DEVELOPMENT OF COOPERATION WITH RUSSIA
AS A MEASURE FOR ENHANCING
SECURITY OF GAS SUPPLY TO THE EU

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<th>Abbreviation</th>
<th>Full Form</th>
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<tbody>
<tr>
<td>CP</td>
<td>Contracting Parties</td>
</tr>
<tr>
<td>Bcf</td>
<td>Billion cubic feet</td>
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<tr>
<td>Bcm</td>
<td>Billion cubic meter</td>
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<tr>
<td>BP</td>
<td>British Petroleum</td>
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<tr>
<td>Btu</td>
<td>British Thermal Unit</td>
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<tr>
<td>CIEP</td>
<td>Clingendael International Energy Programme</td>
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<tr>
<td>CIS</td>
<td>Commonwealth of Independent States</td>
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<tr>
<td>cm</td>
<td>Cubic meters</td>
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<tr>
<td>CNPC</td>
<td>China National Petroleum Corporation</td>
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<tr>
<td>CO2</td>
<td>Carbon Dioxide</td>
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<tr>
<td>EC</td>
<td>European Commission</td>
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<tr>
<td>ECS</td>
<td>Energy Charter Secretariat</td>
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<td>ECT</td>
<td>Energy Charter Treaty</td>
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<tr>
<td>EEA</td>
<td>European Economic Area</td>
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<td>EES</td>
<td>European Economic Space</td>
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<tr>
<td>EIA</td>
<td>Energy Information Administration</td>
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<tr>
<td>EU</td>
<td>European Union</td>
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<tr>
<td>FSU</td>
<td>Former Soviet Union</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
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<tr>
<td>GECF</td>
<td>Gas Exporting Countries Forum</td>
</tr>
<tr>
<td>IEA</td>
<td>International Energy Agency</td>
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<tr>
<td>LNG</td>
<td>Liquefied Natural Gas</td>
</tr>
<tr>
<td>M&amp;I</td>
<td>Markets and Institutions</td>
</tr>
<tr>
<td>MBtu</td>
<td>Million British Thermal Unit</td>
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<tr>
<td>MS</td>
<td>Member States</td>
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<tr>
<td>Mtoe</td>
<td>Million tonnes oil equivalent</td>
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<tr>
<td>OECD</td>
<td>Organisation for Economic Cooperation and Development</td>
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<tr>
<td>OPEC</td>
<td>Organisation of Petroleum Exporting Countries</td>
</tr>
<tr>
<td>PCA</td>
<td>Partnership and Cooperation Agreement</td>
</tr>
<tr>
<td>R&amp;E</td>
<td>Regions and Empires</td>
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<tr>
<td>R/P</td>
<td>Reserves-to-Production</td>
</tr>
<tr>
<td>TACIS</td>
<td>Technical Assistance to the Commonwealth of Independent States</td>
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<tr>
<td>Tcf</td>
<td>Trillion cubic feet</td>
</tr>
<tr>
<td>TCGP</td>
<td>Trans-Caspian Gas Pipeline</td>
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<tr>
<td>TEN</td>
<td>Trans-European Energy Network</td>
</tr>
<tr>
<td>TPA</td>
<td>Third Part Access</td>
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<tr>
<td>U.S.</td>
<td>United States of America</td>
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<tr>
<td>UK</td>
<td>United Kingdom of Great Britain and Northern Ireland</td>
</tr>
<tr>
<td>USD</td>
<td>United States Dollar</td>
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<td>WTO</td>
<td>World Trade Organization</td>
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Executive Summary

Energy is a pillar of the current world economy. Demand for energy resources increases significantly, especially, in the developing regions. Due to environmental issues, gas participation in energy generation increases along with its growing consumption. Reserves of gas are limited and their extraction becomes more difficult and expensive. Because of the fact, that gas reserves are distributed unevenly all over the world, more and more attention is paid to the role of security of gas supply. The discussion concerning this subject in the EU was started in 2000 when the first Green Paper on security of energy supply was issued.

This paper provides an analysis of processes on the global gas market with reference to its regional profile. Next, cons and pros, for gas as an energy fuel, are evaluated. Afterwards, development of international relations is studied, in terms of the theory based on two storylines, namely Markets and Institutions, and Regions and Empires. They are presented in reference to gas market. As a next issue, definition of security of gas supply is presented with overview of associated risks and solutions appropriated in each storyline.

