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**BAHÇEŞEHİR ÜNİVERSİTESİ**

# SECURITY OF ENERGY SUPPLY IN THE EUROPEAN UNION: CHALLENGES AND SOLUTIONS

**M.A. Thesis**

**AYŞE BEDEN**

**İSTANBUL, 2009**

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**INSTITUTE OF SOCIAL SCIENCES**

**ADVANCED EUROPEAN AND INTERNATIONAL STUDIES**

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**Tez Danışmanı: Yrd. Doç. Dr. ÖZGÜR ÜNAL ERİŞ**

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I certify that this thesis meets all the requirements as a thesis for the degree of Master of Arts.

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This is to certify that we have read this thesis and that we find it fully adequate in scope, quality and content, as a thesis for the degree of Master of Arts.

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# ABSTRACT

SECURITY OF ENERGY SUPPLY IN THE EUROPEAN UNION:
CHALLENGES AND SOLUTIONS

Beden, Ayse

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This thesis is primarily concentrated on the security of energy supply in the European Union. In this regard, it is comprehensively stressed the main challenges which threaten the energy security and its possible outcomes.

To ensure a better understanding, this study encompasses the historical background of energy, the lack of a common policy and the overall energy situation of the Union. In addition to these crucial issues, the tremendous effects of the main threats and the relationship developed by the European Union members with the supplier and transit countries are mentioned as well. Furthermore, it is important to note that all this study has been supported by the official documents of the European Union, the different perspectives of the various authors and the respectful websites' information.

In the light of these highlighted factors, the main purpose of this thesis is to ensure a significant contribution to other related studies.

Especially, stressing to the basic and essential concerns, it also aims to increase the public awareness and to find relevant solutions regarding this issue.

**Keywords:** European Union, energy supply, security, energy resources

# ÖZET


AVRUPA BİRLİĞİ'NDE ENERJİ ARZ GÜVENLİĞİ:
TEHDİTLER VE ÇÖZÜMLER

Beden, Ayse

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Bu tez, esas olarak Avrupa Birliği içindeki enerji arz güvenliği konusu üstüne yoğunlaşmıştır. Bu doğrultuda, enerji arz güvenliğini etkileyen belli başlı tehditlere ve onun sonuçlarına kapsamlı olarak değinilmiştir.

Daha iyi anlaşılması için, bu çalışma AB içinde enerjinin tarihsel geçmişini, ortak bir politikanın eksikliğini ve birliğin bugünkü enerji durumunu kapsamaktadır. Bu ana hususlara ek olarak, arz güvenliğini etkileyen ana risk ve tehditlerin neden olduğu geniş ve zararlı etkiler ve AB üyeleri tarafından, tedarikçi ve transit ülkeleri ile geliştirilen ilişkiler de değerlendirilmiştir. Ayrıca, belirtmek gerekir ki, bu tez içindeki araştırmalar AB'nin resmi dokümanları, farklı yazarların değişik perspektifleri ve saygın internet sitelerinin bilgileri ile desteklenmiştir.

Altı çizilen bu faktörler doğrultusunda, bu çalışmanın esas amacı bu konudaki diğer araştırmalara etkili bir şekilde katkıda bulunmaktır. Özellikle, konu ile ilgili temel endişelere değinerek, bu hususta artan problemler hakkında kamu bilincini arttırmayı, uygun çözümler bulmayı hedeflemektedir



**Anahtar Kelimeler:** Avrupa Birliği, enerji arzı, güvenlik, enerji kaynakları

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# SYMBOLS AND ABBREVIATIONS

| | | |
|---|---|---|
| Barrels per Day | : | bbl/d |
| Billion Cubic Meters | : | bcm |
| Energy Charter Treaty | : | ECT |
| Eurpean Coal and Steel Community | : | ECSC |
| Gross Domestic Product | : | GDP |
| Liquefied Natural Gas | : | LNG |
| Million Tons of Oil Equivalents | : | mtoe |
| Organization for Security and Co-operation for Europe | : | OSCE |
| Organization of the Petroleum Exporting Countries | : | OPEC |
| Trans-European Energy Network | : | TEN-E |
| Trillion Cubic Feet | : | Tcf |

# 1. INTRODUCTION

Energy is a vital element for the natural cycle of the world. Its sustainability and accessibility are extremely important factors for the human beings to perpetuate their survival. Therefore, the energy resources have become considerably significant in the humans' daily lives.

To enlighten this fact, this study has essentially focused on the crucial role of energy within the European Union. Additionally, to ensure a better understanding, it specifically highlights the uprising concept of the security of energy supply and rigorously stresses the possible measures to ensure and to consolidate this vital issue. Accordingly, it is important to note that, at the basic sense, the security of energy supply is to provide the safe and secure transfer of energy from producer to the consumer countries. In accordance with this basic statement, it is obviously clear that ensuring the security of energy supply has been one of the main priorities of the Union. Since, nowadays, almost all of the members suffer from the limited indigenous energy production capacity and high level of import dependency; the concerns toward the security of their energy supply have been accelerated. Moreover, it also relevant to highlight that due to the high dependency to the unstable areas, their political and economical security has been also under a serious threat.

Furthermore, as well as these key points about this crucial issue, the main five primary energy resources should also be listed. Accordingly, these are oil, natural gas, solid fuels, nuclear energy and recently the renewable energy. Among them, the most predominant fuels are oil and natural gas. In this regard, the state actors which possess abundant oil and gas reserves have become the main actors in the international energy market, international economy and international politics as well. For this reason, the competition between different states from different regions to gain the access to the energy resources is one the main priorities of the international political and economical agenda, as well as those of the EU. To that end, this thesis aims to find out comprehensive solutions to the following

questions: What are the main threats of the EU's security of energy supply? And what are the possible measures that EU should look for, to undermine these problems?

Additionally, to ensure a better understanding, the European Commission's reports have great contributions as well. Since they develop a comprehensive and an intensive analyze about the Union's current energy situation and the main progress made toward this issue, these reports were utilized as the basic reference documents during this study's preparation process. In addition to these basic documents, to provide a deep and realist research, various articles, comments and publications were found out from different resources and coherently harmonized.

In light of the foregoing, this thesis has been consisted of four main chapters. First of all, the first chapter presents an overall overview to the EU's current energy situation by stressing the historical background of the energy in the EU, the members' attitudes toward a common energy policy and the situation of the five primary energy resources within the Union. The study becomes more intensified in the second chapter due to the comprehensive focus on the main risks and challenges of the energy supply. In the third chapter, the main aim is to analyze and to evaluate the crucial relationships of the EU member states with the essential producer and transit countries. Finally, the fourth chapter is about the possible measures to undermine the ongoing challenges and to consolidate the sustainability and the security of the energy supply security within the Union. To that end, this thesis has been mainly concentrated on the crucial importance of the security of energy supply for the European Union both in the short and the long-terms.

# 2. ENERGY IN THE EUROPEAN UNION

## 2.1 THE HISTORICAL BACKGROUND OF THE ENERGY IN THE EU

Energy maintains an essential role to shape the history. Since many decades, the most serious international crisis has been occurred due to the competition over the energy resources. In this regard, the restructuring of Europe is a relevant example to prove the essential role of energy resources over the politics and the history. It essentially pawed the way for a new and great political and economical construction. Especially, in the early years of the European Community, during the years of the European construction, the constructive role of energy had been obviously observed.

Accordingly, it is relevant to stress that energy has a unifying feature for Europe. Specifically, coal, steel and nuclear energy were the main elements of this unifying power. These elements are the subjects of two important founder treaties of EU; ECSC and the Euratom Treaties. The ECSC was founded by the Paris Treaty in 1951. France, West Germany, Italy, Netherlands, Belgium and the Luxembourg were members of that new community. The main aim was to combine the coal and steel resources of the member states to establish a coal and steel union.

The role and importance of energy has accelerated especially after the Second World War, in the Western Europe. As energy is one of the most important parts of the economy, it was essential for the reconstruction of the continent after the war. At that time, coal was the most abundant energy source in the continent. Moreover, coal and steel were the main products of the gun industry. Their indispensable positions in the war industry and also for the security of the continent necessity for the war industries and the security of the continent increased their importance vis-à-vis the European leaders. Coal resources were more abundantly positioned in Germany while steel had been more abundant in France. These two big European states could not obtain a consensus and the production of these

two crucial resources caused a big disaccord. Thus, Jean Monnet recognized that by establishing a coal and steel union, the problems between two countries would be avoided and the absolute peace in the Western Europe would be provided. This objective was modified in scope of the Schuman Plan which was launched by Robert Schuman- the foreign ministry of France-. According to this plan; a high authority would be responsible of the coal and steel production (Matlary 1999, pp.14-15).

The establishment of ECSC is the basis of the European Union and it is a significant example to demonstrate the efficient role of energy in shaping the international politics.

The coal dominance in Europe did not continue too long. The coal consumption started to decrease by 1955. At that time, Middle East started to sell its cheap oil to European markets. And then, oil consumption had gradually started to increase and to replace coal in Europe. At that time, most of the people believed that the sectoral integration could bring a fully integrated political unit (Matlary 1999, pp14-15). This idea became weakened with the failure of two important initiatives; European Defense Community and European Political Community.

After these failures, the efforts for establishing a well integrated European unit continued. Especially, the EURATOM and the European Economic Community were appeared as successful initiatives to promote the European integration. Especially, the creation of the Euratom Treaty was a new milestone for managing the energy issue and increasing its efficiency in the union. At that time, oil was not broadly consumed, the consumption of coal was declining and in that case, the use of the nuclear power seemed quite advantageous. However, all the member states were not completely interested in the nuclear issue. They had different intentions for signing this treaty. To illustrate these different intentions, cases of France and Germany are relevant examples. France was quite interested in the nuclear energy contrary Germany was not. Germany was interested in the establishment of a common market. However, it was perfectly aware of the necessity of France’s support for achieving this long-term plan. These different interests show how

there was a lack of common approach in the energy field, even at that time (Matlary 1999, p.16).

The first main challenge for EU's energy supply security showed itself during the first oil crisis. That was a quite bad experience for the Western oil importer states. Due to the embargo put by the OPEC members, western oil consumers' situation had been worsened and they realized their high level dependency to these countries. For this reason, in that time, Europeans had started to look for the new solutions and efficient measures to strengthen their situations.

These new efforts appeared for the first time in 1974. Europeans agreed on some new targets to lessen the bad effects of the high oil dependency. Besides, in 1980, they re-launched new objectives to improve and to consolidate their energy situations. These goals had maintained more economical features comparing to those of 1974. Among these objectives, the essential focus was to take necessary measures to prevent the high energy consumption. They also highlighted that oil imports would be a big threat for the security of energy supply. In this respect, efforts for reducing the high energy consumption started to accelerate and the European Community achieved to make some progress in reducing the high level of oil imports. In addition, the Commission set new targets in 1986 which should be achieved until 1995. According to these targets, the shares of oil and gas in the electricity production would decrease to 15 percent until 1995, the energy saving, together with the energy efficiency measures, should be enhanced, the rise in the domestic production would be promoted, the diversification of suppliers should be encouraged and the energy networks ought to be developed (Belgrave 1987, pp.185-187). All of these efforts, since 1974, had been launched to avoid the negative effects of the first oil crisis. It is also relevant to mention that this first oil crisis became a wake-up call for the Europeans to take some urgent and efficient measures to promote their security of energy supply.

The energy issue gained a new aspect with a new treaty: The Single European Act. This treaty has been considered as a crucial step to establish a common market and to remove

the barriers for the free trade. However, this new initiative had not covered energy-related issues. It has started to include them since 1988. Furthermore, another reform launched within the scope of this agreement is about the decision-making procedure. The areas where qualified majority voting system has been used were extended. And obviously, by this new step, the members' veto power was restricted and the establishment of a common energy policy started to be encouraged.

In light of these developments, it is obvious that energy issue has remained as an efficient tool over the Union's integration policy. Due to its increasing impetus, it has been considered as a high priority both by member states and European institutions. Recently, in addition to these significant efforts, European Commission published energy green papers Towards a European Strategy for the Security of Energy Supply in 2000 and A European Strategy for Sustainable, Competitive and Secure Energy in 2006, to ensure a better understanding about the indispensable effects of energy as a political and economical means.

As is obvious, since the establishment of ECSC, there have been gradual developments to improve the energy sector and to ensure the security of energy supply in Europe.

## 2.2 THE COMMON ENERGY POLICY

As is very well known, European Union has 27 member states since January 2007. Each of these member states has different agenda and political priorities. These priorities have usually aimed to ensure their survival. The fragmented policies and objectives complicated the process to create common policies, especially in some certain areas, in the EU. One of these problematic fields is energy. Its indispensable effects on politics and on economy have increased its importance both in the member states' and in the Union's agenda.

Energy is considered as one of the primary national priorities by most of the member states. Most of them consider it as a political, economical and security oriented issue. Therefore, these members refuse to be involved in any serious commitment which can damage their

interests in the future and they are also against also any possible transfer of power to a more supranational body in this issue. In that point, the main opposition is about to install a supranational authority and, more precisely, to create a common energy policy.

This situation has become more problematic especially after the fourth and the fifth enlargement. In the enlarged EU, the national interests and the approaches toward the new initiatives were diversified. Common interests are totally eliminated in some areas. As is already stated above, energy is considered as a crucial tool for being a global leader in the politics and in the economics. Moreover, these ambitions have led an aggressive competition between consumer states and producer states and automatically ignore the importance of the common interests. Briefly, the increasing tendency toward the protection of the national interests, the ignorance of the common interests, the opposition for a supranational authority and the obvious diversity of national interests prevent "to speak with one voice"(European Commission 2006, pp.14). Actually, this expression is a quite effective to provide a better understanding. The most difficult condition is to provide a full coherence in the Union. Due to the reasons stated in above, this coherence cannot be fully and perfectly settled and members cannot speak with one voice. Especially, the idea of a supranational dominance on the national energy policies is the main obstacle for providing such coherence. They do not want to lose their interest in their national policies (Umbach 2007, p.11). For this reason, there is no consensus for the creation of a common energy policy and to speak with one voice.

It is clear that all member states have different approaches about the common energy policy. Some of them are strongly against and some of them have more moderate approaches toward this issue. However, unfortunately, the majority of the Union is totally against to have a common energy policy. They do not accept a supranational authority in the energy sector.

Member states and interest groups are the main actors in the decision making process for the energy sector. Both of them are quite influential and effective actors for the creation of

an energy policy. However, despite the similar objectives, their focuses are generally different. Member states have preserved the protection of their sovereignty and their national policies as the main priority. On the other hand, interest groups mainly focused on their economical interests and their benefits using their lobbying force. They are usually in the form of companies and associations. Moreover, most of these energy companies are unified and established large scale frameworks in the form of federations. These are Eurogas, Europia, and CEPCEO. The lobbying force of these interest groups is obviously efficient. They have enough power to contribute to the decision making process. Especially, about the common energy policy, they can easily influence their national governments, according to their benefits, and shape the national and more broadly the union's policy (Matlary 1999, p.95).

As mentioned above, it is quite clear that not only the national interests of states but also the interests of the specific groups affect the initiatives and decisions in the European Union. Creation of a common energy policy is one of the areas in which they are predominantly active. For this reason, despite the commission's efforts to install a common policy in the energy field, almost all of the initiatives had failed and the community authorities could not succeed. Among the commission's various efforts, the most significant one was launched by the Maastricht Treaty. In this treaty, they tried to put a separate chapter for the common energy policy. However, this proposal could not succeed. It failed because of the strong oppositions of member states (Matlary 1999, p.95). This initiative is very significant because this is a clear attempt to transfer an important share of competence in this issue to the Union.

Despite the failed initiatives, efforts for a common energy policy have continued. Some of the members have especially insisted on it because they believe that the security of energy supply can be perfectly ensured by a common policy. However, unfortunately, the different priorities and interests among the member states prevent to have an integrated approach for the energy supply security. To illustrate, the target of 20 percent for the renewable energy, proposed by the EU Commission, became a controversial issue because of the concerns of

some member countries. According to this target; the commission proposed to increase the share of the renewable energy until 20 percent in the total energy consumption, in 2020 (European Commission 2006, p.3). This is a serious and detrimental percentage for some members. However, most of the member states have reacted aggressively to this new proposal because of their national priorities. The rise in the share of renewable energy will increase its share in the electricity production and this situation is considered as a threat by the member states which produce the electricity from the nuclear energy and the coal. These members are mainly France, Finland, Hungary, Poland, Czech Republic and Poland (http://www.foeeurope.org/press/2007/coverage/Euractive_energy_spring_summit_070307.pdf 2007). This opposition is a perfect example to demonstrate why EU cannot have a common energy policy. Unfortunately, these kinds of concerns are quite detrimental for the Union and also for its security of energy supply. If the member states do not take into consideration these advises and propositions of the Commission, they will not have a common approach in this issue, the import dependency will not be decreased and the security of supply will not be ensured.

## 2.3 ENERGY SITUATION IN THE EUROPEAN UNION

The European Union, despite its political and economical strengths, has a vulnerable energy situation. This vulnerability essentially arises from three main challenges which are limited energy reserves and insufficient indigenous production, the rise in the energy consumption and the high import dependency especially for the fossil fuels. All of these challenges are the basic threats of the security of energy supply.

As is well known, there is not an equal and fair distribution of reserves throughout the Union. Accordingly, some of the areas are in a more advantageous situation than the others. Especially, the member states which possess oil and natural gas reserves have relatively more chance to strengthen their security of energy supply. However, despite these opportunities, almost all of them cannot totally meet their increasing energy demand and

are highly dependent to the imports. So, it is obvious that each energy source has a different situation. To illustrate, some of them are more dominantly consumed or more abundant than the others. However, some of them are more conveyable for the environmental protection while the others are more harmful.

To ensure a better understanding about the EU's energy situation, it is relevant to analyze two important indicators; the share of energy sources in the total consumption and the share of energy sources in the indigenous production. According to the 2005 data, the share of the solid fuels is 18 percent, the share of the oil is 37 percent, the share of the natural gas is 24 percent, the share of the nuclear power is 15 percent and the renewable energy's share is 6 percent in the total energy consumption (Morelli 2000, p.3). Otherwise, in 2003, the share of the solid fuels is 22 percent, the share of oil is 16 percent, the share of the gas is 21 percent, the share of the nuclear energy is 29 percent and the share of the renewable energy is 12 percent in the domestic energy production (European Commission 2006, p.3).

As is clear, the energy consumption is higher than the indigenous production in the European Union. Especially, due to the limited reserve capacity, the high oil and gas consumption levels increase the vulnerability of the energy situation in the EU. Briefly, each energy source presents different advantages and disadvantages.

### 2.3.1 Oil

Oil is not only an energy source but also an important political and economical tool. It has strong effects both on the producer and the consumer countries. Among all the energy resources, oil is indispensable for the European Union. It is relevant to stress that oil is one of the most important instruments which influences the international economy and politics

> *The dramatic price rises experienced in recent years, and heightened awareness of the role of hydrocarbon combustion to global environmental change, have returned energy, and petroleum, to the centre of political debate (European Commission Directorate, 2007).*

This statement clearly shows how oil is indispensable and the change in oil prices affects the international politics.

