyutları ve enerji tasarrufuyla enerjinin en verimli şekilde kullanılması için ulusal kaynakların önemi, Avrupa'nın enerji arzı ve enerji talebi açısından durumu yer almaktadır. İkinci bölümde; Avrupa Birliği kurulması, Avrupa Birliği'nin enerji politikası ele alınmaktadır. Üçüncü bölümde Avrupa Birliği'nin alternatif enerji hatları ve enerji güvenliği açısından çeşitlendirme stratejisi tartışılmaktadır. Sonuç bölümünde bu bilgiler ışığında Avrupa Birliği'nin enerji güvenliği açısından çeşitlendirme stratejisi değerlendirilmektedir.

Anahtar Kelimeler: *Avrupa Birliği, Çeşitlendirme Stratejisi, Enerji, Enerji Güvenliği, Enerji Politikası.*

ENERGY SECURITY IN EUROPEAN UNION AND DIVERSIFICATION STRATEGY

ABSTRACT

This thesis consists three main sections. First chapter includes definition of security Energy security, their relationship, threats to energy security, sizes of energy resources, the importance of domestic resources for the efficient use of energy in energy saving. Second chapter contains foundation of the European Union and the energy policies of the European Union. Third chapter discusses alternative energy routes of European Union diversification strategy for the energy security. In conclusion, diversification strategy is evaluated in the light of such information.

Keywords: *Diversification Strategy, Energy, Energy Policy, Energy Security, European Union.*

1. INTRODUCTION

Energy is one of the most important basic resources in the world. Energy plays a vital role in human life. Heating a house, cooking a dinner, lighting a street, running a factory, all these require energy. Thus, energy is at the heart of life and it is the strategic element for the development and power. Especially, because of the Industrial Revolution referred to scientific and technological developments in the world in the second half of the 18th century; energy became indispensable for the scientific and the technological production. Today, energy is still the most important element in the world.

The subject of this study is based on the importance of energy. The growing energy needs of Europe, various projects on this subject in the future to ensure energy security and historical framework of the European Union (EU) are covered in this study. It aims at analyzing the EU-wide energy policies, energy security and diversification strategies of the EU. It aims to answer the question on the energy of the EU in international platforms. Energy saving, the development of renewable energy sources and various initiatives such as the single market in the EU are also covered.

There are three chapters in this study. Chapter one deals with the theoretical framework. Concepts of security versus energy security and energy composition of the EU are analyzed. In this framework threats to energy security in Europe and European energy resources analyzed. Chapter two deals with the historical framework in which the foundation of the EU and energy policies of the EU is discussed in historical perspective. In chapter three, diversification strategy in EU energy policy is discussed. In the conclusion, it is argued that due to insufficiency of energy resources in EU, renewable energy sources, imported resources, pipelines and diversified energy policy are necessary for the EU. The EU is also required to promote the development of energy-saving tools to minimize the energy consumption and the efficient use of energy. In the research, official documents of European Energy Agenda books, articles, the European Union periodicals, papers, reports, conference presentations and news announced at the web sites of European Commissions are used.

2. CONCEPTUAL FRAMEWORK: ENERGY SECURITY AND ENERGY COMPOSITION OF THE EUROPEAN UNION

2.1 Security versus Energy Security

2.1.1 Definitions

Security plays an important role in international relations, the traditional concept of security means that is military power, the causes and consequences of war between states, economic strength, to ethnic, religious and ideological conflicts, energy supplies, trade and economic conflicts (Buzan, 1998). According to these, the past years, Energy security has become a major theme of the international security debate. According to Europe's growing dependency on oil and gas, this is not surprising. The rising energy needs of growing powers such as India and China, The middle of this century, the expected depletion of fossil fuels (Ruhle, 2012).

Firstly, there are important organizations in energy security, such as NATO and the UN. NATO has a significant role to play in energy security. However, it was difficult to define the exact nature of this role at first. When a gas crisis, containing Russia, Ukraine and varied countries in Eastern and central Europe led to serious energy cutoffs and many NATO allies enforced for a more important role in the energy security of NATO (Ruhle, 2012).

Another important organization in energy security is the United Nations. The United Nations has become progressively involved in supporting the diffusion of clean energy technology, development, transfer and service (United Nations, 2008). The scale of investment needed in the energy sector in the next 30 years. The international community needs to work together to identify how this could be best reached, and to decide on the most efficient role of the UN system in these efforts (United Nations, 2008).

Other issue, a country does not supply enough energy to remove the deficiency of the energy because of international policies and pricing. Therefore, Europe's growing dependency and resources will be imported from other countries with high prices in the international market. Therefore, the European Union can pay more to supply the oil or gas. This situation affects the economic situation.

For example, "Energy supply security must be ensured... the proper functioning of the economy, the uninterrupted physical availability... at a price which is affordable ... while respecting environmental concerns... Security of supply does not seek to maximize energy self-sufficiency or to minimize dependence, but aims to reduce the risks linked to such dependence" (European Commission, 2000). Energy must be sustainable for sustainable economic growth.

The European Union has developed a comprehensive energy and climate change package for fossil fuels, renewable energy, energy efficiency improvements to increase efficiency and reducing the environmental impact that catalyzes the security of energy supply and sustainability issues in order to overcome the energy challenges of the 21st Century (EUFocus, 2009, p.1). The development of the European Union continues for clean, renewable, domestic energy and the EU works with research organizations and academic, which works for European Technology Platforms investment and offshore wind farms, photovoltaic and concentrated solar energy, second-generation biofuels and renewable technologies such as carbon capture and storage technology in order to promote the development of industry (EUFocus, 2009, p.1).

2.1.2 Contemporary threats to energy security

The contemporary world places relying on a vast energy supply to fuel everything from transportation to communication, to security and health delivery systems. Maintaining energy security is connected with the strategic planning. Energy security included in the concept of a wide-ranging and environmental protection, however, the threat is more difficult to identify and Energy security refers to an affordable price for continuous availability of energy resources. Risks in the European energy security can be listed as follows:

2.1.2.1 The impact of regional conflicts and terrorism on the energy sector

The North African region has played a decisive role in forming the global political agendas over the past few years. It is the birthplace of the Arab Spring (Tunisia). Security uncertainties and political instability in several Arab countries since the second half of 2010 have led to cuts off supplies in Libya, Egypt, Yemen and Syria (The World Financial Review, 2012). To overcome the psychological barriers and to avoid high prices increasing, OPEC members, led by Saudi Arabia have increased the production (The World Financial Review, 2012).

Secondly, the energy sector is a target-rich environment for terrorists. Vulnerabilities are in pipelines, refineries and storage facilities, transportation check points and loading facilities the region most often affected by Islamist terrorist groups. Terrorism effects of the energy security of the European Union (Gartenstein, 2005). There are many examples of this event in recent years. As early as 1996, al-Qaeda leader Osama bin Laden as a tactic to force them to leave the Middle East, the United States and other Western countries, has announced his desire to destroy their economies. Initially, Bin Laden's attacks on the Middle East, the industry argued that they are targeted Western workers only (Gartenstein, 2005). However, in 2004, the list of targets expanded to include infrastructure in the Persian Gulf. Al-Qaeda and sympathetic terrorist groups inspired by the oil industry staff, infrastructure, and since then have carried attacks on shipping in the region on a regular basis (Kimery, 2007).

The potential impact of a terrorist attack on an oil or gas infrastructure in terms of its impact on the global economy may be the most damaging periods. This is the threat to refuel both at international and regional level; it seems very likely to remain for the indefinite future.

Thirdly, conflict and instability can have a negative impact on the state of the energy sources. This effect is a degradation of extraction, refinement, or resource producing or transit countries; conflicts can occur due to road transport. 48.1% of the world's proven oil reserves are located in the Middle East in 2009. Venezuela had 17.9%, Russia had 5.3% and Kazakhstan had roughly 1.8%. Africa had 8.0%, which were located in Libya 2.9% and 2.3% of Nigeria and Asia-Pacific had only 2.5% (BP Statistical Review of World Energy, 2012, p.3).

In world's proven gas reserves was in 2012 it is similar, 38.4% in the Middle East, 21.4% in Russia (BP Statistical Review of World Energy, 2012, p.4). Obviously, the world's oil and gas mass is unstable or prone to manipulation by the supplier countries in order to realize their own political goals. Conflict and turmoil because of reduced global energy supply is an obvious example. The Russian invasion of Georgia in August 2008 was on the supply of oil to Western markets shown by many observers as a direct attack (Stern, 2006, p.33). The Baku-Tbilisi-Ceyhan (BTC) pipeline and the Baku-Supsa pipeline transport Caspian oil to the Europe. There were other reasons. It was a message for the Western leaders that Georgia in particular is still a part of the back yard of Russia (Stern, 2006, p.35). Georgia's cooperation with NATO and the West was seen negatively by Russian leaders, for

these reasons conflict and disruptions in the supply of oil were reasonable outcomes for Russia (Stern, 2006, p.40). The reason was not a result of direct attacks on pipelines by the Russians. Another example, Part of the BTC Pipeline in Turkey for two days due to a fire started by the alleged PKK terrorist organization and pipeline had been shut down before the conflict in Georgia (German, 2009, p.344-362). It is possible to multiply examples.

2.1.2.2 Piracy

Piracy is a problem for all ships-source traffic in some parts of the world. Published by the International Maritime Bureau Piracy Reporting Centre, in a report in 2013, a steady increase in incidents of piracy in recent years has been reported worldwide. Vessels associated with these reported incidents directed against various oil industries. The reported incidents include 63 chemical tankers, 43 crude carriers, 33 product tankers, 7 liquefied petroleum gas tankers, 2 bitumen tankers and one LNG tanker (German, 2009, p.14). These attacks, especially in the light of some size tank may cause interruption to the supply chain, and in some mega-tankers are capable of carrying 2 million barrels of product (IAGS, 2008, p.11). The European Union naval forces belonging to the first land operation carried out for pirate bases in Somalia and said that it had destroyed a large number of the boat. On 21 March 2011, the EU reiterated the need to strengthen initiatives to combat piracy. The EU commended the contribution of the EU anti-piracy operation for this purpose. The pirates continue to attack with changing tactics. EUNAVFOR-Atalanta works to implement proactive measures are considered possible. Due to the loss of the product in the market, prices could rise abruptly.

2.2 Energy Composition of Europe

The European Union imports half of its energy need and other half of the energy is produced in the region (Eurostat, 2014). In total energy consumption in Europe, oil will remain dominant with 37%, followed by natural gas, coal, nuclear energy and renewable sources (European Commission Statistical Pocketbook, 2014, p.45). United Kingdom (UK) and Denmark have oil resources and remaining oil imported from Russia (30% of oil imports), Middle East (20%), Norway (16%), North Africa (12%), and other regions (a quarter of the oil consumed in the EU is imported, 23%) (European Commission Statistical Pocketbook, 2014, p.45).

Natural gas has mainly become more popular for environmental and economic reasons in the last decade at the expense of coal. Natural gas currently constitutes

one-fourth of the EU's total energy consumption, and consumption is expected to increase even more (International Energy Agency World Energy Outlook, 2007). 1.2% of the world's natural gas reserves is in the North Sea-and overall depletion areas, one-third of the natural gas consumed in Europe is domestically provided (BP Statistical Review of World Energy, 2012), remaining natural gas has imported from Russia (30.9% of all natural gas imports), from Norway (31.4%), from Algeria (13.4%), and some 14.6% from Nigeria, Libya, Egypt, Qatar and Oman (Eurostat, 2014).

Only 20.1% of primary energy consumption is from renewable energy sources (Eurostat, 2014). The EU plays a modest role on this issue, but it has a potential to use more. The most advanced forms of renewable are biomass, hydroelectric power - especially in the Nordic, Alpine and Iberian Mountains and, wind energy (especially in Germany and Spain), geothermal (in Italy) and solar power (Eurostat, 2014).

2.2.1 Energy Supply: Energy Resources in Europe

2.2.1.1 Coal

The period after the Second World War, as a result of the restructuring, the most important energy source was coal and with a variety of policies, in order to address the high supply of coal, production increased in this period. In addition, a large part of the production of steel, which are based on coal in that period have been accepted as the cornerstone of Europe's first venture on the road to the European Union and the European Coal and Steel Community established on the issue of coal and steel. The communities established according to a new quarry, which is a streamlined and in line with the decisions of the coal sector, which has been opened to cater for the supply of coal and industrial development have been insured with long-term contracts. As the positive results of these policies, coal production increased in 1950-1960 (Ege, 2004, p.109). Then, new fuels discovered in the production of electricity and heat in Europe, thus cheaper coal imported from abroad and domestic coal production decreased. There was an oil crisis in 1970. After this crisis, the importance of coal started to increase in the 1970s, despite all this, coal production still did not increase. In 1990s, environmental factor emerged. Thus coal was defined again by EU and Europe should remove the effects of Coal on the environment to win again the importance of coal (Ege, 2004, p.109-110).

Currently; United Kingdom, Germany and Spain continue to produce coal, but domestic coal production continues to decrease in these countries. Because,

imported coal is cheaper than domestic coal (Candan, 2004, p.10). Despite the high production costs, only UK produces coal at a level to compete with the other three countries (Pamir, 2005, p.78).

An important issue is to mention here that in EU member states, coal reserves are not limited to these countries. EU's coal reserve based on the data of the year 2014 is shown in Table 2.1, especially in Germany it is estimated that there are still approximately 55 million tons of coal reserves (BP, 2014).

Table 2.1: 2014 Coal Reserves of the EU

Countries	Reserve (Million tons)	Share of Total	Production / Million tons' oil equivalent
Germany	40548	4.5%	44
Bulgaria	2366	0.3%	6
Czech Republic	1052	0.1%	21.6
France	35	-	0.1
United Kingdom	228	-	11.2
Spain	530	0.1%	2.5
Hungary	1660	0.2%	2.0
Poland	5465	0.6%	56.2
Romania	291	0.2%	6.7
Greece	3020	0.3%	7.4
TOTAL	55.190	6.3%	158,3

Reference: BP, 2014 Review, <http://www.bp.com/content/dam/bp/pdf/Energy-economics/statistical-review-2014/BP-statistical-review-of-world-energy-2014-full-report.pdf>

In Figure 2.1 and Figure 2.2, since 2000, consumption of coal has been increasing as well as production. Dependence on import is increasing as well.

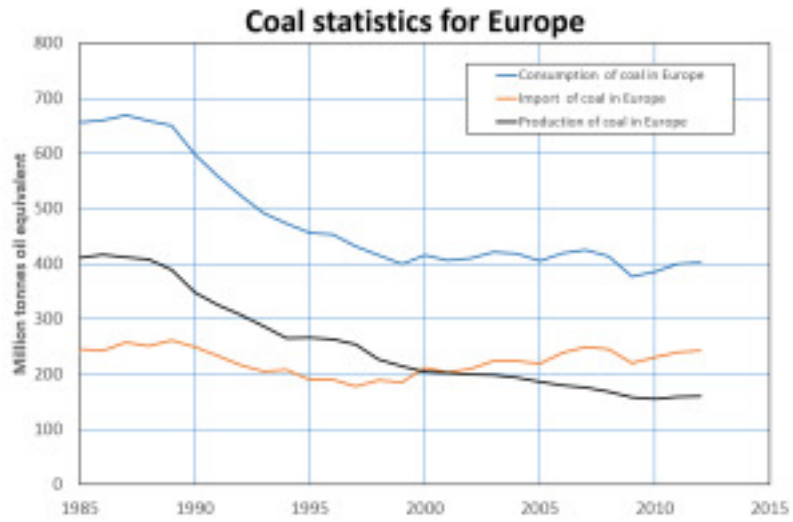


Figure 2.1: Production, Imports and Consumption of Coal in EU-28

Reference: Kjell ALEKLETT Energy Mix, <https://aleklett.wordpress.com/2014/05/07/european-energy-horizons-2014/>

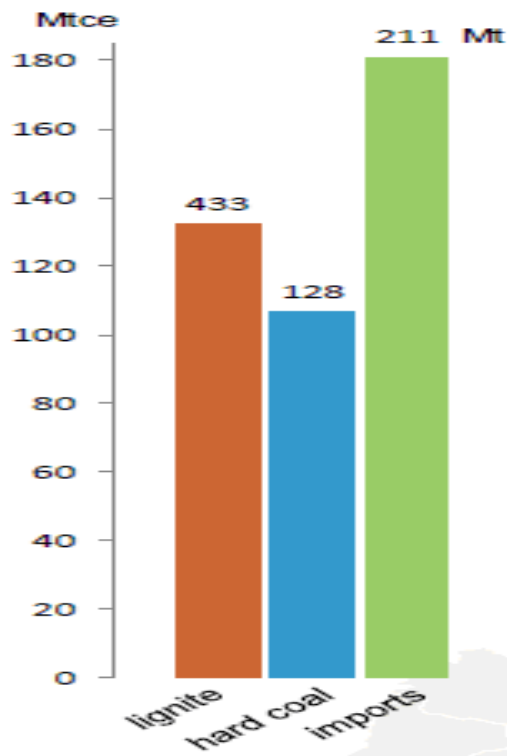


Figure2.2: Coal in Europe 2014

Reference: Coal industry across Europe, (2014). EURACOAL, p.37.

EU member states can cut their investments in the mining industry and turn to imported coal. This is a high probability for the EU. The most important factors for the decrease in the coal production are as follows;

- It is more expensive than imported coal.
- a reduction in coal consumption due to widespread use of natural gas in the EU (İKV, 2011, p.8.)
- coal reserves in the EU with geographically mountainous areas
- High salaries of the workers and expenses paid to social security institutions (Tonus, 2004).

Finally, the future role of coal is not bright, but the production of coal plays an important role for secure and competitive energy in the EU. Electricity production will consume coal-based in the EU. A dynamic energy security increase in demand about 2% each year (Eurostat, 2014b), against a background of a competitive and environmentally-friendly energy production is great importance of the EU energy policy. The annual rates of electricity demand are more than 5% especially it is increasing proportions in the southern Member States (Eurostat, 2014b). The EU electricity market requires a global strategy with technical and economic integration and energy sources should be reliable and affordable for electricity to ensure adequate security of supply. Therefore, the use of coal continues to be a key factor for the EU in the future energy production. The resources price will be decided between gas and coal development for its future role in the European electricity production, reduction targets have an impact on climate protection high binding also reduction targets have an impact on climate protection, high binding such as reduction of CO₂.

2.2.1.2 Oil

The rising oil dependency of EU Member countries was the risk due to the oil shocks in the past. After oil crisis, the EU started to implement various policies. According to these policies, member states must improve their inventory stock system for the similar potential crisis to supply energy needs of a specific period. The amount of inventory held to a minimum for each member state designated as 90 days enacted for 120 days in 2007 (Constantin and Gracceva, 2004, p.7). EU member states show their concern for energy crisis with such policies (Durmuş, 2007).

In addition, the EU constitutes various policies for the promotion of efficient use of oil. The Commission prepared energy-saving report in 2010 (European Commission, 2010, p.5), thus they planned for a savings of 60 billion Euros per year. According to this report, EU planned an extensive energy saving and aimed to generate an energy saving of around 20% of the energy used in the field of individuals and industry by 2020. One of the decisions taken in the report is that the traffic jam is controlled by the Galileo satellite and vehicles waiting in that time consume more fuel; hence under the Kyoto Protocol “*Long-term benefits should be measurable to minimize the effects of climate change*” (Güven, 2006). How reach for reduction of carbon dioxide emissions commitment. The report is prepared to show the importance of such a detail (Referans Gazetesi, 2006).

These decisions are binding for EU member states. Despite, member states want to create national policies on critical issues and execute differently, they find common points about oil industry regulations, demand reduction with the taxation and diversification of resources. Natural gas starts to replace oil as a resource in the diversification. However, increasing use of natural gas raised dependence on foreign sources and revealed the issue of security of supply as well as oil (Ege, 2004, p.143).

In 2012, the EU-28's imports of crude oil were 12% from Middle East (Iraq, Kuwait, Saudi Arabia), 24% from Africa (Algeria, Angola, Cameroon, Congo, Egypt, Gabon, Libyan Arab Jamahiriya, Nigeria, Tunisia), 0.24% from Australia, 45% from Former Soviet Union (Russian Federation, Azerbaijan, Kazakhstan, Other FSU countries,), 21% from Europe (Denmark, Norway, United Kingdom, other European Countries), 4% from America Region (Brazil, Canada, Colombia, Mexico, United States, Venezuela) (Eurostat, 2014c).

Based on the Report of the World Energy Technology Overview 2050, annual energy consumption is still 10 billion oil equivalents in the EU and this will increase 22 billion tons of oil and policies reduced dependence on imported oil in the 1970s (World Energy Council, 2013). Today, despite these policies, the importance of oil will increase and it will be the main source for the EU (Dünya Gazetesi, 2007).

2.2.1.3 Natural Gas

As the inevitable result of competition increased in the late 1980s, the integration of divided markets, countries started to take steps towards the liberalization of energy markets with the creation of the internal energy market. Integration of electricity and natural gas markets was in the early 1990s.

Liberalization of the markets is aimed at the end of the 1990s. European Union aimed to reduce costs after the energy crisis in order to improve economic performance and effectiveness, European has been made to open markets, competition, privatization, structural features and regulatory reforms for preventing monopolization. This varies according to the countries (United Nations Conference on Trade and Development, 2011). First, according to information from the CRS, 24% of the EU's energy consumption is provided by natural gas and European energy consumption ranks is third after the USA and China (Congressional Research Service, 2013, p.5).

Secondly, EU energy policy which was the establishment for an internal market open for competition, and fully integrated environmental protection, the fight against global climate change, security of energy supply, energy efficiency and clean energy technologies, in order to improve the efficiency of investment and the development of a common external energy policy which is determined within the framework of the objectives for natural gas policy shaped in this approach. In "*Sustainable, Competitive and Secure Energy Strategy for Europe*" report published by the European Commission in March 2006, the threat of climate change reveals how important to use natural gas for states that fights against climate change (European Commission, 2006).