Next, the EU gas market is thoroughly analysed in terms of demand for gas, internal production, infrastructure for gas delivery. Afterwards, trade contracts in gas sector are described with reference to their influence on security of supply. Moreover, the EU import dependency on gas is verified. As a following step, the EU documentation concerning internal gas market is presented with reference to the growing position of Russia as a main gas supplier.

As a next point, Russian gas production capacity, level of domestic demand for gas, Gazprom’s monopoly position, and Russian politically driven relation with former Soviet Union countries are examined. All mentioned above issues are presented in terms of risks that may threaten security of gas supply from Russia to the EU.

Finally, it is evaluated, whether a development of the EU-Russia cooperation will strengthen security of gas supply to the EU. Following this, an analysis of effectiveness of the Partnership and Cooperation Agreement along with the EU-Russia Energy Dialogue is delivered. Afterwards, issues concerning introduction of reciprocal and transparent rules in legislation for gas market of both partners is touched upon. Next, prospects for creation of integrated gas market between the EU and Russia is examined. In the end, SWOT analysis of the EU-Russia cooperation in gas sector is delivered.
Introduction

For many years energy has been a subject that brings together countries and regions. In the current world everything has more and more international dimension and the same situation is with energy. Issues like security of supply, delivery, transportation network and security of available energy resources could no longer be treated as purely local ones. Energy is a pillar for stability, wealth and development of each country and it is perceived as a strategic good. It is also important to note that energy policy is closely associated with policies such as security, foreign relations or external trade. Taking into account that the EU energy market is a part of the world one, the security of supply should be viewed in an international or at least regional perspective. Security of energy supply is quite a complex policy including analysis of associated risks, trends on the energy markets, political circumstances and investments in energy facilities. The purpose of this paper is to answer the question:

“Whether closer cooperation with Russia in the gas sector will contribute to the EU security of energy supply?”

In my research I will do my best to provide evidence that closer cooperation with Russia in gas sector is an essential condition for European security of energy supply. In order to verify this thesis I will first concentrate on the present situation on the energy market and possible diversification of energy sources and suppliers. Afterwards I will analyse the dynamics and forecasts of demand for energy and gas. Next I will study whether a closer cooperation with Russia is in line with the EU policy and legislation. I also will verify stability and reliability of Russian Federation as the main energy resources supplier to the EU. Later I will explore whether current and future Russian gas infrastructure is sufficient for expected deliveries and I will also focus on future Russian gas export volumes. Next I will focus on risks associated with security of gas supply from Russia. Additionally, I will examine whether EU-Russia energy dialogue has brought expected results. After that I will analyse how the possible development of political and economic situation in the world may influence the EU-Russia relations. Finally I will verify whether there is a possibility of creation the Pan-European gas market.

Research on this subject is important because energy constitutes a basis for economy, and gas has a substantial share in energy generation. The EU energy resources are not sufficient to
meet the internal demand and its reserves have depleted. Security of supply seems more important in the context of the growing demand for energy resources and an unequal location of the oil and gas reserves all over the world. Ensuring future supply of gas is essential because its global and European demand is expected to grow significantly. The consumption of gas should increase because it is a much more environmental friendly fuel than oil and coal which contribute the most to the Greenhouse effect. Additionally renewable energy has not been well developed yet, and nuclear energy is not facilitated by the EU.

The decision for choosing this subject for research is a result of my long lasting interest in the EU–Russia relations. My Master Thesis in Poland, namely “Stable and democratic Russian Federation as an important factor for European security – in the light of the EU-Russian cooperation” was about the political cooperation between the EU and Russian Federation. My research in this paper will be a continuation of my previous academic works. Energy issues and EU-Russia relations are a complex area where not only economic aspects, but also political and diplomatic ones have to be very carefully analysed. Besides the predictable behaviour of all partners, there are many unexpected ones, and the latter often have more important impact on the decisions concerning energy issues.

Studies will be conducted in a descriptive way and in a form of desk research, i.e. with references to the second sources of data. There are discrepancies among data delivered by different sources concerning gas demand, consumption, production, export and import dependency. This might be a result of diverse indicators for gas volume measurement. In my analysis I will just try to show the dominant trend of a situation on the market which does not require detailed data.

Research and views presented by scholars in various periodicals have constituted basis for this paper. I have also focused on the EU documents concerning the energy area, i.e. security of energy supply, liberalisation of the market and energy dialogue between the EU and Russia. The discussion of possible energy market scenarios will be based on the theory of Market and Institution and Regions and Empires. The SWOT analysis on the pros and cons for closer cooperation with Russia will be also delivered.