Specifically, oil has a special position in the European energy market. Due to the high oil consumption in the transport sector, it is the predominant energy source in the domestic production and consumption. According to 2004 data, regarding the dispersion of sectors in the energy consumption, the transport is in the first rank, the second one is the industry, the third is the households and the fourth is the commerce (European Commission 2006, p.3). Especially, its large share in the transport sector demonstrates how oil is crucial and essential for Europe's future. Actually, since the increasing oil consumption cannot be met by the indigenous production, the Union became worsened. According to the 2004 data; oil production in the European Union was 145.12 mtoe and the consumption was 645.85 mtoe (European Commission 2006, p.3). This large gap between the production and the consumption shows how EU is dependent to oil imports to meet its increasing demand. In this regard, main oil exporter countries to the EU are Russia, Middle East, Norway, and North Africa. Naturally, all the member states do not have the same dependency level to the imports; some of them are more dependent while others are less. To illustrate this situation, it is relevant to stress the current situation of Germany, France and Poland. Germany's import dependency level is 97 percent, France's dependency level is 95 percent and Poland's dependency level is 98 percent. At that point, it is important to note that all these three members import oil from different suppliers. Germany and Poland are highly dependent to Russia. However, France's oil imports are more diversified. The significant share of oil has been imported from the Middle East and also from the North Africa. Their share in total oil imports is 51 percent. The remaining has been usually imported from the North Sea and Russia. The share of North Sea is about 32 percent and the share of Russia is about 23 percent (Geden, Marcelis and Maurer 2006, p.6). Furthermore, to avoid the negative effects of the high oil import dependency, the European Union favors an effective and competitive access to the oil market by avoiding any possible volatility in the prices. Beside this objective, EU also encourages the establishment of the security stocks to

undermine the possible destroying effects of the supply disruption (http://ec.europa.eu/energy/oil/index_en.htm, 2007).

Nonetheless, even though it is not sufficient, there are also a few domestic oil suppliers which contribute to the Union's overall oil production. Among these suppliers, the United Kingdom is one of the main domestic oil suppliers in the EU. Since the major oil fields were discovered in the 1970s, most of the large oil reserves are mature. The oil production in these fields, reached to the highest level in 1999 and then the production started to decline. In 2000, just after one year, the decline in the production was about 7 percent (Zittel 2001, p.8). This decline in the production is a crucial risk for the European energy security. If this decline continues, the UK will be a net oil importer in 2010. However, according to some expectations, this bad situation may arrive earlier than 2010. Some of the experts believe that UK's oil production will not be sufficient to meet the oil demand and it will have to become an oil importer by the year 2008 (The Oil Depletion Center, 2007). Consequently, this decline in the UK's oil production increases its dependency to the external resources and relatively the concerns about the supply security in the EU.

Another domestic oil producer country is Denmark. Denmark's energy situation has been changed since the last decade. Contrary to the UK's situation, it became an oil exporter country. The discovery of the new fields especially in the North Sea is the main reason of this progress. In 2003, its crude oil production was 375 thousands of barrels per day and its consumption was 188 thousand of barrels per day. It is quite obvious that the overall oil consumption is less than the total oil production (http://www.cslforum.org/denmark.htm 2007). This unique case has a great contribution to the Union's energy security. Apart from these two important producer countries; Italy, Germany, Netherlands are other oil producer countries. But, none of them have the capacity to export. Besides, they should import to meet their domestic demands. In Italy, the consumption exceeds its production. Its reserve capacity which is approximately 750 mb is not enough to meet the total consumption. For this reason, Italy is very much dependent to the external sources

(http://www.cslforum.org/denmark.htm 2007). Similar to Italy, Germany is also another important oil producer in the EU. Its proven oil reserves are approximately 367 mb according to the 2006 data. However, despite its reserves, Germany still depends on additional oil imports, as well as Italy (http://www.cslforum.org/italy.htm 2007). The situation is almost similar in the Netherlands. Being sixth biggest oil consumer in the Union cannot meet its growing demand by its limited reserve capacity. Thus, it is desperately dependent to the external resources (http://www.cslforum.org/netherlands.htm 2007).

Finally, it is quite obvious that none of these domestic producers in the EU possesses adequate reserve capacity to meet the EU's overall oil demand. These limited oil reserves and high level consumption increase the EU's dependency to the external and mostly unstable oil suppliers and considerably weaken the EU's security of energy.

### 2.3.2 Natural Gas

Similar to oil, natural gas has a significant impetus in the European energy market. Especially, consumers have an increasing tendency toward the use of natural gas. In 2004, its share in the total consumption was about 23.9 percent. It maintains the second largest share in the total consumption after oil (European Commission Directorate General for Energy and Transport 2006, p.12). According to the estimations, each year, there will be an increase of 2.4 percent in the natural gas consumption in the EU. Unfortunately, contrary to this high consumption, there has been a significant decline in the production capacity in the EU. Especially, main natural gas producer countries are the North Countries, which possess large gas fields in the North Sea, and Netherlands. However, due to the maturity, the gas production capacity of these areas has a tendency to decrease. Especially in the North Sea, the oil production reached to its highest capacity in 2001 and it has being decreased since that time (Hitzfeld 2007). In this regard, unlike the consumption, between the years 2004-2005, the fall in the production capacity of the North Sea was approximately 5.8 percent. Despite this fall, in the same period, the rise in the total gas consumption was about 2.9 percent in the Union. Among the member states, Spain, Estonia, Portugal, Italy, Greece,

Lithuania, Austria and Hungary experienced the most dramatic rises in the natural gas consumption. On the other hand, the natural gas consumption decreased significantly in Finland, Luxembourg, Sweden, Denmark and Belgium In this regard, the main gas producers in the EU are United Kingdom, Netherlands, Denmark, Germany, and Italy and with a small size; Hungary and Poland. All of these suppliers, except Denmark, suffer from the decline in their gas production. However, the situation is different in Denmark. In this country, the gas production increased by 10.8 percent in 2005, comparing to 2004 (Jimenez 2007). Obviously, such a decrease in the production capacities is a big concern for the Union's security of energy supply. More the indigenous production capacity decreases more the EU's dependency to the external resources increases. Among them, Russia is the biggest natural gas supplier with a share of 25 percent. Apart from Russia, natural gas has been also imported from Norway and Middle East as well. The share of Norwegian gas in the total EU's gas import is 15 percent and that of the Middle East is 14 percent (European Commission 2006, p.24).

Moreover, among the indigenous suppliers, United Kingdom is the biggest gas producer in the European Union. Its production is about 100 bcm per year. Its reserves are generally mature and they do not have large capacities. Besides, the production of UK is in decline and has become gradually more dependent to the imported gas. According to the estimations, if this trend will continue as in today, UK will have to import 80 percent of its needs in 2020. Especially, in winter, because of the bad climate conditions and the need of heating, the demand for the imported natural gas increases. The main reason of this increase is that most of the European consumers prefer the natural gas as the main source of the electricity production. This preference relatively increases the demand for natural gas in the country (Parliamentary Office of Science and Technology 2004, p.1).

Another important EU producer is Netherlands. It is the second large natural gas producer in the European Union. Netherlands has 1.45 trillion $m^3$ proved reserves according to the 2005 data. The natural gas production increased from 2003 to 2004 by 15 percent

(http://ec.europa.eu/energy/energy_policy/doc/factsheets/mix/mix_nl_en.pdf, 2007). The main resource of its production is the Groningen Field. Due to its maturity, it has a limited production capacity. However, to ensure the sustainability and the continuity in the gas production, there are also smaller fields which contribute to the overall domestic gas production. Their main problem is their limited production capacity. They already reached to their maximum production level. This situation of the Groningen and the other smaller fields is a serious obstacle for the Netherlands' gas production (Clingendael Institue 2004, p.10-11). In this regard, the maturity and the limited capacity of the Dutch gas fields will threaten, in the future, the energy supply security and increase the level the import dependency for the natural gas as well.

Denmark is also another significant actor for the European Union. Unlike other indigenous producers, in Denmark, the total gas production is higher than the overall gas consumption. Thus, Denmark is indispensable for ensuring the energy supply security in the Union (www.cslforum.org./denmark.htm 2007).

Apart from these main domestic actors, there are also some other slighter gas producers. For instance, Germany possesses approximately 0.2 percent of the world gas reserves. Consequently, its domestic production cannot meet its consumption. 75 percent of its consumption has been imported essentially from Russia and Norway (www.cslforum.org /germany.htm 2007). This situation is similar for the other small gas producer countries. One of these producers is Italy. Similar to Germany, Italy's domestic gas production cannot meet its overall consumption and therefore, Italy has to import a big amount of gas from the external producers. Its suppliers are two Mediterranean Countries; Algeria and Libya, one Nordic country; Norway and also Netherlands and Russia (www.cslforum.org/italy.htm 2007).

It is quite clear that the domestic suppliers cannot totally meet the growing gas demand in the EU. The rise in the gas consumption and the decrease in the production capacities of the

gas fields complicate the energy security issue and threaten the security of the energy supply in the Union.

### 2.3.3 Coal

Each energy source has a different situation in the EU. The coal has a historical importance for the Union. It is one of the main elements of the ECSC. This historical factor increases the importance of the coal for the Union

Germany, United Kingdom, Spain, Poland, Czech Republic, Slovakia and Hungary are the main coal producers in the EU-25. Especially, the fifth enlargement had significantly contributed to the coal production due to the large coal reserves of some new member states like Poland, Czech Republic, Slovenia and Hungary. However, among them, Germany and Poland are the major coal producer countries in the EU (IEA Clean Coal Centre 2004).

Germany, being the largest coal producer in the EU, possesses approximately 7.5 billion short tones according to the 2005 data. In that country, coal has been mostly used for the electricity production. This role consolidated the position of coal in the German economy. Despite its large reserves, 19 percent of the total coal demand cannot be met by the domestic production. Therefore, Germany is dependent to the coal import from different producer countries, as well (www.cslforum.org/germany.htm 2007).

Similar to Germany, Poland has also a significant and crucial position in the international coal market. It is the seventh largest coal producer in the world. In Poland, there are three main productive areas for the coal production. These are Lower Silesia, Upper Silesia and Lublin (IEA Clean Coal Centre 1998). The accession of such a big coal producer country to the Union is a big advantage to increase the domestic production.

The coal's contribution to the EU's security of energy supply is a real dilemma. As is well known, its abundance in the Union is a big advantage for the European consumers. They

can access to this abundant fuel by a cheaper and easier way than oil or gas. Additionally, since it can increase the dependency to oil and gas imports, it may substitute the natural gas in the electricity production. Such a substitution will also decrease the electricity prices because the coal is cheaper and more abundant than natural gas (IEA Clean Coal Centre, 2007).

On the other hand, even though it contributes to the security of energy supply, there are some other concerns about the environmental protection. As is clear, the environmental protection has an increasing importance in the international politics. The climate change, the greenhouse gas emissions, the change in the ecological balance are the main environmental problems. In this regard, there is an increasing concern about the use of coal because of its $CO_2$ emissions. These emissions are the biggest challenges for the climate change. These increasing concerns about the use of coal influence the decision-making process and the energy mix of the members.

However, there are new initiatives to make the coal more efficient and convenient for the security of energy supply in the European Union. In this respect, EU highlighted two important new technologies in the recent energy Green Paper. In this document, the European Commission stressed that the carbon capture and the geological storage can be a significant and efficient options to eliminate the harmful gas emissions (European Commission 2006, p.12). These technologies can be new opportunities to revitalize the share of the carbon in the total consumption.

### 2.3.4 Nuclear Energy

The use of nuclear energy is a very important and problematic issue in the European Union. As in the coal situation, it has a historical significance. The Euratom Treaty had strengthened the position of the nuclear energy in the union.

Similar to coal, the use of the nuclear energy has both advantages and disadvantages. Its main advantage is that it does not contain the harmful gases and it has a significant contribution to the environmental protection.

On the other hand, the use of the nuclear energy has also some disadvantages. The concerns about the nuclear energy are not very recent. The Chernobyl Accident and its effect are still on the agenda. This accident showed that how the use of the nuclear energy and the nuclear centrals can be dangerous and harmful. Apart from its negative effects, the European Commission highlighted the importance of the nuclear energy to ensure the European energy security in its communication: An Energy Policy for Europe. The EC strongly mentioned that each member has the right to choose the relevant energy sources for its own energy mix. However, if the countries choose to use the nuclear power, they should strictly obey to the 'nuclear safety' priorities set by the Euratom Treaty. In addition to this condition, the document has also focused on the nuclear waste and the decommissioning issues. EC favored a new initiative at the community level to deal with these two issues (European Commission 2007 p.17). Actually, these steps prove how European Commission endeavors to avoid the concerns for the nuclear energy and to increase its share in the energy mix of the member states.

In parallel, the member states have different approaches about the use of the nuclear power. France is the strongest supporter of the use of the nuclear power. The main reason of this support is the high share of the nuclear power in its electricity production. In addition to France, United Kingdom and Poland also support the nuclear energy. They consider the use of the nuclear energy as a good option to deal with the challenges against the supply security and the climate changes. However apart from these countries, Germany decided to cease the operation of the nuclear centrals (Geden, Marcelis and Maurer 2006, p.6).

As is clear, there is not a common approach about the use of nuclear issue. However, even though there is not a consensus, all the countries should respect the priorities concentrated

on the security, nuclear waste and the decommissioning. Additionally, it is important to note that a legally binding rule should be launched about these priorities.

### 2.3.5 Renewable Energy

The renewable energy has an increasing importance for the European Union. Especially after the oil crisis in the 1970s which causes the price volatility and high dependency for the gas imports, member states realized that they should take some additional measures to deal with these challenges. Renewable energy is a significant way to fight against these problems.

The renewable energy is consisted of the solar energy, wind power, hydro energy and the biomass. These sources have great contributions to the security of energy supply. Especially, the solar and hydro energies and the wind power can be domestically produced and decrease the import dependency to the other fuels. The biomass was launched as an option to replace oil especially in the transport sector (European Commission 2006, p.34). So, if oil can be substituted by the biomass, this means that the oil dependency will significantly decrease and this will be a big success to ensure the security of energy supply. Therefore, European Commission looks for the new measures to increase the share of the renewable energy in the total energy consumption.[1]

Each member state focuses on different sources of the renewable energy. To illustrate, Germany focuses more on the wind energy and the solar power while France and Poland concentrate more on the biomass energy and the hydropower (Geden, Marcelis and Maurer 2006, p.6).

As is mentioned above, each energy source has different advantages and disadvantages for the Union. However, unfortunately, due to the different reasons, all of them have different

[1] For further information; please see: Chapter IV: Solutions for Ensuring the Security of Energy Supply in the EU

obstacles and this situation complicates the energy situation in Europe. Especially, the limited capacities of the oil and natural gas reserves and the high level import dependency for these fuels increase the risks and challenges for the security of energy supply.

# 3. THE SECURITY OF ENERGY SUPPLY: RISKS AND CHALLENGES

As is a well known concept, security is the essential factor for each political being; states, international and intergovernmental organizations. Indeed, it is a crucial factor for their survival as well. It should be guaranteed in terms of politics, economics and military to ensure and even to strengthen their position in the international scene. In this respect, different factors determine their positions and affect their security. Among these different and various factors, energy is one of the main driving forces affecting the security of the political being, especially, those of the states. Regarding this issue, the main focus is concentrated on the concerns about the security of energy supply which is enormously important both for national and international politics. Basically, the security of energy supply is to provide secure transfer of energy supplies from producer to the consumer countries. It is obviously clear that this is a complicated and difficult process. It is mainly related to the internal energy market's situation, the political stability in the producer and transit countries, the stability and the transparency of the energy prices and also the dialogue with the main energy actors.

It is crucial to mention that energy situation differs from one country to another and from one region to the other. The most distinctive elements of the state's energy situation are their production capacity and their dependency level to the external producers. Therefore, the security of energy supply, being a priority for each consumer, is an outcome of these elements. The bad experiences in the international energy markets, the unexpected oil crisis and their negative outcomes have brought this issue to the top in the EU's political agenda. Its domestic production capacity, growing demand for energy and high import dependency both have seriously threatened its supply security. In addition to these main challenges, the lack of a common approach in this issue is another major problem. All of these factors prove how it is important to ensure the security of energy supply in the EU. In this regard,

there are two main questions to ensure a better understanding about the energy situation in the EU. These are:

i) Is the European Union's energy situation really in a fragile and vulnerable situation?

ii) What are the main threats and risks?

The answer for the former question is quite clear. As is already mentioned in the previous chapter, each energy source has different problems and disadvantages which threaten the general energy security. For this reason, the vulnerability of the EU's energy security is quite obvious. Actually, both of the questions are interrelated. The fragility of the EU's energy situation arises both from the domestic factors and also from the possible threats and risks. Therefore, to enlighten better this issue, the security of energy supply concept and the possible risks and challenges should be better analyzed.

### 3.1 THE DEFINITION OF THE SECURITY OF ENERGY SUPPLY

There are different approaches and explanations concerning the security of energy supply. The basic and clearest approach toward this concept can be interpreted as "…security of supply essentially as a strategy to reduce or hedge risks that derive from energy use, production and imports" (Egenhofer 2006, p.5).

The European Commission strongly accentuated the security of energy supply issue both in the Green Papers published in 2000 and in 2006. These two documents have proved how the security of energy supply is important and essential for the European Union. Especially in the green paper published in 2000, the European Commission stressed the fragile energy situation and the EU's high dependency to the external energy suppliers. The Commission has also highlighted the basic factors to promote the energy supply security. According to the same document;

> *security of energy in the energy field must be geared to ensuring, for the good of the general public and smooth functioning of the economy, the interrupted physical availability on the market of the energy products all prices for all consumers (both private and industrial), in the framework of the objective of sustainable development enshrined in the Amsterdam Treaty* (European Commission 2006,p.10).

From these definitions, it is obvious that the factors which prevent the access to the energy resources and damage the stability of the energy prices are the main threats for the security of energy supply. To protect the domestic consumers from the possible risks and energy crisis is essential for an enhanced energy security. Especially, energy crises are considered as one of the main critical challenges for the consumer states. These are mainly, the gap between the demand and the supply positions in the energy market, the sharp price changes, the supply disruptions because of the physical, economical and technical risks and the unexpected growth in the supply (Clingendael Institute 2004, p.36). In this regard, it is relevant to highlight the 1973-74 oil shocks and the Russian-Ukrainian gas disputes which caused tremendous impacts in the international energy market are the recent examples for this kind of crises. Even though the former has larger impacts, the latter has more serious outcomes for the EU. It is considered as a milestone for the Union because of its crucial effects on the European consumers and also on the national politics of its members. After this crisis, the European consumers started to focus more attentively to the security of energy supply issue.

### 3.2 THE RISKS OF THE SECURITY OF ENERGY SUPPLY

The security and the risk are actually two parts of a medallion. These concepts are quite interrelated. It is possible to mention that security can be ensured through eliminating the risks. Especially, in the energy field; the security of supply is very much affected by the different type of risks.

The author Christian Egenhofer clearly cites the main types of the risks, in his article: Integrating Security of Supply, Market Liberalization and Climate Change. According to the author; risks can be classified as the short term and the long term risks. The short-term risks are usually unexpected events which cause the supply disruption like the weather disaster, sudden political crisis, and technical problems. However, the long-term risks are more predictable and long-lasting problems like the gap between the demand and supply, the unavailability of the resources because of the lack of investment and the problems in the infrastructure (Egenhofer and Legge 2001, p.4).

Besides to Christian Egenhofer's arguments, the green paper 'Towards a European strategy for the security of energy supplies' classified the risks under four main pillars; the physical risks, the economic risks, the social and the environmental risks. According to the same document; the physical risks should be analyzed as the permanent and temporary risks. The permanent physical risks occur usually when the production of an energy resource come to an end. This is exactly what European Union has experienced today. Its limited oil and gas reserves are sharply declining and European Union became more dependent to the external resources. This is one of the biggest concerns today for the European Union concerning its security of energy supply. The temporary physical risks are related to the unexpected political and economical events, geopolitical problems and the environmental or the natural damages (European Commission 2000, p.64). The energy crisis between Russia and Ukraine in January 2006 is a clear example for the tremendous effects of the physical risks in the energy supply. During the crisis, Europe could not receive enough energy supplies and this had caused serious damages in the energy situation of most of the members.