Thirdly, enlarged EU facing lack of available resources has grown energy needs with growing energy consumption in the North Sea. They consume more oil and natural gas resources, which is not enough because, coal production decreases due to social security and labor costs in the EU. This is in the "*Energy Supply Document Security Technical History*". According to the Commission's report, the association of coal production costs is 3-4 times more than the world average, the fact that member states support domestic production, but the geological conditions and the lack of suitable laws and regulations governing the rights of workers, all those associated with the presence of the problems (Yorkan, 2009, p.25-41).

The EU import account is 62% of the energy needed by the European Union (BP, 2014). The widespread use of natural gas is growing rapidly in the EU energy consumption. This consumption has been identified for 24% of the total available for heating, industrial and power generation facilities (The European Union of the Natural Gas Industry, 2010). Commission reports that share of natural gas consumption is 29% in electricity production, 29% in households, 25% in industry, 13% in transportation and other areas (Yorkan, 2009a). Demand is increasing for

natural gas is 1.6% per year and it will reach about 692 billion cubic meters in 2020 (Lecarpentier, 2009) and in 2030, this ratio is expected to be 70% (European Commission, 2007, p.15).

Table 2.2: Natural Gas Reserves Status, 28 EU Members

Country	Proved Reserves of Natural Gas (Trillion Cubic Feet)
Germany	3.425
Italy	1.985
Netherlands	31.702
Denmark	1.210
England	8.502
Poland	3.002
Total	49.826

Reference: EIA, (2014). *Natural Gas Reserves*,

<http://www.eia.gov/cfapps/ipdbproject/IEDIndex3.cfm?tid=3&pid=3&aid=6>

Natural gas reserves in the EU are shown in Table 2.2. According to that, Denmark has 1.518 trillion cubic meters, Germany 3.425 trillion m³, Italy 1.985 trillion m³, England 8.502 trillion m³, the Netherlands 31.702 trillion m³ and Poland 3.002 trillion m³ has 49.826 m³ of natural gas reserves (EIA, 2014a). The amount of energy supplied from renewable energy resources, which are taken into account and Europe's natural gas demand and imports, is expected to increase in the future.

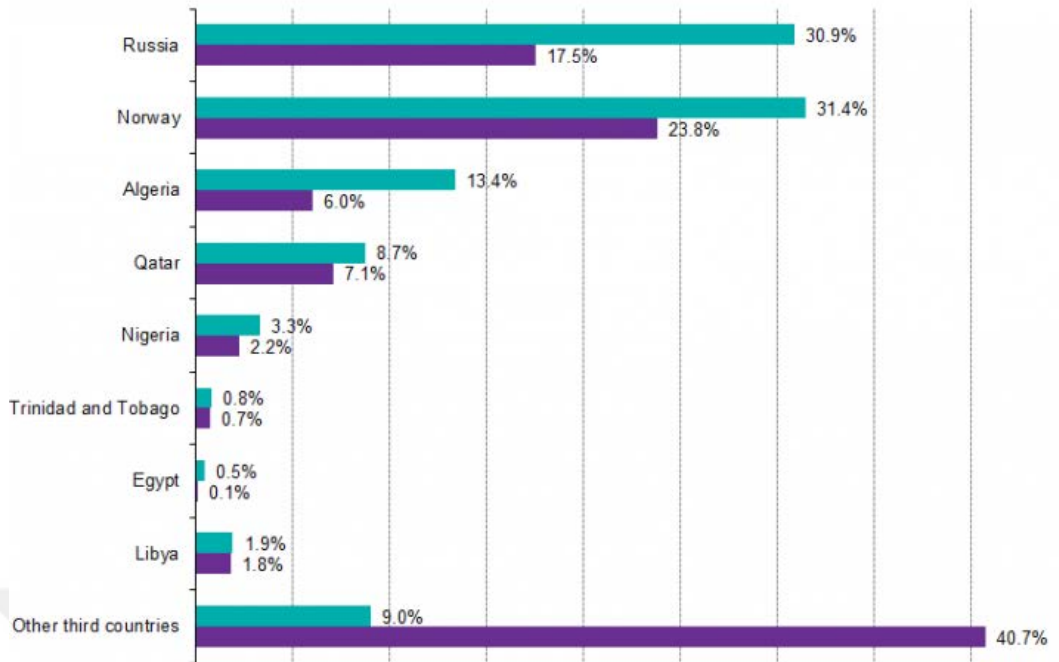


Figure 2.3: Imports of Natural Gas (EU-28)

Reference: Eurostat, (2014). Imports Natural Gas
http://ec.europa.eu/eurostat/statisticsexplained/index.php/File:EU28_imports_of_natural_gas_-_percentage_of_extraEU_imports_by_country_of_origin.png

The European Union imports natural gas from Russia, Norway, Algeria, Nigeria, Oman, Libya, Qatar, the United Arab Emirates (UAE) and Trinidad-Tobago. The rate of imports is 30.9% from Russia, 31.4% from Norway, 13.4% from Algeria, 8.7% from Qatar, 3.3% from Nigeria, 0.8% from Trinidad and Tobago, 0.5% from Egypt, 1.9% from Libya, 9.0% from other countries (Eurostat, 2014d). As a result, Russia is main natural gas supplier for the European Union.

Although there are different opinions to ensure security of supply in the European Union, it is common policy to reduce dependence on Russia (Fujishima, 2009, p.1). At this point, Europe provides it from new sources of natural gas such as Central Asia and the Caspian region, Azerbaijan, Turkmenistan, Iraq energy resources and EU enters into natural gas purchase contracts with other countries; it focuses on the investment and infrastructure in order to achieve that. According to 2010/11, "European Energy Program for Improvement (EEPR)", construction of 31 natural gas infrastructure project is supported by 1.39 billion Euro (European Commission, 2007).

2.2.1.4 Nuclear Energy

Nuclear energy is one of the options about carbon reductions in ensuring the sustainability of energy systems (Saygin, 2011, p.29). The EU is adversely affected by the oil crises in the 1970s, especially in power generation, in order to minimize the use of oil; it has started to promote the use of nuclear energy (Tonus, 2004, p.5). Because oil is largely dependent on the Middle East and natural gas is largely dependent on Russia, and EU faced with an energy deficit in the event of worsening of relations with the countries in these regions. This is perceived as one of the most important problems for the EU.

The European Union has been working on projects for getting out from the crisis with the least damage. At the end of these projects, European Union emphasized the energy security and the importance of the use of nuclear energy for casual occasions. Alternatively, The EU considered activating for solar energy, wind energy and bio-energy (Durmuş, 2005). Especially when combined with the use of nuclear energy for electricity generation, there will be a contraction in demand, especially, in the oil market. The EU can under control price increases in excess demand (Çetinkaya, 2007).

In fact, before the oil crisis, the EU took a decision about the use of nuclear energy in the EU founding treaties. It signed on March 25, 1957 and entered into force in 1958, the treaty is the European Atomic Energy Community and the European Union opened the way for this purpose in the targeted use of atomic energy for peaceful purposes and the development of technology. However, after the oil crises in the above-mentioned concerns for the security of energy supply will end traditional fuel sources with the increasing importance of nuclear energy. During this period, nuclear energy is an abundant, cheap and clean energy in the future (Ege, 2004, p.130-140).

However, after the Three Mile Island nuclear power plant accident in the United States, environmental concerns with reduced confidence occurred in 1979 and then 1979 oil crisis caused an increase in the importance of nuclear energy. In the 1980s, emergence of excess supply in the oil market and consequent reduction in prices has caused a decline in the importance of nuclear energy (Ege, 2004, p.129). In addition, the Chernobyl Nuclear Power Plant accident occurred in 1986 and its result led to the questioning of the reliability of nuclear energy. After nuclear energy accident, transport, waste management and decommissioning issues raised about safety standards and the subject of the control of the spread of nuclear technology.

Although the attitude of EU countries is different from each other on nuclear energy, though, some of them are over-dependent on nuclear energy, while others are away from nuclear energy determined by energy policy; however, nuclear safety, non-proliferation and human health issues are considered based on some of the principles to be kept in the forefront (Official Journal of the European Union, 2010).

After 1965, sensitivity to pollution and environmental issues increased, especially, the scientific evidences led to several meetings on environment and development. The first international step was in 1987 with a report titled "*Our Common Future Brundland*". Subsequently, in 1997, because of the recent developments, countries signed the Kyoto Protocol for protecting the environment (Utku, 2007).

Although nuclear energy is an option under the consideration of emissions for the Kyoto Protocol in the Clean Development Mechanism but the EU had reservations about nuclear energy for including it in the Clean Development Mechanism because of the aforementioned risks of nuclear energy based on former cases of accidents in the world (Utku, 2007, p.5).

Today, as a result, EU plans to reduce the use of nuclear energy for environmental problems. This plan is based on the EU's energy policy with the text on the Green Paper. Currently, total energy consumption is 27% in electricity production (Eurostat, 2014c). The EU significantly plans to reduce use of nuclear energy with this plan by the year 2030 (Zippel, 2007). However, the EU suggested that it was in a very large contribution in Green paper about security of supply, nuclear energy and the reduction of greenhouse gases. In addition, Green Paper mentioned that it is one of the most important factors for the development of nuclear energy about radioactive waste (European Commission, 2003).

Another important topic is nuclear energy production in the EU. The threat of global climate change is important for ensuring the continuity of the energy in the European Union to control the ecological balance. Low carbon economy is important in the environmental factors for the European Union (Saygın, 2004). The EU energy demand has increased very fast. Energy demand was 5.1% in 1979 (El-agra, 2001, p.315) and demand increased to 30%. This 30% is the level of the total data in order to supply the EU countries in 2004 (Gerçeker, 2004, p.1). There are 132 operating reactors in 14 EU Member States (European Commission, 2013). Until 1987, Italy had the four nuclear power plants, while a country took a decision about a nuclear power program to close these plants after the Chernobyl disaster in 1986, and thus

Italy was the last country among the countries with nuclear power programs (Gerçeker, 2004, p.1).

Table 2.3: Nuclear power plants in Europe, in operation & under construction

Country	In operation		Under construction	
	Number	Net capacity MWe	Number	Net capacity MWe
Belgium	7	5,927	-	-
Bulgaria	2	1,906	-	-
Czech Republic	6	3,884	-	-
Finland	4	2,752	1	1,600
France	58	63,130	1	1,630
Germany	9	12,068	-	-
Hungary	4	1,889	-	-
Netherlands	1	482	-	-
Romania	2	1,300	-	-
Slovakian Republic	4	1,816	2	782
Slovenia	1	688	-	-
Spain	7	7,121	-	-
Sweden	10	9,325	-	-
United Kingdom	16	9,243	-	-
Total	131	112.200	4	3.982

Reference: Euronuclear, (2015). *Nuclear Power Plants*,
<http://www.euronuclear.org/info/encyclopedia/n/nuclear-power-plant-europe.htm>

131 nuclear power plant units is in operation in Europe with a capacity of 112 GWE net installed powers in January 2015 (Table 2.3). In 2011, France ranked first with 77.7%, then 54.0% in the Slovakian Republic and is followed by Belgium. In Germany (as of January 2013), the 12.696 MW of electricity gross output operates nine nuclear power plants (Euronuclear, 2015). In 2011, electricity (shut including eight plants down in 2011) generated 107.9 billion kWh. Equipment and energy availability was 82% (European Nuclear Society, 2013). After Explosions in the nuclear power plants in Japan after the earthquake, Germany decided to shut down old plants temporarily (NTVMSNBC, 2011).

The nuclear energy used for electricity production in the EU. In this way, part of the EU provides 26.3% electricity from nuclear power plants (World Nuclear Association, 2015). As it is seen, nuclear energy has the highest share in electricity production.

After The Three Mile Island in 1979, Chernobyl accident in 1986 and tsunami occurred in Japan in Fukushima power plant causing explosions, accidents in 2011, they led the questioning the reliability of nuclear energy and safety. Some countries have decided to close their nuclear power plants questioning the security risks (Gerçeker, 2004, p.2). France and Britain did not take any negative decisions on nuclear power. Sweden, Spain, the Netherlands, Germany and Belgium are dropping the nuclear power plants and nuclear power plants will be closed (Gerçeker, 2004, p.2). Lithuania, Slovakia and Bulgaria agreed with the European Union about non-nuclear power plants for the European Union standards to close in 10 years and those countries are required to close old plants by the year 2030 (Saygın, 2004).

Although the EU is concerned about distrust of nuclear energy, it must continue on nuclear energy and nuclear waste management, especially on the research and studies for the development of most of the applications persistently maintained safely. Because renewable energy sources and nuclear energy will become the primary energy sources in the 21st century (Kılıç, 2006, p.9). On 25 February 2004, the European Economic and Social Jobs held by the Committee on issues regarding the use of nuclear energy were for electricity production. These decisions taken at the meeting reveal the importance of nuclear energy in the EU. Nuclear energy in this meeting had these (EESC, 2004):

- Assuring its safety in the EU's energy supply,
- Reducing dependence on foreign energy,
- The fulfillment of the commitments undertaken within the framework of the Kyoto Protocol,
- Contribute to the provision of electricity price stability from a stable production costs revealed

Although there are advantages of nuclear energy, several factors similar to the above concerns will always be kept on the agenda on nuclear energy in the future. These factors are listed as follows (Severcan, 2004, p.3):

- *"Charged with the management of nuclear waste storage, and in the solution of problems,*
- *The applicability of the new generation power reactors economically*
- *Safety of reactors in Eastern Europe countries*
- *Commonwealth of Independent States in the struggle against nuclear weapons*
- *The fight against global warming."*

Decisions made by governments present their own decisions rather than the decision of the society. This belief reinforces the outcomes of various surveys. Public opinion is important in the production of nuclear energy, which is not a problem of radioactive waste consisting mostly post-production. This is due to the lack of adequate and accurate information from the public on wastes. The public opinion polls show that there is an adequate and accurate information only about 2% to 3% of the radioactive waste (Gerçeker, 2004, p.4). Diminishing support on nuclear energy is from Sweden, Finland, the Netherlands, France, Belgium, Luxembourg, Italy, Denmark, Britain, Greece, Germany, Portugal, Ireland, Spain and Austria (Gerçeker, 2004, p.4).

2.2.1.5 Renewable Energy

An effect of energy resources on the environment was evaluated. The result of the use of nuclear and fossil fuels has a negative effect on the environment. The European Union insists on the diversification of renewable resources.

There are no negative environmental effects on use of renewable energy. Renewable energy resources are environmentally friendly sources. In addition, other reasons for renewable sources in the EU are as follows: Domestic resources reduce dependence on foreign energy; investing on renewable energy increases employment in Europe and public support for renewable resources is a higher than other energy sources. All these are features in the deserved position of the renewable energy sources in the EU (Ege, 2004, p.84).

The Lisbon Strategy was granted in 2000 and the subsequent meeting in Gothenburg in 2001. In the meeting, developments should be timed with the globalizing world and sustainable development strategy. In particular, within the framework of the Lisbon strategy, investments should be made on renewable energy sources (Utku, 2007).

After June 1-4, 2004, in Germany, importance of renewable energy sources was accepted by the participation of 154 countries at the conference. In this conference focus were on the renewable energy resources, sustainable development, reduction of greenhouse gases, transport, and the creation of new economic opportunities and issues of energy security. In the conference, it is agreed that the use of renewable energy sources should increase in the share of the world energy supply and countries are responsible for this (Bonn Yenilenebilir Enerji Konferansı, 2004).

In addition, Green Book was prepared by the EU Commission and in this book; the importance of renewable energy sources is emphasized against global warming and renewable energy sources will play a key role in combating global warming. The total energy requirement of these sources increased from 6% to 12% in 2010 and electricity production increased 14% to 22% (Pamir, 2007, p.77). For the realization of these goals, financial support should be focused on the development of renewable energy and tax relief. Renewable energy resources, such as wind energy, solar energy, hydropower, geothermal, energy and biomass energy in the EU will be discussed individually in the following parts.

2.2.1.5.1 Wind Energy

Today, wind energy utilization purposes to generate electricity from wind turbines. More propellers mounted on elevated towers utilizing the power of a motion of the wind. The rotation of a shaft is provided, and this movement is transmitted to a generator of electricity generation which is carried out through. Wind energy is a natural fuel. Therefore, windy places are very important which are in determining the rate of annual wind for turbines. In addition, wind energy is less harmful for the environment than other forms of energy (Atmaca, 2006, p.16).

The European Union encouraged the development in wind energy. The average annual growth of wind energy rate is approximately 55% per year (Ege, 2004, p.91). Planned production amount of wind energy achieved with this rate. The increase was realized three years ago. This is a positive outcome that made the biggest impact in Denmark, Germany and Spain. It has been because of initiatives such as the countries that invested heavily in wind energy (Ege, 2004, p.91). The EU, as a priority in 2010-2020 periods, aims to increase the share of wind energy in total energy production and then aims to concentrate on solar energy (Tonus, 2004, p.6).

The contexts of wind energy incentives aim to increase the amount in production in various EU countries. In particular, research and development (R&D) spending on renewable energy sources has been increasing every year. For example, Denmark

produces wind turbines. It is located in a very advanced level of the world production of the turbine. Denmark is responsible for 60% the production of wind turbine (Durak, 2005, p.4). Installed wind power reached 500 MW capacity in France in 2005, as planned at 10,000 MW in 2010 (Durak, 2005, p.4).

The shell is the largest enterprise in the oil giant; continue to work on various projects for renewable energy sources. In 2025, the contribution of renewable energy sources of fossil energy will be half of the current contribution in the world or even 2/3 ratio predicted by the Shell oil company (Öztürk, 2006). Therefore, Shell allocated 1 billion Dollar for the development of renewable energy sources (Öztürk, 2006). The company has currently 350 MW wind power capacity, the company is aiming to raise as much as 500 MW capacities in 2007. In order to achieve this objective, the company invested 200 million Euro and the construction of 36 wind farms were completed in the Netherlands. Wind power is the 108 MW (Öztürk, 2006). As a result, if wind powers work with full capacity, electricity of 100 thousand homes will be supplied. Similarly, British oil giant BP aimed to increase amount of wind power from 30 MW to 2,000 MW by 2015 (Öztürk, 2006). Thus, it aims to be among the world's top wind energy developers (Öztürk, 2006).

A wind-powered energy will mean reduced risk associated with fossil and nuclear fuels in the future. Wind energy reduces dependence on external energy required, the need for energy imports, fuel costs, and fuel price risk, it does not have any resource constraints, CO₂ and other harmful emissions and it has no radioactive waste. European domestic consumers can use renewable resources with the use of increasingly higher energy costs for industry for low power, reliable and clean energy. Energy is essential for economies. Energy demand will be 965 TWh in 2030 (European Wind Energy Technology Platform, 2014). This projection for half of the same period, the rate of consumption is expected to increase (European Wind Energy Technology Platform, 2014).

Table 2.4: EU Wind Energy Capacity

EU Wind Energy Capacity (MW)					
Country	2014	2013	2012	2011	2010
Germany	39.165	33.730	31.332	29.060	27.214
Spain	22.986	22.959	22.796	21.674	20.676
France	9.285	8.254	7.196	6.800	5.660
Italy	8.663	8.551	8.144	6.747	5.797
UK	12.440	10.531	8.445	6.540	5.204
Portugal	4.914	4.724	4.525	4.083	3.898
Denmark	4.845	4.772	4.162	3.871	3.752
Sweden	5.425	4.470	3.745	2.907	2.163
Netherlands	2.805	2.693	2.391	2.328	2.245
Ireland	2.272	2.037	1.738	1.631	1.428
Greece	1.980	1.865	1.378	1.629	1.208
Poland	3.834	3.390	2.497	1.616	1.107
Austria	2.095	1.684	1.378	1.084	1.011
Belgium	1.959	1.651	1.375	1.078	911
Romania	2.954	2.599	1.905	982	462
Bulgaria	691	681	674	612	375
Hungary	329	329	329	329	295
Czech Republic	282	269	260	217	215
Finland	627	448	288	197	197
Lithuania	279	279	225	179	163
Estonia	302	280	269	184	149
Cyprus	147	147	147	134	82
Luxembourg	58	58	58	44	44
Latvia	62	62	60	31	30
Slovakia	3	3	3	3	3
Croatia	347	339	180	131	89
Slovenia	3	2	0	0	0
Malta	0	0	0	0	0
EU-28	2.908.969	2.676.283	2.410.574	94.088	84.163

Reference: European Wind Energy Association (February 2014). *Staff Wind in Power*.

2.2.1.5.2 Solar Energy

Solar energy has a special place in the renewable energy resources and the sun is the most important energy source. Therefore, it is estimated that solar energy will be the first resource in renewable energy resources. Especially in 1950, the first solar cells have been able to use solar energy directly to electricity conversion. Today, solar energy is used as a heat source in various fields such as heating, cooking, hot water supplies, agricultural field, greenhouse heating, drying of agricultural products, production of salt from seawater and fresh water more and more with each passing day (Varinca and Varank, 2005, p.3).