There are numerous academic works about current energy situation, including the EU market and the EU–Russia energy dialogue. However, gas market, due to its dynamic character is poorly covered in academic and technical publications. This paper aims to fill this gap by contributing to a better understanding of ongoing processes in the gas market.

Being aware of the complexity of the subject and the very dynamic political, economic and legal environment in the energy sector of the EU and its neighbouring countries, I have
chosen to limit the time scope of this paper to years 2000–2006. Nevertheless I will add some remarks on developments in 2007, where it is necessary for the proper analysis of this paper.

Realising the whole range of questions that may arise while analysing the security of energy supply and to make this research more useful, I have decided to describe issues connected with the EU security of gas supply in the context of the EU–Russia cooperation. The other issues, like oil security of supply to the EU and transportation network for energy goods are, illustrated less profoundly although they are equally important to get a complete picture of the discussed problem. There are also other crucial aspects for the security of energy supply, i.e. environmental issues, renewable energy sources, nuclear energy and electricity. Analysis of all mentioned above subjects would be very interesting however they are out of the scope of this paper.

Literature concerning the European security of gas supply has not been well developed yet. There are available mainly articles in scientific periodicals, the EU documentation and analysis delivered by the gas companies and associations. There are a lot of documents concerning the EU-Russia relation and a gas sector however just a few of them refer to the pan-European gas market in wider extent. The Internet and Newspapers were also a very useful tool for gathering information about the security of gas supply issues.
1. Gas as an energy resource

This chapter I would like to start with a statement of Jose Manuel Barroso that *energy is a heart of the European integration*. Following this, energy can constitute basis for effective international cooperation. Trade in energy resources tightens economic bounds among states, regions, private and trans-national companies (Maňě-Estrada, 2006). Nevertheless, one of the most important factors on energy market is security of energy supply.

In my research I have focused on the security of gas supply to the EU and thus further description will refer mainly to the gas sector. Nevertheless, the situation on the world energy market and the EU energy market will be also taken into account.

1.1 Growing demand for energy

It is worth to underline that global consumption of energy will steadily increase despite any potential changes in energy efficiency. This demand has been growing, because in developing countries, an average consumer requires more and more “energy products” in an every day life. The global demand for energy is expected to surge, from the level in 2005, by 60% until 2030 (EC, 2006g). The present and predicted energy consumption, in chosen countries, is compared in Figure 1.1. It shows that, even though the EU will become more efficient in energy use, the developing countries will still use energy intensive technologies. This implies that production of energy sector will expand.

OECD-Europe countries will increase energy consumption, however, its growth will be lower than Russian one. India and China will keep pace with the already established energy regions and will eventually have similar energy needs.

The illustrated in Figure 1.1 higher demand for energy in China and India will be covered mainly with gas and oil. China is going to increase its gas consumption in total primary energy supply up to 6% in 2010 from the level of 3% in 2002. The growth of annual demand rate for gas in China, up to 2030 is expected to be at 6.8% (Gazprom, 2007).

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1.2 Gas as an energy fuel

Gas is ranked third\(^5\), after oil, fuel in the world energy generation (IEA, 2007). Those two energy resources are often analysed at the same time. Nevertheless, neither of energy fuels has similar to gas features. This implies that gas has no direct substitute.

Gas has many advantages, one of which is low pollution level. In comparison to gas, oil and coal generate respectively 25-30% and 40-45% more CO\(_2\), for the same energy production.\(^6\) On the other hand, gas is difficult to handle because it needs huge transportation and storage capacity. Gas is transported mainly by pipelines and in a form of Liquefied Natural Gas (LNG) by special vessels. Gas stocks cannot be kept in land-based tanks, for the reason that those tanks would have to be extremely huge. Hence, gas storage is usually organised in disused mines, depleted fields or salt cavity (Petroleum Economies, 1998).

The global consumption of gas by sector is presented in Figure 1.2. Main utilisation of gas is in power generation (33% in 2000, IEA, 2004) whereas oil is used in transportation (58% in 2000, IEA, 2007). In fact, in these areas gas and oil may substitute each other, e.g. after some adjustments in power generation plants for dual-fuel technology or additional equipment for gas fuel in car.

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\(^4\) Data converted into Million tonnes oil equivalent from Quadrillion (AmE) British thermal units by indicator 100 Mtoe=4040 TBtu, www.bp.com

\(^5\) Total Primary Energy Supply in 2005 constitutes of 35% oil; 25,3% coal; 20,7% natural gas; 10,3% renewable; 6,3 nuclear; 2,2% hydro (IEA, 2007). The energy mix in the EU is presented in Figure 2.1.