Additionally, apart from the physical risks, there are also economical risks which affect the security of energy supply. They have usually concentrated on all the economical and financial dimensions of the energy supply. It is important to note that upon this kind of risks, the price is the main determinant. The sharp price changes affect the consumers negatively. The high import dependency for the fossil fuels, especially for oil and natural gas, makes the prices more dependent to the world market and worsens the supply and demand balance in the energy market (European Commission 2000, p.64). Its high oil and gas dependency especially to a few suppliers increases the risk of disruption. The two main giant suppliers are Russia and OPEC. Their pricing mechanisms highly affect the security of energy of the EU.

The sharp changes in the oil and gas prices are dangerous for the producer and the consumer countries. The decline in the energy prices are harmful as well as their rise. For most of the producer countries; the energy export is one of the main revenues. For this

reason, a sharp decline in the energy prices can affect directly their economy. On the other hand, as well as the producers, the consumers can also suffer from the decline in the prices. Above all, low oil price is a real danger for the oil companies. It is not easy to provide the sustainable production for these companies because of the high cost of production. Therefore, they cannot meet their cost of production with the low prices. Apart from these outcomes, decline in the oil prices has another negative effect. The oil and gas prices are interrelated. For this reason, the decline in the oil prices can directly cause the decline in the gas prices and this situation increases the risks and the threats in the economy (Clingendael Institute 2000, p.39). It is quite obvious that the change in the prices have negative effects on the energy sector. For this reason, it is reasonable what Christian Egenhofer supports in his article. According to author, the prices should stand at a reasonable and a sustainable level (Egenhofer 2006, p.5).

According to the Green Paper, other risk groups are the social and the environmental risks. It is obvious that energy is vital for the countries and for this reason any disruption in the energy supplies can cause a domino effect. It affects politics, economy and the social life as well. Moreover, any kind of the environmental accident like in the Chernobyl disaster, the harmful gas emissions polluting the air and damaging the climate like the $CO_2$ gases can be considered as environmental risks (European Commission 2000, p.65).

Apart from these types, there are also domestic risks. They essentially cover all the problems relating to the indigenous energy production, and the infrastructural and technological capacity. Especially, EU suffers from this kind of risk. The limited gas storage capacity, the insufficient oil and gas production, the problems in the gas and electricity networks are some examples for the domestic risks in the EU (European Commission 2000, p.65).

## 3.3 THE MAIN CHALLENGES FOR THE SECURITY OF ENERGY SUPPLY IN THE EU

All of the risks, explained above, have direct effects on the security of energy supply. However apart from these risks, there are four main challenges in the EU which threaten its security of energy supply. These challenges are;

1-Limited indigenous energy production and high import dependency,

2- The reliability of the energy suppliers

3- Problems in the energy infrastructure,

4- Lack of a common approach in the energy field.

### 3.3.1 Challenge I: Limited Indigenous Energy Production and High Import Dependency

As is considerably evident, EU has suffered from the limited indigenous production and the high import dependency. Nowadays, EU members' politics are essentially focused on the threats arising from the high import dependency. Basically, these two challenges are interrelated. It can be relevant to stress that the latter is the outcome of the former.

Unfortunately, there is not a direct and proportional link between domestic energy production and domestic consumption. For instance, since 1998, each year there is a gradual rise in the energy (European Commission Directorate General for Energy and Transport 2003, p.1). However, the limited domestic production cannot meet such an increasing demand for energy resources.

Actually, even though EU suffers from the limited production capacity, its geographical location is a great chance for the Union. EU is located in a very special area. It is surrounded by two major energy producer countries which are Russia, Norway and also it can access easily through two important transit countries, Turkey and Ukraine, to the Caspian, Central Asia and the Middle East reserves. It has also the chance to access to the Mediterranean and North African reserves. Its geographical proximity to these regions

increases the opportunity of supplying from different resources. Relatively, this situation directly develops the appropriate conditions for the energy imports. Today, EU's energy dependency is around 50 percent but unfortunately, according to the expectations, this level will increase to 70 percent in 2030 (European Commission 2006, p.3). The main reasons of this dependency are the high oil and the natural gas consumptions. Their shares in the total energy imports are 80.2 percent and 54.5 percent (European Commission Directorate General for Energy and Transport 2006, p.12). Furthermore, the worst point is that EU has supplied its needs from two main cartels; Russia and OPEC. The share of OPEC is about 51 percent in the total energy imports (www.globalchange.umd.edu/energytrends/eu/3/ 2007).This data proves how EU is dependent to these countries. In addition, Russia has also, especially for the gas, a strong position in Europe. It is the main gas supplier to the EU. Its share in the total gas import is 36.7 percent (http://ec.europa.eu/dgs/energy_transport/figures/pocketbook/doc/2006/2006_energy_en.pdf 2007). These data clearly highlight that the import dependency is an inflating challenge for the EU. Being dependent especially to a few suppliers worsens the current fragile situation.

Despite the concerns toward such a dependency, it is not easy to reduce the oil and natural gas consumption in the short-term. The main reason of this obstacle is their strong positions and dominance in many sectors. The highest energy consumption is in the transport sector. In 2004, its share in the total energy consumption was 30.7 percent (http://ec.europa.eu /dgs/energy_transport/figures/pocketbook/doc/2006/2006_energy_en.pdf 2007). The oil is the predominant energy source in this sector and the substitution of oil with another fuel is almost impossible (Egenhofer and Legge 2001, p.7). The efforts for reducing the oil consumption seem quite difficult. As is developed in the last chapter, the use of renewable energy can be considered as an alternative to decrease the oil dominance in this sector.

This challenge directly affects the security of energy supply and its relative elements. It should be highlighted that "security of supply has two equally important constituent parts: physical availability and price" (Egenhofer and Legge 2001, p.3). The physical availability

and the stability in the energy prices are major elements to enhance the security of energy supply. Notably, the access to the resources and the prices of the imported fuels can be easily affected by the political and economic changes in the supplier countries. It is also possible that the supplier countries can increase the prices of their fuels or cease the supply and cause a physical disruption. Especially, the change in the prices can have a very large and destructive effect. They can even cause an economic crisis in the consumer countries. In this respect, it is considerably clear that security of energy supply has close links with the physical availability to, especially, oil and gas reserves and the stability in the prices. Possible problems either in the availability or in the prices directly cause serious supply disruption.

On the other hand, even though EU has faced with the serious challenges, EU has also the chance to diversify its energy suppliers thanks to its geographical proximity to the different producers. This is crucial advantages to decrease the relative risks and threats.

In conclusion, there are serious outcomes of the limited energy production and the high import dependency for the EU's sustainable energy supply. However, there are also possible solutions to deal with these challenges. In this respects, the diversification of the energy resources and the energy routes should be considered as one of the major solutions to enhance the security in the energy supply. If the EU is able to diversify its suppliers, the EU can avoid the high import dependency to OPEC and Russia and have the chance to choose more secure and reliable suppliers. Consequently, the serious damages of these challenges would be eliminated.

### 3.3.2 Challenge II: The Reliability of the EU's Energy Suppliers

As is highlighted in the previous section, European Union has suffered from the high import dependency. However, unfortunately, in addition to this problem, there are also increasing concerns about the reliability of the supplier countries. There is not a

consolidated and sustainable stability in most of its suppliers. Almost all of them suffer from their own domestic problems.

EU's main energy suppliers are Russia, Norway, Middle East, Gulf Countries, North Africa and Mediterranean Countries. EU also focuses on the energy resources in the Caspian Basin and in the Central Asia.

Among them, Russia and the OPEC are the biggest oil and gas suppliers. They possess the biggest shares in the total energy import. These levels of dependency show how these suppliers have strong position in the European energy market. However, these two big giants represent the biggest threats for the security of energy supply in the EU as well. Their strong positions have two main negative outcomes for the security of supply. First of all, Russia and most of the OPEC countries, Iran, Iraq, Nigeria, Libya, and Indonesia, suffer from different political and economical problems. The domestic stability cannot be totally ensured in these countries. For this reason, it is very risky to import the oil and gas from these countries. Their supply can be easily interrupted because of the internal problems of these countries. Second negative outcome is that they have large political and economic effects on the consumer countries. As it is obviously clear, energy is a vital issue in the national and international context. Countries which possess large energy reserves automatically obtain significant political powers. This fact is clearly effective in Russia and OPEC. These two main suppliers have economically and politically benefited from their large energy resources. Actually, they are not strong enough in the political and social fields however their large oil and gas reserves bring them directly to the top of the international agenda. These two energy giants have the power to influence the decision-making process of their consumer countries. Especially Russia demonstrated its power in the Russian-Ukraine gas dispute.

On the other hand, even though most of the producer countries are not reliable, EU has still one quite reliable and stable supplier; Norway. Norway, being a member of the IEA, has a quite reliable, stable and transparent energy sector. Besides, the interconnection of the

Norwegian gas and electricity market with the European gas and electricity market strengthened the dialogue between Norway and EU (www.iea.org/textbase/nppdf/free/ 2000/Norway_comp02.pdf 2007).

Consequently, concerns about the stability and the reliability of the energy suppliers are one of the main challenges of the energy sector in the EU. Diversifying the suppliers and increasing the numbers of the reliable producer countries should be one of the EU's objectives to ensure its security of energy supply.

### 3.3.3 Challenge III: Problems in the Energy Infrastructure

The infrastructure is quite important to ensure the security of energy supply. Any problem in the infrastructure can cause a short or long-term disruption in the energy supply. Especially, the European electricity and gas market has inflated the importance of the infrastructure for the EU. An enhanced and developed infrastructure is urgently required for strengthening the energy security and reducing the risk of disruptions.

The infrastructure is considered as one of the main challenges because of the current serious problems. Nowadays, one the main goals in the Union are to establish a well functioning electricity and gas networks. However, due to the infrastructural insufficiencies, serious problems occurred in these systems and threaten the sustainability of the electricity and gas market. In addition, they cannot still completely ensure the third-party access to the market through non-discriminatory ways, the interconnection of the national markets are not still completed, there are still some areas which are not integrated to the European electricity and gas networks, the congestion and the bottlenecks problems are not solved yet and finally there is not necessary investment to improve the internal and the cross-border infrastructural development (European Commission 2007, pp.4-5). These are the general problems concerning the infrastructure. In this regard, it is relevant to analyze the problems in the electricity and gas infrastructure separately.

Basically, in the electricity infrastructure, the main problems are the low interconnection levels in some areas, the congestions and the bottlenecks. In the European Union, there are four main interconnection levels. The highest interconnection level are between Denmark, Sweden, Austria, Belgium and the Netherlands on the other hand the lowest interconnection level is between United Kingdom and Spain. This difference prevents to have an integrated and perfectly interconnected electricity market in the EU. Relating to these different interconnection levels, the threat of congestion has appeared. The main risk of the congestion is that it makes the prices higher. The price of the interconnections increases when there is congestion. This was mainly experienced between France and United Kingdom, Denmark and Netherlands (European Commission Directorate-General for Energy and Transport 2002, p.27). The risk of the bottlenecks is another challenge for this sector. In Europe, there are seven major areas where there are bottlenecks. These are between Denmark and Germany, in Ireland, in United Kingdom, between Belgium and Netherlands, between France and Spain, in Italy and in Greece (ec.europa.eu/energy /electricity/florence/doc/florence-8/pres-infrastructure.pdf 2007).All of these challenges are the main obstacles for the internal gas and the electricity market.

Additionally, the gas sector also suffers from the infrastructural problems. The main challenge in this sector is the increasing demand for the gas. This situation is an obstacle for the gas network capacity. Today, it is quite sufficient to meet the demands for the gas however tomorrow it is not certain if the gas networks will be able to meet the increased demand for the gas. Furthermore, even though there is a strong and well-interconnected a gas network in the EU, there are still two members which stay out of this network. They are Finland and Greece (European Commission Directorate-General for Energy and Transport 2002, p.33).

As is previously mentioned, these challenges are important obstacles for the European energy infrastructure. A developed and strengthened energy infrastructure is crucial both for the effectiveness of the European gas and electricity market and relatively for the sustainability of the energy supply as well. Well-established electricity and gas networks

decrease the risk of disruption in the energy infrastructure and improve the security of electricity and gas supply in the Union.

### 3.3.4 Challenge IV: Lack of a Common Approach toward the Energy Suppliers

In the European Union, there are fragmented approaches toward the common policies. Especially, most of the concerns have been concentrated on the creation of a common energy policy. Most of the member states are reluctant about transferring their national dominance to a supranational authority. They want to preserve their energy policy as a national interest. This approach is the basic argument of some of the member states. However, unfortunately, these members are not aware of the negative outcomes of the lack of a common energy policy. This is a big challenge for the security of energy supply in the EU. It is a serious obstacle to ensure a coherent and efficient approach within the members in this issue.

European Commission has also highlighted this problem in the latest energy green paper. It has mainly focused on three main elements. These are the security of supply, the competition and the environmental protection. According to this document, all of these elements are interrelated and have a significant impact on the EU's energy policy (European Commission 2006, p.4). Especially, to have a common policy in the Union, these elements should be highly respected. However, due to the different national interests and national priorities, there is still not a common energy policy. Recently, the most significant effort about the creation of a common energy policy is the unratified draft constitution. In the draft constitution, they tried to put a separate chapter for the energy policy. This was an important step for the creation of a common policy. According to this document; the energy issue should be under the shared competence. If this treaty had been ratified, the energy issue would not have been an exclusive national policy. Therefore, this step was a quite important initiative for the EU (mail.foeeurope.org/activities/convention/convention-article.htm 2007).

Regarding these failures, the efforts toward a common policy have weakened. However, as the concerns towards the energy security have being increased, some of the members began to change their approach toward a common energy policy. They began to realize its negative outcomes. They have started to experience that the lack of an integrated approach increases the threats for the security of energy supply. Therefore, the lack of a common energy policy is one of the main challenges of the supply security. The main reason is that when there is not a common policy and when there are not necessary binding rules, they can pursue their own priorities and can preserve their own interests than the community interests. To avoid such a situation, member states should have a common policy. Especially, for decreasing the import dependency, the appropriate measures should be taken at the community level and they have to be binding. This argument does not refer to a very strict common policy however at least in some specific and basic issues; member states should be coordinated and undertake their common responsibilities. Decreasing the import dependency, increasing the use of the carbon free fuels, developing the bilateral dialogue with the producer countries at the community level, decreasing the excessive energy consumption should be considered as basic and specific goals of the common energy policy.

In conclusion, the lack of a common policy is big obstacle and makes EU's energy situation more vulnerable. Especially its negative effects on the security of supply are obvious. For strengthening the energy the supply security, the common energy policy should be encouraged by convincing the member states on its positive outcomes.

As it is highlighted in this chapter, there are different risks and challenges affecting the security of energy supply in the EU. Especially, the limited indigenous production and the high import dependency are the main threats for the EU in the energy issue. In this respect, the situations of the main energy suppliers and transit countries and their dialogue with the EU should be analyzed for ensuring a better understanding.

# 4. THE EUROPEAN UNION'S SUPPLIER AND THE TRANSIT COUNTRIES: CRUCIAL RELATIONS

The geographical location is a crucial factor for the European Union to determine its weakness and strengths. In some cases, its location brings significant advantages and increases its strengths. Regarding the energy security issue, the EU's proximity to the various suppliers and transit countries has been considered as a major advantage to affect its security of energy supply. Major suppliers are Russia, Norway, Algeria, OPEC members. Main energy transit countries are Turkey and Ukraine.

## 4.1 RUSSIA

Energy resources are essential factors to determine the state's politics and its position in the international environment. The most significant example for such a situation is Russia. This country has experienced a fast and considerable economic recovery since the dissolution of the USSR. This process especially accelerated after 1999, with Putin's presidency. The large oil and natural gas reserves became the main factor determining the Russian economy. Due to its vast natural gas and oil, Russia became one of the most powerful states in the international politics.

In addition to its large reserves, Russia's geographical advantage has brought an additional advantage to this country. Its proximity to the Caspian and the Central Asian reserves increases its importance for the consumer countries. Both the western and the eastern consumers, the European Union, China and India are the main competitors over the Russian energy sources. Among them, European Union is the main competitor. EU's fragile energy situation and its high oil and gas import dependence increase the role of Russia for the European Union. However, the Russian position in the European market has started to be questioned because of the increasing concerns about the security of energy supply in the EU.

### 4.1.1 The Energy Situation of Russia

As is mentioned above, oil and natural gas are two strategically important for Russia. Russia is one of the main oil producer countries in the world. Its oil reserves are quite important for improving its economy and for being integrated to the world's oil market. According to the BP statistics, the proven oil reserve capacity in Russia was 72.4 tmb at the end of the 2004 and 74.4 tmb at the end of the 2005. In parallel with oil reserves capacity, the oil production also increased by 2.7 percent between the years 2004 and 2005 (BP 2006, Statistical Energy Review).

A large share of the oil production has been exported to Europe and to the East Asia. The revenues of these exports are crucially important for the Russian economy. In 2006, 70 percent of oil was exported and the remaining amount was used both for the domestic consumption and the refinery sector. They use either the pipelines or the railways for exporting the oil to the consumer countries. Usually, they use the pipeline for the European consumers and the railways for the Asian consumers. Its main consumers in the EU are mostly the Central and Eastern European Countries which are Germany, Poland, Hungary, Czech Republic and Slovakia (www.eia.doe.gov/emeu/cabs/Russia/Oil_exports.html 2007).

However, despite its large reserves, Russia suffers from the problems in the oil sector. The main problem is the financial incapability. The main oil company; Rosneft has financial problems and is not able to support and develop the new oil projects. In addition to this problem; in the oil sector, the technology is not sufficiently developed as well. Russia suffers from the lack of a modern technology and sufficient equipments. The research and the exploration process necessitate technologically developed infrastructure and modern equipments (Monaghan and Montanara-Jankovski 2006, p.20).

These problems threaten the future of the oil production in the country. Even though the oil production is less than the gas production, its continuity and its sustainability is vitally important for the Russian economy and also for its political power as well.

In addition to the oil production, there is also quite large natural gas production. It is relevant to mention that the natural gas is the main economic and political tool of this country. Russia has the largest natural gas reserves in the world. Beside, at the same time, Russia is also the main gas producer and exporter in the world. Most of the gas production has been provided by three main fields which are Urengoy, Yambourg and Medvezh. Approximately 70 percent of the total natural gas has been produced by these fields. However, the productivity of these fields is not as efficient as before. (http://www.eia.doe.gov/emeu/ cabs/Russia/NaturalGas.html 2007). Therefore, Russia started to focus on the new gas fields to guarantee its future gas production. Apart from these areas, other fields are located mainly in the West Arctic, Far East and in the Eastern Siberia. Especially in the West Arctic; the Kara and the Barent Seas have high potential for the future Russian gas supply. The Rusonovskoe and Leningradskoe fields in the Kara Sea and the Shtokmanovskoe field in the Barent Sea represent the largest natural gas production in these areas. Apart from these fields, the Sakhalin Area represents a huge potential for the natural gas production in Russia (www.eia.doe.gov/emeu/cabs/Russia/NaturalGas.html 2007).

Additionally, even though Russia has the major gas producer, there are some problems in this sector as well. The essential problems are the maturity of the fields, their limited capacity, and the centralized structure of the country and of the energy market, the dominant position of Gazprom and the lacks in the infrastructure (http://www.eia.doe.gov/ emeu/cabs/Russia/NaturalGas.html 2007).