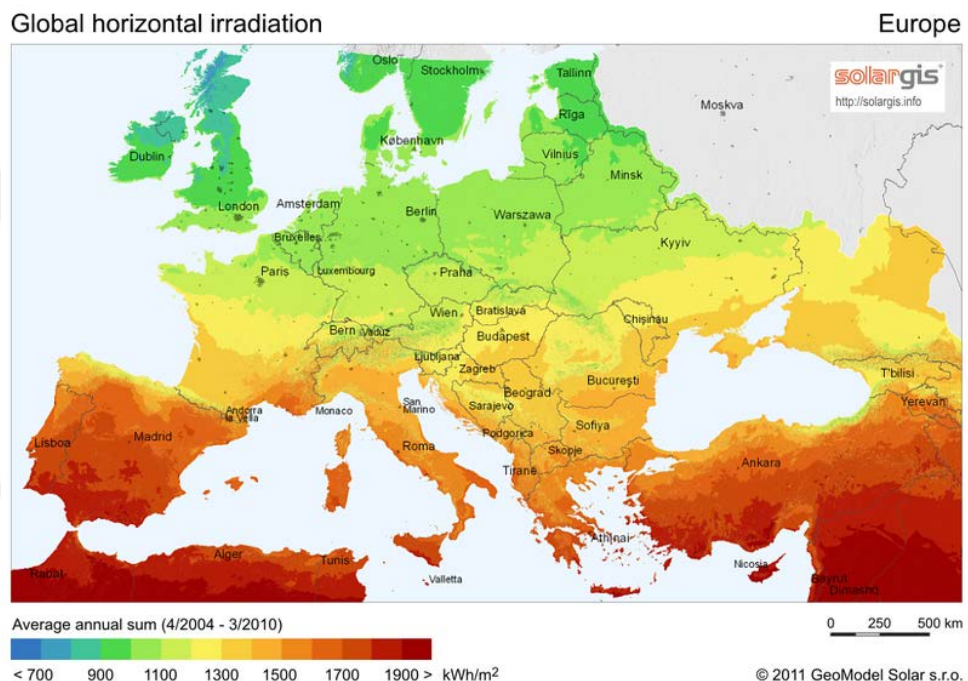


Figure 2.4: Solar Energy in the EU

Reference: Solargis (2014). *Solar Energy*, <http://solargis.info/doc/71>

Increasing use of solar energy is mainly due to its advantages when compared to other energy resources. First, solar power is inexhaustible and almost infinite source of energy. It does not create any harmful waste polluting the environment. It allows native applications, and it has the luxury of energy used anywhere needed. The energy needed in a calculator, a clock, a lighthouse or lookout hut on forest site can be supplied without any external input. It is argued by the Turkish Ministry of Energy and Natural Resources that It is not affected by any economic crises because it is not dependent on import and it does not require complex technology and it has much lower operating cost.

Solar energy is a clean energy resource; there is no problem to get ready in a very short time for the operation, and trouble-free operation for many years throughout the world. In 2010, it is aimed that the share of the sun in electricity production of the EU to be 0.1% (Varınca and Varank, 2005, p.4). The Photovoltaic energy sector is growing by 29% per year and it is quite a popular a source of energy in the EU (Ege, 2004, p.91). In this area, the French oil company, Total and the French Electricity Authority have been working on the production of solar energy. The Company had built solar panels, and continues to produce electrical energy from the sun and stored is about 10% to 15% (Öztürk, 2006). Total has reached in except that France also has meetings on the establishment of solar power plants in various countries (Öztürk, 2006).

Solar power plants have to be built in places that see the sun directly. Especially, desert areas are ideal places for the establishment of solar power plants. Especially in the Middle East and North Africa, established plants will reach the level of electrical energy that can be imported to Europe in the course of time (Öztürk, 2006). To accomplish this goal, an organization called Trans-Mediterranean Renewable Energy Cooperation has been operating since September 2003. This organization is in the EU, the Middle East and North Africa, one of the other words, countries aims to create a collaborative environment. From deserts to Europe, the energy security of Europe will become more powerful together. Europe's electricity need is 10% and 15% by 2050 and energy problem can be solved this way (DESERTEC, 2007, p.3).

2.2.1.5.3 Hydroelectric Energy

The kinetic energy of the water is utilized as an energy source for centuries. However, it has been used for the electricity production in the last 100 years. Because of the advancement of technology, electricity production by water increased in Europe and the world day by day. Hydraulic power in terms of capacity and energy efficiency has become one of the leading resources of renewable energy in electricity produced (Türkiye Teknoloji Geliştirme Vakfı, 2007, p.5).

Today, energy consumption rates in the world reflect that 90% of the consumed energy is from fossil, 7% from nuclear and 3% from hydraulic with the other resources (Gençoğlu, 2001, p.1). In terms of electricity consumption, 80% of the consumed electricity are from coal, natural gas, oil and uranium, which are known as non-renewable resources. Hydro resource is in the first place with a share of 19% (Gençoğlu, 2001, p.1).

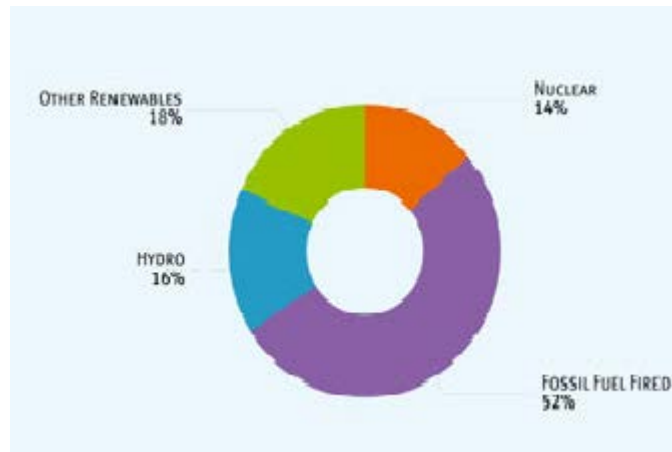


Figure 2.5: Renewable Electricity Generation in Europe

Reference: Eurelectric (2014). *Renewable Electricity Generation*,
<http://www.eurelectric.org/powerstats>

The main share of electricity production from renewable in Europe is hydroelectric power with 70% (Figure 2.5). Looking at the definition, hydraulic is classified as large and small hydraulic power packs in the world (Eurelectric, 2012, p.64). Large power plants are conventional renewable energy resources and small hydraulic power plants are not introduced in renewable energy resources. However, this classification does not have a condition, especially in the EU countries because of their own limitations. For example, the hydroelectric power definition is over 10 MW in Britain, Czech Republic, Romania and Slovakia and hydroelectric power definition in Germany and Hungary is over 5MW (Uğur, 2005, p.64).

Incomparably most environmentally friendly fossil fuels are hydroelectric power plants. However, there are some disadvantages on the environment. The erosion of the land is one of the first problems with dams. Later, archaeological and historical places disappear after the reservoir and construction of the dam affect social, cultural and economic structure in the region. Especially enforcement of people, whose settling areas and land remain under water to migrate, affects their psychology negatively. These problems are caused protests by environmentalist (Çevre Envanteri Dairesi Başkanlığı, 2004, p.193-194).

2.2.1.5.4 Geothermal Energy

Italy started to work on geothermal energy in 1841. After Italy, geothermal wells started to be opened by using new techniques in the year 1904. It is the world's first geothermal steam and electricity generation. Thus, as a result, geothermal energy has been a source of renewable energy in the production of electricity. According to

the data in 1943, geothermal electricity generation capacity in Italy reached 132 MW (Dünya, 2003, p.6). Geothermal electricity generation by the year 1992 in total electricity production increased to 6000 MW in 21 countries and worldwide proliferation (Dünya, 2003, p.6). Characteristics of geothermal energy can be listed as follows (Ligtenberg, 2008, p.3):

- It produces a continuous and reliable power.
- It provides a clean and secure energy.
- It requires only a small soil.
- It protects the fossil fuels to be used for other applications.
- It prevents energy import.
- It is in line with the overall strategy for sustainable development in Europe.
- It addresses the growing demand for energy.
- It helps to reduce CO₂ emissions.

Geothermal energy resources in Europe (EGEC, 2014);

- contains high enthalpy heat areas with intensive warm.

- Heat, for example, brought close to the surface and the volcanic rift processes.
- Exploitation is often large-scale, such as power plants.

- contains low enthalpy heat areas with intensive warm.

- The use of heat is from the sun and heat mixed within the soil.
- Exploitation is often small-scale, for example, heating individual houses, office, apartment complex

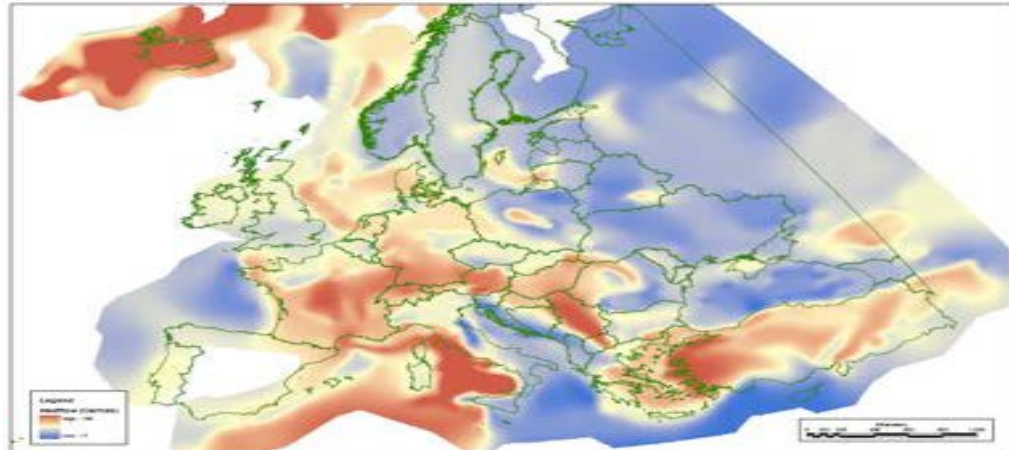


Figure 2.6: Concentrated Regions for Geothermal Resources

Reference: European Federation of Geologists (2014). *Geothermal Energy in Europe*, p.3

High enthalpy:

Iceland, Italy, Greece, parts of France, Germany and Austria.

Low enthalpy:

Ireland, Norway, Sweden, UK, Poland.

In the figure 2.6, Alpine-Himalayan Mountain System is the potential of geothermal energy in European countries. Installed capacities of geothermal electricity-producing countries and the European countries are shown in the utilization of this energy in Italy which is superior location (Durak, 2007).

There is fuel oil and coal-based central town heated with heating systems in many localities across Europe. These systems prevent air pollution and fuel economy. These systems are cheap and using geothermal energy can make the event, thus more efficient results can be obtained in the region (Madencilik Özel İhtisas Komisyonu Endüstriyel Hammaddeler Alt Komisyonu, 1996, p.39).

2.2.1.5.5 Biomass Energy

The definition of biomass is non-fossil organic material of biological origin; it is used to describe the masses. The main components of the biomass energy are carbohydrate compounds of animal or vegetable origin, materials for the energy (Acaroglu, 2007). Biomass energy resources can be divided into classic and modern. Classic biomass resources are residues the forests supplied with firewood consists of plant and animal. Modern sources of biomass are for energy from forest and wood industry wastes from forestry and agricultural products, vegetable and animal waste, urban waste, agricultural waste industry. These sources evolve over

time, according to the needs of solid biomass fuel converted into liquid and gaseous fuels with processing techniques (Başçetinçelik, 2004, p.440).

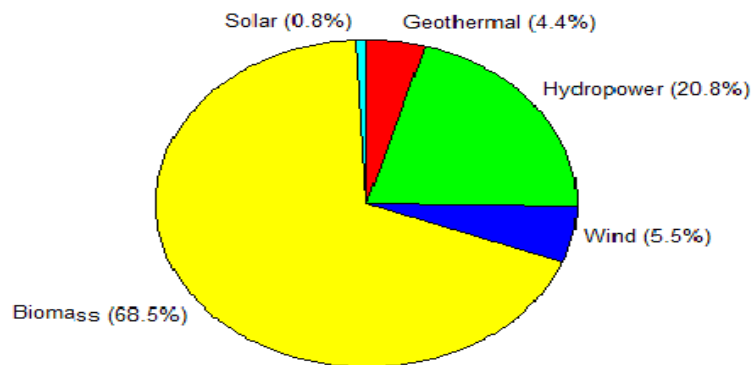


Figure 2.7: Renewable Energy in Europe

Reference: Eurostat (2014). *Renewable Energy*

http://epp.eurostat.ec.europa.eu/portal/page/portal/publications/eurostat_yearbook

According to the Eurostat statistics, biomass and waste have been increasing in European Union's renewable energy. Biomass energy with 68.5% is the largest renewable resource of energy (Eurostat, 2014e). Leaders provide the least amount of renewable energy production from wind (5.5%) and from geothermal (4.4%), from solar (8%) (Eurostat, 2014e). The share of renewable energy in the total energy consumption is at 6% throughout Europe by the European Commission in 2001 and they have aimed to raise the level to 12% (European Commission, 2001). Creating a program of work is prepared for the fulfillment of this goal (Başçetinçelik, 2004, p.440). This program realizes about biomass energy production, research and development by the Commission of the European Parliament in the EU-wide (Acaroglu, 2007, p.7).

Biomass energy is the source of raw material in the production of energy supported by the agricultural sector. Especially in Germany and Austria, it has increased rapidly in recent years and the increasing number of facilities opened for this issue. At the same time, the research and development activities have increased due to the incentives. Particularly, it is at the forefront of research in the field of biogas (Erdin, 2002, p.2-3).

The biomass produced because of burning of fuel does not have any increase in carbon dioxide level in the atmosphere. Because the carbon in bio-fuels, plants, carbon dioxide go back into the air. This is the case in many environmental sectors; in order to prevent the increase for carbon dioxide, bio-fuels should be used instead of fossil fuels. In particular, EU pulls carbon dioxide emissions target under the

Kyoto Protocol of 1990 to the data analyzed for the EU shows increasing importance of bio-fuels (Limitsiz Enerji Platformu, t.y).

2.2.2 Energy Demand: Energy Consumption in Europe

Gross inland consumption of primary energy in the EU-27 was 1.698 million tons of oil equivalent (toe) in 2011 (EEA,2011) and in 2010; gross inland consumption of primary energy in the EU-28 was 1.759 million tons of oil equivalent (toe) (Eurostat, 2014). Primary energy decreased in between 2010-2014, much of this change because of the financial reasons, which can be attributed to a lower level of economic activity rather than a structural pattern of energy consumption. Gross domestic consumption of each member state depends on the structure of the energy system and availability of natural resources for energy production, the development of economies in each country greatly varies, it is not only true for conventional fuels and nuclear power, but also renewable energy resources (Eurostat, 2014)

Table 2.5: Consumption of Primary Energy 1995-2011(mtoe)

	1990	1995	2000	2005	2010	2011	2012	Share in EU-28, 2012 (%)
EU-28	1 080.2	1 079.0	1 131.2	1 189.3	1 160.0	1 107.2	1 103.4	100.0
Belgium	31.6	34.5	37.6	36.8	37.5	37.8	36.6	3.3
Bulgaria	16.4	11.4	9.1	10.1	8.8	9.3	9.2	0.8
Czech Republic	32.5	26.1	24.8	26.0	25.4	24.5	24.1	2.2
Denmark	13.5	14.8	14.7	15.5	15.2	14.5	14.1	1.3
Germany	228.9	221.6	220.0	218.5	220.5	209.2	213.1	19.3
Estonia	5.8	2.6	2.4	2.9	2.9	2.8	2.9	0.3
Ireland	7.3	8.0	10.8	12.6	11.9	11.0	10.7	1.0
Greece	14.7	15.8	18.7	21.0	19.0	18.9	16.3	1.5
Spain	57.1	64.0	79.9	97.8	89.1	86.7	83.2	7.5
France	136.1	143.5	155.3	162.8	158.4	146.5	150.8	13.7
Croatia	5.9	4.5	5.4	6.3	6.3	6.2	5.9	0.5
Italy	107.7	114.6	124.7	134.5	124.8	122.1	119.0	10.8
Cyprus	1.1	1.4	1.6	1.8	1.9	1.9	1.8	0.2
Latvia	6.4	3.8	3.3	4.0	4.3	3.9	4.0	0.4
Lithuania	9.7	4.6	3.8	4.6	4.8	4.7	4.8	0.4
Luxembourg	3.3	3.1	3.5	4.5	4.3	4.3	4.2	0.4
Hungary	19.9	16.2	16.1	18.2	16.6	16.2	14.7	1.3
Malta	0.3	0.5	0.4	0.4	0.5	0.5	0.4	0.0
Netherlands	41.4	48.1	50.6	52.4	54.0	50.7	51.1	4.6
Austria	19.3	21.4	23.7	28.2	28.4	27.5	27.3	2.5
Poland	59.9	62.9	55.7	58.3	66.3	63.9	63.6	5.8
Portugal	11.9	13.9	18.0	19.1	18.1	17.3	16.2	1.5
Romania	40.8	27.0	22.8	24.7	22.6	22.8	22.7	2.1
Slovenia	3.7	4.1	4.5	4.9	4.9	5.0	4.9	0.4
Slovakia	15.2	11.0	11.0	11.6	11.5	10.8	10.3	0.9
Finland	21.5	21.9	24.6	25.3	26.3	25.1	25.3	2.3
Sweden	31.2	35.1	35.0	33.7	34.1	32.4	32.4	2.9
United Kingdom	136.9	142.7	153.2	152.8	141.3	130.9	133.8	12.1

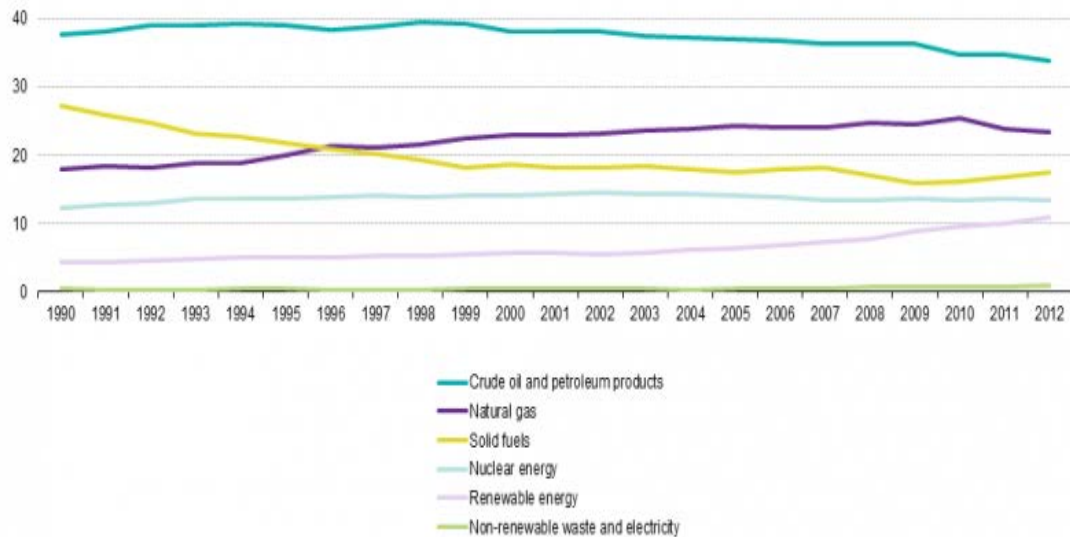
Source: Eurostat (online data code: nrg_100a)

Reference: EUROSTAT, *Final Energy Consumption 2014, 1990-2012*

[http://ec.europa.eu/eurostat/statisticsexplained/index.php/File:Final_energy_consumption,_1990%E2%80%932012_\(million_tonnes_of_oil_equivalent\)_YB14.png](http://ec.europa.eu/eurostat/statisticsexplained/index.php/File:Final_energy_consumption,_1990%E2%80%932012_(million_tonnes_of_oil_equivalent)_YB14.png)

In accordance with the data for the whole of the EU-28, the gross domestic consumption of primary energy fell in all member states with the exception of Denmark in 2011 and Croatia in 2013 (Table 2.5) (Eurostat, 2014). Consumption of the member states recovered in 2010 with Greece, Spain, Cyprus, Lithuania and Portugal only in 2009 and 2011 to record the consecutive contractions in consumption. Probably, it reflects the low level of economic output, and consumer confidence in many of these countries.

The gross domestic energy consumption of Germany has been found to be higher with a 213.01 Mtoe share of the EU-28, France 150.08 Mtoe United Kingdom 133.8 Mtoe and Italy 119.00 Mtoe were recorded only a double-digit share in other member states (Eurostat, 2014).



Source: Eurostat (online data code: nrg_100a)

Figure 2.8: Gross Domestic Consumption, 2000-2010, EU 28

Reference: EUROSTAT, *Gross Inland Consumption 2014*

[http://ec.europa.eu/eurostat/statisticsexplained/index.php/File:Gross_inland_consumption,_EU-28,_1990%E2%80%932012_\(%25_of_total_consumption\)_YB14.png](http://ec.europa.eu/eurostat/statisticsexplained/index.php/File:Gross_inland_consumption,_EU-28,_1990%E2%80%932012_(%25_of_total_consumption)_YB14.png)

In the Figure 2.8, information on the energy mix in 1990-2012 is shown. It also shows that there is a gradual decline in the share of petroleum products, crude oil and solid fuels, and nuclear energy. Increasing share of EU-28 gross domestic consumption was accounted for natural gas and renewable energy resources (Eurostat, 2014). However, the relative importance of renewable energy resources in energy supply was growing and it is a major change. Renewable energy resources are more than one third of gross domestic consumption.

These changes reflect the use of each mode of transport energy consumption, but that gains or losses related to fuel efficiency, in particular, may be affected by technological changes (Eurostat, 2014f). The European Union has pledged to cut energy consumption by 20% by 2020, emphasizing a shift from fossil fuels to renewable energy resources, also looking at the development of energy use by various transport modes (Eurostat, 2014f).

3. HISTORICAL FRAMEWORK: ENERGY POLICY IN THE EUROPEAN UNION

3.1 European Community and Energy Issue

3.1.1 The concept of unity between two world wars

The First World War in 1914 was so different from the previous ones. Because it was a total war and considered as the beginning of the permanent war economy. After the war, the idea of Europe would not be the same as in the past. Because it caused death of 8 millions of people, the collapse of empires and degradation of alliances maintaining the balance of forces. In addition, Europe lost being the center of politics, a feature it could achieve until that time (Delanty, 2005, p.150). These results of the war caused nations to come out with plans to form a Pacific Union of nations in an equal platform in order to avoid future experiences with severe consequences (Borchhardt, 1995, p.5).

Because of the destruction and massacres of the First World War, European Nations thought again of the necessity of being a whole as Europe. The first indication of these ideas was their welcoming The United States President Wilson's proposition of founding a League of Nations (Borchhardt, 1995, p.5). However, the League of Nations neither provided the targeted international peace nor the union of Europe under the leadership of Britain and France. Because the League failed to establish a supranational authority binding the member nations. In the Community, where the sovereignty was the basic principle, it could not be managed to take binding decisions, as well (Borchhardt, 1995, p.5).