\(^6\) Eurogas, Marcogas; 2004, Natural Gas the energy for a sustainable future, www.eurogas.org
Nevertheless, gas as an energy fuel has significant advantage over alternative fuels. I will present some reasons for that. The production of renewable sources is not enough developed, nuclear energy still rises concerns, oil and coal cause such environmental pollution (see above) that the EU will not be able to meet the Kyoto Protocol\(^7\) obligations. Additionally increased dependency on oil will be too dangerous to security of energy supply, because Organisation of Petroleum Exporting Countries (OPEC) caused already energy crisis in 1970s.

**Figure 1.2 **World gas consumption by sector, 2005 (in percentage)


1.3 Gas – overview of the situation on the market

Gas market has not been separately covered in the literature; however it is usually presented in comparison to oil market. The main discrepancies, between markets for gas and oil, may be found in their structure. Oil is traded on global market whereas gas on regional one.

The main factor, that implicates regionalisation of gas market, is cost of its transportation facilities. Following this gas is mostly traded in the countries that are near to producer countries. As a result of this situation, in 2004, only a quarter of total gas production was traded internationally, in comparison to 60% of oil.\(^8\) The biggest regional gas markets are the United States, the European Union and Asia (Maňê-Estrada, 2006).

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7 Kyoto Protocol is a part of the United Nations Framework Convention on Climate Change. This Protocol was signed in 1997 and entered into force in 2005. It aims at reduction of greenhouse gases emissions. [http://unfccc.int](http://unfccc.int)

In the further part of this subchapter I will cover issues concerning: international dimension of gas market, LNG development, demand for gas, consumer countries, gas producing countries, gas reserves, contracts for gas trade and eventually components of gas prices.

- **International aspects of gas sector**

  Development of new gas fields requires substantial investments. Due to this fact international cooperation at such projects is necessary. In such projects companies get access to one another technology and knowledge. Their participation in revenues from a project is subject to rules stipulated in a project’s agreement.

  Companies often take part in gas projects, that will not secure delivery to their countries of origin, but they simply strengthen their position on the world market. The Russian main gas producing company, Gazprom, is not an exception to that trend. Gazprom has built economic cooperation both with the EU companies and other ones from all over the world.

- **LNG market development**

  LNG gas market can introduce more global dimension in gas trade. The LNG technology and infrastructure have become less expensive recently. In the period between 1996 and 2000 the average costs of liquefaction per tone\(^9\) were at the level of 230 USD. Ten years earlier the same process cost 560 USD (CIEP, 2004). The LNG tankers\(^10\) were also less expensive in 2000 than in 1996 their price was respectively 155 million USD and 220 million USD (CIEP, 2004). This resulted in a growing trend on LNG market. There are forecasts that LNG market share will raise from 27% in 2006 to 40% in 2010.\(^11\) The LNG production in 2005 amounted to 240 bcm and it is predicted to reach 360 bcm in 2010 and 470 bcm in 2015.\(^12\)

  Russia is not currently present on the LNG market but has started cooperation with countries advanced in LNG production and probably will produce small amount of LNG for export to the U.S.

- **Growing demand for gas**

  Consumption of gas tends to rise recently since it is very environmental friendly fuel, e.g. for electricity generation. The world consumption of gas over the period from 2000-2006 surged by 17% and amounted to 2850.8 Billion cubic meters (bcm) (BP, 2007). The analysis of this

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\(^9\) LNG is usually measured in Million Tonnes LNG. 1000 cubic meters (cm) is equal to 0.73 tonnes LNG (BP, 2007). According to the source (CIEP, 2004) the price for liquefaction per 1000 cm is 169 USD and it is a part of final price. The average price for Russian gas to Europe in 2000 was 103.2 USD (Thomas, 2006)

\(^10\) LNG Maritime transportation requires minus 160°C and special vessels. www.eurogas.org


process is even more interesting, when we compare energy fuel mix in 1970 and gas share of 5% (Ellis et al, 2000) with 20,7% in 2005 (IEA, 2007).