As is clear, even though there are large and productive gas fields in the country, most of them suffer today from the decline in the productivity. For this reason, Russia looks for the new fields to ensure the stability in the gas production. However, strongly related with this issue, there is a big problem in the Russian infrastructural system. There are not sufficient means to explore new fields. The infrastructure needs more technological and financial support for being developed. However, there are also serious problems in the gas delivery

system. Pipeline is the main way to deliver the gas to the different region. Unfortunately, pipelines are not well developed; almost all of them are old and need to be modernized in Russia. In this situation, Russia needs urgently to receive enough financial support to improve its infrastructure (Monaghan and Montanaro-Jankovski 2006, p.20).

Another challenge is the low gas prices in the domestic sector. The low price in the domestic market is a disadvantage for the economic situation of Russia. Even though domestic consumers can be satisfied by these low prices, the Russian economy has suffered from this policy. The domestic revenues decrease automatically when the prices are low and thus when the revenues are low, the required amount for the investments cannot be provided. It is not an advantageous and attractive situation for the investors. It is obvious that all these points are interrelated and form a vicious circle. Besides, as is mentioned above, Gazprom and the Russian government aim to increase the production and for this reason they are looking for the exploration of the new fields. However, they need financial support for the new explorations (Thumann 2006, pp.7-8). For this reason; a rise in the domestic prices can ameliorate the financial situation of Russia by the increased revenues.

The centralized structure of the Russian government and the situation of the Gazprom, the main energy company in Russia, are big obstacles for the country. The Russian government having 51 percent of the company's share has a large and considerable influence on the Gazprom. Therefore, the interests of the state and the interests of the Gazprom have been usually crossed (Thumann 2006, p.7). Gazprom is primarily responsible from 90 percent of the total gas production and the total transportation networks. This vital position makes the company the main decision-maker in the gas sector (Johnson 2005, p.271). Gazprom is especially dominant in the Central and Eastern Europe. In Bosnia-Herzegovina, Estonia, Finland, Macedonia, Latvia, Lithuania, Moldova and Slovakia, the Gazprom is the only supplier and they are dependent 100 percent to Gazprom. Apart from them, Bulgaria imports 97 percent of its gas from Gazprom, Hungary imports 89 percent and Poland 86 percent of their gas from Gazprom. In the EU-15; Austria's dependency is about 40 percent, Germany's dependency is 36 percent, Italy's dependency is 27 percent and

France's dependency is 25 percent to Gazprom (Thumann 2006, pp.7-8). Obviously, these percentages show how Gazprom predominantly controls the domestic production and the pipeline networks. It is also important to note that this dominant situation prevents the integration of new companies to the market and this is the biggest obstacle for a competitive market.

The vulnerable and fragile energy situation of most of the European countries, due to their high gas import dependency to Russia, has been experienced once again by the Ukrainian-Russian gas dispute. This crisis occurred in the 1 January 2006 when Russia cut the energy supplies to Ukraine. The main reason of this crisis was the Russian offensive energy policy. To increase the benefits and to strengthen its dominant position, Russia increased the gas prices and then, Ukraine refused to pay these increased prices. To punish this country, Russia used its stick policy and cut the gas. This was an unpredictable and tremendous shock for Europe, as well. Most of the European countries had suffered from serious gas disruptions.

This event is a perfect example to prove the importance of the energy resources for the Russian foreign policy. Russia can easily intervene to the consumer countries' politics and to their decision-making policy due to its predominant position on their market.

### 4.1.2 EU-Russia Energy Dialogue

As is clearly mentioned in the previous section, EU is the main consumer of the Russian oil and gas. According to the 2006 data, 44 percent of gas and 30 percent of oil are imported to the EU-25 from Russia (Piebalgs 2006, p.2). This amount shows how Russia has a crucial position in the EU's energy market.

The relation between the EU and Russia cannot be explained by the one sided dependency. To clarify this situation, it is relevant to mention the reciprocal benefits. In this respect, Russia has a crucial role to meet the European energy demand. However, European Union

is also essential for Russian economy. EU, having a large market with a growing demand for energy, is vitally important to increase the revenues in Russia. In addition to this fact, the EU's economic and financial abilities are other crucial factors to demonstrate the EU's importance for Russia. These are beneficial means for improving the Russian energy infrastructure. As Russia is not self-sufficient in this issue because of its financial deficiencies, it considerably requires technological and financial support (Schuett 2004, p.6). Consequently, the mutual interests of both parties highlight the importance of a bilateral dialogue.

The necessity of a bilateral dialogue was also recognized by the both parties and it was initiated in 2000. This dialogue focuses on four main goals. These are destroying the monopolistic market structure and liberalizing Russian energy market, promoting the economic and financial situation in Russia, increasing the investments and finally improving the common interests about the environmental protection concentrating on the concerns of the climate change and the nuclear power (http://ec.europa.eu /energy/international/bilateral_cooperation/russia/russia_en.htm 2007). It is obvious that this energy dialogue has a crucial role for decreasing the difference and the gaps between two partners and increasing the security of energy supply in the EU.

The progress report is the main tool to improve the dialogue. The latest report was published in 2006. In this report; there are five highlighted issues. The most important objective mentioned in the report is to improve the energy security. Other objectives stressed in the report are to promote the investment, to encourage the new initiatives serving to their common goals, to increase the trade of the energy products, to improve the energy efficiency and to strengthen the roles of the technology center (Khristrnko and Lamoureux 2004).These objectives are essential for promoting this dialogue and complementary with the basic goals. These progress reports are essential to monitor the efficiency of the dialogue and to support the partners to take further steps under this bilateral framework.

Even though they have common objectives, there are still unresolved problems between two partners. The main problem between two energy partners is the structural difference between the energy markets. This is a big obstacle for a deeper cooperation. European Union favors the liberalization, the competition and the deregulation in its energy market. However, Russian energy market is dominated by a few monopoles energy companies. Therefore, this difference prevents the integration of the energy markets and causes two other problems. One of them is that Gazprom has bilateral energy contacts with most of the EU's members and for this reason; its pricing mechanism differs from one member state to another. Another problem is about the monopolistic structure of Gazprom. Its dominance can cause a reduction in the delivered gas to Europe in the future. The main reason of this probability is that Gazprom has no sufficient financial capabilities to explore new fields and the companies which have the potential to do, are not allowed to be integrated to the Russian market. Therefore, this is a serious challenge for the future of EU's energy supply (Grant and Barysch 2003, p.2). However, Russian government is reluctant to change its market structure and to adopt the European style-deregulated energy market. This pro-monopolistic approach showed again itself in the beginning of this year. Putin agreed to shift all the new initiatives and projects concerning the exploration of the new offshore fields to the Russian main monopoles, Gazprom and Rosneft. This decision was taken by the Russian government to strengthen the monopolistic structure of Gazprom and Rosneft and preventing other companies to be integrated to the market (Buckley 2007). Unfortunately, Russian government and the policy makers are not very well aware that if Russia continues to fallow only its own interests and to refuse the transformation of its market, it will probably suffer from a huge economic crisis in the near future. It is considerably clear that EU is the most important trade partner of Russia. If EU changes its direction and finds another supplier, in this case Russia will be in a real economical trouble and the balance in this region will probably change. For this reason, Russia should urgently have more moderate approach toward the issue.

Another serious problem between EU and Russia is the low energy prices in the country. European Union believes that low energy prices in the Russian market bring the union to a

very disadvantaged situation. Consequently, EU decided to solve this problem during the negotiations for the Russian's accession to the WTO. Firstly, EU considered this problem as a pre-condition for its membership. According to this conditionality, Russia should increase the domestic energy prices to become a member of WTO (Grant and Barysch 2003, p.2). Later, the issue was handled under a more diplomatic framework and both EU and Russia signed a bilateral agreement in 2004 concerning also the Russian WTO membership. This was an important step both for the Russia's WTO membership and the Russian pricing policy. According to this agreement, Russia agreed on the gradual rise in the domestic prices until 2010 (Kernohan and Vinkurov 2004, p.2).

The third problem between two partners is about the ratification of the Energy Charter Treaty and its Transit Protocol. Energy Charter Treaty has a special position in the international context. This is the only legal framework which organizes all the energy-related investment, trade and transit issues at a multilateral level (www.encharter.org/index.php?id=28 2007). However, Russian's reluctance to ratify this treaty is a big problem between these energy partners. EU believes that if this treaty is ratified also by Russia, its sense and efficiency will be promoted. However, Russia does not accept to ratify neither the ECT nor its transit protocol. The main reason of this strong Russian opposition toward this treaty is the concerns about the integration of the new customers to the market. Essentially, they believe that this treaty will damage to their market structure and many foreign customers will be allowed to enter to the Russian market (http://www.rferl.org/featuresarticle/2007/02/3b55571f-960b-41b2-b2b7-596c3ed811a3.html 2007). It is obvious that Russia is against all of the initiatives which can damage the monopolistic structure of the Russian oil and gas market. For this reason, they are quite reluctant to ratify this treaty. The biggest obstacle of this treaty is the Transit Protocol. Russian government believes that when Russia ratifies this protocol, it will automatically allow the foreign companies to use their transportation routes. In this situation, the dominance of the monopole companies will gradually decrease (Dempsay 2006).

All these oppositions toward the ECT and its transit protocol clearly demonstrate the Russian approach toward its energy sector. Russia is aware of the importance of its energy sources for its survival and tries to maximize its benefits. Thus, it is clear that this is the main reason why Russia is always opposed to share its benefits with the foreigners. However, this attitude has quite negative impacts on its relations with the European Union. The ratification of this treaty would be a milestone for the EU-Russia energy dialogue. In this respect, EU should withdraw all kind of support from Russia unless it ratifies this treaty. Moreover, EU can also use its diversification policy as a soft weapon to punish Russia.

In addition to these concerns, it is obviously important to stress the energy crisis between Russia and Ukraine. The most important outcome arisen from this crisis is the dominant position of Russia. However, it should be highlighted that, even though Russia exhibits its energy resources as a 'treasury', without sustainable and reliable consumers, this treasury means nothing. For this reason, all of these aggressive policies damage primarily Russia, itself. It is obvious that it is not easy to find another such a big supplier for EU however if Russia continues to threat the energy security of the EU, members states will absolutely look for other options and the Russian economy will relatively shrink.

Finally, for a better bilateral dialogue, both parties should focus on their responsibilities and take the necessary measures to decrease the challenges and to promote the energy security and the security of energy supply. If Russia will not necessarily contribute to the energy dialogue and increase its challenges toward the EU's security of supply, European Union should urgently change its suppliers and focus on the other producer countries for substituting Russian oil and gas supplies.

### 4.2 NORWAY

Norway has an important position in Europe. Especially with the EU, they have a very long historical background. Since its creation, EU tried to integrate Norway to the Union twice

but each time, its membership was refused by the Norwegian citizens in the referenda. However, despite these refusals, the relationship between EU and Norway is quite improved. The main factor of this strengthened relationship is the vast Norwegian oil and gas reserves. Its energy sources are quite important for the EU and its security of supply. As well as its large reserves, it is also considered as the most stable and reliable supplier country. Its political and economic stability comparing other suppliers increases its reliability and importance for the security of energy supply in the EU.

### 4.2.1 Energy Situation in Norway

Due to the large oil and gas reserves, Norway possesses large oil and gas production capacity. Its large oil and gas reserves offer a specific and advantageous situation comparing to the other western European countries.

Norway's proven oil reserves are 8.5 billion barrels and its proven gas reserves are about 73.6 tcf. Most of these reserves are located in the North Sea. The remaining are in the Norwegian and in the Barent Seas (Morelli 2006, p.19). As is obvious, the North Sea has an important significance for the European energy supply and especially for Norway. 57 percent of the Norwegian oil has been produced by the fields in the North Sea (www.eia.doe.gov/emeu/cabs/North_Sea/Oil.html 2007). Especially, the Ekofisk field in the North Sea is the oldest but the most important oil and gas field in Norway. (www.norway.org.uk/business/news/oilproduction.htm 2007).

However, as in the other producer countries, the change in the oil and gas production capacities is also an important challenge for Norway. Recently, because of the insufficient oil production in the Norwegian shelf of the North Sea, there has been a decline in the oil production since 2000. In 2000, the oil production was 3.2 million barrels per day however in 2005 this amount decreased to 2.5 million barrels per day (Solholm 2006). This decline is a serious problem both for Norway and for the EU. For Norway, it is risky because the energy production is important for the Norwegian economy and it can be easily affected

from such a decline. Apart from Norway, it can be also a problem for the EU as well. If EU receives less oil and gas supply from such reliable and stable suppliers, this will be a real threat for its supply security.

Despite the maturity of the North Sea fields and the decline in the oil production, there are still many unexplored oil fields especially in the Barent Sea. Theoretically, these unexplored fields are quite advantageous options for contributing to the total Norwegian oil production. Unfortunately, there are serious problems concerning these fields. The main problem is that the Norwegian environmentalists totally disagree with the energy companies and also with the Norwegian government for the exploration of the oil fields in the Barent Sea. They argue that the exploration operations will damage the ecology of this area. The second problem is about the weather conditions; its climate is quite severe. This situation complicates the exploration process, in the economical and technical terms, in the Norwegian area (Bavenger 2004).

Comparing to oil, the natural gas production is in a better position. The gas fields are not as mature as the oil fields and represent a high potential for the future gas supply. The main gas fields are Troll and Ormen Lange fields. The Troll was the oldest but at the same time the largest gas field in Norway. It is vital for the current and future Norwegian gas production. Its production capacity was 70 bcm and according to the expectations, this amount will be around 100 bcm in 2010. In addition to Troll Field, the Ormen Lange field is another large and productive field in Norway. However, apart from these fields in the North Sea, in the Barent and in the Norwegian Seas, there are also smaller gas fields (Clingendael Institute 2003, pp.13-14). Unfortunately, because of the negative environmental and the climate conditions, it is not easy to explore these fields.

It is quite clear that Norway possesses high oil and gas production capacity thanks to its geography. These large energy reserves are quite important for EU as well.

### 4.2.2 EU-Norway Energy Dialogue

Norway is an indispensable supplier and an energy partner for the European Union. Norwegian large oil and gas reserves, its reliable and stable economical and political structure, its geographical proximity to the EU are important factors to prove the importance of Norway for EU, especially in terms of energy. Norwegian oil and gas are also significant alternatives against the Russian oil and gas supplies. It is fruitful to improve the relationship with Norway for a better diversification of energy supplies and improving the energy supply security.

In this respect, their energy dialogue is quite important to strengthen their energy relations.

> *…Bilaterally, the EU-Norway Energy Dialogue principally aims at the coordination of energy policies in a wider sense, including research and technological development in the energy sector and relations with other energy producing countries (ec.europa.eu/dgs/energy_transport/international/bilateral/norway/index_en.htm 2007)*.

Especially since 2005, they have focused on also the alternatives like the renewable energy, energy efficiency to promote the security of energy supply

Finally, the Norway-EU energy dialogue is an important driving force to promote the security of energy supply in the European Union. If the Union is able to increase its energy supply from Norway, this can be a great contribution to the energy supply security in the EU.

## 4.3 ALGERIA

Algeria is one of the most important and developed countries of the North Africa. Its political and economical predominance in the region arises not only from its energy resources but also from its key position in the Euro-Mediterranean Partnership (Euro-Mediterranean Partnership was launched by the Barcelona Declaration 1995). Its significant contribution to the Euro-Mediterranean Partnership is an obvious step for strengthening the political and economical dialogue with the EU. However, apart from this partnership

process and its various outcomes, the supply of the Algerian natural gas to Europe is essential both for the development of the country and also for the energy supply security of the Union

### 4.3.1 Energy Situation in Algeria

Oil and natural gas are two main indispensable Algerian energy resources. According to relevant data updated in 2007, its proven oil reserves are 12.3 billion barrels. Accordingly, thanks to its large reserves, Algeria is the third biggest oil producer in the continent. Essentially, there are two main basins for the oil production. These are Hassi Messaoud and Berkine Basins. Most of the oil, approximately 70 percent, has been produced in the former field. Even though Algeria is a significant energy producer country and possesses large oil reserves, the level of domestic consumption is not very high. In 2006, its crude oil production was 1.37 million bbl/d however the overall oil consumption was only 283.000 bbl/d. It is quite clear that the production exceeds the consumption. This is a significant advantage both for Algeria and EU because the oil surplus has been mainly exported to Europe. The main importer countries of the Algerian oil, in the European Union, are France, Italy, Germany and Spain (www.eia.doe.gov/emeu/cabs/North_Sea/Oil.html http://www.eia.doe.gov/emeu/cabs/ Algeria/NaturalGas.html 2007).

Moreover, similar to oil, natural gas is also extremely important for its survival. In this regard, it is important to note that the proven Algerian gas reserves were 161.7 tcf in 2005. Accordingly, the main gas fields are Hassi R'Mel, Rhourde Nuss, and Tin Fouye Tabankort, Alrar, Ouan Dimeta and Oued Noumer. The Hassi R'Mel, possessing 85 tcf proven reserves, is the largest and the most productive gas field in Algeria (www.mbendi.co.za/indy/oilg/gas_/af/al/p0005.htm 2007). In that country, the gas production has increased, most effectively, since 1991 and reached to 80 bcm in 2000. According to the estimations, the level of production will continue to rise as far as new reserves are discovered for the new productions (Clingendael Institute 2004, p.14).

Algeria has also a leading role in LNG production. It is one of the main LNG producers not only in its continent but also in the world. Its LNG production is about 30 bcm and most of them have been exported to Europe. The main LNG importers from Algeria, in the EU, are France, Belgium and Spain (The Clingendael Institute 2004, p.15). It is obvious that, in addition to the oil and gas exports, LNG export to the EU promotes the energy dialogue between two parties and enhances the energy security in the Union.

### 4.3.2 EU-Algeria Energy Relationship

As is already stated in the previous section, Algeria was the third gas exporter country to the EU in 2005. Its portion was about 19.1 percent in the total gas import. (ec.europa.eu /dgs/energy_transport/figures/pocketbook/doc/2006/2006_energy_en.pdf2007).
This situation demonstrates that Algeria's oil and gas supplies have a crucial importance to provide the sustainability in the energy consumption and to enhance the security of energy supply in the EU.

According to a speech of Andris Piebalgs, energy commissioner in the European Commission, Algeria has been considered as a major oil and gas supplier to the EU. However, it should be also highlighted that this relationship between two parties is not one-sided. Even though EU is dependent to the Algerian resources to meet its increasing demand, Algeria is also dependent to the EU in terms of financial assistance to develop its technology and its infrastructure (Piebalgs 2006, p.3). Therefore, there is an increasing interdependence between Algeria and EU.

In the same speech, Andris Piebalgs has also highlighted three important points for an enhanced dialogue between EU and Algeria. Accordingly, these points are

> …*(1) the convergence of the Algerian and EU energy policy through convergence of our regulatory frameworks; (2) the development of energy infrastructures of common interest and (3) technology cooperation and exchange of expertise* (Piebalgs 2006, p.3).

Moreover, even though EU highly benefits from Algerian oil and gas resources, the transportation of the energy supplies is a complicated process because of the long distance between two continents. To eliminate the negative outcomes of such a situation, the natural gas has been transported through the pipelines to Europe. There are two main arteries for this kind of transportation. These are Transmed Pipeline and Maghreb-Europe Gas. Natural Gas has been transported by the former line to Italy and to Spain and by the latter to Portugal (Clingendael Institute, 2004, p.15).