Various organizations of the postwar period were the glimpses of Europe's changing identity. The most important example of these organizations was the Pan-European movement whose foundations was laid by Coudenhove-Kalergi in Vienna between 1922-1925. Kalergi wanted a Monroe Doctrine on an idea of Europe and his motto was "Europe is for Europeans!" (Gehler, 2005, p.44). Based on the examples of the independence of the USA in 1776, Unity of Sweden in 1848 and the foundation of German Empire in 1871, Kalergi discussed the necessity of founding a United Nations of Europe in 1923 (Borchhardt, 1995, p.5).

At the first Pan European Congress organized in 1927 under the leadership of France Foreign Affairs Minister Briand, he accepted being the Honorary President

and took the initiative. In his speech at the League of Nations, Geneva on 05 September 1929, Briand offered the idea of constituting a European Union within the framework of the League of Nations. Nevertheless, the delegations of the member nations of the Pan European Union decided to constitute an economic union rather than such a political one (Bozkurt, 2001, p.48).

3.1.2 Change in Europe after the Second World War

The Economic Crash of 1929 and the resulting Fascist and Nazi Movements that took possession of Germany and Italy in 1930s disrupted the ideas of unity in Europe and more importantly, they prepared the ground for the second major catastrophe.

Desires of unity until the Second World War was used as a method to cover up the desires of Hitler or the similar leaders in the Europe. On the other hand, futuristic ideas of the farsighted thinkers never used. Application of these ideas was immediately after the second world war, which was more destructive than the first one (Bozkurt, 2001, p.48). The foundation of an organization to solve the international conflicts in the Europe raised from the resistance movements against the despotic governments (Fontaine, 2006, p.5).

Balance of power in the world after 1945 was not similar to the past times. Europe totally collapsed during the war. European nations like Britain, Germany and France, which were considered as the super-powers of the world for centuries lost their former powers in a large scale and being the center of power. At this power gap after the war, Eastern Europe was occupied by the communist Soviets and the Western part was under the influence of the power of center USA (Bozkurt, 2001, p.48).

The communist threat rising on the Eastern Europe revealed the fact that the union of the Western Europe was necessary. To achieve this the help of the USA was needed. USA was the most profit making nations of the Second World War. While the European nations did not want to be economically depended to the USA, they wanted to eliminate the communist threat through solidarity pacts (Bozkurt, 2001, p.48).

As victors of the war, Britain and France-though it was conquered by Germany before- desired to gain their former powers again and to have a say in world politics. However, they were collapsed after the war and lost their colonies so they were not likely to reach the economic and political powers of the two superpowers USA and the Soviet Union (Canbolat, 2002, p.80-89).

In addition, the possibility that as the most sufferer of the war Germany would seek for revenge someday bothered especially France. Not only to control the German threat, but also to constitute an everlasting peace and cooperation within the wounded continent, initiatives are launched to make it possible to find EU in the current sense (Aktan, Dileyici and Özkivrak, 2006).

3.1.3 Important stage on the foundation of European Union

On 19 September at the University of Zurich Churchill, a speech on the foundation of a United European Nations was given in cooperation with Germany and France (Britain was supported). This triggered the discussion of Europe (Gehler, 2005, p.50). On the discussion of Europe started by Churchill, there were two outstanding approaches. One of these was federated and the other one was functional approach.

Federation approach was based on the idea to form a dialog and complementary relation between local, territorial, national and European power centers and its defender was an Italian Federalist Altiero Spinelli. Functional Approach, on the other hand, stood up for the step by step transfer of sovereignty from the national stage to communal stage and its defender was Jean Monnet who inspired the Schuman Plan which provided the foundation of ECSC (Fontaine, 2006, p.5). It was decided to realize the new Europe with economic integration, which will make his political union possible. As the bitter experiences of the past had shown in political union had the chance of realization only to the extent it contains the political and economic integration (Canbolat, 2002, p.85).

The movement of unity in Europe took the whole support of USA thanks to the foundation of the Organization for European Economic Cooperation (OEEC) in 16 April 1948 for the regulation of Marshall Plan (Oran, 2004, p.485) and foundation of NATO as a result of Truman Doctrine (Oran, 2004, p.486) to protect Western European nations against the communist threat. However, this support of USA while accelerating the union of Europe it made grounds for the un-American policies within the framework of the reasons mentioned above (Dedeoğlu, 2003, p.47).

With the Shuman Plan prepared by France Foreign Affairs Minister Robert Shuman and France Planning Organization Chairman Jean Monnet on 09 May 1950, it was agreed on the necessity for France and Federal Germany and desiring European Nations to collect their coal and steel sources together. The first sentence of the Plan was *“World peace would not be protected without creative attempts against the threats”* (Pamir, 2005, p.71). Thus, the process that will end up with the foundation of the EU began and the longest peaceful period of Europe was started (Aktan, Dileyici and Özkivrak, 2006).

3.1.4 European Coal and Steel Community (ECSC)

Defenders of the establishment of economic unity to provide political unity afterwards came together and achieved the realization of their ideas and this started the era of communities in Europe. The necessity to provide the economic integration with the regulations that will take the control of steel production, which is the raw material of coal as the most important energy source of that time and war industry was prominent and as a result it was decided to establish the ECSC (Dedeoğlu, 2003, p.48).

The ECSC agreement was signed in Paris on 18 April 1951 with the participation of Germany, Italy, France, Belgium, Netherlands, and Luxembourg and became effective for 50 years on 23 July 1952. As it was signed in Paris, the Agreement is known as the Paris Agreement (Ege, 2004, p.110). The basic aim of the community was taking control of the coal and steel production, which were the basic premise of war industry, under an associated institution (Aydoğan, 2003, p.170). Thus, ending the rivalry of France and Germany in these industries from the past to the present it was aimed to make a war impossible on a material basis (Bozkurt, 2001, p.61).

Germany, which had fought against France in the Second World War and was defeated, had to sign the agreement because of various reasons. First, because Germany wanted to gain a political prestige again placing itself in the community of nations from which it was excluded. In addition, German economy, which tried to stand on exportation was depended on European Money to get out of the crisis after the Second World War (Borchhardt, 1995, p.15). Besides, as it was under occupation Germany was assuming that being a member of such community it could obtain its political independence again (Bozkurt, 2001, p.63). The most important point revealed by this community was the fact that winners and losers of the war could cooperate and gather as equals in an organizational structure and thus providing the peace in Europe (Fontaine, 2006, p.6).

3.1.5 European Economic Community (EEC)

The developments after the failure of attempts to found European Defense Community because of the French opposition in 1954 were effective as they indicated that the union of Europe would be sought despite the political stalemates. In fact, the necessity to continue the attempts to find European Union was clearly stated again in the Messina Conference in 1955 held by the delegations of Belgium, France, Netherlands, Italy and Luxembourg (Bozkurt, 2001, p.61). A similar meeting was held by the same delegations in Venice in 1956 (Dedeoğlu, 2003, p.51). These meetings emphasized the necessity of founding new organizations to solve the conflicts on agriculture, energy and defense. As a result, it was decided to found EEC and EAEC.

In accordance with this decision EEC was founded as a result of the Rome Agreement whose basic aim *“is to develop the economic activities within the community in a harmonious, balanced and continuous way, provide an economic stability, increase the living standards, provide a close and everlasting relations between member nations”* (Durak and Atik, 2003, p.35) The agreement was effective on 01 January 1958.

EEC was constituted to contain all the organizations that aimed to avoid the conflicts between European nations and founded in various dates. It was not considered as a cooperative organization depending only on the economic benefits such as common market formations; it is constituted with a consideration aiming the political union. With the long term programmers needed to be achieved for the political union a stronger structuring was a subjective (Aydoğan, 2003, p.171).

To provide the economic balance assumed as the first objective to realize the political unity of Europe, EEC decided to establish a customs union and common market in which the goods, services, capital and probably the most important labor circulated freely. Thus, the member nations planned to prevent every sort of limitations blocking trade and expand their foreign trade by abolishing the customs duties between themselves and applying a common customs duty tariff to the other countries (Başbakanlık Hazine ve Dış Ticaret Müsteşarlığı, 1991, p.6).

Besides the second item of the agreement puts the mission of the community as; *“The mission of the community is to establish a common market and bringing the economic policies of the member nations together, thus providing the development of economic activities in a harmonious way in the whole community , continuous and stabilized growth, rapid increase of living standards and establishing close relations*

between the nations brought together by the community itself” (Avrupa Topluluğu ile İlişkiler Genel Müdürlüğü, 1993, p.6).

Almost ten years after the Rome Agreement on 01 January 1958, customs union was established on 01 July 1958 between 6 founder nations one and half year before the planned date. Besides, despite some problems, especially agriculture and trade policies, were not corrected, it achieved the aims to establish common policies in transportation and energy fields (Aktan, Dileyici and Özkıvrak, 2006).

3.1.6 European Atomic Energy Community

The EAEC agreement was signed in Rome on 25 March 1957 together with the EEC agreement and EAEC were founded as the agreement became effective on 01 January 1958 (Avrupa Birliği Bakanlığı, p.2). The main objective of the community was indicated in the second item of the agreement as *“the mission of the community is to provide necessary conditions and establish nuclear power plants, thus contributing the increase of living standards and developing the relations in the member nations”* (Başbakanlık Hazine ve Dış Ticaret Müsteşarlığı, 1991, p.329).

In order to accomplish the duty, EAEC gave credits to the institutions using nuclear energy for civil aims, tried to develop the nuclear energy activities, facilitated the procurement of raw material needed for nuclear energy production, provided the control of nuclear energy and necessary precautions for security of staff working in the facilities (İktisadi Kalkınma Vakfı, 2006).

Despite all these aims and attempts it failed to constitute internal markets similar to the markets of the EEC. The reason was, in addition to the sensitivity of public opinion on nuclear energy, the attempts of some member nations like France and Britain, which became a member afterwards, to keep their defense policies outside the EAEC (İktisadi Kalkınma Vakfı, 2006).

Mainly EAEC was established because of its member nations’ intensive studies on atomic energy because of energy shortage, which was caused by the political hitches in petroleum exportation of the Middle East. However, provision of petroleum from Africa thanks to the later reconciliations and that there were not dramatic increases in petroleum prices until 1970s constituted the most important obstacle for EAEC’s development (Aktan, Dileyici and Özkıvrak, 2006).

3.2 European Union Energy Policy and Its Goals

3.2.1 EU Energy Directives

After Second World War in Europe, in order to prevent resumption of war between France and Germany, the coal used in the manufacture of iron and steel resources and their declarations of intent to transfer to a supranational authority started the economic integration of Europe. The founding treaties in the field of coal and nuclear energy regulations over time with the creation of a common energy policy prepared the ground (Candan, 2004, p.6-7).

Initially, especially between years of the 1945-1970 the developments in the creation of a common energy policy were too far away. Member countries were intervening intensive energy markets and energy markets and trying to set up state monopolies. EU's founding treaty envisions the establishment of a common energy policy in the Treaty of Rome, there were no specific regulations on energy (Ege, 2004, p.48-49).

However, after the oil crisis in 1973 and the Council decision of April 1974 in order to reduce its dependence on oil in the search for alternative energy sources, Community began the construction of nuclear power plants. Because of these decisions taken in the EU it was necessary to establish a common energy policy. Subsequently, the conjunction acquired after September 1986, the member states decided to become self-sufficient in energy, and in 1988, they created a report on the establishment of the internal energy market, the EU had to follow more liberal policies in the energy field. Especially after the establishment of the Single Market, it is decided to include the energy sector to the single market as a solution to overcome the problems in the field of energy (Kayacı, 2007).

Despite these developments in a common energy in the Community, member states had to provide their own energy in different ways. This was the main reason for the formation of policy. Expanding European Union adopted the structure of states with different political preferences, construction, natural resources and energy sectors. It was in order to ensure energy security in the context of national security of states. This is the creation of a common energy policy which has been continually delayed (Oktay, 2006, p.160).

Despite all of such difficulties and obstacles, each day, Community approached towards the creation of common energy policy, step by step and White Paper was published in 1995, entitled Energy Policy for the EU. In this book, the general principles of the EU internal energy market and the goals are for the energy supply

security, environmental protection and taking into account the overall competitive strength (Candan, 2004, p.7).

The EU after 1990, after the independence of Central and Eastern Europe good relations with the countries developed and the efficiency of the use of energy faced with serious problems due to increasing energy dependence. However, the EU may face energy supply risks in the future and is aware of the necessity for the development of an energy policy. To accomplish this goal, in 2000, Green Paper has been prepared based on a common energy policy. The preparation of this book was pointed out that an increase in import dependency, the EU consumes energy sources. Energy production and consumption in the Community has been studied and especially the emphasis on meeting the lack of dependence on foreign sources of supply in terms of security is also emphasized (Pamir, 2005, p.75).

In particular, recent crisis between Russia-Ukraine on natural gas, and Russia-Belarus oil disputes are the threats in the environment of the Union, it may cause significant changes in the field of energy policy. A few of these projects are grouped as follows (Tonus, 2004, p.9):

- The share of oil in energy consumption in the Union will never be underestimated. Within the Union in the oil sector and the sector's main use of optimization, 2/3 per cent of oil consumption is realized. However, The EU was aimed at overcoming the barriers to the production of alternative energy sources for the negative impact of oil on the environment and increasing dependence on oil in the short term. Union has encouraged use of rail transport in order to minimize dependence on oil in transportation.
- There are some taxes for energy uses in the EU. In particular, the EU aims to reduce increasing consumption in using of polluting energy resources through taxes. In addition, the research and production of new energy resources through tax incentives will be promoted.
- High-energy production in EU in the context of economic policies requires aluminum, iron and steel, fertilizers, etc. The EU provides the development for the service sector in business areas as well as an alternative to the requirement of energy informatics, computer software. Thus, the EU was provided energy savings in consumption with the expected development of high value-added business areas.

- At the same time, the EU aims to increase productivity a smaller size in the energy market with the recent expansion of the new members.

3.2.2 EU Energy Policies (1950-2015)

3.2.2.1 EU Energy Policy in 1950-1970

An energy-related action of the Commission was the basis of substance shaped by article 235 in the 1950s. In 1960, the EU was determined to ensure the security of energy supply. This approach determines the overall and specific objectives for the achievement of the Council's 1995 decision in 1986 to adopt a policy. The aim is the development of energy resources within the EU's borders, diversification of energy sources provided outside the borders, energy systems, increased flexibility, joint crisis systems, with a variety of different types of energy and energy savings in the provision. The effectiveness of such targets remains. In addition to this general approach, special targets are in order to increase energy efficiency, reduce fuel consumption level and increase the use of coal. Immediate response to the oil market with very low costs and environmental issues due to the pressure requirements, goals, and specific objectives will be reached (Lynos, 1998, p.5).

After Second World War, Common Market for Coal, Western Europe towards the realization of a true solidarity among the countries of the ECSC was established as an important part of searching for the product of Coal. ECSC was carrying obligation and responsibility for the coal industry in the EEC, and responsible for energy in abroad (Canbolat, 2002, p.112). On the other hand, as in Article 3 of the Treaty, ECSC has been instrumental about coal and steel production in the various national barriers by eliminating the supranational authority a combination of economic integration was under the control of the developer (Canbolat, 2002, p.192).

Policies in this sector, formerly the Common Market Commission and the Council of Ministers have undertaken the task of execution in conjunction with the execution of the High Authority in 1967, with a common High Authority Commission, as the combination of a single European Commission after Market European Commission. However, since 1958, under the Community coal industry started to fall. This time, the problem was the excessive coal production. The demand was too much for coal and the High Authority was developed collective solutions for the production. There was no confidence in the member countries. Thus, these developments created a decline in the coal sector. Reasons for the decline in the coal industry were as follows;

- Coal industry community rules to be complied with the member states regularly applied to the one-sided solutions to problems. Here, the most significant factor is readiness to use new energy sources such as oil and long-distance sea transportation fees due to reduced competition in the energy sector. This new situation has led member states to prefer optimum solutions. For example, in appropriate circumstances Italy thought that coal was imported from America; on the other hand, there were negotiations to supply the Middle East oil. Germany and the Netherlands prepared the plans to acquire natural gas from the North Sea in the 1970s.

Energy crisis showed that removing the subjects were necessary applications for a common energy policy. Energy necessities of the EU members are dependent largely on imported oil, coal and nuclear energy. The countries agreed that the EU should have a common energy policy and the EU Treaties were provided for a common energy policy.

In later periods, the first attempts to determine a common energy policy in December 1968 and April 1973, urgent measures to redirect efforts have been fruitless. However, because of these initiatives, a Common Energy Policy is outlined. The Council of Ministers took a decision in the direction of the new energy policy strategy identified a common energy policy goal in May 1974. Difficulties with regard to the common energy policy of member states differ from each other due to their expectations. For example, France was in close cooperation with some of the Arab countries and France did not want to bind herself with common energy policy. On the other hand, England was the only country that exports oil and England wanted to be effective decisions on this subject (Canbolat, 2002, p.194-196).

3.2.2.2 EU Energy Policy in 1971-1986

Before the first oil crisis in 1973, EU member states, which are the most developed countries, the EU's countries, were wasteful about energy consumption and depended on import. Oil crisis showed the need for energy supply strategy to protect EU against external shocks. In 1980, environment as another concern emerged. The global energy system was generally regarded as very harmful to the environment. How to redirect current energy systems without compromising the environment has become a major problem. At the end of the 1980s, liberalization of the energy markets was fragmented across countries moving towards integration. The internal energy market was the focus of competition (European Commission Delegation, 2010, p.2).

By the end of the colonial period, Western European countries had been forced to make significant revisions in the energy policies after losing colonies. 1973-1974 oil shock, had a significant impact in Europe, the United States was also affected by shocks. Europeans, after these shocks, recognized the dependence on oil imports (Çaha, 2000, p.1543).

In energy crisis that occurred in the 1970s, European countries have faced two obstacles: First, to reduce dependence on foreign energy substitution and the obligation to invest in energy saving, the latter producing the goods to be imported oil-producing countries to ensure the long-term trade balance requirement to invest in selected export sectors. The two policies have complemented each other. Ultimately, this situation has led to the Europe-wide major structural changes. First, the Community believed the need to create a common energy policy. As mentioned earlier, ultimately, a new strategy was created under the name of New Energy Policy by the decision of the Council of April 17, 1974 (Karluk, 2002, p.398). This strategy includes changes to be implemented until 1986. Energy Committee was set up within the community in order to do it. For Europe, long-term policy priority was to find energy sources from the Middle East and Africa and energy efficiency to substitute oil and encourage the construction of technological research. As an alternative to oil, coalmines exist in the first place. Second is the North Sea, and to support their national oil companies, which ensure the safe removal of oil and gas regions. They chose the third one, which is nuclear energy as an energy substitute for European countries and it was used for military purposes during World War II. Nuclear research channeled in this direction immediately after the Second World War. West Germany was the loser of the war, Germany entered about the use of nuclear energy for peaceful purposes in 1954. European countries discussed nuclear energy, nuclear power and their attitudes within the framework of independence.

The European post-war period is dominated by the United States government scientist's skeptical approach to nuclear technology, because if there were problems between America and Europe, the question is what Europe can do. The monopoly position of the United States in the field of nuclear power; France, Germany, acting jointly with the United States to enter into a nuclear monopoly had led to the quest to remove. R&D activities in the field of nuclear power were regarded as a national policy. State support for this field is recognized throughout Europe. Energy intensity increased by nearly 25 per cent between 1973 and 1986, energy dependence decreased from 65 per cent to 45 percent, oil consumption rate fell from 63 percent

to 47 percent in 1986. Electricity generation, oil and gas utilization rate declined to 15 percent from 40 percent. During this period, there has been an increase in energy production in more than 70 percent of the community. This increase is primarily on oil (10 million tons to 150 million tons), and is due to nuclear energy. Nuclear energy use has increased six fold. Electricity generated by nuclear power was more than one-third of total electricity production. This amount of total energy corresponds to 13 percent of consumption (Çaha, 2000, p.1545). The European Union formed a common energy market about energy production services (Çaha, 2000, p.1545).

3.2.2.3 EU Energy Policy in 1987-1995

Energy Policy established objectives for 1995 based on Community Council decision on September 16, 1986. Through this decision, the Council restructures the energy sector, the energy policies of member states requiring a self-sufficient manner. Until 1995, Community energy policy requires to ensure adequate energy supply, control energy prices and search for protective energy in order to support an environment (European Council, 2005).

Until the early 1990s, the Single Market policies, security of supply and energy issues had more influence on policy on environment and Community level. Targets were put before 1986; the Gulf War, and developments in the internal energy market were considered by the Commission in the assessment, in 1993-94, the implementation of a new energy policy started. These developments in the EU, there were the three main targets; security of supply, sustainable development and competitiveness and The EU prepared “green paper” for the three main targets and “white paper” for an Energy Policy for the European Union (Lynos, 1998, p.5).

In addition, three objectives were mentioned social and economic cohesion, in the white book they were about quality of life, job creation and solidarity between regions. The white paper combined all the European authority about the energy in the three founding treaties and the EU Treaty. According to European authorities; national policies can generate barriers to trade in the EU, thus, in this situation European authority is accepted (European Commission Delegation, 2010, p.2).

In November 1995, the European Union commission provided the conditions required for the formation of the internal market, the decision-making in the Community and strengthened the mechanism of energy market liberalization in the member countries, a resolution adopted compelling advice to countries on the basis of the Green Paper. The second part of this policy decision highlighted in the White

Paper, contains a series of energy policy targets. Thus, energy policy objectives were as follows (European Commission, 1995).