The world production of natural gas increased in 2000-2006 by 18% and amounted to 2865,3 bcm\(^{13}\). That growth was preceded by quite regular increase of gas production by 2,5% each year over the past 10 years (BP, 2007). It is important to underline that the production of Russia contributed a lot to that result.\(^{14}\)

- **Consumer countries**

In the EU gas consuming countries there is a tendency of a gas-to-gas competition (Cremer et al, 2003). This requires liberalised access to the pipeline network, namely all authorised companies should have access to pipelines. Moreover, costs of transportation, storage and distribution should be counted separately. Eventually, finally customers should be able to choose an authorised supplier. The right of entry to a pipeline network and all associated issues are managed by an independent regulatory authority (Cremer et al, 2003). All those activities are aimed at securing the best conditions for the final consumer and his security of gas supply.

- **Producing countries and the “gas OPEC”**

In producing countries, gas sector is rather centralised and there are just a few companies on the market. Following this market structure, and above mentioned information, some monopolistic tendencies or natural monopoly conditions can be observed in gas sector. This situation could make the prices considerably higher than the marginal cost of gas production. Previously gas producing countries did not aim at working together upon developing international connection in the world gas market, but this situation has changed. In 2001 they organised Gas Exporting Countries Forum and eventually “gas OPEC” in 2007. They behave as if they were going to create a real gas cartel. They have already built international strategy for gas prices in long-term contracts.

Nevertheless, in my opinion, it is more difficult to manipulate the gas market than the oil one in 1970s. There are still too many producing countries on the market. Additionally, the already existing infrastructure for gas extraction and transportation has not amortised yet.

- **Gas reserves**

Gas reserves are distributed unevenly all over the world. More than half of them is located in Russia, Qatar and Iran.\(^{15}\) Global gas reserves should be sufficient for the next 63 years from

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\(^{13}\) The difference between the consumption and production figures may be a result of gas leaking and some storage reserves.

\(^{14}\) Russia has been ranked first gas producer in the world in period 1995-2006 (BP, ENI, 2007)
2006 on, provided the production is kept at the same level as in 2006 (BP, 2007). Nevertheless, most of the easily and economically accessible gas reserves have already been under extraction.

- **Contracts for gas delivery**

As a consequence of a high level of costs associated with gas extraction and transportation, gas is traded on the basis of long term contracts with provisions assuring profitability. Before investments in gas facilities start, issues like demand of the destination market, time perspective for finishing the project, market and law regulations in the producing country (especially the ownership rights and the financial matters like taxes etc.) have to be quite thoroughly analysed.

Risks associated with investments in exploitation of new fields are spread between consumers and producers, namely the former agree to buy contracted gas volumes and the latter agree to offer contracted price. The buyers bear the “market risk” following the “take-or-pay” provision, which means that they have to pay for the contracted gas volume regardless the real demand level. The producers have to face the risk of potential price adjustments according to the rules set in contract. Usually gas prices are related to the oil prices as the competitive energy source but they can also be fixed for the whole time of contract (Correlje, Van der Linde, 2006).

All those above mentioned issues are so important because initial investments undertaken in the gas industry are to be paid in advance, long before they start to pay off and usually in a form of sink costs. This is a considerable entry barrier to the gas market for producing and transportation companies.

- **Components of gas price**

As I have written above, gas prices in most contracts are linked to oil prices. Additionally, they also include such factors as proximity, caloric value\(^{16}\), associated political risks\(^{17}\), and flexibility in volumes delivery.

The flexibility of volume supply, namely swing, may be included in the contract along with special price conditions. The possibility of swing supply is vital because of the characteristic of gas consumption. There is a high fluctuation of demand for gas between winter and summer time. There are, however, demand peaks also in summer because of high electricity

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\(^{16}\) Gas from Russia and Norway usually has higher caloric value than Dutch gas. In such a case the comparison between contracts should be made on the basis of payment per caloric unit (Asche et al., 2002).

\(^{17}\) The lower political risk the higher price for gas.
usage for air conditioners. According to Asche, the lack of swing option has direct impact on Russian prices for gas and they are lower than the Dutch and Norwegian ones, which have this option included (Asche et al., 2002).

Prices of gas and oil have risen during the last decade substantially. The reasons for this trend may be described in the dimension of the structure of the market and scarcity rent, since gas and oil are exhaustible resources (I will refer to it in sub-chapter 1.5.1). Exhaustibility of oil resources was taken as an excuse for the higher prices in 1973 by OPEC. The same situation may take place on the gas market as “gas OPEC” already exists.

1.4 Markets and Institutions versus Regions and Empires

One of the theories, concerning current situation on the world markets, is based on Markets and Institutions (M&I) versus Regions and Empires (R&E) storylines (CIEP, 2004). Those two storylines are thoroughly described by Van der Linde and his research team. Before I deliver a more detailed presentation of these storylines I would like to point out the main differences between them:

- A key force in the economy is
  - market (M&I),
  - state (R&E).