There are also three new projects which will facilitate the natural gas transportation to Europe. These are Medgas Pipeline, Galsi Pipeline and Trans-Saharan Pipeline. According to the expectations, due to these new projects, there will be a rise in the supplied natural gas to Europe (Piebalgs 2006, p.4).

In conclusion, Algeria is one of the main important energy actors for the EU. It is crucially important for the European Union to diversify its natural gas suppliers. The oil and especially gas supplies from Algeria can decrease the import dependency to Russia, diversify the suppliers and enhance the security of energy supply.

### 4.4 OPEC

OPEC, having a vital and crucial dominance in the international energy market, is one of the most important energy actors in the world. As is well known, having a leading position, OPEC perfectly manages the relations with the oil and gas importer countries in the energy market. To ensure a better understanding about the organizational framework, it is relevant to list its eleven members. Accordingly, these are Algeria, Indonesia, Iran, Iraq, Kuwait, Libya, Nigeria, Qatar, Saudi Arabia, United Arab Emirates, and Venezuela. Among them, the most dominant member is Saudi Arabia. Due to its large oil reserves, this country has a very pivotal role in the international oil market. Therefore, as well as the Saudi Arabia, other members possess also a crucial position in the consumers' markets. In this regard, since they are able to supply large and significant amount of oil, EU members have paid a

special attention to these energy actors. To enlighten the crucial link, it is important to note that OPEC meets 40 percent of the EU's total demand for oil. This ratio shows how crucially EU is dependent to this organization to provide the sustainability and the reliability in the oil supply. In addition to this high dependency, the sharp changes in the oil prices and the concerns toward the stability of the oil market have highly required an energy dialogue between EU and OPEC. Under these ideas, this important dialogue was launched in 2004 to pursue some common objectives and to maximize the mutual interests (http://ec.europa.eu/dgs/energy_transport/international/int/opec/index_en.htm 2007). In the light of this statement, it is relevant to stress that having common objectives and sharing the same vision at certain points are extremely important to ensure a consolidated cooperation and diversified benefits for both parts. In this regard, their common aims are essentially based on the stabilization of the relations between oil consumer and producer countries. Furthermore, maintaining a well-functioning, stable oil market and ensuring fair and acceptable oil prices are other main constituent parts of this crucial dialogue. Further, it is important to note that price is one of the main determinant factors of this energy dialogue. Consumers highly suffer from the unexpected changes in the pricing mechanism. Unpredictable and unexpected dramatic rise or decline in the prices desperately damages the economic situation of the importers. Therefore, for the consumers, ensuring the price stability is essential to maintain the security of energy supply.

This bilateral energy dialogue is also important to increase the coordination and interaction between oil consumer and producer countries. Accordingly, it enhances the reliability of both partners by supporting the transparency and promoting the efficiency in the oil market's mechanism (europa.eu/rapid/pressReleasesAction.do?reference= IP/05/1527&format=PDF&aged=1&language=EN&guiLanguage=en 2007).

As is previously mentioned, despite different objectives between both parties, the interests of OPEC members and those of European consumers are complementary. While EU concentrates on the stabilization of the prices on the oil market and a close dialogue between supplier and consumer parties, OPEC members much more focus on enhancing the

members' political and financial interests (http://ec.europa.eu/dgsenergytransport /international/int/opec/index_en.htm 2007). Furthermore, both parties have also concentrated on the investment in the oil market and on the development of the oil stock capacity. In terms of investment, OPEC has insisted in investing especially in the refinery sector. This is also considered as a high priority for the future actions within the scope of this dialogue. They argue that any increase in the investment for this sector will, in the same time, contribute to the stability and prosperity of the world oil market (www.consilium.europa.eu/ueDocs/cms_Data/docs/pressData/en/misc/89925.pdf 2007).

The spare capacity is also important as much as the investment for the EU and OPEC members. The spare capacity which promotes the oil stocking mechanism is a very efficient way to deal with the unexpected disruptions. This mechanism is efficient and necessary for the consumer and producer parties because they are affected, both of them, from the unexpected crisis. Therefore, the spare-capacity can also be called as a life-jacket for both the producer and the consumer countries. If the producer countries have large oil stocks, even if there is a crisis, the producer countries can continue to supply. Thus, the physical supply disruption will be avoided and the security of the energy supply will be promoted in the consumer countries (Europa Rapid Press Release 2006, p.1).

Consequently, EU consumer and OPEC producer countries try to develop a coherent, reliable and stable dialogue. It is clear that these efforts will promote the European security of energy supply in the future. European Union is perfectly aware of the necessity of the good relations with the producer countries to undermine the possible risks and to avoid the disruptions in its energy supplies.

### 4.5 TURKEY

As is well known, due to its strategic location, Turkey has been a political, economical and social bridge between the eastern and western countries. This strategic importance does not

arise only from its political and military strengths but also from its social and cultural diversity, geographical location, and various energy resources.

Basically, Turkey has been located between the prosperous, democratic, liberal West and poor, unstable, undemocratic East. In such a fragile situation, Turkey has been usually the main political actor to transfer modern Western values to these unstable eastern countries to promote these areas. However, even though eastern countries have suffered from their fragile and vulnerable political position, their large oil and natural gas resources are considered as considerable strengths vis-à-vis western countries. This situation makes Turkey a key transit country between these areas. As is obviously clear, energy is a vital instrument for Turkey to determine its foreign policy and to promote its political position in the international arena.

However, despite the crucial role of energy resources, Turkey is not able to produce sufficient level of oil and gas to meet its domestic consumption. Unfortunately, Turkey has mainly suffered from inadequate indigenous production capacity and high oil and gas dependency level. Currently, 70 percent of the consumed oil and gas has been imported from external resources and it is estimated that this import dependency level will continue to rise and exceed 80 percent by the year 2030. Among the hydrocarbon resources, having a share of 40 percent in the total consumption, oil is the predominant energy resource for the energy mix. To meet this excessive oil demand, Turkey imports significant amounts of oil from Middle East countries and Russia. These suppliers essentially represent 90 percent of the total oil import (Arslanalp 2006, p.4). Apart from oil, there is an increasing demand for natural gas as well. Similar to oil, there is excessive natural gas consumption in EU. In 2001, the share of the natural gas in the total consumption was 19 percent and according to the expectations, this share will increase up to 32 percent in 2010. To meet this increasing demand, Turkey has to import significant amount of natural gas from different external resources. Despite the variety of suppliers, most of the gas has been imported from Russia (Arslanalp 2006, p.5).

As is well known, a consolidated energy security is essential for the western consumers. Accordingly, to ensure the sustainability and the continuity in the energy supply is crucial for enhancing their energy security as well. Therefore, since Turkey maintains a geographical proximity to most of the world's oil and gas reserves, it represents an efficient option to diversify the energy supplies and to provide a safer oil and gas transportation. Especially after the end of the Cold War, the energy resources in the Caspian Region and in the Central Asia had been liberalized and opened to the world's energy market. This development increases the geopolitical importance of Turkey vis-à-vis western consumers as well.

As is already stressed, European Union is highly dependent to the unstable and unreliable external suppliers. Therefore, to avoid all the negative outcomes of such a dependency, EU became aware of the necessity to find out some new reliable suppliers to ensure its energy supply security. In this case, European Union needs a transit country to reach diverse Central Asian, Caspian or Middle Eastern hydrocarbon reserves. Besides, this transit country should be secure and reliable. In this respect, EU has two main options; Turkey or Ukraine. Comparing to Ukraine, Turkey maintains much more advantages to ensure the energy security in the EU. Its geographical proximity to the diverse oil and gas resources, its close relations with EU members and its political stability increase the reliability and credibility of Turkey vis-à-vis the European Union. In this regard, it is considered that Turkey is the safest option as a transit country while transporting the Caspian and Central Asian resources to Europe. The statement of Pamir (2006, pp. 19-20) also highlights Turkey's significance for the EU:

> *Turkey's strategic location makes it a natural "Energy Bridge" between major oil producing areas in the Middle East and Caspian Sea regions in the East and big consumer markets in Europe and in further West. This is why a parallel and integrated system of oil and gas pipelines known as the "East West Corridor" is underway to transit those resources first to Turkey and then further to the western markets.*

As is clear in this statement, Turkey has been considered as a pivotal actor to ensure the sustainability and the security of energy supply for an enhanced energy security. This significant position brings mutual interest to both of the parties. This can be considered as a

kind of interdependency. While this interdependency provides the EU to diversify its suppliers and transit countries, at the same time, it also gives Turkey the opportunity to be integrated into a larger gas market to sell the gas passing through this country (Roberts 2004, p.19).

Additionally, new special pipeline projects have been launched to encourage this fruitful interdependence and to ensure Turkey's position towards the EU. Basically, these are the South Caucasus Pipeline, Turkey-Greece Gas Pipeline and the Nabucco Projects. Apart from these new projects, Turkey is also part of the Baku-Tbilisi-Ceyhan Pipeline Oil Pipeline, Baku,-Tbilisi-Erzurum Gas Pipeline, Kirkuk-Yumurtalık Oil Pipeline, Russia-Turkey Western Pipeline, the Blue Strem Gas Pipeline, and Iran-Turkey Gas Pipeline (Pamir, 2006 p.25). All of these pipeline projects increase the geopolitical importance of Turkey both in the region and also in the world.

Finally, it is clear that Turkey's and EU's interests are obviously overlapped. The main goal of both sides is to ensure their security of the energy supply by avoiding the tremendous effects of high import dependency to a few monopole suppliers. In this regard, the best way to obviate the negative outcomes of such a high dependency is to launch an enhanced, coordinated and strategic dialogue between Turkey-EU and to encourage Turkey's related projects.

### 4.6 UKRAINE

Despite the political and economical problems, Ukraine is one of the most significant actors in the region. Due to its location and proximity to Russian and European energy market, Ukraine is considered as a major transit country.

The domestic production of Ukraine is mostly concentrated on oil and gas. Unfortunately, the country is not able to meet the total demand for them. Due to the insufficient domestic oil production, Ukraine has to import large amounts of oil from external resources. In 2004,

the domestic production met only 20 percent of the total consumption and the remaining was imported. Its main oil suppliers are Russia and Kazakhstan. Eventually, the amount imported from Russia is higher than the amount imported from Kazakhstan (www.eia.doe.gov/emeu/cabs/Ukraine/Oil.html 2007).

The situation is similar for the natural gas as well. Its main gas suppliers are Russia and Turkmenistan. Especially, between Turkmenistan and Ukraine, the energy agreements are in the form of the long-term energy contracts. The current contract covers the years between 2007 and 2032. However, despite these agreements and contracts signed by Turkmenistan, the most dominant actor in the Ukrainian gas market is still Russia. Ukraine has transited approximately 78 percent of the Russian gas to deliver them to Europe. (www.eia.doe.gov/emeu/cabs/Ukraine/NaturalGas.html 2007). Therefore, the stability and the prospect of this country are crucially vital both for Russia and EU. Any unexpected crisis in Ukraine may interrupt the gas supply to the European countries and damage their energy situation. To eliminate such kind of concerns, EU should more efficiently focus on taking some measures to strengthen the political, economical and social environment in Ukraine. In this regard, the European Neighborhood Policy is a significant path to enhance the stability in this country.

However, comparing to Turkey, Ukraine is not a stable and secure option. It is obvious that the security of transportation is essential for ensuring the security of energy supply. If any problem occurs during the transportation process because of the political or technical problems, oil and gas supply may be disrupted. This kind of a bad scenario had been experienced in January 2006. Due to the crisis arisen between Russia and Ukraine, natural gas supply to the EU members had been interrupted. This was a quite bad experience for most of the EU consumers. Especially, the Central and the Eastern members which are highly dependent to Russia and also to Ukraine as a transit country, had highly suffered from the interruption in the gas supply. This crisis has been a milestone for the EU. In the post-crisis period, the reliability and the safety of Ukraine became to be questioned and EU

realized that not only suppliers but also the transit countries should be stable, safe and secure for a consolidated and enhanced energy supply.

Moreover, despite the concerns toward this country, Ukraine is still one of the main transit lines. Therefore, EU has tried to improve its relations with this county. In this respect, in 2005, they agreed on four specific and essential points on energy fields to consolidate their relations. These points are mainly about to ensure the safety of the nuclear energy, to increase the coal sector's contribution to the environmental protection, to provide the interconnection of the Ukrainian gas and electricity market with the European market and Finally to promote the security of energy supply (ec.europa.eu/external_relations/ukraine/pdf/political_and_legal_foundations.pdf, 2007). Among them, the most important point is to ensure the EU's security of energy supply. Ukraine's high import dependency to Russia has become a real threat for the security of the EU's energy supplies, especially after the 2006 crisis.

In conclusion, it is clear that the European Union has different supplier countries and two important transit countries. Among the suppliers, Norway and among the transit countries, Turkey is the safest and the most reliable options for the European Union's energy supply security. To that end, it is obviously clear that enhanced and well-coordinated dialogue with the producer countries will have a significant contribution to the energy supply security in the European Union.

Finally, the European Union perceives quite well the obstacles which threaten its security of energy supply. In this respect, EU should develop some new measures to avoid the obstacles arising from its domestic energy situation and the problems regarding the supplier and the transit countries.

# 5. SOLUTIONS FOR ENSURING THE SECURITY OF ENERGY SUPPLY IN THE EU

There are many factors which influence the security of energy supply in the EU; some of them are domestic and some of them are external factors. However, both of them are concentrated on the reduction of the risks which threaten the security of energy supply. Therefore, the EU institutions, private energy companies, and even the householders should spend maximum efforts to reduce the risks and to promote the security of energy supply.
In the light of these basic aims, the possible measures can be taken at the three levels; at the national, community and multinational levels. At the national level, member states take their measures unilaterally. At the community level, the measures are taken in a wider context in the EU. At the multinational level, the European Union cooperates and interacts with the international or intergovernmental organizations multilaterally.

## 5.1 MEASURES AT THE NATIONAL LEVEL

The measures taken at the national level are unilateral. There are two main ways to promote the security of energy supply at this level. These are the diversification of the energy mix and the long-term agreement with the producer countries

### 5.1.1 Diversification of the Energy Mix

Diversification of the energy mix is a way to enhance the security of energy supply at the national level. This is a national choice to decide its own energy mix. Accordingly, “Each national government or energy company within a nation decides what mix of energy will actually be utilized” (Morelli 2006, p.3). Each member state is free to form its own energy mix. There is no strict community rule for this issue. However, there are some special targets set by the EU to protect the EU’s security of energy supply from the threats. The

most problematic issues in the energy mix are the use of nuclear power, the environmental concerns about the use of fossil fuels, especially the coal, and the high import dependency.

The use of the nuclear power is a quite problematic issue. Due to its $CO_2$ free structure, the nuclear power has great contributions to the environmental protection and it is considerably convenient to fight against the climate change. However, because of the security concerns, there is no common decision taken at the community level about the use of the nuclear power. Member states are free to add or not the nuclear power to their energy mix. However, once they decide to use it, they shall respect some security rules to enhance the safety. In this respect, these rules and related conditions are very well summarized in the European Commission's communication about the Nuclear Illustrative Programme. In this document, this issue has been highlighted as in below;

> *…At the same time, nuclear safety, decommissioning nuclear reactors at the end of their active life, management, transport and final disposal of radioactive waste together with non-proliferation are important issues that must continue to be actively addressed* (European Commission 2006, p.5).

Moreover, while determining the energy mix, there are also increasing concerns toward the energy resources which are harmful for the environment. Especially, due to the extremely high carbon dioxide emissions, the coal is the most harmful fuel for the environment. However, contrary to coal, the most convenient fuel for the protection of the environment is natural gas. Accordingly, natural gas has begun to replace coal in various sectors. Especially in the power generation, the share of natural gas is increasing while the share of coal is decreasing (European Environment Agency 2006, p.33). Additionally, the use of LNG has an increasing importance in the energy mix, as well. EU's LNG consumption is 8 percent of the total LNG consumption in the world. The biggest LNG supplier is Algeria however Oman, Qatar and Egypt also produce and export them to Europe. The use of LNG is very important because suppliers can reach to further areas by the LNG terminals. As is well known, the pipelines cannot be constructed along the very long distances and they have always the risk of being disrupted because of political or technical reasons. Around Europe, there are different projects about the constructions of new LNG terminals.

Especially Spain and Italia, the largest LNG exporters, put considerable efforts for the new LNG terminals constructions (Morelli 2006, p.18).

The import dependency for the hydrocarbons is another factor affecting the energy mix. Due to the high import dependency for the fossil fuels, EU members have begun to look for new options to decrease the current high import dependency. In this regard, as it is domestically producible, the renewable energy has appeared as a convenient alternative to promote the security of energy supply.

Finally, it is obvious that the member states have the right to decide how to form their energy mix. There is no strict limitation about the use of the fuels. However, it would be better if the member states respect the priorities and conditions put by the EU to support the environmental protection and to enhance the energy supply security. For this reason, even though the diversification of the energy mix is considered under the national competence, there should be also some community interventions to this area to consolidate the stability and prosperity of the system.

### 5.1.2 Bilateral Dialogues and the Long-term Agreements with the Producer Countries

Bilateral energy dialogues and the long-term agreements are the main instruments to promote their security of energy supply. Bilateral dialogues require usually a close relation between the consumers and producer countries and they are mostly consolidated by binding agreements. Most of the EU members have strengthened their security of supply by the long-term agreements signed with some specific supplier.

These long-term agreements are mostly in favor of the suppliers because they have the chance to guarantee their position in the consumer countries by these agreements. Basically, they impose to the consumers to buy the fuel that they need for a given and long period from them. Moreover, in the long-term, the consumer countries can also benefit from these contracts by ensuring their long-term energy supply and consolidating their

energy security. However, due to the political reasons, this kind of binding long-term agreements may bring significant disadvantages to the consumer countries, as well. They, actually, lay the groundwork for the producer countries to intervene to the consumer country's energy market, to obtain the largest part in the total energy supply and to use their dominant position as a political leverage.

Furthermore, these contracts are currently used by the Russian gas cartel, Gazprom. Especially, its energy dialogues with Germany and France are based on these long-term agreements. Especially in the German energy market, Gazprom has an indispensable dominance. To preserve this position, Gazprom consider these contracts as vital instruments and use them as primary tools in this country. Recently, the agreement signed between Russia and Germany has been already expanded until 2020. This expansion is a proof to demonstrate how Gazprom's position has been strengthened in the German energy market (www.eon-ruhrgas.com/cps/rde/xchg/SID-3F57EEF5-80C77878/er-corporate/hs.xsl/804.htm?rdeLocaleAttr=en 2007).

Russia has also very close energy dialogue with France based on the long-term agreements. The French gas company, Gaz de France and Gazprom agreed on the extension of their long-term contracts about the gas delivery until 2030 (www.globalresearch.ca/index.php?context=va&aid=4399 2007). The expansion of these long-term agreements demonstrates that states prefer to launch bilateral dialogue with their suppliers and benefit from this kind of relationship mutually.

Another close energy dialogue is between United Kingdom and Norway. The geographical proximity and the Norwegian oil and gas potential for the UK's energy market are the main reasons of this close relationship between two countries. In 2005, the Oil and Gas Co-operation Treaty was signed by these two countries. This treaty is actually based on the commitments of both sides for a given period about a sustainable supply of oil and gas (Geden, Marcelis and Maurer 2006, p.8).

Third example for this kind of relations is between Algeria and Spain and also between Algeria and Italy. Spain and Italy imports large amounts of natural gas and LNG from Algeria. To illustrate, Sonatrach and Endessa, the Algerian and Spanish energy companies, agreed on a long-term supply contract about the LNG delivery. This agreement is for a period of twenty years. Thus, most of the Spanish demand for LNG will be met by Algeria during twenty years (Morelli 2006, p.18).