- Competitiveness within the community, employment, growth, harmony (cohesion) to create in accordance with the strategy, the completion of the internal market of natural gas and electricity energy policies to be made within cooperation;
- A regular review of energy that legal regulations and removal of outdated regulations on energy;
- Achieve energy and environmental goals more effectively on behalf of the financial support instruments, such as environmental costs, transnational structuring and sharing information necessary, the use of practical and applicable tools;
- Numerical targets needed to be applied, and especially under the Trans-European Network infrastructure which has become a necessary development;
- Heat and power production and use of energy sources with renewable energy sources in the EU activity in the field of providing and maintaining for protecting the environment and reducing energy dependence;
- The development of existing measures and comparing with new measures, cooperation with the International Energy Agency to prevent interruption of the supply of energy;
- Ensure the safety of all forms of energy taking into account the energy sector goals, providing a variety of resources, emphasis on safety, security and environmental issues, fulfillment of the requirements of the Agreement establishing the Community order.

Energy Policy for the European Union is called White Paper. Some of the basic parameters of the energy use of the Community in the future are determined. These are summarized as follows (European Commission, 1995):

- Europe's dependence on imported energy will increase substantially.
- Natural gas, fuel oil competes as a basic component of the mixture.
- European consumers increasingly will become dependent on the energy.
- Market liberalization, renewable energy sources, technology impacts, climate change provides considerable flexibility to change policy in the future.

The most important part of the White Paper is guidelines for the implementation of the energy policy. In this part (European Commission, 1995);

- Energy policy was interpreted about the provision of the conditions of competition, security of energy supply, protection of the environment, market integration, sustainable economic growth, employment and energy policy must be reconciled with these targets as possible in all conditions.

The European Union discussed four main parts. These are market integration, management of external dependency, sustainable development and energy technology and research. In addition, existing rules, policies and actions, and the potential is analyzed in white paper. Moreover, stating a need for the concept of the energy status of the Community decision-making power, the Commission invited the member states to organize. Support the use of renewable energy resources are given in paragraphs. "*Consensus achieved at Community level, an energy policy focused on energy targets in order to develop a report that*" a periodical removal requested the Commission to take measures to ensure traceability and economic indicators have been invited.

Finally, the European Commission was a variety of programs between 1987 1995; these are Joule, Thermie, Save, Altener and Valoren programs. In this program; oil and gas utilization rate should reduce about 15% in the production of electricity until 1995; the share of oil in total energy should be 40% constant, the development of energy technology in the European Union, ensuring security of supply, use of the energy should be maximized and making legal and administrative arrangements for competition.

3.2.2.4 EU Energy Policy in 1996-1999

In the Annual report published in 1997, the Commission stressed the inadequacy of refining capacity in the industry and capacity in the industry is still the need for revision, an increase in investments in natural gas infrastructure, in the electricity sector in Italy, the United Kingdom and Germany. The Commission planned and built thermal energy facilities, around 70 per cent of the total capacity. Following the decision of the Council, the Commission, as a first step; acted quickly to implement the new energy tools. In 1996, a proposal submitted by the Commission for common energy policy objectives had already been drafted and Energy Consultative Committee was established.

The third instrument in order to keep track of trends in the energy of DGXVII was working on and deriving its status as an official program, the Energy Framework

Program in 1997. In October 1996, the Commission agreed on common energy objectives of member states, including the shape of the member countries to evaluate the progress of these goals on a regular basis to ensure favorable conditions for the exchange of information, it prepared a draft Council Decision. A proposal from the Commission changed a little bit in the Parliament opening in 1998. The changed draft Council Decision contained only three basic elements: The first element was established energy cooperation between the Community and member states. It was determined in a series of principles of energy policy. These principles are listed as follows (Lynos, 1998, p.6):

- Energy policy objectives established at Community level, the formation of the single market, sustainable development, environmental protection and energy supply security should be determined based on the agreements taking into consideration.
- Community energy market will be dominated by a competitive and open market system integration of elasticity in the energy sector, efficiency and long-term supply are important to ensure the safety. Member countries in the process of integration and fossil and non-fossil energy sources, a mixture of different economic and strengthening social cohesion and should be considered The gradual development of TENS (Trans-European Networks).
- To ensure conditions of fair competition and protecting the environment, taking into account the sustainable development of the Community in order to ensure that should be created all fuel more transparent, more efficient forms of energy prices in the markets.
- The agreements provide for the sustainable development, the environment and energy targets to be successful need to be integrated. Wherever possible, all prices, costs of energy production and consumption should be specified. Economical and fossil non-renewable sources of energy supply and the highest level of security measures taken in order to reach these objectives can contribute significantly to nuclear energy.
- Improved diversification and flexibility of the resources by importing existing resources within the Community, should eco-friendly provide a significant amount of the security of domestic energy resources and energy producers, energy supply, strengthening, particularly oil and natural gas supply to provide a more flexible response capability.

- Free and open trade and eco-friendly technologies can be applied to ensure a secure framework for energy investments on behalf of the co-coordinated use of external energy relations. The cooperation with non-member countries to increase the security of energy supplies should be promoted to ensure achievement of environmental objectives and optimum energy technologies, which will make it possible to transfer to third countries.
- Both the community and supportive measures should be taken at the level of member states through the introduction of renewable energy sources in total energy by 2010. The share of this type of fuel will make it possible to increase significantly.
- Enhanced cooperation at the national level and Community level by the year 2010 with a significant increase in energy efficiency will be provided.

The second article listed a range of activities in order to achieve energy targets:

- Monitor the impact of the developments and changes in energy policies of the member states agree on where that might require a revision, which should be taken into account to evaluate the global energy situation.
- Scrutiny of actions at Community level and at national level in the field of energy and the sharing of good actions.
- All information related to all aspects of energy policy energy monitoring, evaluation and change.
- To develop cooperation in the energy field and the results obtained, and the link with allocation of the broader.
- Related to the objectives of sustainable energy policies, or a tax incentive system the development and use of rapid transition.
- Some of the support measures which the member states to support some of the specific Community acts on behalf of the revision.

The third article provided information on the measures for achieving the objectives of energy. European Parliaments supported for this article in 1977. The European Commission added request of parliaments, but some of the requests were disregarded by the Commission. These requests were the establishment of the European Climate Agency and an Energy Consumption Tax and Commission rejected the using of a formal decision. Legal counsel, concluded on the proposal is as follows (Lynos, 1998, p.6) .

“The proposal for a decision, the agreement does not comply with the powers given to the Commission by the Council and is not based on legal ground. Therefore, the need for the law and the legal order of the identification and determination of the Commission of the measures should be reviewed by the Commission.”

Another subject was the establishment of the Energy Consultative Committee. The Committee formally established on November 8, 1996. Energy Advisory Committee on the Commission was expected to implement European energy policy and make recommendations to the objectives. The committee can consult for problems about the Community's energy policy and the committee can report to the Commission. In fact, with the Decision, the Commission, the Energy Advisory Committee, and the task of the Commission stated that the actions will be needed in cases in which areas. After some serious pressures, especially like the blockage of the Germany's Save and Synergy, Energy Commissioner Christos Papoutsis had to review several energy programs, which were controlled by DGXVII in 1996. The first step in this process is called an Overall View of Energy Policy and Actions 20-page text of a communication was published in April 1997. This is a large part of the White Paper mentioned before, and the four most important priorities in the book. In addition, a more holistic approach of the Commission on behalf of the five arguments was put forward by the scope of the measures taken in the energy field as follows (Lynos, 1998, p.6):

- Article 235 of the inadequate legal basis, the need for clear and specific energy issues.
- Both the current actions on behalf of the energy industry, as well as those legal decisions, sometimes because of lack of transparency in EU energy policy implementations need for greater transparency.
- Better, achieve objectives in order to maximize effectiveness of targets.
- Need for co-operation between the Community and the member states (the purpose integrating all of its members and help to achieve the objectives of the Community to ensure that the energy choices).
- Ensure the full participation of all interested parties.

This approach was in the same year, with many draft legislative proposal packages. The Energy Framework Program was followed by a formal proposal. The basis of this draft decision, which is based on Article 235 of the decision the general framework, described in the main financial elements and practitioners. The EU

made appropriation from the field of energy by the European Investment Bank, the European Commission and communities. In a study of Lyons¹, this figure was a total over 4 billion European Currency Unit between 1994 and 1997. The Commissioner Papoutsis for Energy was requested 300 million ECU for 1998-2002 from The EU Commission, but The Commission reduced this figure to ECU 200.4 million (for Nuclear transport and safety measures, an additional \$12.5 million ECU) (Lynos, 1998, p.11).

3.2.2.5 EU Energy Policy in 2000-2016

In the early 2000s, the EU suffered from the problems in the global energy supply and faced environmental impact requiring new solutions for potential problems for the next 10-20 years. In previous years, there were some problems caused by internal factors and military interventions in energy-intensive areas in the world, therefore the EU started to work on creating a new energy strategy.

According to a special report prepared by Administrator Marcel Rommerts, The European Union was considered important about creating new energy strategies. In light of these approaches of the European Commission, a broad discussion was initiated by publishing a document called Green Book in order to create a common energy policy for Europe's future energy strategy and the European Strategy for Energy Supply.

Green Book published by the Commission. It includes issues such as increasing energy efficiency, alternative transportation policy, and use of renewable energy resources, maintaining and ensuring the security of supply, autonomy of member states at Community level initiatives in five areas including the general solution to the problems. These problems were increasing energy efficiency, alternative transportation policy, the use of renewable energy sources, ensuring security of supply, the general solution to the problems of member states. The Commission has proposed to launch the market transformation and change in consumer behaviour. For example, on energy efficiency and the "*European Climate Change Program*" in the spring of 2000, the Commission adopted an action program. Member States were required to follow a common policy. Member states affected this policy. For example, there were Community energy policy, environment, cost, and the single market policy (Rommerts, 2005).

¹ Main Sources of Finance for Community Energy Actions, Com/97/167.

While EU with 15 members could not apply a common energy strategy, with last 10 new members joined the EU, energy policy of the community gained a new dimension. As a result, besides the negative effects such as increasing import dependence rate, there were also positive effects such as increasing rate renewable energy resources and increasing energy efficiency. After the expansion of the EU, the energy problems of the new members participating in the community were different from the former members despite the similarities between them. Thus, they are required to produce new solutions on behalf of the Community.

At the same time, the EU has some difficulties about the influence of the conditions of energy supply in the short and medium term. Gas and oil-producing countries are in an effort to establish good relations with the EU and to secure energy supply. The process of creating a strategic oil and natural gas stocks has been carried out in the common search for solutions. At the same time, strengthening the capabilities of transportation, energy supply is important for the continuity of supply. Community's dependence on energy imports as of 2011 is given in the Table 3.1. Due to failure to take necessary and effective measures, it is expected to grow further in the future. EU dependency on imports is increasing for all fossil fuels. Dependence on oil imports reached 84.9% in 2011 and 67.0% for gas (European Commission, 2013, p.22). Finally, increasing dependence on energy products, European countries have accelerated its efforts to establish a new union in 2015. The European Commission has announced (19 march) its plans about building a so-called "*Energy Union*". Before that Polish Prime Minister Donald Franciszek Tusk presented a study about energy road map for European Energy Union on April 10, 2014. He explained his views on this issue with an article in the Financial Times on April 21, 2014 (Petroturk, 2015). According to Tusk, Ukraine crisis was risk for Europe Energy Security. Energy dependence on Russia should reduce for Energy security and he was planning to establish an Energy Union a similar of The European Central Bank. After, Donald Tusk was elected to the Presidency of the EU Council on August 30, 2014. The main objective of the European Energy Union (EurAktiv, 2015);

- Solidarity-based supply security,
- An integrated European Energy Market,
- Reducing Energy Demand
- EU leaders aimed to make the world leader about renewable and low-carbon technologies.

Meanwhile, the Commission will prepare a number of legislative proposals in the framework of the Energy Association plan. Plans also need approval by the member states and the European Parliament to put into force. However, national governments have opposed this plan, because they did not want to give up sovereignty in this area.

Table 3.1: Energy Import Dependency

Import Dependency (%)	1995	2000	2005	2009	2010	2011
Total	43.2%	46.7%	52.4%	53.8%	52.6%	53.8%
Solid Fuels	21.4%	30.5%	39.2%	41.1%	39.4%	41.4%
Petroleum and Products	74.3%	75.7%	82.2%	83.2%	84.1%	84.9%
Gas	43.5%	48.9%	57.7%	64.3%	62.4%	67.0%

Reference: European Commission (2014). *European Energy in figures*, p.22

Environmental affects cross-national borders, and requires a common approach at Community level. Climate change, increasing emissions hinder the achievement of the obligations of the Kyoto Protocol. In the 1990s, according to the protocol, emissions are required to be reduced by 8 per cent in 2030 (İklim Değişikliği Şube Müdürlüğü, t.y). Taken the necessary measures in the near future, the Community emission rate will increase. The European Union's renewable energy targets for reaching a 20% share of renewable energy in the final energy consumption and a 10% share of energy from renewable sources in transport by 2020 (European Commission, 2013). The EU energy policy objectives are listed as follows (Avrupa Komisyonu Türkiye Delegasyonu, p.2):

- Competitiveness is a balance between energy supply security and protection of the environment, deciding to protect its share of coal in total energy consumption.
- Increase the share of natural gas in total energy demand.
- A maximum of safety requirements for nuclear power plants to establish and to increase the share of renewable energy sources.
- Increase the share of renewable energy sources.

Another important subject is recent developments in the region. Many projects, agreements and events also affect the energy security of the European Union. The European Union does not have enough resources about energy security to reduce

dependence on energy imports. Firstly, in recent years, the important subject is the crisis between Russia and Ukraine for energy security, the reason of this; Russia was extremely uncomfortable from the Ukraine's interview with the NATO. This showed that military intervention to Ukraine. Accordingly, the tension has raised after the Russia's military intervention in Ukraine's Crimea occupation. The effect of this, energy fields were affected negatively and the European Union had made an economic embargo decision for Russia. The European Union is Russia's largest gas market. Therefore, Russia began to search for new ways in the energy field. The Turkish stream project is one of them. The Turkish stream project was born because of cancelling the South Stream pipe project (Sputnik, 2015). However, there are uncertainties about the project. The project was stated that the statement made by Russia on hold due to political uncertainty in Turkey (Ulusal Kanal, 2015). Even so, after the Russian energy moves, TANAP project started in the transportation of natural gas to firstly in Turkey to Europe from Azerbaijan. Azerbaijani gas is important in terms of running to the European market independent from Russia. (Stratejik Düşünce Enstitüsü, 2012). Another important energy area is the Eastern Mediterranean area. This area is between Israel and Cyprus Island and the region called Leviathan. Between Egypt and the Nile island of Cyprus in the regions. The total energy reserves are remaining the equivalent of approximately 30 billion barrels of oil between Israel and Cyprus island, which is called Nile region, the rest of the South-eastern Crete Island, which is called Heredot region and the around Cyprus Island (Bilgesam, p.3). Location of the Leviathan has approximately 1,689 billion barrels of oil and 122 trillion cubic feet of natural gas (Bilgesam, p.3). The EU will be able to control the key point in the eastern Mediterranean island of Cyprus and Greeks is deeply involved with a common strategy followed by the government.

The EU and Turkey high-level energy dialogue conference held in Istanbul on January 28, 2016, the European Energy Commissioner Miguel Arias Cañete, and Turkish Energy Minister Mr. Berat Albayrak discussed about energy sector (European Commission, 2016). Turkey is located in strategic location for Europe energy security and policy. In this respect, they will work together more closely and they discussed the natural gas resources in the Caspian region and TANAP project (European Commission, 2016a). TANAP natural gas pipeline project is important for the EU energy security from Azerbaijan to Europe. TANAP is expected to completed in 2018 (TANAP, 2015).

On February 8, 2016, Speech held at Bruegel on "*How will the Paris agreement impact EU climate and energy policies?*" the European Energy Commissioner

Miguel Arias Cañete explained some information about the EU energy security and diversification in event. The entry of new opportunities in the global energy market is important for the energy security of Europe (European Commission, 2016b). For examples, after the removal of sanctions, Iran will be a major player in the market. In addition, Australia will become the world's largest LNG suppliers in 2020. (European Commission, 2016b). Finally, as mentioned above, the discovery of new gas fields in Leviathan is extremely important for European energy security. Another point of meeting was the future of the gas crisis. Miguel Arias Cañete said that firstly all countries should provide natural gas to homes and some social institutions necessary. This means that priority should be citizens (European Commission, 2016b). Energy security is very important for the EU, which is concerned with the energy fields. In this reason, it is looking for new areas of diversification of energy itself.

4. EU DIVERSIFICATION STRATEGY

The energy diversification policy has been one of the priorities of the political agenda of the European Union (EU) countries ever since the winter 2005/2006 interruptions in deliveries of Russian gas to EU recipients. January 2006 marked the first time that Russian Gazprom decided to cut the flow of gas through the pipeline crossing the territory of Ukraine, leading to significant drops of supplies to Austria, France, Germany, Hungary, Italy, Poland and Slovakia, 7 member states of the European Union. Although the crisis was solved on January 4, 2006 with a new Russian-Ukrainian agreement, high EU officials voiced their concerns over the existing system of energy supplies to European recipients. Remarked Javier Solana (2006), the High Representative (HR) for the EU's Common Foreign and Security Policy in his paper addressed to the European Council. "*A secure energy supply requires a combination of internal and external policies*", continued Solana, with the suggestion that "the development of a coherent and focused external EU energy policy, drawing on the full range of EU internal and external policies, would enhance the collective external energy security of the Union. It would also help the EU face more effective possible strategies by major external energy suppliers to adversely influence market fundamentals. Among other suggestions, related mainly to the internal EU markets, Solana looked towards the East. One of Solana's suggestions was to look for resources in Central Asia, especially around the Caspian Sea basin.

Consequently, one could identify four main characteristics of the EU's energy diversification policy. First, it would involve accessing Central Asian energy resources; second, it would circumvent the Russian pipeline system. It should lead to a decrease in prices (alternative supply routes, ergo less reliance on one supplier and their prices) and should increase the EU's influence on the former republics of the USSR.

4.1 EU Energy Policy

The main aims and objectives of the European Coal and Steel Community, created in 1952 were the integration of the energy market, equal and free access to common energy resources and security of energy supply. The problem of energy supply and energy security became one of the most important global challenges.

At the same time, the main goal of the European Energy Policy, which is common policy on energy supply for sustainable development of the European Union, has not been achieved.

The starting point for establishing a European Energy Policy came in 1986 when the Internal and the Energy Markets were created among the member states. The moment of the signature of the Single European Act initiated the progressive working on integration in the area of energy. The main goals of building the coherent energy market were formulated in the working paper about internal energy market in 1988. Year 1992 brought “The General explaining memorandum” which launched the liberalization of the energy market in three stages (European Commission, 1998, p.2).

- 1st stage – implementation of new directives concerning transparency of prices and transit
- 2nd stage – cancellation of the exclusive right on entry and working on energy market
- 3rd stage – increase in the number of recipients, who can use the Networks

In the 1990s, some new directives became important initiatives towards the creation of the Internal Energy Market (European Commission, 1998, p.2):

- Council Directive 90/377/EEC of 29 June 1990 concerning a Community procedure to improve the transparency of gas and electricity prices charged to industrial end-users,
- Council Directive 90/547/EEC of 29 October 1990 on the transit of electricity through transmission grids,
- Council Directive 91/296/EEC of 31 May 1991 on the transit of natural gas through grids,

- Directive 94/22/EEC of the European Parliament and of the Council of 30 May 1994 on the conditions for granting and using authorizations for the prospection, exploration and production of hydrocarbons.

Later on, the following documents were crucial for the further development of the Internal Energy Market (European Commission, 1998, p.3):

- In January 1995 The Green Paper - Towards a European strategy for the security of energy supply with its main goal: access to coherent European energy policy
- In June 1995 The White Paper - Energy for the future: renewable sources of energy specified the reform of energy sector
- Two directives, which had a fundamental meaning for the functioning of the energy sector: Directive 96/92/EC of the European Parliament and of the Council of 19 December 1996 concerning common rules for the internal market in electricity and directive 98/30/EC of the European Parliament and of the Council of 22 June 1998 concerning common rules for the internal market in natural gas
- Treaty of Amsterdam which defined some necessary elements of the energy policy, such as the eliminating quantitative limitations, using the principle of freedom of economic activity and the free movement of services in reference to energy companies, ensuring the equal rights in the energy sector by the competition principle and the harmonizing the laws, which guarantees the free movement of services and goods
- The multidirectional programmer of working for the energy sector in 1998-2002 accepted by the European Parliament on 26 February 1998
- The Green Paper - A European Strategy for Sustainable, Competitive and Secure Energy, (8 of March 2006) which confirmed sustainability, security of supply and competitiveness as the three energy objectives of the EU.

It was broadly thought that the EU should build up its profile in international energy negotiations, notably by developing an external energy policy with a common voice for the whole EU. There were also calls to incorporate energy policy objectives into all areas of the EU's external relations, including trade policy (European Commission, 1998, p.3).

The concept of EU energy dialogues with major producers was generally endorsed, subject to clarity between the relative roles of the EU and member states. These dialogues should not only deal with energy supply issue, but also with environmental, climate, social and trade issues. The need for a new initiative with energy consuming nations was also emphasized (European Commission, 1998, p.4).

It was stressed that EU should give support for proposals to develop new partnerships with new suppliers, including Africa, the Caspian basin and Latin America. However, the need to combine this with good governance was considered essential (European Commission, 1998, p.5). In the Green Paper, there was also a general support for the EU's energy initiatives with its neighbors, notably the Energy Community Treaty and its possible extension, as well as closer energy relations with key transit countries, including Turkey and Ukraine (European Commission, 1998, p.5).

Currently, after over 20 years of creating common energy policy, the main priorities in this area are:

- Ensuring the smooth functioning of the internal energy market,
- Developing ambitious economic instruments to finance common research and development projects on alternative energies,
- Deepening and structuring cooperation in Europe-wide energy networks,
- Setting up oil and gas purchasing groups to facilitate procurement from foreign suppliers, thereby strengthening and focusing the EU's foreign policy in this field (Andoura, Hancher and Woude, 2010).