- Areas of cooperation in economy are
  - global (M&I),
  - regional (R&E).

M&I is a situation where markets are international and integrated, the same as institutions. The economy is driven by market forces and all resources are used efficiently.

R&E describes a situation where divided political and economic blocks along with their satellite regions compete for resources and markets. In order to achieve their goals they may use political, economic and military power (Correlje, Van der Linde, 2006).

It is important to underline that M&I and R&E may apply to one sector of economy and be irrelevant to another (CIEP, 2004), in my analyses I will apply this theory to energy market with special attention to its gas dimension.

1.4.1 Markets and Institutions

In M&I scenario there will be free circulation of energy resources within the EU countries and eventually in the global market. All countries will be interested in building sufficient infrastructure for energy transportation. There will be stable development of economy in the
region and all countries and organizations will cooperate with one another in the energy issues. In described circumstances securing the gas supply for the EU will not be difficult.
The EU and Russia will tend to create European Economic Space (EES) (CIEP, 2004). Following this, economic integration with Russia will increase security of gas and oil supply. There will be no longer legal and political constrains for free access to energy resources for European companies and Third Part Access (TPA) to transportation network in Russia. The Energy Charter Treaty (ECT)\textsuperscript{18}, an international agreement that regulates trade in energy goods, will serve as a legal framework for gas sector.

In M&I circumstances the energy market will be a self-regulating mechanism of energy security (Maňě-Estrada, 2006). All countries will be concentrated on achieving common goals and fulfilling Kyoto Protocol obligations.

The EU in its assumptions is following the M&I model. There is free flow of goods, people, services and capital. Demand and supply are driven by market forces. The rules on the market are guarded by the EU authorities, WTO; IEA (Correlje, Van der Linde, 2006).

\subsection*{1.4.2 Regions and Empires}

In the R&E scenario, situation will be completely different. The world will split into competing regions and blocks. Russia, the EU and the US will have their influence area.

The international economic integration in this scenario will be almost completely broken. The global market for strategic goods will be ineffective, and bilateral agreements and treaties will have a growing importance. Companies will operate from the local perspective. In economy there will be more rivalry than cooperation.

The EU and Russia may also cooperate in this scenario, but Russia as the local “empire” will not be so eager to integrate its energy or just gas market with the EU. Russia will seek closer cooperation within Common Independent States (CIS) and will strengthen its position in Central Asia region. These countries will be an influence area for Russian rebuilding power.

\subsection*{1.4.3 Conclusion}

Despite the future situation on the world market, it is important for the EU to facilitate cooperation with Russia. In the M&I storyline it will be a natural integration of gas markets that will ensure security of its supply. In R&E the EU should establish common external energy policy. The EU should negotiate with Russia contracts for gas delivery, on behalf of all Member States, as one body.

\textsuperscript{18} The Energy Charter Treaty will be described in details in sub-chapter 4.2.
1.5 Security of gas supply

Security of gas supply is one of the crucial factors of energy trade. It is a pillar for energy policy. Its significant meaning was underlined in the M&I and R&E storyline, as well as in the EU Green Paper - *Towards a European strategy for the security of energy supply*, concerning solely security of energy supply issues (EC, 2000).

In this sub-chapter, I will describe the definition of security of gas supply and associated risks in terms of current circumstances and possible future M&I or R&E storyline. Afterwards, mechanisms concerning exhaustibility of gas will be explained. Finally, recommended solution for ensuring security of gas supply will be delivered.

1.5.1 Definition of security of gas supply and associated risks

A definition of security of gas supply should be created before an analysis of this process begins. In my opinion, this definition should be as follows:

**Security of gas supply** is assured, when the necessary amount of gas is constantly available on the market. This condition should be fulfilled, even though a regular delivery of gas to the market is interrupted. It means that all sectors involved in gas consumption (see Figure 1.2) will not experience any shortages in gas delivery, although:

- their gas consumption will increase,
- a regular gas supply volume will be lower,
- there will be a breakdown of production or transportation facilities,
- production of fields under exploitation will decline, etc.

All the mentioned above circumstances may be described in a form of risks associated with security of gas supply. According to Weisser, those risks may be divided into four groups: **structural risk**, **facility dependence**, **transit dependence** and **source dependence** (Weisser, 2005). The European Commission defines some more risks, namely **physical** and **economic risk** and **terrorist’s attack** (EC, 2006g), (EC, 2000). In the Green Paper of 2000 the European Commission suggests, that security of gas supply, should be achieved by reduction or elimination of associated risks.