All the bilateral relations highlighted above, show perfectly member states' approaches toward bilateral relations between producer and consumer countries at the national level. However, even though the bilateral relations and long-term contracts are considered as efficient measures taken at the national level for ensuring security of energy supply, they have also appeared at the same time as big obstacles which prevent the creation of a common approach toward the energy issue in the Union.

## 5.2 MEASURES AT THE COMMUNITY LEVEL

### 5.2.1 Diversification of the Sources and the Transit Routes

As is well known, European Union has suffered from the increasing demand for oil and gas. Its domestic production capacity cannot meet its increasing demand and the union has to import considerable amounts from external resources. As it is previously highlighted, EU is highly dependent to the Middle East for oil and to Russia for gas. Consequently, such a high dependency to a few suppliers is a big threat for ensuring the security of energy supply. The dependency level differs from one member to another in the EU. Some of them are totally dependent to a unique supplier. To illustrate this fact, it is relevant to stress the situation of Estonia and Finland. These members are totally dependent to Russia for gas. This is a considerably risky situation for EU not only because Russia is not totally reliable but also, because Russian resources will be mature and will not be able to meet the increasing demand for oil and gas in the near future (Morelli 2006, p.18). Thus, EU supports a diversification policy to ensure oil and gas supplies from different resources and to contribute to the energy supply security in the EU (European Commission 2006, p.15).

For an efficient diversification policy, EU members should aware of the fragile situation of the Union and launch new projects in the different regions to find out new reserves and suppliers to meet their increasing demand.

Caspian Basin and Central Asia, Gulf Region, Mediterranean Basin and North Africa are new alternatives for EU members to diversify their energy resources and to eliminate risks arising from the high dependency to a few suppliers.

#### 5.2.1.1 Caspian Basin and Central Asia

Caspian Basin and Central Asia possess large oil and gas reserves which are extremely important for EU member states to diversify their energy resources and to enhance their security of energy supply.

Despite its geopolitical and geostrategic advantages, this region has serious political and economical problems. Since the beginning of 19th century, especially the Southern Caucasian countries highly suffer from the political turbulence. The Russian dominance which lasted more than 40 years and the inter-states problems are the main reasons of the depression in the region.

Moreover, during the SSCB, Russian monopolistic approach impeded the technological development and the investigation activities for new energy resources. For this reason, during this period, neither regional countries nor Russia was aware of the high oil and gas production capacity of these areas. However, with the dissolution of USSR, the constituent states gained their independency and became the unique power on their energy reserves. Accordingly, in order to gain political and economical benefits, new independent states prioritized their energy policies and accelerated their investigation activities for new oil and gas reserves. As well as the regional countries, the Western consumers like US and EU

started to differentiate their energy priorities and to focus on the rich oil and gas reserves of this region.

In this region, Azerbaijan, Kazakhstan and Turkmenistan are driving forces of the overall oil and gas production in the region. Most of these reserves are located on these lands. Basically, Azerbaijan has pursued a pro-Western approach and preferred to be part of the US or EU related projects. Contrary, Turkmenistan and Kazakhstan have preserved their pro-Russian approaches and supported the Russian influence over the region. These fragmented policies prevent to have a coherent policy stance toward the future of these energy reserves.

As well as the regional powers, there are fragmented approaches between the consumer countries as well. It is relevant to highlight that there is an aggressive competition between the United States, European Union, Russia and China. Each of them has different interests toward this region. This study, ignoring US' and China's perceptions, focuses on the accelerated competition between EU and Russia over these resources. Russia that aims to preserve its position attributed during the Cold War is the most aggressive and competitive actor. Its dominance, especially, over the Caspian oil and gas reserves is strategically important to maintain and even to promote its political and economical position in the international context (Moradi 2006, p.174).

Apart from Russia, these rich resources are extremely important for the European energy security as well. As noted above, EU's primary objective is to diversify their suppliers to ensure their security in the energy supply. In this regard, specifically for the European Union, the Caspian and Central Asian reserves are more secure options than Russian and Middle East reserves. The main concern of the EU toward Russia is that this country considers its dominant position over the Caspian reserves as political and economical weapon toward both regional countries and EU Members. Thus, EU has already realized that Russian control should be ignored while transporting oil and gas from this region. Therefore, it is better to use Georgia and Turkey as transit countries rather than Ukraine and

Russia. Not only for Azerbaijani oil but also for Turkmen and Kazakh oil has to be transited through Georgia and Turkey as well. In this respect, Baku-Tbilisi-Ceyhan Pipeline is an essential example for a safe and secure transfer of oil from Caucasia to Europe. Due to the geographical difficulties and the long distance between the regions, European consumers cannot access directly to these reserves. For this reason, Caspian oil and gas have been usually transported through the pipelines. Accordingly, constructing developed and well-functioning pipeline system which passes through reliable transit countries is considerably necessary (Moradi 2006, p.174).

The relations between the regional actors and EU members are not one-sided. There is a strategic interdependence. EU members are dependent to this region to ensure a secure and safe energy supply but regional powers are also dependent to EU to obtain political and economical support. Since there are endless regional conflicts and ongoing Russian control in this region, enhanced security is the main priority for regional actors. For this reason, the EU and US- related projects have been more than welcome by most of the states in this region. Regional countries consider EU as a guarantor to promote the political and economical reforms and NATO, as well, to ensure their security militarily. However, even though most of the regional states agreed on these perspectives and pro-Western approaches, there are also some countries that are still tentative and more conservative toward Western initiatives.

In light of these factors, EU has initiated various projects to maximize its benefits from the Caspian and Central Asian reserves.

#### *5.2.1.1.1 Baku-Tbilisi-Ceyhan Pipeline (BTC)*

The launch of Baku-Tbilisi-Ceyhan Pipeline is a milestone both for the regional actors and EU member states. Since this project enables to diversify EU's oil suppliers and transit countries, EU has the chance to ensure its security of oil supply. According to the itinerary of this pipeline system, the initial point is Baku. The Azeri gas starts to be transported in

Baku and arrives to Ceyhan passing through Tbilisi. In 2006, for the first time, the Azeri gas was delivered to Italy from Ceyhan. Accordingly, since that time, BTC has transported oil from Azerbaijan to Europe and perfectly contributes to the diversification of oil supplies (Paskur 2006).

BTC has multidimensional effects on both regional powers and major European consumers. Actually, this project has 2 main objectives. The primary objective is to transfer the Azeri oil to Europe through Turkey which has been already fulfilled. Its second aim is to develop Caucasia and to undermine the political, economical and social problems of this region. Basically, it is clear that there is an obvious interdependence between the actors. Not only for EU but also for the regional states, this project has brought significant advantages. As is noted above, the main advantage of EU is to lessen the high dependency to oil imports from Middle East and Russia and to ensure security of oil supply.

> *The B.T.C. pipeline will account for only a small percentage of global oil, but the West considers a stable- -and not Moscow-controlled- -supply to be worth the financial and political cost* (www.pinr.com/report.php?ac=view_report&report_id=537&language_id=12007).

As well as the EU, this pipeline project has brought significant advantages to the regional actors. Especially, Azerbaijan and Georgia which mainly suffer from ethnic disputes, political and financial problems have considerably benefited from this project. The economic effect of this pipeline on Georgia and Azerbaijan is indispensable. The BTC has various economic effects in Georgia. It has contributed to its GDP, the level of the employment, the national budget and the amount of investment (Papava 2005, p.87-88). The economical development in the country enables the opportunities to promote the social stabilization as well. Similarly, this project has brought significant advantages to Azerbaijan as well. The stability and the prosperity of these countries are quite important for the EU. If the stability in these countries can be consolidated, the security of energy supply would be promoted as well. Consequently, the BTC is a perfect case to show how a pipeline can be used as an efficient political and economic instrument to develop the supplier and the transit countries. Apart from the BTC oil pipeline; there are also three new

gas pipeline projects; Nabucco Gas Pipeline, Turkey-Greece-Italy Interconnector and the South-Caucasian-Pipeline

#### *5.2.1.1.2 The Nabucco Pipeline*

As far as European consumers look for new projects for ensuring the security of gas supply, Nabucco Pipeline Project has appeared as a relevant initiative to serve to the union's priorities.

The main objective of this project is to ensure a safe transport of Caspian natural gas. Accordingly, Nabucco Pipeline aims to deliver natural gas supplied from Iran, Azerbaijan and Turkmenistan to Austria and then to different EU members' markets. Main transit countries are Turkey, Bulgaria and Hungary (Özkan 2007, p.51).

Among all the pipeline projects, Nabucco Pipeline has significant advantages and outcomes for both EU members and regional actors. Since Caspian suppliers and transit countries will be integrated through this project, it represents a significant occasion to enlarge the European energy market. Additionally, this project also favors and encourages the coordination between all the participant countries.

Thanks to this pipeline project, Caspian producer countries and Turkey will be integrated to this market. Additionally, apart from this advantage; another important point about this project is the coordination between all the participant countries. They have represented a perfect coherence and coordination by balancing the interests and priorities of all the parties (Piebalgs 2006, p.1-2). Furthermore, it is important to note that this pipeline project represents a significant advantage to the EU members thanks to its reliable transit countries. Especially Romania, Bulgaria and Hungary will considerably contribute to the effectiveness of this project and then directly to the European supply security. In addition to these countries, Turkey is also an important part of this project as well. Further, similar to the Baku-Tbilisi-Ceyhan Pipeline, this project is also a big advantage for Turkey. It

consolidates Turkey's position as a transit country. John Roberts summarized very well this situation in his article by these sentences: "This is particularly true of the Nabucco Project, which, if it is developed in the way its promoters envisage, would do most to establish Turkey as Europe's fourth artery" (Roberts 2004, p.19).

Consequently, this project is a real chance for EU's security of natural gas supply. EU will have the chance to receive large amount of natural gas from different resources and to diversify its suppliers. If a sufficient amount of gas can be supplied from these areas to Europe, the import dependency for the natural gas to Russia will considerably decrease and the security of supply will be enhanced.

#### *5.2.1.1.3 Turkey-Greece-Italy Interconnector*

Turkey-Greece-Italy interconnector is also a significant initiative to diversify the energy resources and to ensure the security of energy supply in the EU.

Actually, this interconnector is just a part of the pipeline project which will be constructed between Middle East and Caspian natural gas supplier countries and European consumers. Essentially, this pipeline project is consisted of 2 main parts. The construction of the first part which is called Turkey-Greece Natural Gas Pipeline was started in 2003. The main objective of this project is to link Turkey and Greece and to ensure a safe transport of natural gas from Middle East and Caspian Region through Turkey to Greece and later to Italy (Özkan 2007, p.51).

This project is quite Sefficient for both Turkey and Greece. According to the expectations, this initiative will perfectly serve to the basic interests of both sides. To highlight their interests, it is relevant to stress that Greece mainly aims to diversify their supplier and transit countries and to ensure the security of their energy supply. On the other hand, Turkey's main aim is to strengthen its position as a transit country between East and West (Tsombanopoulos, 2007).

This natural gas pipeline between Turkey and EU is only the first part of this project. The second part will link this interconnector to Italy especially to enhance the sufficient gas supplies to Italy. The extension of this pipeline to Otranto will be held between 2010 and 2015 (Tsombanopoulos, 2007).

It is obvious that these two integrated projects will have significant effects on the European energy security. Since the supplied gas will pass first through Turkey and then through Greece, all the possible risks regarding sabotage, disruptions, instabilities.etc will become minimized. Finally, in the future, if the expectations will be perfectly met, this initiative will be an efficient measure to improve the security of energy supply in the EU.

#### *5.2.1.1.4 The South Caucasian Pipeline (Baku-Tbilisi- Erzurum Pipeline)*

The South-Caucasia Pipeline which is also called as Baku-Tbilisi-Erzurum pipeline is one of the efficient pipeline projects launched by the Western partners. As well as Nabucco project, it is considered as one of the main initiatives to lessen the high dependency to Russian natural gas reserves and to ensure a safe access to the large Caspian gas reserves. The main objective of this pipeline is to transport the Azeri and Turkmen gas to European markets passing through Tbilisi and Erzurum. If this objective will be perfectly met, the dominant position of Russia will be weakened in the region and European energy security will be enhanced (Özkan 2007, p.51).

Different and coincident objectives of Turkmenistan and Azerbaijan are the main obstacles of this project. Due to the problems between these two regional powers, Turkmen political actors do not still accept to be integrated to this project. Finally, if this obstacle will be overcome and both of Azeri and Turkmen gas will be transported to Europe, this project will be a serious challenge for Russia. It will be also a relevant option for EU to diversify its suppliers, to lessen the threats and to ensure the security of its energy supply.

#### 5.2.1.2 Gulf Region

Gulf Countries' oil and natural gas reserves are strategically and geographically important for both regional and western consumers. These main regional supplier countries are Bahrain, Iran, Iraq, Kuwait, Qatar, Oman, Saudi Arabia and United Arab Emirates. According to 2003 data, these countries possess 57 percent of the world's oil and forty-five of the world's natural gas reserves (www.eia.doe.gov/emeu/cabs/pgulf.html 2007).

Among them, Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, United Arab Emirates are also the members of the Gulf Cooperation Council which is considerably important for the European consumers. Most of the reserves in these countries enable the EU to diversify its suppliers. Accordingly, EU aims to develop its relations with the GCC members, especially to ensure reasonable oil prices, to strengthen the infrastructure between two regions, and to promote their energy dialogue based on transparency and reliability (europa.eu/rapid/pressReleasesAction.do?reference=IP/05/379&format=HTML&aged=0&language=EN&guiLanguage=en 2007).

Apart from the GCC members, Iran has also a significant position for the future of the European energy supply security. Due to its large oil reserves, Iran is the fourth biggest oil producer and exporter country. Additionally, Iran also possesses the second largest gas reserves in the world (Moradi 2006, p.181).

Despite its large oil and gas reserves, there is no actively launched energy dialogue between EU and Iran. Basically, the political regime of Iran is the main reason of this obstacle. Accordingly, its political regime, the dispute with the United States, its pro-Russian attitudes and its nuclear efforts impede to launch a closer dialogue between Iran and the EU. Among these reasons, United States' opposition toward Iran is the main challenge for both sides. This kind of opposition prevent to initiate a long and efficient pipeline project

between South Caspian Region and Europe which will deliver Iranian oil and gas to European markets. However, though the high political tension between US and Iran, EU also continues to pave the way for a possible energy dialogue in the future. Iran's observer status in the ECT is the proof of these efforts (Moradi 2006, p.183).

It is obvious that if the necessary political stability will be installed both in its domestic politics and in its relations with the Western consumers, Iran can be an efficient actor for the EU's energy security in the future.

#### 5.2.1.3 Mediterranean and North African countries

Similar the producers in the Caucasus and in the Gulf Region, the Mediterranean and North African countries possess large oil and gas reserves. These large reserves enhance the geopolitical and geostrategic importance of these areas. Specifically, Algeria, Tunisia and Libya are the main energy actors of this region.

The Euro-Mediterranean Partnership, launched in 1995 by the Barcelona Declaration is a milestone to improve the dialogue between EU members and Mediterranean Countries. This partnership essentially aims to develop the partner countries in the political, economical and social terms. As well as political and economical issues, energy has a significant importance to deepen this dialogue. Thus, Mediterranean and North African large gas reserves make this area more attractive for the European Union and its supply security.

This close energy dialogue is actually based on some crucial priorities. Basically, these are to promote the energy related areas, to enhance the dialogue between the partners, to consolidate the energy infrastructure and to encourage the energy efficiency and the use of renewable energy in these areas (ec.europa.eu/external_relations/euromed/conf/sect/energy.htm 2007).

In light of the priorities set above, it is obvious that EU members have seriously focused on oil and gas reserves of this region to diversify their suppliers. Accordingly, EU members are part of three essential ongoing natural gas pipelines and also two recently-launched initiatives. Main ongoing pipeline systems are the Trans-Mediterranean, Maghreb-Europe Gas and Greenstream Pipelines. Among them, both Trans-Mediterranean and Maghreb-Europe Gas Pipelines transport the Algerian gas to Italy. (www.eni.it/eni/internal.do?RID=@2xUaE%7C0?xoidcmWopk&catId=-1073759905&cntTypeId=1005&portalId=0&lang=en 2007). Unlike these two pipeline projects; Greenstream is the sole pipeline which transports natural gas from Libya to European markets. A significant part of this project is under the sea. It has the capacity to produce8 bcm natural gas per year (www.eni.it/eni/internal.do?RID=@2xUaE%7C0?xoidcmWopk&catId=-1073759905&cntTypeId=1005&portalId=0&lang=en 2007).

Due to the geographical proximity, Italy, Spain and Portugal are the main delivery points for the Mediterranean gas. Therefore, both Mediterranean and European partners have focused on the construction of the new pipeline projects. One of these recently-launched initiatives is Medgas. It is designed that this project will ensure a safe transportation between Algeria and Spain. Most part of the pipeline will be under the sea. As well as ongoing projects, it is expected that this initiative will also contribute to the security of energy supply in the future (www.medgaz.com/medgaz/pages/claves_mejora_seguridad-eng.htm 2007).

Another pipeline project which will connect the Mediterranean Basin to Europe is the GALSI project. This project, having a capacity of around 353 bcf, will transport the Algerian natural gas to Italy passing through Sardinia and Corsica. It is estimated that the construction of GALSI will be completed on 2008 (Massaras 2006).

Thanks to all of these pipeline networks, the European Union has the opportunity to access to the reserves of these areas and gains the chance to diversify its suppliers. Consequently,

the Euro-Mediterranean Partnership is the main tool to promote the energy dialogue between EU and partner countries and to enhance a safe oil and gas transport.

### 5.2.2 Energy Efficiency

Energy efficiency is an effective way to ensure the security of energy supply and to promote the environmental protection. Basically, it aims to decrease the overall oil and natural gas consumption and to increase the energy saving in the Union. Accordingly, it is acknowledged that energy efficiency has multiple effects. It mainly affects the security of energy supply, the competitiveness in the EU and the environmental protection. Accordingly, as it aims to decrease the overall consumption of the primary energy in the EU and to increase the energy savings, it will directly decrease the high import dependency and to promote the prosperity and the competition in the European society. Additionally, it has also a significant role for the environmental protection as well. Due to the decline in the fossil fuels, the $CO_2$ emissions will decrease and the Kyoto protocol's commitments will be respected (ec.europa.eu/energy/demand/index_en.htm 2007).

Nonetheless, the key idea of the energy efficiency is the energy saving. To consolidate this initiative, European Commission set a target to decrease the excessive energy consumption. In light of this effort, the Commission strongly advises to the EU members to diminish their consumption by twenty until 2020 (ec.europa.eu/energy/demand/index_en.htm 2007).

To enhance the energy efficiency in the Union, it is relevant to analyze the sectors according to their energy consumption. Since the beginning of 1990s, the transport sector has had the highest share in the total energy consumption. Especially, the excessive oil consumption is the main threat for this sector. It is also relevant to stress that the rise in the living conditions, the increase in the private cars, the promotion of the internal market and technological and the infrastructural developments in this sector are the main reasons of its highest share (European Environment Agency 2006, p.25). As well as the transport sector, households also consume large amount of energy for heating and cooling. During the

summer, the southern part of Europe and during the winter, the northern part of the Europe becomes biggest energy consumers in Europe (European Environment Agency 2006, p.25).