4.2 Energy Relations of the EU: Geo-Energy Areas

Geo-energy areas are energy relations between countries in the geographical areas. There are some actors in these areas. These are active in their areas of producer and consumer countries, transition countries, and national and international energy companies. Security of energy supply, energy demand and energy transit in geo-

energy areas is significant subjects. There are countries dependent on imported energy sources, such as the European Union. Therefore, energy sources should be continuous, secure and consumption of a variety sources with affordable price for these countries. Energy exporter countries want many countries, continuous, frequenter with selling the high price for its own resources (Saygın and Çelik, 2011, p.28). This means that security of energy supply and demand relations is important in these areas. The important geo-energy areas are listed as follows:

4.2.1 EU-Russia Geo-Energy Area

Russia is an important country of world energy markets. Russia is second largest oil exporter in the world, According to the European Commission, 30% of natural gas and 35% of oil and 26% of the EU's coal from Russia in 2011 (European Commission, 2014). Gas consumption is expected to increase significantly more oil consumption in the future; some experts rely on more than 40% of natural gas from Russia for Europe by 2020 (Smith, 2007, p.2). Russia is the closest country to the European for energy demand; therefore, Russia and the European Union relations are indispensable. This is sometimes an advantage to Russia. Russia's apparent goals are by using the energy to achieve willingness.

4.2.1.1 Pipelines

Russia and the European Union are interdependent in terms of their respective energy policies. The EU is dependent on energy from imports. Russia is world's largest natural gas reserves of 48 billion cubic meters as well 17 billion tons of oil reserves (RT, 2013). EU member countries are the first targets of Russian energy resources.

Oil and gas pipelines play an important role in this relation of interdependency. The projected pipelines are the probability of uninterrupted about secure supply energy. However, Pipelines are also a political and economic power. Therefore, there is competition between Russia and EU about pipelines and pipeline projects. The EU is intended with diversifying its suppliers, and therefore transportation routes provide lasting energy security for the region (Borisocheva, 2007, p.17). On the other hand, Russia is trying to increase the energy export levels to its established markets, however, Russia and EU common interests for Central Asian resources, the indecisive relations with transit states. Thus, according to their own interests, pipelines or pipeline projects are important in the area.

4.2.1.1.1 Druzhba Oil Pipeline



Figure 4.8: Druzhba Pipeline

Reference: LaBelle (2010). *the Energy SCEE*, <http://energyscee.com/2010/12/05/would-surgut-investment-in-mol-save-cee-oil-flow/>

Druzhba pipeline is the most important EU-Russia oil pipeline in geo-energy Area. Druzhba Pipeline means is friendship. This pipeline is the world's longest oil pipeline belonging to the Russian company Transneft (Saygın and Çelik, 2011, p.50). The Druzhba line starts in South Eastern Russia. The Druzhba collects oil from the Urals, Western Siberia, and the Caspian Sea. This line is 5327 kilometers long and it carries oil from the eastern part of the European Russia to areas in Slovakia, Ukraine, Poland, Czech Republic, Belarus, Hungary, and Germany (Pipelines International, 2009). Most of the crude oil is mixed exported to a general adaptation called mixture was Russian Export Blend (REB), or Urals Blend. The line works to Mozyr After the line is divided into two branches: The Northern and Southern Druzhba lines (Pipelines International, 2009).

The Northern Druzhba line works from Mozyr to Adamowo in Poland, and from Adamowonwards to Plock refinery station in Poland. This line connects with the Pomeranian pipeline and its works from Plock to Gdansk refinery. Druzhba pipeline continues from Poland to Heinersdorf in Germany. Here, it was divided into branches with two lines: It goes to Schwedt and Leuna refineries. In Heinersdorf, the Druzhba pipeline connects with Rostock Schwedt pipeline (European Commission, 2010a).

The Southern Druzhba line is from Mozyr to Brody in Ukraine, and then on to Uzhgorod located in western Ukraine with both the Hungary and Slovak Republic

(Pipelines International, 2009). In Uzhgorod, the Southern Druzhba is divided into two lines, Druzhba-1, this line feeds the Slovak Republic and the Czech Republic, and Druzhba-2 feeds Hungary. Druzhba-1 passes through the Slovak Republic and works from Budkovce to Sahy for Bratislava refinery (PECOB'S Energy, t.y). The Druzhba-2 line passes from Uzhgorod in Hungary and works from Fenyestitke to Szazhalombatta refinery (PECOB'S Energy, t.y). There is a connection between Szazhalombatta and Sahy, tying Druzhba-1 and Druzhba-2.

4.2.1.1.2 Brotherhoods Natural Gas Pipeline

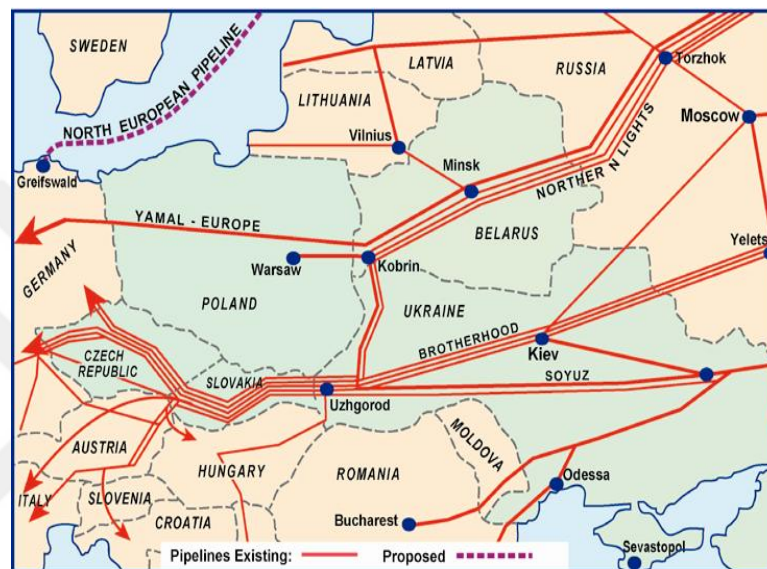


Figure 4.9: Brotherhoods, Northern Lights and Yamal-Europe Natural Gas Pipeline

Reference: Stern (2009). *Oxford Institute for Energy Studies*, <http://www.oxfordenergy.org/wpcms/wp-content/uploads/2010/11/NG35FutureGasProductioninRussiasTheConcernAboutLackofInvestmentJustified-JonathanStern-2009.pdf>, p.3

There is an old pipeline in Europe, which is the Brotherhood pipeline from Russia to Austria built in 1967; it was built for the transit of natural gas (Gazprom, 2014). Especially it works from Russia to Ukraine, Slovakia, Austria, Czech Republic, Germany and Italy. This pipeline's capacity is 100 billion cubic meters per year (Gazprom, 2014). Slovakia is a transit country for natural gas from Russia for this line (Vaszi and Varga, 2010, p.127).

4.2.1.1.3 Northern Lights Natural Gas Pipeline

Northern Lights Natural Gas pipeline is one of the major natural gas pipelines between European Union and Russia (Figure 4.9). A line extending from the Ukraine via Belarus is one of the most important pipelines that feeds northwestern Russia network (Dienes and Shabad, 1979, p.86). In addition, this is one of the major transit lines for Russian natural gas to the European Union. Total length is 7377 kilometers, but part of 2500-kilometer line is used to transit the gas directly to the European Union (Dienes and Shabad, 1979, p.86). It stretches from Minsk in Belarus to Ukraine, later it is combined with a Brotherhood Natural Gas pipeline in the west of Ukraine. The first part of the line was completed in 1969 and began to work at full capacity in 1983. The total capacity is 51 billion cubic meters, but due to the condition of an old line, about 46-48 billion cubic meters' capacity is estimated to be used (Saygın and Çelik, 2011, p.51).

4.2.1.1.4 Yamal-Europe Natural Gas Pipeline

Yamal-Europe Natural Gas Pipeline is 4196-kilometer-long (Figure 4.9). Natural gas pipeline runs from western Siberia in Russia, through Belarus and Poland to Germany (Energy Business Review, 2013). At the same time, it is the first Russian natural gas pipeline, which does not pass in Ukraine. It started to work at full capacity in 2005. It carries 17 billion cubic meters of natural gas per year (Energy Business Review, 2013). The pipeline is planned to be extended to a line to and.

4.2.1.2 Pipeline Projects

Pipeline projects are a vital for the future energy security and energy security demand for geo- energy areas. The European Union has many pipeline projects for its own energy security. Pipeline projects have been suggested to bring gas and oil from energy-rich neighbor Russia. According to the commission, the selected projects reflect the need to better interconnect all EU member states and reduce the isolation of the more remote nations (Pipelines International, 2010). The European Union imports for ensuring a diverse source of oil and gas. This is a key theme in the energy security strategy. On the other hand, Russia wants to control on European supplies as much as possible. The European Union's third largest trade partner and Russia are most important energy supplier (Ortung, 2008, p.63), but the Europe interests for Central Asia geo-energy area for diversification strategy. Russia is not satisfied about this and Russia especially is pushing for their projects regardless of their cost-efficiency. This also shows that Russia's preferences. The European Union will continue to buy Russian energy in the future.

4.2.1.2.1 Nord Stream Natural Gas Pipeline Project



Figure 4.10: Nord Stream Natural Gas Pipeline Project

Reference: International Institute for Strategic Studies (2010). *Nord Stream Moves Forward*, <http://climatesecurity.blogspot.com/2010/03/nord-stream-moves-forward.html>

It was proposed by Russia and transporting natural gas project between Russia and the European Union and this will deactivate the Ukraine as well as a Belarus natural gas pipeline (Gazprom, 2014). Northern European Natural Gas Pipeline was planned to get rid of dependence on transit countries and carry natural gas from Russia's city of Vyborg in the Gulf of Finland to Germany's city of Greifswald (Saygin and Çelik, 2011, p.58) (Figure 4.10).

The pipeline is 1224 km long and it will consist of two parallel lines; first line is scheduled for 2011 while the second line is scheduled for 2012 (Glayscalein, 2011). In mid-April 2012, Nord Stream successfully completed in the complex international logistics program (Nord Stream, 2014). The annual capacity has 55 billion cubic meters (Gazprom,2014).

When Nord Stream Project is complete, the Baltic States and Poland will have lost the chance to use their position as leverage against Russia. More importantly, these countries' energy security will be reduced. Through transportation of natural gas via transit countries Belarus and Ukraine, from Russia to the EU and transit countries will be partially eliminated as possibly oil and natural gas will not be vulnerable to crises in Russia. In addition, as moving away from Russia, the energy security of the former Soviet Republics, such as the Baltic States and Poland will be jeopardized (Saygin and Çelik, 2011, p.58).

In April 2012 the second string of the Nord Stream gas pipeline was positioned in the schedule. By January 31, 2013, a memorandum was planned to sign by Russia

and EU on creating new gas transmission facilities across the Baltic Sea to Europe (Gazprom, 2014a).

4.2.1.2.2 Yamal-Europe 2 Natural Gas Project



Figure 4.11: Yamal-Europe 2 Natural Gas Pipeline Project

Reference: GAZPROM, *Yamal-Europe*

<http://www.gazprom.com/about/production/projects/pipelines/yamal-evropa/>

It is planned to be built parallel to the Yamal-Europe natural gas pipeline and it will cost about 10 billion dollars (Gazprom,2014b). It is transported from Russia to Poland, Slovakia and Hungary. Total annual capacity will reach 70 billion cubic meters with Yamal-Europe natural gas pipeline, (Figure 4.11) but, there are some obstacles about construction. All of the following is listed below (Suzdaltsev 2013);

- Absolute insufficiency of the Belarusian leadership to fulfill responsibility, violation of virtually all signed and confirmed agreements.
- Belarus gas monopoly "Beltransgaz" had chance to control Gazprom's pipeline.
- Tough pricing policy of official Warsaw in regard to Russian natural gas, followed by a large-scale and continuous anti-Russian propaganda in the Polish media.
- Permanent attempts of the official Minsk to use its status of transited of Russian energy resources to blackmail both the West and the East.

- Polish transit policy - strongly rejection of construction an alternative pipeline “Yamal-Europe” and the ventures to control the Russian transit through Polish territory.

Finally, Vladimir Putin said talking with Alexei Miller in April 04, 2013, *"I would like you to re-activate the Yamal-Europe 2 project. I know that you are actively dealing with this issue together with Gazprom's partners. I mean raising the reliability of gas supplies to Poland, Slovakia and Hungary"*(The Voice of Russia, 2013). Through this development, Yamal Europe 2 natural gas project will return in future.

4.2.1.2.3 Baltic Pipeline System



Figure 4.12: Baltic Pipeline System

Reference: Valesstroy, *Baltic Pipeline System*,

http://www.velesstroy.com/product_info.php?products_id=17&language=en

It was operated by the Russian Transneft pipeline company and within the territory of the pipeline; oil is transported from the ground systems in a new and different one (Saygin and Çelik, 2011, p.61). In this system, oil is exported from Timan-Pechora region, Western Siberia, and the Urals-Volga, as well as the CIS states, specifically designed for a new direction in Kazakhstan oil exports (Leningrad Oblast Administration, t.y) (Figure 4.12).

Russia, on the one hand, has reduced its dependence on transit countries through bypassing Baltic States-Estonia, Latvia and Lithuania through the Baltic Pipeline System in entering Northern Europe and North America markets (Saygin and Çelik, 2011, p.61). According to the duration of seaborne transportation from the Middle East and Africa to North America, this route is nine days shorter with an advantageous position compared to its competitors (Saygin and Çelik, 2011, p.62).

4.2.1.2.4 Baltic Pipeline System 2



Figure 4.13: Baltic Pipeline System 2

Reference: Velesstroy (2013). *BPS-2 pipeline system map*,

http://www.velesstroy.com/product_info.php?products_id=19&language=en&osCsid=b013d5ec54096d3de910abd0dbe5fa6c

Transneft, the Russian oil pipeline monopoly, is planning to launch 1170 km length Baltic Pipeline System 2 (BPS-2). In the beginning of the BPS-2, it was postponed to November 2011 and The BPS-2 pipeline is planned for a total capacity of 50 million tons annually (European Dialogue, 2012). BPS-2 is planned to carry 20 million tons in 2012, followed by a 10-million-ton capacity increase in 2013 due to a serious technical flaw in the final destination of the pipeline, Ust-Luga Terminal. The pipeline will carry 30-million-ton crude oil per year to the Western European markets and will reduce European dependence on Russia with a transit through Belarus and Ukraine (European Dialogue, 2012) (Figure 4.13).

4.2.1.2.5 South Stream Gas Pipeline Project



Figure 4.14: South Stream Natural Gas Pipeline Project

Reference: South Stream, *Gas Pipeline Route* <http://www.south-stream.info/en/pipeline/route/>

The South Stream project is aimed at strengthening European energy security. It is important, according to the EU's strategy for diversification of natural gas supply routes. South Stream gas pipeline significantly improves energy supply security of the entire European continent and it will provide a direct link between consumers and producers. According to projections, additional gas import demand in Europe will reach 80 billion cubic meters by 2020 and 140 billion cubic meters in 2030 (South Stream, t.y). Thus, the main topic of energy security of Europe has a risk. This line is completely under the initiative of Russia.

The main objective of the South Stream Natural Gas Pipeline Project is to meet additional demand from the most environmentally friendly and safe fossil fuel in Europe. Natural gas will be a reliable resource for the European energy sector; therefore, new joint projects in the offshore gas pipeline systems, diversification of routes and the application of current energy security architecture in Europe are important (South Stream, t.y).

Consequently, if South Stream Natural Gas Pipeline Project is realized and Nabucco Natural Gas Pipeline Project is canceled, (Figure 4.14) both Turkey and EU will be negatively affected, and Russia will benefit most. Therefore, the dependence of EU on Russia will continue to increase (Saygin and Çelik, 2011, p.65). The South Stream project will supply Europe's extra demand for natural gas.

4.2.1.2.6 Turkish Stream Natural Gas Pipeline Project



Figure 4.15: Turkish Stream Natural Gas Pipeline Project

Reference: Gazprom (2014). *Turkish Stream Natural Gas Pipeline Project*, <http://www.gazprom.com/about/production/projects/pipelines/turkish-stream/>

The Turkish Stream is a natural gas pipeline from the Russian Federation to Turkey. The suggested pipeline should change the cancelled South Stream project (BBC News, 2014). It will be 1.100 km and Turkish Stream pipeline start in the Shallow waters of the black sea. Pipeline gas capacity is about 15.75 billion cubic meters per annum (bcm/a). Design of natural gas pipeline will be taken into consideration for increasing need of natural gas in Istanbul (Milliyet, 2015). Because, Istanbul's gas needs are increasing day to day and it is important for energy demand in Europe.

There are some risks for Turkey. First, the Turkey stream project can be considered as a political alliance between Russia and Turkey, but Turkey's gas imports will increase dependence on Russia. Secondly, Turkey and Russian foreign policy are very different from each other. For example, there are differences of opinion about Syria and Crimea. These problems could have a negative impact on future energy cooperation (Hazar Enerji Enstitüsü, 2015).

However, there are some advantages for some European countries. For example, Greece is a useful and an important partner for Russia's Gazprom. The Turkish Stream natural gas project will be significant for Greece to diversify energy. Despite Greece's financial problem is very important for this project. Finally, this project is an important for Europe's energy diversification, but Europe's energy dependence will increase on Russia.

4.2.2 Pipelines and Pipeline Projects in Khazar Basin/Black Sea

4.2.2.1 Pipelines

4.2.2.1.1 Baku-Novorossiysk Oil Pipeline



Figure 4.16: Baku-Novorossiysk Oil Pipeline, Baku-Supsa Natural Gas Pipeline, Caspian Pipeline Consortium

Reference: The Oil Drum (2006). *A primer on Caspian Oil*,
<http://www.theoil Drum.com/story/2006/11/18/102426/08>

Baku-Novorossiysk Oil Pipeline is 1330 kilometers (SOCAR, t.y). It carries oil from the Sangachal Terminal near Baku in Azerbaijan to Novorossiysk Terminal in Russia (Figure 4.16). Pipeline became operational in 1997 and the maximum capacity is about 5 million tons per year (Saygın and Çelik, 2011, p.67). Azerbaijan and Russia reached an agreement on cooperation in the exploration and production projects in the sphere of marketing, sales of oil and oil products (Uluslararası Stratejik Araştırmalar Kurumu, 2013).

4.2.2.1.2 Baku-Supsa Oil Pipeline

This line is 833 kilometers (SOCAR, t.y). It carries oil from the Sangachal Terminal near Baku to Supsa Terminal, Georgian terminal in the Black Sea (Figure 4.16). Annual capacity is 6 million tons, with a maximum capacity of 11 million tons per year (Saygın and Çelik, 2011, p.67).

4.2.2.1.3 Caspian Pipeline Consortium



Figure 4.17: Caspian Pipeline Consortium

Reference: Chevron Caspian Pipeline (2011). *Consortium Base Operations and Expansion Project*, p.2.

The Caspian Pipeline Consortium (CPC) is an important international crude oil transportation project with the accession of Russia, Kazakhstan and leading international oil and gas companies (Caspian Pipeline Consortium, t.y). The major source of crude oil is from productive fields in Western Kazakhstan with extra crude oil from Russian producers (Caspian Pipeline Consortium, t.y). A memorandum was signed for the pipeline in 2008 (Downstream, 2008).

It is 1,510 kilometers (KazMunayGas, 2011). Pipeline capacity will increase to 1.3 million barrels per day. First CPC expansion facility completed in 2012 and the Caspian Pipeline Consortium was a laden 3000th Tanker in 2013 (A Barrel Full, 2013). Caspian Pipeline Consortium's role in the improving of major oil fields in the Caspian Region is clear.

4.2.2.2 Pipeline Projects

4.2.2.2.1 Burgas-Dedeagac Oil Pipeline Project



Figure 4.18: Burgas-Dedeagac Oil Pipeline Project

Reference: Sputniknews (2008). *Burgaz-Dedeagac project is dangerous*, <http://sputniknews.com/infographics/20100706/159709677.html>

When it finished will be 279 kilometer length (Transneft, 2006). It carries Russian and Caspian oil from the Black Sea later first stop is port of Burgas in Bulgaria then the port of Alexandroupolis in Greece. The project aims to bypass Turkish Bosphorus. It will be a capacity of 15-23 million tons (Transneft, 2006) annually in the first step after Plans to raise 35 million tons in the second step. The cost of the project is approximately \$1.4 billion (Saygın and Çelik, 2011, p.68).

The project is progressing slowly, and in March 2007. The agreements signed in Athens, Russia, Bulgaria and Greece will work together in this project. Shareholder of the project is Russia 51%, Bulgaria and Greece 24.5 percent (Diplomatic Observer, 2008). There are some negative sides of the project, it will not make tanker traffic in the region with this reason, there are big or small on hundreds of islands in the Aegean Sea, such as tourism, fisheries and the environment, adversely affect areas. In 2013, the Bulgarian Parliament rejected the Burgas-Dedeagac oil pipeline project for financial and ecological concerns (Enerji Günlüğü, 2013). As a result, the project does not seem possible the implementation.

4.2.2.2.2 AMBO (Albanian Macedonian Bulgarian Oil) Pipeline Project



Figure 4.19: AMBO Pipeline Project

Reference: BBC (2004). *AMBO Pipeline Project*, <http://news.bbc.co.uk/2/hi/business/4130271.stm>

It is one of the projects that will bypass the Turkish Straits. Through this project, it is planned to carry Russian and Caspian oil from the Black Sea to the port of Burgas in Bulgaria, then the port of Vlore in Albania in the Adriatic Sea. When completed, it will be 870 kilometers (Enerji Günlüğü, 2013). It is expected to carry approximately 30 million tons of oil per year (Saygın and Çelik, 2011, p.69). It will cost approximately 2 billion \$. When the project is completed, it will reduce tanker traffic in the Aegean Sea. On the other hand, shipping traffic increased in the Turkish Straits. A strait is a bottleneck for tankers, it has a size limitation and AMBO project shows a good environmental and long term economic solution to Black Sea crude oil exports (The Energy Charter Secretariat, 2006). It will provide advantages to Albania, Macedonia and Bulgaria. These countries will be part of the diversity of energy transit routes in ensuring the energy security of the European Union. This project is supported by the United States and Russia will have not included a new route.