A **structural risk** is relatively high today due to insufficient transportation network, ageing infrastructure for gas production and lack of investments in this sector.
Transportation of gas is also exposed to risk of **facility dependency**. Gas is mainly delivered by pipelines. The participation of LNG in transportation is still too low. In case of a breakdown of existing transportation facilities, interruption in gas supply will take place because there is no alternative way for delivering gas to market. (Weisser, 2005)

A **transit risk** is also connected with pipelines transportation. Gas is transported via many countries and for long distances before it finally gets to its destination. Transit countries are playing crucial role in the security of gas supply. If they are stable and reliable, there is no threat of shortages of gas. Countries that have unstable political and economic system may cause difficulties. Transit countries may siphon off gas or even stop further flow of gas. As a result of such actions the amount of gas delivered to the destination country will be lower than contracted. This risk is especially important in securing gas delivery from Russia. The EU has already experienced gas turn off because of Russian disputes with Belarus and Ukraine.

**Source dependency** is connected with high dependency on one source of supply, namely one region or country. This risk will be reduced when suppliers are diversified.

**Physical risk** may cause long-term and short-term disruptions in gas supply. The long-term shortages could appear for objective and predictable reasons as source exhaustibility or cease of production because of e.g. profitability aspects. There could be also temporary physical interruptions which could be a result of strike, natural disaster or geopolitical crisis (EC, 2000).

**Terrorist’s attacks** can destroy everything about the security of gas supply, as it was shown after the attack on New York and Washington on 11th September 2001. Gas storages or transportation facilities may be an object of attacks. Actually, besides thorough monitoring of the situation and international cooperation among states in prevention of terrorist’s actions, nothing more can be done. Diversification of routes and facilities for gas transportation can be effective prevention measure, provided they are not destroyed, as well.

The meaning of **political risk** in cooperation with Russia is not significant. Russia is highly dependent on incomes of hard currency from the gas export to the EU. In such circumstances political tools concerning gas should not be used.

**Economic risk** may be an effect of considerable growth of gas prices. Unfortunately, the EU prices for gas are linked to the world oil prices. Those prices are set by the producer countries, mainly OPEC. In the case of M&I scenario however such a risk could appear only in case of unexpected disaster, since prices will be a result of market forces and this situation can be easily monitored.
1.5.2 Gas as an exhaustible good

Security of gas supply is related to its price and volumes available on the market. This issue is a part of complex political, economic and academic analysis. Gas and oil have been described in theories as goods of specific features. They both are goods that are exhaustible, namely greater consumption today implies less consumption tomorrow (Cremer, Salhei–Isfahahani, 1991). According to BP statistics the natural gas reserves-to-production \( \text{R/P} \)\(^{19} \) ratio at the end of 2006 amounted to 63.3 years (BP, 2007). Those calculations were made with the conditions of present prices and technology.

The price of the exhaustible good, according to Hotelling’s theory, in a fully competitive market is higher than the marginal cost of the production, because of the interest rate. This interest rate could be explained as a gratification for the owner of the fields for keeping oil or gas till the present day. The difference between the gas price and the marginal cost is called “scarcity rent”. Marginal cost and scarcity rent make the so called “user costs” that is the opportunity cost of selling gas in a certain period of time (Cremer, Salhei–Isfahahani, 1991).

When we analyse the present energy market it is important to take into consideration the circumstances that started oil crises in the 70s of twentieth century. The basic grounds for countries’ behaviour have not changed much and could be applied both for oil and gas markets. An increase in prices of energy resources can be treated by producers as a temporary or long lasting trend. They will act differently in each situation. Temporal growth of prices will encourage them to produce and sell more immediately while long lasting one could prevent them from extracting and selling energy resources.

To sum up, gas is a fuel that is exposed to actions associated with an exhaustible good, namely price and volume manipulation. This means that dependency on this fuel should be managed in line with its stock policy, namely sufficient gas reserves should be available for strategic sectors in case of sudden interruption. Also those sectors where gas is used should be prepared for possible change of fuel.