As is previously pointed out, energy efficiency is a relevant solution to undermine the obstacles threatening the energy supply security. It is obvious that if the domestic energy consumption lessens, the import dependency to the external resources will decrease as well. Accordingly, it will be better if such a serious solution will be enhanced at the community level rather than national level. Therefore, it will be efficient if EU authorities will launch some new measures to promote the energy efficiency and to ensure the security of energy supply. Nonetheless, to clarify this issue and to inform European consumers, the European Commission published the Green Paper on the Energy efficiency which specifically focuses on some possible measures to enhance the energy efficiency. In this respect, first of all, EU should focus on the role of the research and development to develop energy efficiency-related technologies. Especially for the transport and households sectors, the research and developments are considerably important. Furthermore, there are also specific national action plans for each member state. In this green paper, these action plans are considered as one of the main tools which should be taken to enhance the energy saving in the Union. Essentially, national action plans are vital instrument for the consumer states to list and to guide their priorities. Specifically, it will be better if member states will list the energy efficiency as one of the main priorities in their action plans. To make more efficient these plans, they should also put some benchmarks about the progress that they want to make. As well as benchmarks, these efforts should absolutely comply with the Lisbon principles. (European Commission 2006, p.16)

As well as the efforts previously stressed, another possible measure is to implement a tax policy. Tax can be used as a promoter or a deterrent instrument in the EU to ensure the energy efficiency at the community level. This policy can be efficient if the additional taxes will be implemented to the energy products which contradict with the goals set for the energy efficiency. On the other hand, the energy products which serve to the energy saving

priorities should be tax free. In this case, eventually, the demand for the tax-free energy products will increase and the energy efficiency will be indirectly promoted (European Commission 2006, p.17). Besides these possible measures, the financial aids from the member states, EU' s institutions and EU-related funds have also crucial importance to improve the initiatives supporting energy efficiency in the Union (European Commission 2006, p.17). As well as the Green paper on energy efficiency, European Commission has also proposed some new measures on its action plan for energy efficiency document. According to this communication, some appropriate measures should be taken to limit the excessive oil consumption and its tremendous effects, mainly in the transport and building sectors. In the transport sector, the high-tech developments have crucial importance to promote the energy efficiency. These developments especially pave the way for the production of new types cars and vehicles. Accordingly, "The Commission will continue its efforts to develop markets for cleaner, smarter, safer and energy-efficient vehicles through public-procurement and awareness-raising" (European Commission 2006, p.15).

Additionally, apart from the transport sector, the building sector has also suffered from high oil consumption. In this respect, European Commission put a target of 40 megatons of oil equivalent energy for the energy saving until 2020 (European Commission 2006, p.19). Besides, EU has also focused on the construction of new-types buildings. This recently-launched initiative specifically aims to provide the lowest possible energy consumption. If they will be successful in this new initiative, the construction of this type of houses will increase in Europe especially until 2015 (European Commission 2006, p.12)

Finally, European Commission has also another plan at the multilateral level. According to this new initiative, the commission plans to launch an international agreement focusing on the energy efficiency and on its advantages. Thanks to this agreement, the positive outcomes and benefits of this issue can be expanded beyond the borders of Europe (European Commission 2006, p.19)

In conclusion, the energy efficiency is one of the most significant ways to prevent the growing energy consumption and the European energy supply challenges. For this reason, European Union and its member states should urgently implement all the necessary measures on this issue to contribute to the environmental protection and to ensure the security of energy supply.

### 5.2.3 The Use of Renewable Energy

The renewable energy has an increasing impetus in the EU. The fragile European energy situation, the high level gas and oil dependency, the price volatility of the fossil fuels in the European and international energy markets, the concerns about the use of nuclear powers and the commitments of the Kyoto Protocol increased the importance of the use of the renewable energy in the European Union. Accordingly, to undermine these threats, member states have an increasing tendency to use the renewable energy.

According to 2004 data, the share of the renewable energy was only 6.3 percent in total energy consumption. Increasing demand for oil and gas in almost all of the sectors is the main challenge of the renewable energy.

Since a decade, the European Commission has launched various initiatives to promote the use of the renewable energy in the Union. In this respect, in 1997, the first target set by the Commission was to increase the share of the renewable energy by 12 percent until 2010 (European Commission 2006, p.4). At that time, this target was realistic and desirable. However, today, it seems that member states will not be able to achieve this target until 2010. Actually, even though the Commission pursues a good policy by setting targets, the diverse interests and different priorities of the member states complicates this process and make considerably difficult to achieve a common target. As well as this fact, the lack of legally binding rules has also weakened the community initiatives in this issue. It will be better if the community rules penetrate to the member states and reorient some part of their national energy policies. Especially, the transport and households sectors should be

regulated by the community binding rules due to the high energy consumption (European Commission 2006, pp.4-5). Despite these obstacles, the Commission has continued to focus on this issue and launch new initiatives. Recently, member states agreed on the mandatory target set by the commission. According to this new step, member states agreed on increasing the share of the renewable energy to 20 percent in the total energy consumption (European Commission 2006, p.10). In light of previous experience, this target represents a big ambiguity as well as the previous one. As is obvious, each member state has a different energy mix and different capacity to invest on the related technologies. Therefore, it will be a hard process for almost all the member states to reorganize their energy mix regarding this new and mandatory target.

Contrary to the obstacles and ambiguities stressed above, the renewable energy has also considerable contributions to EU's energy supply security and the environmental protection. As is well known to ensure the environmental production, the main measure to be taken is to impede the excessive demand for the fossil fuels and to encourage $CO_2$-free energy sources. Accordingly, renewable energy appears as a relevant option. Basically, the wind, hydro and solar powers and biomass do not contain harmful $CO_2$ gases and are able to protect the environmental balance and prevent the negative effects of the climate change. As well as the environmental protection, the use of renewable energy is also crucially important to enhance the security of energy supply. Basically, as renewable energy is domestically producible, it has the potential to decrease the high import dependency if it will be able to substitute oil and natural gas. Essentially, it has appeared as a recent alternative source for the electricity production. Due to the coal's carbon emissions and the high import dependency for the gas, the renewable energy brings much more advantages to consolidate the security of energy supply. In this respect, each member state has set its own target to determine the share of renewable energy in its electricity production. (europa.eu.int/eur-lex/pri/en/oj/dat/2001/l_283/l_28320011027en00330040.pdf 2007). If the members will be able to meet their targets, 21 percent of the total electricity production will be maintained by the renewable energy in 2010 (European Commission 2006, p.7).

Under these circumstances, the role of the renewable energy will be accelerated and begin to replace fossil fuels, more seriously, in the overall consumption.

In addition to electricity production, renewable energy is also important for the transport sector as well. As is already stressed, the excessive oil consumption in the transport sectors maximizes the vulnerable energy situation of the EU. To prevent the tremendous effects of this situation, the Commission strongly advises to use biofuels rather than petrol and diesel. Thus, it has recently set a target to promote biofuels in the member states. According to this new step, biofuels will constitute 5.75 percent of the total petrol and diesel consumption in the transport sector (European Commission 2006, p.8).

As is clearly mentioned, the use of the renewable energy has significant effects on ensuring the security of energy supply. It has a crucial role to decrease the import dependency especially for the oil and gas. For this reason, all the efforts and the initiatives supporting the use of renewable energy should be completely enhanced and strengthened.

### 5.2.4 Internal Electricity and Gas Market

The internal gas and electricity market is actually a complementary element of the European internal market. The full integration of the EU can be reached only if all sectors will be integrated. Regarding such integration, the creation of a well-functioning gas and electricity market is essential.

In this respect, the gas and electricity directives adopted in 1996 and 1998 are considered as the first steps toward the creation of an internal energy market. The main aim of these directives was to create a fully liberalized internal electricity and gas market by promoting the energy efficiency and the competition. In addition to this basic step, further steps have been still required to develop this initiative. Thus, these two directives were promoted by another two electricity and gas directives adopted in 2003. The main objective was to ensure the openness and the full liberalization of this market. They essentially targeted that

by July 2004, the industrial and by 2007 all the customers would be able to choose their suppliers in the market (www.europarl.europa.eu/oeil/OpenDetailFiche.do?ficheId=601&language=en 2007). Basically, these two benchmarks are milestones to create a perfectly integrated internal energy market. Especially, having the right to choose the suppliers avoids all the discriminatory regulations and promotes the openness and liberalization. To that end, such a competitive market avoids the monopolistic structure of the market and contributes to the security of the energy supply in the EU.

As is mentioned above, a fully integrated and liberalized energy market requires new infrastructural investments. Due to the security concerns, improving the infrastructure is essential. If the internal energy market is based on a well functioning and strengthened infrastructure, most of the disruptions will be minimized, benefits will be maximized and the security of energy supply will be enhanced (European Commission 2006, p.4-5). To be successful, main priorities to improve the infrastructure of the gas and electricity market are set accordingly;

> *i) Identifying the most significant missing infrastructure up to 2013 and ensuring pan-European political support to fill the gaps. Appointing four European co-coordinators to pursue the four of the most important priority projects: the Power-Link between Germany, Poland and Lithuania; connections to offshore wind power in Northern Europe; electricity interconnections between France and Spain; and the Nabucco pipeline, bringing gas from the Caspian to central Europe.*
>
> *ii) Agreeing a maximum of 5 years within which planning and approval procedures must be completed for projects that are defined as being "of European interest" under Trans-European Energy Guidelines.*
>
> *iii) Examining the need to increase funding for the Energy Trans-European networks, particularly to facilitate the integration of renewable electricity into the grid.*
>
> *iv) Establishing a new Community mechanism and structure for Transmission System Operators (TSOs), responsible for co-ordinate network planning* (European Commission 2007, p.9).

It is relevant to highlight that the main benefit of this Trans-European Networks (TEN-E) is to minimize the risks of disruption by integrating all the local electric and gas networks at the community level. To be successful, TEN-E précised different objectives and benchmarks for the gas and the electricity sectors. In the gas sector, TEN-E primarily aims to integrate the insulated regions to the European gas sector, to improve the pipelines'

infrastructure and to extend the delivery of the natural gas to further areas in the EU. On the other hand, in the electricity sector, TEN-E essentially focuses on the interconnection of the electricity networks between the member states and also on the extension of these networks to outside of Europe, to the third countries (http://europa.eu/scadplus/leg/en/lvb/l06019.htm 2007).

Finally, creating a well functioning and fully liberalized internal gas and electricity market has significant contributions to strengthen the security of energy supply. As is obviously clear, it is an efficient instrument to avoid two important challenges which are the dependency to a few suppliers and the risk of supply disruption. Since a competitive and liberalized electricity and gas market avoids the monopolistic structure by allowing the smaller energy companies to integrate to the internal energy market, consumers gain the chance to diversify their suppliers and find the safest and the most reasonable options. Additionally, as the internal energy market considerably favors new infrastructural investments, the possible disruptions arisen from the technical problems and infrastructural deficiencies can be avoided.

In conclusion, the internal gas and electricity market has a crucial role to enhance the security of energy supply. Therefore, all possible measures should be taken to complete the liberalization process of the market and to increase its efficiency.

### 5.2.5 Storage Capacities and Emergency Stocks

As is well known, EU has tried different ways to ensure the security of energy supply and to ensure the energy situation of EU in the future. It is relevant to stress that main measures listed above, the diversification of energy sources, energy routes and energy mixes, the improvement of the energy efficiency and the use of renewable energy, the implementation of a liberalized and secure internal gas and electricity market are able to ensure the security of energy supply in the long-term. However, EU also needs some other short-term measures to provide the stability in the market and to ensure the security of energy supply

during an unexpected crisis. In this respect, creating a gas and oil stock mechanism can be an efficient way to protect the security of energy supply from the possible effects of an energy crisis in the short-term.

Obviously, such a stock mechanism has a significant potential to support and to improve the EU's fragile energy situation. As is previously mentioned, the high dependencies to the unstable and unreliable suppliers increase the risk of being disrupted. Therefore, a sufficient storage capacity is highly required to prevent the tremendous effects of such an expected crisis.

Today, the storage capacity issue has an increasing impetus in the EU. Member states began to realize the importance of such short-term measures for their security. Unfortunately, EU does not have still a well-functioning storage policy. It has a more coordinated oil stock mechanism than gas stocks. At least, all the member states have a legal obligation in this issue. According to this obligation, member states are obliged to have oil stocks at least for ninety days.[2] The aims of these oil stocks are to ensure the security of oil supplies by increasing the coordination between the member states, avoiding all the possible damages arising from the energy crisis and protecting and strengthening the stability and the reliability of the oil market (http://ec.europa.eu/energy/oil/stocks/index_en.htm 2007).

As is clear, these oil stocks are very important to protect EU from the negative outcomes of a possible energy crisis. Especially, when there is a physical or a technical disruption, the consumer countries can easily face with the interruption in the supply. In this case, member states can provide their oil supply from their oil stocks. Thus, thanks to these stocks, the stability of the energy market and the security of the oil supply can be enhanced. To be more efficient, the capacity of oil stocks in the EU has been developed. Today, they are able to meet 120 days oil needs in the EU (www.eurunion.org/News/press/

[2] This is a legal obligation according to the directive: 98/93/EC

2007/2007002.htm 2007). This is a serious and important development in the storage policy. Bearing in mind that such a development in the oil storage capacity proves that member states started to take seriously the concerns relating the unexpected energy crisis and the effective yields of the storage capacity.

Unlike the oil storage capacity, there is not a legally binding requirement to establish permanent and mandatory gas stocks in the member states. Each member state has quite different gas stock capacities. According to 2005 data, Austria possesses the largest gas stock capacity among the EU members. As well as Austria, Germany, France and Italy are other member states which have also large and well-developed emergency gas mechanism. Apart from these members, Finland, Ireland and Sweden have highly suffered from the lack of a gas storage capacity (www.eu2006.at/en/News/Press_Releases/January /0901bartenstein.html 2007). This obvious gap between the members has appeared as a big challenge to ensure the security of energy supply not only at the national but also at the community level as well. To prevent all possible risks and threats, a co-ordination between the member states is highly required. The interaction should be enhanced and the cooperation should be strengthened between the member states. To that end, the countries which possess large gas stocks should help and provide assistance to the countries which have limited stocks when it is necessary. Unfortunately, it is not always possible to ensure such an enhanced cooperation. As is well known, consumer states usually preserve their advantageous situation due to the increasing concerns in this issue. Thus, most of members which possess large gas storage capacity are reluctant to share their stocks with other members (Morelli 2006, p.26).

Finally, both oil and gas stocks are quite effective instruments to ensure the sustainable energy supplies, especially, in the unexpected situations. To be successful, it would be better if a binding mechanism will be launched to regulate the gas storage capacity among the member states. In conclusion, a mandatory and binding initiative will considerably

promote the efficiency of this mechanism and enhance the sustainability of secure energy supplies.

### 5.2.6 External Energy Policy

As is discussed in the previous chapters, the challenges toward the security of energy supply are neither ordinary nor simple. All of these challenges necessitate serious measures to avoid their negative and destroying effects. Specifically, an enhanced and a well-coordinated external policy are highly required to avoid these threats.

As is well known, diplomacy is one of the main policy tools to solve the problems and to promote the interactions between the political actors in the international relations. Accordingly, to enhance the sustainability in the energy supplies, and to consolidate the stability in the energy market in the long term, diplomacy should be taken into consideration as an efficient tool. Specifically, having a common approach toward suppliers and establishing reliable and transparent dialogues are essential to create an external energy policy ( European Commission 2006, p.14). Furthermore, it is relevant to highlight that the key notions of such a policy are transparency and reliability. Without ensuring transparent and reliable relations, EU cannot launch an external energy policy between its members and third parties. In this regard, spring EU Summit précised that EU should spend much more efforts to develop this policy and focus on the suppliers and policies toward Black Sea, Central Asia, Russia and other European neighborhood areas, Middle East, China, Norway and United States. As is highlighted in the previous sections, among these areas, the Black Sea and Central Asia are the main priorities for the EU to diversify the suppliers and transit countries. To that end, it is quite useful and necessary to develop an external energy policy, especially, in favor of these areas. In light of these goals, the European Commission set some principles to promote an external energy policy. These are;

*i) The EC and its Member States should be a key driver in the design of international agreements, including the future of the Energy Charter Treaty and the post-2012 climate regime.*

ii) *EU energy relations with its neighbors are fundamental to European security and stability. The EU should aim to build up a wide network of countries around the EU, acting on the basis of shared rules or principles derived from the EU energy policy.*

iii) *To enhance relations with our external energy suppliers, further developing comprehensive partnerships based on mutual interest, transparency, predictability and reciprocity.*

iv) *To continue to develop closer energy relations with other major consumers, in particular through IEA and G8 or through intensified bilateral cooperation.*

v) *Develop the use of financial instruments, via enhanced co-operation with the EIB and EBRD and the establishment of a Neighborhood Investment Fund, to enhance the EU's energy security.*

vi) *To improve the conditions for investments in international projects, working for example to secure a clearly defined and transparent legal framework and appointing European coordinators to represent EU interests in key international projects.*

vii) *Promote non proliferation, nuclear safety and security, in particular through a reinforced cooperation with the International Atomic Energy Agency* (European Commission 2007, p.18).

If these objectives will be implemented, there will be an external energy policy at the community level and it will have three main contributions to the security of energy supply. First of all, an external energy policy will consolidate the stability in the energy market and to prevent the consumers from the sharp price changes. This policy will also enhance, at the same time, new common initiatives which will serve to the interests of both parties. Especially, the construction of the new pipelines or the LNG terminals will be significant beneficial outcomes of this policy. Finally, it will encourage the member states to have a common approach to deal with the outcomes of the serious energy crises (Geden, Marcelis and Muare 2006, p.25 ).

Among the member states, despite the fragmented approaches toward the common energy policy, almost all of them support an external energy policy to ensure their energy security. Especially the big member states, Germany, UK and Poland, strongly encourage and support an external energy policy (Geden, Marcelis and Muare 2006, p.25).

Finally, an external energy policy is strongly recommended to enhance energy dialogues with producer and transit countries to avoid the possible damages of the energy crisis and to

promote the security. In conclusion a well-functioning network system with third parties and an enhanced dialogue based on a common external energy policy will relatively minimize the challenges which threaten the security of energy supply in the Union.

## 5.3 MEASURES AT THE MULTILATERAL LEVEL

The energy issue is a big priority in the global agenda as well as in the EU. Especially in the energy issue, the security of energy supply concept has a growing importance for both the countries and the international institutions. Most of the organizations have some initiatives to ensure the security of supply.

The European Union is also in cooperation with some of the international organizations to improve the energy security. Some of them are International Energy Agency, G8 Summits, OSCE, United Nations, and Energy Charter Secretariat.

### 5.3.1 International Energy Agency (IEA)

Concerns towards western energy security and security of energy supply have appeared for the first time during 1973-74 oil crises. The tremendous effects of this crisis weakened the energy security of western consumers by strengthening the dominant position of OPEC. Accordingly, this bad experience can be considered as a wake-up call for consumers to take relevant and adequate measures to undermine the destroying effects of the crisis. Since almost all the western countries highly suffered from this crisis, they realized that their energy security cannot be enhanced only at the national level. They agreed on the necessity of a multilateral assistance to solve the ongoing problems and to stabilize the international energy market. To that end, the International Energy Agency was established in 1974 by 26 members. The common objectives of these 26 members are to promote security of energy supply, to decrease the risks relating to oil, to enhance the energy market (Belgrave 1987, p.185-188). The establishment of IEA is, especially, the sole positive outcome of the 1973 oil crises.