4.2.2.2.3 Pan-Europe Oil Pipeline Project

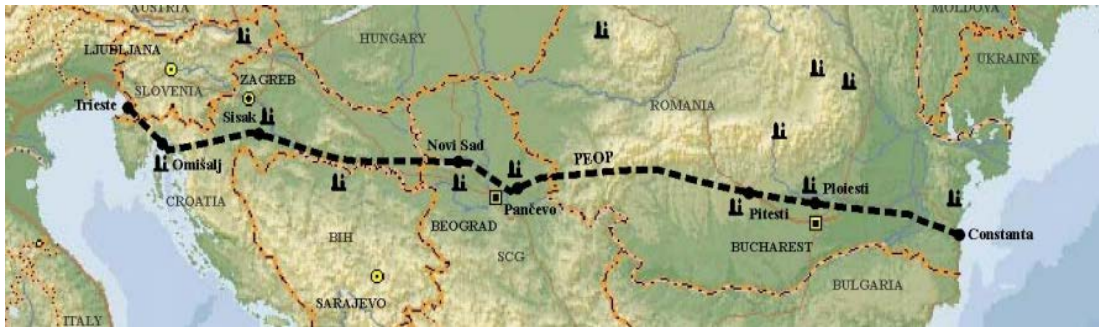


Figure 4.20: PEOP Project

Reference: TRANSNAFTA (2010). *Overview of the Pan European Oil Pipeline Project*, p.6

The project is the third projects that will bypass Turkish Straits. If it is completed, it will be 1320 kilometers (Transnafta, 2010). Russian and Caspian oil in Black Sea will be carried from Constanta, a Romanian port on the Black Sea, through transportation from Constanta to the Port of Trieste in Italy, through Slovenia. The Transalpine oil pipeline connects the port of Trieste; extends to Austria and Germany. The first stages of the line carry oil 40 million tons per year and later it is planned to raise capacity to 90 million tons. The cost of the project is around \$ 3 billion (Saygın and Çelik, 2011, p.69).

It is aimed at reducing the number of tankers passing through the Turkish Straits (Transnafta, 2010). Pan-Europe Oil Pipeline is less risky. Italy is hesitant as a partner for the Italy Samsun (Unye)-Ceyhan project. Due to the difficulty of finding the source of both the project in this reason Samsun (Unye)-Ceyhan project can be seen as more important for Italy. In addition, Russia is not a partner for this project Therefore; the pipeline project does not seem to work effectively.

4.2.2.2.4 Odessa-Brody-Plock-Gdansk Oil Pipeline Project



Figure 4.21: Odessa-Brody-Plock-Gdansk Oil Pipeline Project

Reference: OBOZRETAVEL (2011). *Odessa-Brody-Plock-Gdansk Oil Pipeline Project*
<http://eng.obozrevatel.com/ukraine-and-the-world/poland-to-examine-ukraines-preparedness-for-taking-part-in-odessa-brody-plock-project.htm>

This project extends oil pipeline Odessa-Brody project. The current line is extending 674 km further from Brody which is the north of Ukraine (Inogate, 2006), a first Plock city in Poland and then Gdanska Port in the Baltic Sea of Poland. Thus, the Azeri and Kazakh oil with Baku-Supsa pipeline to the Black Sea, from here to Port of Odessa and last stop is European Union Markets (Forbes, 2011). The main purpose of the project reduces its dependence on Russia (Saygın and Çelik, 2011, p.70). The Brody-Plock oil pipeline construction project will complete by the end of 2015 (Azernews, 2013). The Odessa-Brody oil transportation project was planned for diversification, oil supplies to Ukrainian refineries and improve the country's transit potential.

4.2.2.2.5 Samsun (Unye)-Ceyhan Oil Pipeline Project



Figure 4.22: Samsun (Unye)-Ceyhan Oil Pipeline Project

Reference: America Pink, *Samsun-Ceyhan Oil Pipeline Project*, http://america.pink/samsun-ceyhan-pipeline_3897583.html

This pipeline is completely within the boundaries of Turkey. With this pipeline, Russian and Caspian oil is scheduled to be transported to Samsun, to Ceyhan Terminal (Mediterranean Sea). When it will be completed, length will be 550 kilometers (EIA, 2006). It is one of the most important projects bypassing Turkish Straits. With this project is expected to transport 70 million tons of oil per year (Saygın and Çelik, 2011, p.71).

During Russian President Dmitry Medvedev's visit to Turkey in 2010 (Rianovosti, 2010), an agreement on transportation of oil to international markets through Samsun (Unye)-Ceyhan oil pipeline project from the Black Sea signed that he said it is a priority. Thus, it is important for Turkey, but the problems at the source of oil flow through the pipeline occurred.

In addition, Nursultan Nazarbayev, President of Kazakhstan, who visited Turkey in 2009, announced their support for Samsun (Unye)-Ceyhan pipeline (Saygın and Çelik, 2011, p.72). Kazakhstan oil to the European market, as the most important exit route, is dependent on Russia and control lines in Transneft. The new lines can be done in the long term with the possibility of transporting Kazakh oil directly to the Black Sea. If this situation occurs, it will negatively affect Russian energy fields. Otherwise, Turkey will make herself more dependent on Russia in terms of the weight of energy fields. Samsun (Unye) Ceyhan will be the most important pipeline in Russia-Turkey Geo-Energy area in the near future after Blue Stream (Saygın and Çelik, 2011, p.72).

4.2.2.2.6 Trans Anatolian Natural Gas Pipeline Project (TANAP)



Figure 4.23: Trans Anatolian Natural Gas Pipeline Project

Reference: TANAP, *Trans Anatolian Natural Gas Project*, <http://www.tanap.com/>

The purpose of the TANAP Project is to collect natural gas produced from Azerbaijan's Shah Deniz-2 gas field, and other areas of the Caspian Sea. Firstly, it will reach to Turkey and after to Europe. TANAP will work from the Turkish border with Georgia, beginning in the Turkish village of Türkgözü until it ends at the Greek border in the Ipsala district of Edirne (TANAP, 2014). This line will reach 1850-kilometer length (TANAP, 2014). Turkey's energy minister Taner Yıldız announced that it will complete within four years of the program determined in this line (Enerji Bakanlığı, 2015).

Trans-Anatolian Natural Gas Pipeline Project (TANAP) is committed to building for contributing Turkey's economic development and ensuring the sustainability of natural resources safe, high quality of its environmental and social responsibilities. This pipeline is the most important for European energy diversities. In recent years, the civil war in the Middle East threatens the energy security of Europe. Increasing consumption is a problem of energy security; in this reason, Europe is searching more resources for new energy routes.

4.2.3 Alternative Geo-Energy Areas for EU: Diversification Strategy

4.2.3.1 EU-Norway Geo-Energy Area

Norway is not an EU member, but Norway is the second largest exporter after Russia in natural gas to the EU. According to RT news; Norway was the largest source of gas for Europe in 2012, such as Russia and Gazprom exports fell by 10% by coal and high prices in 2012, Russia lost the main supplier position for the EU (RT, 2013). Figures on Norwegian export show that 35% of natural gas consumption in Europe is provided by Norway (CRS, 2013). As of 2012, proven natural gas reserves of Norway is 4.000 million barrels of oil equivalent (Statoil, 2012). The majority of these reserves are in the North Sea, but there is also a significant amount in Norway and the Barents Sea.

Norway opens a new opportunity, LNG export market for the start of an EU search for energy security. Statoil is the operator for Snohvit project, which is activated in October 2007 and Statoil plans to build Europe's first large-scale LNG export terminal, with pipelines to Europe. The EU recognized the Norway in Europe's energy security debate and Europe has also expressed interest in "facilitating Norway's efforts to develop resources in the high north of Europe" (European Commission Green Paper, 2006). European countries have also recognized the potential role of secure energy. Poland had already begun discussions on building an LNG terminal along the coast in the industry with Norway and the Baltic countries for LNG transportation to other parts of Europe.

4.2.3.1.1 Norway-EU Pipelines

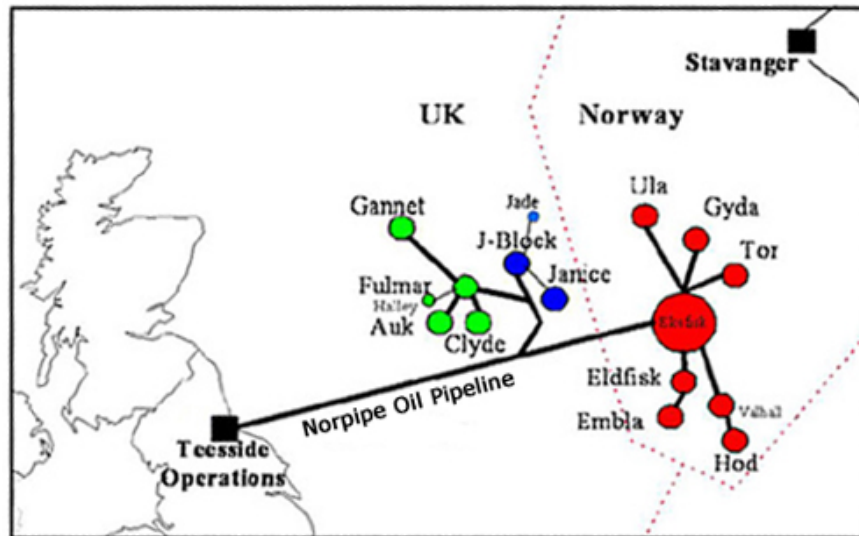


Figure 4.24: Norpipe Oil Pipeline

Reference: Petroleum Safety Authority Norway, *Norpipe Oil Pipeline*, <http://www.ptil.no/news/audit-of-management-of-the-integrity-of-the-norpipe-oil-pipeline-article5382-878.html>

Norway has a large pipeline system called Oseborg Transport System along the coast connecting terminals with production sites in the bottom of the sea. This system connects Terminal Oseborg Oil Field with Stura, and it transports approximately 38 million tons of oil (Statoil, 2015).

Troll-1 oil pipeline connects the Troll B platform to Mongstad Terminal, while Troll-2 oil pipeline connects the Troll C platform to Mongstad Terminal. Troll-1 carries approximately 13 million tons of oil per year and Troll-2 carries approximately 15 million tons of oil (Saygın and Çelik, 2011, p.76).

On the map above, Norpipe Oil Pipeline is Norway's first oil production site and it connects Ecofisk oil field in the North Sea to Teesside Terminal in Great Britain and has approximately 45 million tons of annual capacity (Saygın and Çelik, 2011, p.76). Norway, as of December 2012, has 17,027 bcf of proven natural gas reserves (Subsea Oil and Gas Directory, 2012).

In 2012, Norway produced 96.8 billion cubic meters of natural gas, consumed 6.6 billion cubic meters (Bloomberg, 2012). Remaining 29.4 %billion cubic meters of natural gas was exported to the European Union from Norway (Eurostat, 2014d). Norway-England (Vesterled, Langeded), Norway-France (Franpipe), Norway-Belgium (Zeepipe), Norway-Germany (Europipe I, II, Norpipe) are the pipelines.

4.2.3.2 EU-North Africa Geo-Energy Area

Security of energy supply in Europe and the EU's efforts to reduce its dependence on Russia calls for a strong political and economic participation in the Middle East and North Africa has increased in Europe. The current problems of the region's political instability and strong competition for energy resources from Asia and North America countries are challenging the existing European efforts.

The Persian Gulf countries (Bahrain, Iran, Iraq, Kuwait, Qatar, Saudi Arabia, and only the United Arab Emirates) hold half of the world's oil reserves (57%) and the Middle East Region produces about 31% of the world's oil.² In addition, it is expected to keep Libya 40 barrels and Algeria 12 barrels. The Persian Gulf region has 45% of the world's total natural gas reserves as well, representing approximately 2.400 trillion cubic feet (TCF). Algeria has 161 tcf and Libya has 52tcf according to estimates (BP, 2014).

The European Union is dependent on the North Africa and Middle East region by 30% in oil imports and about 15% in natural gas. The majority of this oil comes from Saudi Arabia, which is followed by Libya and Iran.³ Europe's primary supplier of natural gas is from Algeria through two pipelines via Italy and Spain. A smaller amount comes from Libya to Italy with pipelines. Two additional natural gas pipelines from Algeria to Spain and Italy are under construction. Perhaps the most significant development has been the breeding status of liquefied natural gas (LNG) in this area of Europe. The main suppliers are Algeria, Egypt, Oman, and Qatar for LNG to Europe. The world's third largest exporter of LNG is Algeria. Almost all-Algerian natural gas (25b cubic meters) goes to Europe. In 2006, the Algerian national oil company, Sonatrach signed a 20 year LNG supply with Spanish energy company Endessa (Lloyd's List,2006).

LNG has become an important factor in the development of natural gas exports from the Persian Gulf. European energy companies as well as the Gulf LNG companies began to express their interest in buying more. Large quantities of natural gas reserves in the Gulf countries have been placed to meet part of the demand for Europe's future.

European relations have improved steadily with the countries of the Persian Gulf and North Africa over the years. North Africa and the EU relations were formalized

² For additional information see "Persian Gulf Oil and Gas Exports Fact Sheet," Energy Information Administration, U.S. Department of Energy

³ EU Energy Policy Data, Op. Cit.

in 1995 with the creation of the Euro-Mediterranean Energy Partnership. EU also has developed relations with the Persian Gulf countries through EU-Gulf Cooperation Council (GCC), in which the dialogue is created and a formal dialogue is launched with the countries of OPEC. European energy companies also located in the Middle East have become more. On the other hand, observers note that these forums have developed slowly, and countries such as Algeria, Europe have been reluctant to accept the terms offered. For example, in September 2007, Algeria reported that \$ 7 billion (5 billion Euros) worth of gas contract has been canceled with Spanish companies (Youngs, 2007).

Due to the growth potential of Europe's energy security strategy, the Middle East and North Africa is important for the European energy competition. There is long-term political instability in Asia and North Africa. The European Union's energy dependence will increase in the future. However, the Caspian region will reduce the European Union's dependence on the Middle East and North Af

4.2.3.2.1 Trans Mediterranean Natural Gas Pipeline



Figure 4.25: Trans-Mediterranean Natural Gas Pipeline

Reference: Pipelines International, *Trans-Mediterranean Natural Gas Pipeline*, http://pipelinesinternational.com/news/trans-mediterranean_pipeline/009342/

There are two pipelines transporting natural gas from Algeria to the EU. In addition, there are the two pipeline projects for an alternative line. From Algeria to the EU in 1983, the first of the natural gas pipeline from Hassi R'Mel natural gas field in Algeria through Tunisia, this line starts from there to the Mediterranean island of Sicily in Italy under the first 35 km of stretches and with a line from Italy Natural gas

pipeline system is connecting Slovenia's pipelines (Pipelines International, 2011) (Figure 4.25). Trans-Mediterranean Natural Gas Pipeline capacity has been increased in 1994. Natural gas transport capacity of 30 billion cubic capacities of this line until 2012 with a planned removal of 33.5 billion cubic meters (Saygin and Çelik, 2011, p.79).

4.2.3.2.2 Maghreb-Europe Natural Gas Pipeline



Figure 4.26: Maghreb-Europe Natural Gas Pipeline

Reference: Energy Manager, *Maghreb Europe Natural Gas Pipeline*, http://www.energymanager-online.com/pages/ltsa_maghreb.htm

The pipeline is from Algeria to Europe and it carries natural gas, it is completed in 1996. The Maghreb pipeline is transporting natural gas from Algeria via Morocco to Spain and Portugal (Energy Manager, t.y) (Figure 4.26). The second phase of the line contains an extension to France and Germany but Maghreb-Europe natural gas pipeline completed in the line construction of a long time, because there were border issues between Algeria, Morocco and Algeria.

4.2.3.2.3 Medgaz Natural Gas Pipeline



Figure 4.27: Medgaz Natural Gas Pipeline

Reference: Natural Gas Europe, *Medgaz Natural Gas Pipeline*, <http://www.naturalgaseurope.com/spanish-firm-buys-stake-in-medgaz-pipeline>

EU wanted to build a natural gas pipeline without a connection to Morocco and Algeria, as an alternative for Maghreb-European Line, carrying natural gas by pipeline under the Mediterranean, directly to the EU (Figure 4.27). Medgaz Pipeline has the capacity to transport 8 BCM of gas, and it is supplied with gas from the Hassi R'Mel field in Algeria, through a 547 km pipeline, which was constructed as part of the project (Pipeline International, 2011).

Medgaz project was completed in March 2011. The Medgaz gas pipeline will carry natural gas pipelines directly to the EU-North Africa and the EU will reduce their dependence on the energy field in Algeria and Morocco and the pipeline is more stable and economically (Saygın and Çelik, 2011, p.81).

4.2.3.2.4 GALSI Natural Gas Pipeline



Figure 4.28: GALSI Natural Gas Line

Reference: EDISON, *GALSI*, <http://www.edison.it/en/company/gas-infrastructures/galsi.shtml>

GALSI Natural Gas Pipeline Project from Algeria to Sardinia and further in Northern Italy. It is planned to transport natural gas from Algeria directly to the EU without a transit country (EDISON, 2013) (Figure 4.28). The first line will be 1505 km and it has 8 billion cubic meters' natural gas transportation, scheduled for completion in 2014 (EDISON, 2013). When the pipeline will complete on stream in 2014, the gas pipeline will supply an alternative at competitive prices to supply resources from Eastern Europe.

4.2.3.2.5 Green Stream Natural Gas Pipeline

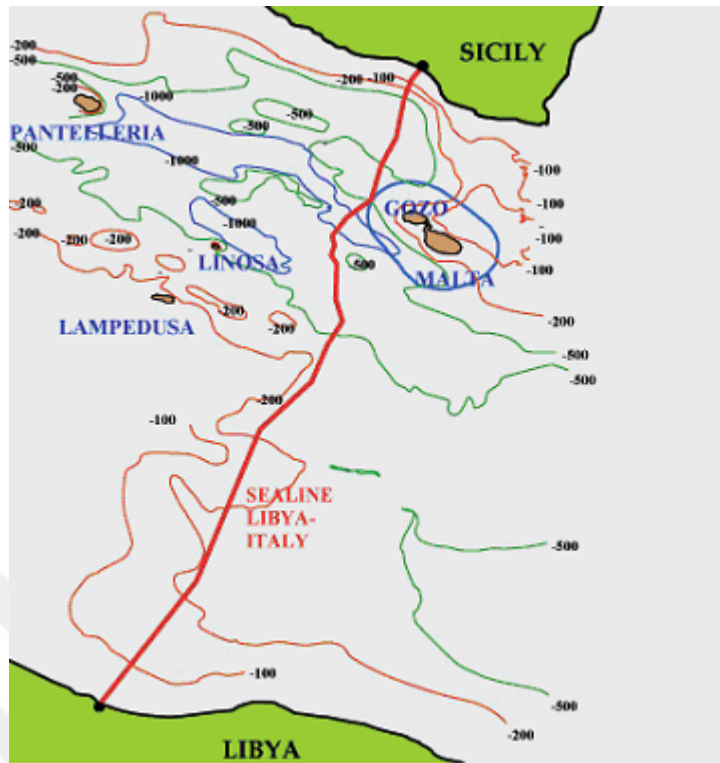


Figure 4.29: Green Stream Natural Gas Pipeline

Reference: NASDAQ, Green Stream Natural Gas Pipeline, <http://www.nasdaq.com/article/why-unrest-in-libya-could-be-a-boon-to-europes-natural-gas-market-cm59467#ixzz2iH2o2vs8>

The Green Stream pipeline is a natural gas pipeline from Libya to Italy. Wafa gas is taken from the gas field near the Algerian border; the pipeline is from the Port of Melita taken under the Mediterranean to Sicily (GreenStreamby, t.y). First stop is Italy and later, the line is planned to extend to other European countries (Map 4.22). Internal conflicts in the North African countries such as in Libya on February 15, 2011 are the challenges. They turned into civil war (NaturalGasEurope, 2013), as a result, the UN, NATO decided to intervene Libya (The Guardian, 2011). In the EU market, because of these developments, major oil and gas producer operating in Libya, ENI (Italy) and OMV (Austria), mainly oil companies decided to stop drilling activities due to increased conflict. Intervention of oil and natural gas fields in the country for a long period increases the risk of downtime and disturbance in oil production led to the highest level of oil prices in recent years. These developments would be limited to the short-term price effect. On 20 October 2011, after the killing of Libyan leader Muammar Gaddafi, the National Transitional Council provided the management and control completely and quickly; as a result, it will be significantly less uncertainty in the country (Saygın and Çelik, 2011, p.82).

4.2.3.2.6 Suez Canal

Egypt is the third country for EU to import oil and natural gas in the EU-North Africa in geo-energy area. As of January 2013, Egypt has 4.4 billion barrels of proven oil reserves (EIA, 2014). Suez Canal is a strategic point for Egypt and the world in terms of energy transportation. The Suez Canal is a passage canal from Red Sea for Persian Gulf oil to the Mediterranean and Russian and Caspian oil in the Mediterranean to Red Sea. The Suez Canal was opened in 1869, today; including the northern and southern direction it carries about 3% of the world's oil supply or 2.5 million barrels oil every day (Quartz, 2013). Carrying capacity is increasing and there is deepening and expansion work in the Suez Canal to go through large tankers (Saygin and Çelik, 2011, p.83). Suez Canal will remain open for the Egypt economy.