In light of objectives set above, the main goal of IEA is to ensure the energy security among its members. In this case, IEA mainly focuses on the development of oil stock capacity to avoid all kind of effects of unexpected oil disruptions and related crisis. Accordingly, IEA members have to keep their oil storage capacity equal to 90 days (in minimum) of the previous year's oil import level (International Energy Agency 2007, p.8). This measure is significantly efficient not only for IEA members but also for EU as well. 17 members of IEA are the EU members at the same time. Therefore, all measures taken at IEA level directly affect the EU politics. To illustrate this close dialogue, it is relevant to stress that similar to IEA, EU members have also to maintain an oil stock mechanism which will be sufficient for 90 days. This similar measure about the oil stock mechanisms shows that EU and IEA are interacting in the energy field. Especially for the EU, this obvious interaction is necessary and quite efficient to avoid the negative effects of unexpected oil crisis and promote its energy supply security.

In conclusion, the close dialogue between IEA and EU promotes the initiatives to enhance their security of energy supply and to consolidate their energy security. By taking overall relevant measures, IEA promotes the stability in the Western energy market.

### 5.3.2 G8 Summits

The G8 summits, holding a different structure, represent a special multilateral platform to discuss the ongoing essential global problems. G8, consisted of 8 main prosperous states, usually focuses on the main ongoing challenges. The main G8 countries are United States, Canada, Germany, France, Italy, Russia, European Union and Japan. Among various challenges, the security of energy supply had been one of the main priorities of 2005 and 2006 summits (European Commission 2006, p.42).

The 2005 summit, held in the United Kingdom, specifically focused on the environmental protection and the climate change. Specifically, they highlighted the harmful effects of the $CO_2$ emissions for the climate change and mentioned the importance of secure and reliable

energy suppliers to ensure the security of energy supply. To deal with these problems, they highlighted various measures which should be taken and implemented seriously. Accordingly, these measures are to enhance the cooperation between the participant countries, to maintain financial assistances from world's primary financial institutions, to develop a common approach about the climate change, to decrease the emissions of the carbon dioxide gases, to promote new initiatives to support energy saving and to consolidate the energy security and the sustainable development (G8 Gleeneagles Summit 2005, pp.1-3)

In 2006, the energy security had still remained as one of the main issues discussed in the G8 Saint Petersburg Summit. They especially focused on enhancing the energy security concentrating on both security of demand and supply, the stability of oil and gas market and promoting the alternative cleaner energies (European Commission 2006, p.42). The main interesting point of this summit is that US, EU and Russian leaders maintained an opportunity to discuss the current and essential problems and to find out relevant solutions.

Finally, it is obviously clear that these summits provide a relevant platform to handle and to discuss the ongoing problems between EU and Russia and to strengthen the transatlantic and pacific relations of EU.

### 5.3.3 OSCE

OSCE, holding 55 participant countries, is one of the largest regional security institutions. It is not only a European organization but also responsible of the problems in North America, Mediterranean Basin and Asia. Thus, its zone of influence is considerably large. The main objective of this efficient security organization is to ensure the security in these large areas by using different measures. Through a well coordinated policy, OSCE especially favors a comprehensive approach of security. They do not only focus on military and politics, but also encourage the stability in the economical and environmental issues.

As is highlighted above, OSCE interprets the security issue from different aspects. Accordingly, one of these aspects is the energy security. So, to promote the energy security, OSCE has essentially focused on ensuring a sustainable, reliable and safe energy supply. To that aim, they essentially favor the security of energy supply and demand, the enhanced energy dialogue between the consumer and the producer countries, the launch of new initiatives toward the energy efficiency, the use of the renewable energy, the stability and reliability of the international energy market and the diversification of the energy suppliers and the transit routes (Gutch 2006).

To conclude, it is relevant to highlight that all of these objectives perfectly comply with the EU's priorities in the same issue. Both OSCE and EU favor a strong energy policy to ensure a reliable and affordable energy supply and to promote their energy security.

### 5.3.4 United Nations

Among the IGOs, United Nations is the largest organization which favors peace, equality and prosperity in the world. Since its sphere of activities is considerably large, UN has been frequently involved in many areas. Such a large zone of influence is a big advantage for the EU as well. As is well known, all of EU members are parts of UN system. Therefore, there is a close interaction between UN and EU.

Due to this close dialogue, it usual that UN and EU share some common goals, priorities and policy initiatives. Specifically, one of these common priorities is the energy security. Under the UN framework, the energy issue has been handled within the scope of the sustainable development project. According to this significant initiative, they basically aim to ensure a safe access to the reliable and secure energy resources, to increase the use of renewable energy and to improve the energy efficiency for decreasing the total

consumption and to ensure the energy saving (www.un.org/esa/sustdev /sdissues/energy/enr.htm 2007).

In light of these objectives, it is acknowledged that United Nations and European Union pursue the same goals in the energy field. Both of them have spent considerable efforts on the energy security.

Accordingly, these close interactions between EU and UN have pave the way for the creation of a specific commission for the economic affairs in Europe which is called UN Economic Commission for Europe. This commission provides a forum in which European countries have the chance to meet, to discuss and to evaluate the problems and to look for the solutions to these challenges ( European Commission 2006, p.42).

To sum up, it is relevant to highlight that European Union should pay considerable attention to its relations with UN. The financial and political assistance of this organization provide great advantages to ensure its goals. Especially, in the energy field, UN support is highly required for the EU to deal with the ongoing energy challenges.

### 5.3.5 Energy Charter Treaty

Energy Charter Treaty, signed by 51 countries, is an energy related agreement which mainly focuses on trade, investment and transit issues. In a broader sense, ECT has been based on two main factors; encouraging adequate infrastructural investment and enhancing the energy transit security. Accordingly, the main objective of this treaty is to favor the energy security by taking the appropriate rules to minimize the risks concerning investment and trade. It basically highlights the crucial role of the investment for the energy infrastructure and the energy security. In this respect, the treaty requires that each state should accept the foreign direct investment at different levels provided that all the investments are equally accessible, transparent and efficient

(www.encharter.org/index.php?id=6 2007). Additionally, ECT also deals with the security of energy transit within the scope of the security of energy supply. It especially highlights that the transit countries should take appropriate measures to prevent any supply disruption and to ensure the continuity of the safe and reliable energy supply (www.encharter.org/index.php?id=5 2007). Since the priorities of both sides are quite similar, the energy dialogue between ECT participant states and EU members had been much more heightened.

To conclude; EU's close energy dialogue with the different organizations is an efficient way to promote the security of energy supply. As these organizations maintain efficient policy instruments and large zone of influence, it would be efficient if EU members encourage the cooperation and respect the decisions taken at this level.

# 6. CONCLUSION

Since the 1990s, the EU has been one of the major political and economical actors in the world. Especially, as a soft power, the Union has significantly promoted the stability, transparency and security. Accordingly, all the possible risks and threats which have caused deep crisis or, in a wider extent, the turbulence in the EU are considered as the major challenges for the security. In this respect, to ensure the security is indispensable. Therefore, the security of energy supply is an important part of the overall EU's security. In accordance with this fact, it is important to note that, the new technology age has increased the energy consumption and, to that end, the need for more energy has automatically inflated.

As is previously mentioned, this study has focused on five primary energy resources. Among them, oil and natural gas have dominant positions by holding the largest shares in the total consumption. In addition, these shares have also the tendency to increase in the very near future. It is clear that due to the lack of sufficient oil and gas reserves, EU has to import large amounts of oil and gas from the external suppliers which are generally unstable and unreliable. This means that the increasing demand for oil and natural gas has become one of the main challenges of the Union.

In accordance with the increasing demand, the external oil and gas suppliers have became crucial actor's vis-à-vis the EU members. Basically, these are Russia, Middle East and Gulf Countries, Norway, Mediterranean, North African Countries, the Caspian and Central Asian producers. Among them, Russia and OPEC are two main giants in the international energy market. Essentially, Russia is the gas and OPEC is the oil monopole. This situation is the same for the EU as well. Specifically, most of the EU members, especially the Central and Eastern European countries are desperately dependent to Russia for the gas supply and almost all of them are dependent to the OPEC countries for the oil supply. This kind of dependency is a quite risky situation for the EU members. As is mentioned in the

previous chapters, almost all of these major suppliers have suffered from the deep political, economical and social turbulence. Furthermore, it is also a big challenge to be dependent to a few suppliers. Due to their dominance in the international energy market, they have the ability to affect and to change the overall situation of the consumers. For instance, a possible unexpected price changes or political dispute with the members can cause an unpredictable supply disruption in the Union. The 1973-74 oil crisis and the Russian-Ukrainian disputes are the relevant examples for this kind of threats. In both cases, European consumers have seriously suffered from the tremendous effects of these crises and realized, once again, the negative effects of the high dependency to a few suppliers.

Nonetheless, apart from these challenges, there are also some infrastructural problems which threaten the security of energy supply. In this regard, the lack of investment to develop the energy infrastructure and the gaps in the interconnection network in the European gas and electricity market are other main problems of this issue. Especially, in accordance with these problems, the lack of a well-interconnected gas and electricity market has appeared as one of the main challenges in the Union. Some of the areas and the countries are not still integrated to the market and this situation prevents the completion of the natural gas and the electricity market.

Moreover, as well as the challenges stated above, another important challenge for the security of energy supply is the lack of a common energy policy. The national interests and the national priorities prevent to develop a common energy policy within the Union. Also, it is important to note that, today, all the possible solutions to solve the problems relating to the security of supply at the national level are the short-term efforts. For the long-term solutions, member states should be well coordinated and have the same approach in this issue.

In light of these challenges, it is relevant to add that both EU governments and European citizens have seriously realized the forthcoming threats toward their energy security. So, to

undermine these challenges, this study has listed and mentioned the relevant and appropriate measures. To be effective, the measures should be taken at the national, community and multilateral levels. At this juncture, it is important to note that all of the proposed measures have been backed by the official documents of the EU and reputable international articles. As well as these basic documents, the specific points have been also referred to the web sites' information, where necessary. Among these different efforts, the measures taken at the community level are more efficient than the others. Actually, the measures at the national level which are the diversification of the energy mix and the bilateral relations with the producer countries are not as effective as the measures at the community level. They are usually long-term solutions and they cannot totally ensure the security of energy supply. In parallel, the measures at the multilateral level do not serve perfectly to the required objectives. Since they have more general effects, they can support the EU's initiatives but they cannot solve the problems completely. Therefore, it is possible to emphasize that the community measures should have primary importance vis-à-vis other measures and they should be respected by all the member states. Among these diverse measures, I strongly believe that to diversify the suppliers and the transit routes and also to promote the energy efficiency are the most relevant and efficient measures to deal with uprising threats and challenges.

According to these efficient efforts, the diversification policy is quite important to provide and even to strengthen the security of energy supply in the EU. As is previously mentioned, Russia and OPEC are the monopoles in the European energy market. Most of the European consumers are highly and desperately dependent to the oil and gas imports from these suppliers. To eliminate this dominance, the diversification of suppliers and transit routes has been launched as a relevant policy. In this respect; Caspian, Central Asian, Mediterranean and North African suppliers appeared as the main alternatives in scope of this policy. Specifically, Azerbaijan, Turkmenistan, Kazakhstan, Algeria, Tunisia and Libya are the main oil and gas producers in these regions. Furthermore, EU should also diversify its transit routes as well. In this regard, Turkey has a growing importance. Comparing other major transit country; Ukraine, Turkey is more reliable and secure for a

safe oil and gas transportation from the Caspian Basin and Central Asia. Besides, as well as the diversification policy, EU should also focus on promoting the energy efficiency which mainly aims to decrease the consumption and to increase the energy savings. If the energy efficiency is sufficiently promoted, under this circumstance, the overall energy consumption and the import dependency level will decrease and the security of supply will be enhanced. However, it is important to highlight that these measures can be efficient and successful if only they are implemented by all the member states. Therefore, the coordination and the coherence are strongly required and recommended. To that end, I strongly believe that a common energy policy should be immediately launched in the union. This common policy should not be a strict policy but, at least, in some issues, there should be binding decisions. Especially, member states should have legally binding targets about the use of renewable energy, the energy efficiency and the gas and storage capacities. Above all, all the member states should have minimum storage capacities for gas as well as oil. If all the member states achieve to have an equal storage capacity, the gap between them will be decreased and during an unpredicted crisis, a possible supply disruption will be minimized. For this reason, to be more effective and secure, member states should have legal obligations about these issues. In accordance with these crucial points, even though most of the member states are reluctant toward a common policy, this study comes to the conclusion that a loose common energy policy will be an effective solution and will perfectly ensure the security of energy supply.

In conclusion, the security of energy supply is one of the vital priorities of the European Union. To ensure the energy security, especially in terms of the energy supply, has been one of the essential targets in the political and economical agenda of the Union. In this regard, it is important to note that a safe, secure and sustainable energy supply is directly linked to the overall energy security of the union. Therefore, for a consolidated and strengthened Europe, member countries should be aware of their vulnerable energy situation and they should take relevant efficient measures to deal with the challenges. Finally, to be successful, EU should develop new projects to access to the new and rich areas for a better diversification policy and to launch new initiatives to promote the energy

efficiency and to save the optimum energy possible within the Union. To conclude, all the efforts listed and comprehensively stressed should be assimilated by the European citizens and the efforts toward a strengthened energy supply security should be developed at the lowest level.

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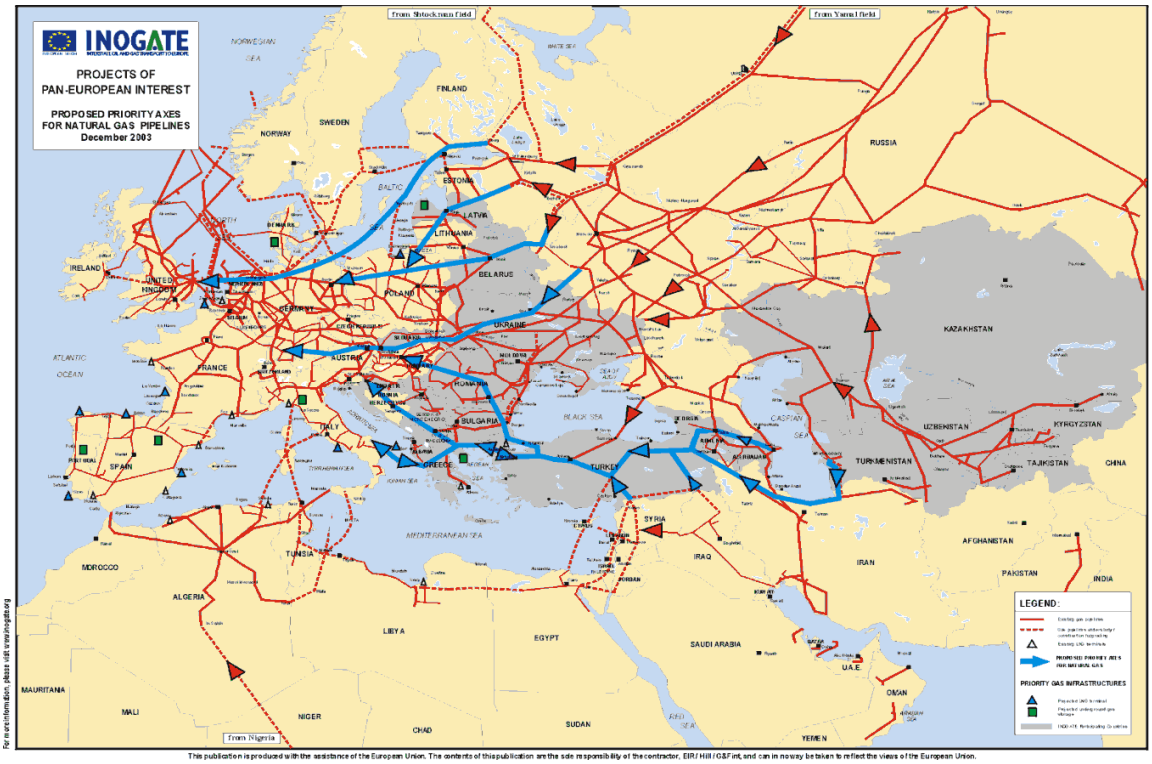
***APPENDICES***

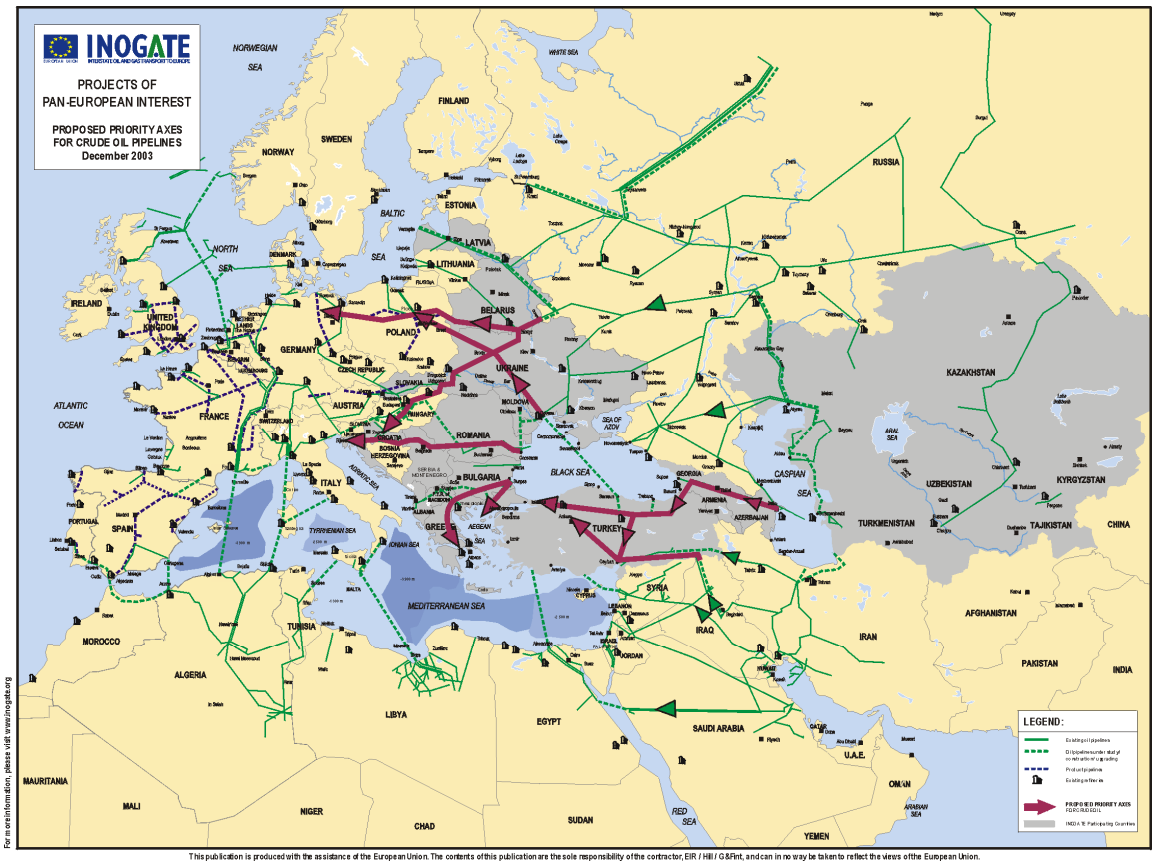
## Appendix 1 - INOGATE Map of Natural Gas Pipeline




**Source:**

**http://www.inogate.org/inogate_programme/inogate_resource_center/maps/gas_map_big.gif**

## Appendix 2 - INOGATE Map of Crude Oil Pipeline




**Source:**

**http://www.inogate.org/inogate_programme/inogate_resource_center/maps/oil_map_big.gif**