4.2.3.2.7 Sumed Oil Pipeline

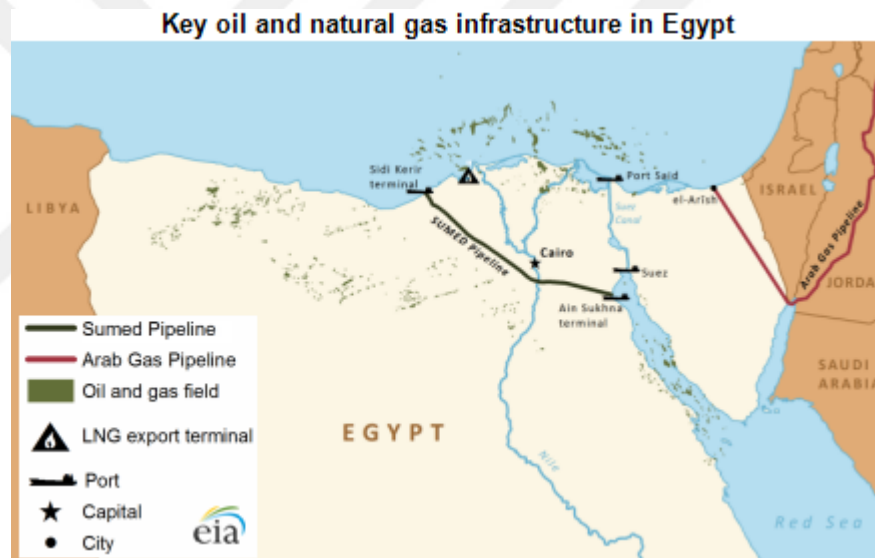


Figure 4.30: Sumed Oil Pipeline

Reference: EIA, *Sumed Oil Pipeline*, <http://www.eia.gov/todayinenergy/detail.cfm?id=12371>

The Suez Canal has limited capacity, and faces closure in adverse weather conditions, thus oil tankers have to go around Africa. For this reason, the Sumed oil pipeline was constructed as an alternative Suez Canal by five Arab countries in 1977 (Saygin and Çelik, 2011, p.84). The annual capacity is 115 million tons with 320 km length (Saygin and Çelik, 2011, p.85).

4.2.3.2.8 Arab Natural Gas Pipeline

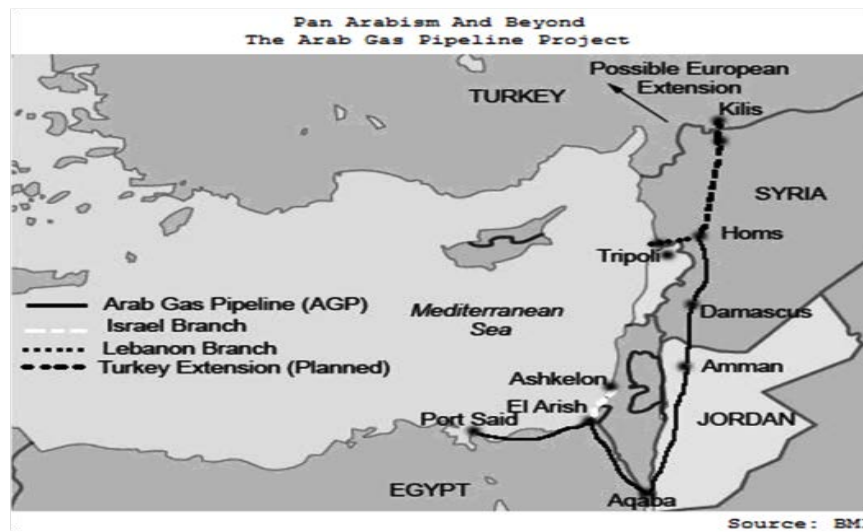


Figure 4.31: Arab Natural Gas Pipeline

Reference: OilPrice, *Arab Natural Gas Pipeline Project*, <http://oilprice.com/Energy/Natural-Gas/Egypt-Declining-Oil-Fields-Lead-To-Growing-Reliance-On-Natural-Gas-.html>

Arab Natural Gas Pipeline is a major pipeline that connects Egypt, Jordan and Syria (Ya Libnan, 2008). The required capacity is approximately 900 million cubic meters per year. The line was completed in 2008 (Ya Libnan, 2008). Importance for the European Union, the line was extended to Turkey, the possibility of connecting to the Nabucco Project. Between Turkey and Syria in 2008, an agreement for the extension of the line was up to Turkey to be completed in 2011. In 2011 the Arab Spring which is the people's movements and internal conflicts. We should not forget all the plans will affect and as of March 2012, the gas supply stopped to Israel and Jordan, because the pipeline was attacked by terrorists on GASCO's feeder pipeline to El-Arish from the beginning of the 2011 Egyptian revolution (Haaretz, 2012). The pipeline returned to work in 2013 (Abramonline, 2013).

Finally, if this line is completed Egypt will be into the EU's natural gas supply via Turkey between countries. Finally, Libya has agreed to the Arab gas line for natural gas participation and with this participation, in terms of the diversity of resources would provide stronger. However, the decision of the UN and NATO's intervention in Libya could disrupt all agreements (Saygın and Çelik, 2011, p.84).

4.2.3.2.9 Arish-Ashkelon Natural Gas Pipeline

This line is a line separated from the Arab Natural Gas Lines, which connect Egypt and Israel (Figure 4.31). Arish-Ashkelon Natural Gas Pipeline completed in 2008. The line capacity is approximately 1.7 billion cubic meters per year (Prospect, 2012). Length is 100 kilometers (Prospect, 2012). This line is very important for Israel. Because the Israeli energy sector, mainly for political reasons does not take oil Arab countries, does long-term and expensive agreements with countries such as Mexico, England, and Norway (Saygın and Çelik, 2011, p.86).

By agreement with Egypt, the establishment of Arish-Ashkelon natural gas pipeline, paving the way for the use of natural gas by changing energy policies of Israel, Arab Spring began in North Africa with internal conflicts and civil wars, which is first in Tunisia, after the start the Egypt. The decisions of the new administration show the effect of energy fields (Saygın and Çelik, 2011, p.86).

4.2.3.2.10 Trans Sahara Natural Gas Pipeline

The government of Nigeria and the government of Algeria agreed on the 4300 km long about Trans-Saharan Gas Pipeline (TSGP) (Downstream Today, 2009). It would connect the Niger Delta in Nigeria and Niger to existing gas transmission hubs to the European Union at El Kala in Algeria's Mediterranean coast (Downstream Today, 2009) (Figure 4.31).

4.2.3.3 EU-Caspian Basin/Middle East Geo-Energy Area

4.2.3.3.1 Pipelines

4.2.3.3.1.1 Central Asia-Center Natural Gas Pipeline



Figure 4.33: Central Asia-Center Natural Gas Pipeline

Reference: Eurasian Energy Analysis, Central Asia Center Natural Gas Pipeline, <http://eurasianenergyanalysis.blogspot.com.tr/2010/09/chinese-demand-for-central-asian-energy.html>

Turkmenistan exports, natural gas with three natural gas pipelines. Two-thirds of exports are with Russia. It is approximately 2000 kilometers long and under the control of Gazprom. The pipeline starts from southeast Turkmenistan natural gas field through Uzbekistan and Kazakhstan to Russia. There are totally four units of natural gas line (Figure 4.33). These pipelines continue to the north west of Kazakhstan to unite and blend in with the Russian natural gas pipeline (Yenikeyeff, 2008). Construction began in 1960 and the pipeline became operational in 1988. Its current capacity is 44 billion cubic meters. Primarily, it is planned to raise it to 55 billion cubic meters of pipeline capacity, to then 90 billion cubic meters (Saygin and Çelik, 2011, p.94).

4.2.3.3.1.2 Baku-Tbilisi-Erzurum (BTE) Natural Gas Pipeline



Figure 4.34: Baku-Tbilisi-Erzurum (BTE) Natural Gas Pipeline

Reference: Natural Gas Europe, *Baku-Tbilisi-Erzurum Natural Gas Pipeline*, <http://www.naturalgaseurope.com/baku-tbilisi-ceyhans-gas-pipeline>

It is known as South Caucasus Natural Gas Pipeline. It runs natural gas from the Caspian Sea in Azerbaijan via Georgia to Turkey. The pipeline was constructed from Azerbaijan to Erzurum in Turkey and it was connected with the Iran-gas line. This line is parallel to the Baku-Tbilisi-Ceyhan pipeline. It became operational in 2006 and it is 692-kilometer-long (BP, 2006). Its capacity is 7 billion cubic meters per year (BP, 2012). The BTE natural gas pipeline is designed to provide natural gas between Georgia and Turkey. This line is not only Turkey's natural gas needs. This is an important line for the EU's rapidly growing natural gas needs. BTE pipeline is planned for Nabucco and Turkey-Greece-Italy natural gas transportation. A BTE gas pipeline which will provide all the actors of the merger (the EU-Caspian / Middle East area) increased the likelihood of the realization of the Nabucco project. Natural Gas in Turkmenistan and Kazakhstan will be moved to the EU. This situation has increased the likelihood of Caspian Sea natural gas pipeline projects (Saygın and Çelik, 2011, p.113).

4.2.3.3.1.3 Baku-Tbilisi-Ceyhan (BTC) Oil Pipeline

The BTC oil pipeline runs between Azerbaijan, Georgia and Turkey for the transportation of oil (Figure 4.35). It has 1768-kilometer length (BP, t.y). The BTC oil pipeline is passing from the Sangachal terminal near Baku through the capital of Georgia near Tbilisi to the Mediterranean terminal of Ceyhan in Turkey. The annual capacity is 50 million tons (BP, t.y).

The BTC oil pipeline was in the agenda for the first time in 1992, and transportation of oil from Azerbaijan's Azeri-Chirag-Guneshli oil field in 1994, after the agreement on the processing and transport of the world markets began to take its present form. Since 1994, after a period of long and difficult negotiations, the Memorandum of Understanding was signed in 1998 thus the first concrete step was taken. BTC government guarantee signed on October 2000. The construction of the pipeline began in 2002. On 24 May 2005, the first Azerbaijan oil was pumped in the pipeline and it was delivered at the Ceyhan Terminal on May 28, 2006 (BP, t.y). Oil was exported to the United Kingdom, Italy, USA, Israel, and France from Ceyhan Terminal (Saygın and Çelik, 2011, p.107).

The BTC oil pipeline is strategically important because, first, it breaks the Russian monopoly on the transportation of Caspian energy resources to the world markets. With this oil pipeline, Azerbaijani oil runs to Turkey, to Europe and western markets, without Russia. Through an alternative route, diversity for the energy security of is provided.

Turkey's geopolitical power increased in the region with the BTC Oil Pipeline and the Turkish Straits has the advantage of reducing the risks arising from excessive traffic load. Ceyhan oil terminal, which also has a second terminal, increases the strategic value of diversity itself and the route provides an alternative source for the Middle East (Saygın and Çelik, 2011, p.109).

4.2.3.3.2 Pipeline Projects

4.2.3.3.2.1 Nabucco Natural Gas Pipeline Project



Figure 4.35: Nabucco Natural Gas Pipeline Project

Reference: European Dialogue, *Nabucco Natural Gas Pipeline Project*, <http://eurodialogue.org/Nabucco-Pipeline-Map>

The line is known as Turkey and Austria Natural Gas Pipeline. Pipeline aims to transport Caspian and Middle Eastern gas resources directly and safely to the EU. It is planned to construct natural gas pipeline from Erzurum in Turkey to a point in Europe (Pipelines and Gas Journal, 2009).

Nabucco is expected to transport Iranian natural gas and Caspian natural gas. In addition, other suppliers are expected to be Iraq and Egypt. Nabucco project was initiated in 2002 and the intergovernmental agreement between Turkey (BOTAS), Romania (Transgas), Bulgaria (Bulgaria gas), Hungary (MOL) and Austria (OMV) was signed on 13 July 2009. Pipeline's annual capacity is 31 billion cubic (Pipelines and Gas Journal, 2009). The cost of the project is approximately \$ 11.2 billion (Saygın and Çelik, 2011, p.116). However, for a long time Nabucco Project has not improved. The first gas crisis between Russia and Ukraine was in 2006 and repeated in 2009. This crisis showed the risk of dependence on Russia for energy security of the European Union. Therefore, the European Union has increased its interest to this project. On the summit of the European Union was diversification of energy. Thus, the project was regarded as a priority.

There are many factors for delays in the progress of the Nabucco natural gas pipeline. There was a conflict between Azerbaijan and Armenia. Turkey's

rapprochement with Armenia (Saygın and Çelik, 2011, p.116) dated August 31, 2011 considered opening Turkey-Armenia border, and then Azerbaijan took a decision to increase for amount of natural gas to Russia. Insufficient natural resources of Azerbaijan would remain inadequate for Nabucco pipeline after increasing the amount of natural gas to Russia the remaining portion of the gas (Saygın and Çelik, 2011, p.118). Another issue is Russian's opposition (Roconsulboston, 2009). Russia has her own projects about how the European Union's energy alternatives should be achieved. For example, Russia has Nord Stream, which is a natural gas pipeline that runs directly to Germany via Baltic; and South Stream, which will run directly under the Black Sea to Bulgaria. In addition, Nabucco pipeline, which will use resources in Azerbaijan and Turkmenistan, in this reason Russia has eyes on these resources, thus the Nabucco project could be run again after a time delay (Vahabov, 2010).

Other issue is that Egypt will provide natural gas for Nabucco natural gas pipeline project but Arab gas pipeline should be extended to Turkey in order to connect Nabucco project. Conflict in Syria and other countries in the Middle East and North Africa will negatively affect this project. In addition, European Union countries do not move together such as in unity. It is an advantage since Russia does not make a deal with the European Union, but with individual countries. Therefore, the interest of the on Nabucco project is reduced (Saygın and Çelik, 2011, p.119). Nabucco Project is an alternative to the Russian energy field for the EU and it is a strategic project for the development of the energy field between EU-Caspian-Middle East regions (Saygın and Çelik, 2011, p.120).

Finally, according to European Union Energy Commissioner Guenther Oettinger; the Nabucco pipeline is not dead and Project is still an option in the long-term energy security for the transport of Caspian gas to Western Europe (Enerji Enstitüsü, 2013).

4.2.3.3.2.2 Trans-Caspian Natural Gas Pipeline Project



Figure 4.36: Trans-Caspian Natural Gas Pipeline Project

Reference: Novinite, *Trans-Caspian Natural Gas Pipeline Project*, http://www.novinite.com/view_news.php?id=132650

The project is planned to run natural gas in southern Turkmenistan under the Caspian Sea to Baku with pipeline. The pipeline will be connected to BTE Natural Gas pipeline in Baku and it will transport Caspian's natural gas from Caspian to the EU (Natural Gas Europe, 2013). Trans-Caspian gas pipeline project was proposed by the United States in 1996. Turkey and Turkmenistan signed a Framework Agreement for the realization of the project in 1998. According to this agreement, 30 billion cubic meters to 16 billion cubic meters of Turkmen natural gas will flow to Turkey and 14 billion cubic meters of gas will flow to the EU (European Dialogue, 2011).

However, there are several obstacles. The first of these issues is that the legal status of the Caspian Sea is still not determined. Russia and Iran will disrupt the ecological balance of the Caspian Sea. However, they should take permission to argue on the Caspian Sea countries. In addition, Turkmenistan exports 30 billion cubic meters (bcm) natural gas to China, starting in 2010 for a 30-year period (Asia Times, 2009). Russia exported 45.4 billion cubic meters of natural gas in 2013 and Iran exported 8.4 billion cubic meters of natural gas in 2012 (Gazprom, 2013).

Caspian oil is transported through BTC pipeline to the EU without Russia, and then second step was taken with Trans-Caspian Natural Gas Pipeline Project. If this project is realized, the realization of Nabucco project will increase in the near future (Saygın and Çelik, 2011, p.114).

4.2.3.3.2.3 Trans-Caspian Oil Pipeline Project



Figure 4.37: Caspian Basin Oil Pipeline

Reference: SRAS (2007). *The Geopolitics of Oil Pipelines in Central Asia*, http://www.sras.org/geopolitics_of_oil_pipelines_in_central_asia

EU-Caspian-Middle East energy field, which will contribute to the development of the oil industry, is one of the most important pipeline projects. Oil Transportation starts from Aktou port in the Kashagan oil field in Kazakhstan goes under the Caspian Sea, to Baku in Azerbaijan. It connects the BTC oil pipeline in Baku with Kazakh oil (Yenikeyeff, 2008). The pipeline transports oil to the EU and to the western market. If this project is realized, The BTC pipeline will run with more capacity and it is going to be more important in the world oil market. Azerbaijan is going to be a transit country with this project. In addition to that, three countries (Turkey, Georgia, and Azerbaijan) will be more advantageous for geopolitical situation, too (Saygın and Çelik, 2011, p.110).

5.CONCLUSION

From the first day of the EU, energy is significant in the process of development and enlargement of the EU. It led to the requirement of establishing energy policy in the EU. There were EEC, ECSC and AAET communities in the history of the establishment of the European Union. These communities show that the energy was in basis of the EU. The European Union energy policy was affected by global developments, technological advances, and the expansion of the union in the 1950s. The process was gradually developed. Today, it affects the global energy security system.

First, the EU energy policy has an impact on the global security. Throughout the history, energy is used for different purposes in different formats that have been an integral part of the human life. Use of energy starts with primitive applications such as heating, cooking; today, energy has become an essential in every area. There were powerful actors in each period and these actors had attempt to dominate the energy areas in their period in order to ensure prosperity. Change in energy types was in parallel with the development of the use of technology. Energy resources were not efficient for steadily growing human population and the importance of energy increased, leading to important struggles for gaining the control of the energy resources. Thus, energy has become an important input for the global security system.

Secondly, oil strategically is an important energy source for the EU. The European Union is second in the world's energy consumption, but the EU does not have enough natural gas and oil reserves. Due to common characteristics of the European Union members, Countries are addicted to oil and natural gas imports, and this dependence will increase even more. Therefore, as an attempt to find its own energy resources in Europe, The European Union started to work on projects for renewable energy sources. Yet, energy from renewable energy sources has not been sufficient for energy consumption in the EU.

These developments are the causes of a common energy policy, but the EU has not been successful in creating a common energy policy. In the failure to establish a common energy policy, there exists the fact that the European Union members do

not want to transfer the sovereignty about energy issues. Thus, member states of the European Union have an attempt to take precautions to reduce dependence on imports of oil and natural gas. Some members have made significant applications in the production of energy from alternative sources, but it did not provide the solution to dependence on imports. For example, Germany is one of the world leaders in the production of electricity from wind power. It is followed by Spain in the EU. Electricity produced from renewable sources is not sufficient for the consumption in Germany and another example is France. France is the world leader in the production of electricity through nuclear, energy capability is not sufficient for energy consumption in this country. Alternative energy production is not possible to talk about the successes of other members.

Thirdly, enlargement policy of the Union has not been a positive impact on energy security to reduce dependence on energy imports. New members joined the European Union do not have enough oil and natural gas reserves to reduce dependence on imports and possible enlargement of the EU in the future will not have a positive effect. However, Turkey has a strategic location in the geo-energy area, in Caspian region reserves and Middle East reserves will transfer to Europe through Turkey with pipelines. It will be effective for EU's energy market and energy security policy. This pipeline project is endowing a special importance in the international arena for Turkey; this is expected to have a positive effect on Turkey's EU membership. The EU can create the world's largest internal energy market after the accession of the candidates with current members. In such a market, the EU can achieve the targets set in Lisbon with the increasing globalization of markets in the face of international competition. While the creation of the EU internal energy market; coal, oil, natural gas and electricity in sectors have different problems with the increasing environmental pressure and it affects different forms for energy sub-sectors.

Another result, the European Union made some programs for the application of the energy policies such as Joule, Altener, Save, Sinerji, Carnot, Etap, Sure, Thermie, Valoren, Tacis, Tracea, Inogate, Bistro Echo programs in order to achieve the objective. The EU aims to achieve the goals with different energy programs, which are currently implemented, but there is no common energy policy yet in the European Union.

Fourthly, another important issue is recent developments in the region. Many projects, agreements and events also affect the energy security of the European Union. The European Union does not have enough resources about energy security

to reduce dependence on energy imports. Firstly, in recent years, the important subject is the crisis between Russia and Ukraine for energy security, Russia was extremely uncomfortable from the Ukraine's relations with the NATO. It led to military intervention in Ukraine. Accordingly, the tension was raised after the annexation of Crimea to the Russian Federation. Because of this, energy fields are affected negatively and an economic embargo is applied on Russia. Then, the European Union's diversification strategy turned to the Eastern Mediterranean for future energy security. In this reason, it aims to look for new areas of diversification of energy.

The EU's energy policy will depend on several factors in the future. They include the U.S. energy strategies, Russia's position in the region, Iran and North Korea on nuclear energy policy, the negative effects on the environment and recent technological advances in the production of alternative forms of energy instead of fossil resources. After all, there should be a strong common energy policy in the European Union, Safe, clean and domestic energy resource nuclear power plants are significant for reducing dependence on imports, but nuclear power security can discuss with the examples in the world, on the other hand, The European public awareness about environmental pollution and global warming is another affect factor for the EU. Hence, the number of the renewable energy sources should increase to reduce dependence and the use of renewable energy sources should encourage such as hydroelectric power, solar and wind energy, geothermal energy and biomass energy. Increasing the use of renewable energy sources are factored in the fulfillment of the obligations of the Kyoto Protocol, due to the purely domestic resources will make a positive impact on the security of energy supply.

The European Union's energy strategy is a multi-pipeline strategy for the energy security. According to this strategy, pipelines and pipeline projects are the most important factor for energy security in the future. Especially for the construction of the Nabucco natural gas pipeline is required to give importance. The EU is also being required to minimize energy consumption in Europe, the rational use of energy and energy-save policies is necessary in the EU. Thus, saving energy reduces the demand for fossil fuels like coal, oil and natural gas and it will do indirect impact on the security of energy supply. Finally, the Coal and Steel Community created in 1951 to create a common market for steel and coal. Today, the European Union is creating a common the Energy Union strategy to develop the EU energy policy. The creation of the Energy Union is important for the stable frameworks, supplying energy security, completing the internal market and climate

change of the EU. The Energy Union will be the new roof that brings together all under the common energy policy.



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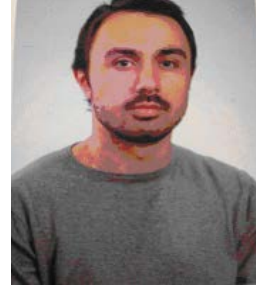
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