1.5.3 Ensuring security of gas supply

Security of gas supply can be performed by facilitating: a diversified energy mix, improving energy efficiency, ensuring stocks of energy fuels, diversifying suppliers and transportation ways. International agreements and the multilaterally signed Energy Charter Treaty are also

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\( ^{19} \) Reserves-to-production (R/P) ratio – this indicator shows for how many years the reserves would last if the production level would be the same as during the last year.
measures for ensuring security of gas supply. In this part I will focus on ensuring security of gas supply in regard to theory of M&I and R&E. As it was already mentioned in sub-chapter 1.5.1, there could be sudden disruption in gas delivery and slow emerging supply gaps. The former can take place due to the technical problems, political decisions or military conflicts; the latter may be a result of insufficient investments in transportation and production capacities. Reduction of risks, connected with sudden interruptions, depends on the possible use of alternative sources or transportation facilities. Slow emerging supply gaps can be avoided when a sort of prevention measures is introduced. These may be monitoring of a state of transportation network, facilitating project for gas extraction in new fields, along with construction of suitable transportation infrastructure.

- **Stock of gas**

An effective measure for securing gas supply is keeping a certain level of its stocks. They have to be available in case of delivery disruptions regardless to storyline.

In M&I storyline gas stocks will be just kept on a strategic level. They will be organised and managed in order to ensure security of gas supply to the EU and finally in the pan-European market. Shortages in gas delivery may occur only due to natural disaster and will be only in a form of short-term disruption.

In R&E each country will keep gas reserves at a level sufficient for longer gas disruption. Countries will not cooperate with each other to reduce effects of shortages in delivery (Correlje, Van der Linde, 2006). Additionally in this scenario security of gas supply is exposed to the whole range of associated risks.

- **Reduction of gas shortages**

In the M&I scenario the shortages of gas will be reduced by higher prices for gas delivery from alternative suppliers. These prices will start a circle of investing in alternative energy sources, exploration of new energy reserves or in extension of existing production and transportation network. Following these actions, situation on the market will come back to stability. However, in order to achieve this balance, there should be available additional gas volumes from alternative supplies. Moreover, transport infrastructure among the EU countries should be developed in order to effectively reduce negative results of unexpected gas disruption.

In R&E sudden disruptions cannot be easily managed in the R&E scenario, because every country is interested only in its security of gas supply. In case of disruption, there is hardly any international cooperation in effective usage of gas reserved available in the region.
Moreover in this storyline, producer countries can take a decision of further reduction of gas production for political or ideological reasons. The decreasing supply may cause a price increase and in this way reduce the demand, but this is not a mean for solving these difficulties in long-term perspective. In R&E storyline at its extreme stage, the gas consuming countries will even fight for the energy resources with one another and with the producing countries.

• **Conclusion**

From the logical point of view there should not appear any interruption in delivery of gas in the short- and mid-term perspective. However, as a result of growing gas consumption, capacity of transportation network and production facilities should be increased. Such activities demand investments and cooperation of many countries and companies. It is not enough that gas producing countries have still substantial reserves, if they cannot deliver them on time, the security of supply is threaten (Correlje, Van der Linde, 2006).

The main problem lies in the distribution of global gas reserves. There are just a few places where gas will be easily and profitably explored. The Russian Federation, the Caspian Sea Region and the Middle East have about 66% of total gas reserves (Correlje, Van der Linde, 2006). Moreover, in the medium term perspective all big energy importing regions, i.e. the EU, the US, China and Japan will be dependent on the same energy producing countries.
2. **Gas on the EU energy market**

Energy was not a part of the common EU policies, due to a strategic position of this sector in each Member State’s (MS) economy and monopoly power of national companies. Nevertheless, the EU authorities have established a legal framework for internal energy market. The main goals of the **EU energy policy** are sustainable development, competitiveness and security of supply. Those aims are to be achieved through a creation of an **internal energy market** (in regard to the Article 14 of the Treaty Establishing the European Community) and a **common external energy policy**. Although the legal framework for both processes has been prepared they have not been accomplished yet.

Beside general rules of energy market, there are also special **gas market** regulations. Transformation towards one single and liberalised gas market has been a gradual and long way. This process is dated from 1998 when the first EU Natural Gas Directive was issued\(^\text{20}\). Eventually Directive 2003/55/EC\(^\text{21}\) facilitated the process of integration of MS’s gas markets. Liberalisation of the EU gas market is important because it will provide consumer with the best prices and make an effective use of the available transportation infrastructure.

Despite wide acceptance of the liberalisation of gas market there is one controversial issue, namely unbundling, that hinders proceeding of this process. **Unbundling** means that energy companies that are involved both in transportation and production should split those two activities. This policy does not follow the world trend where counterpart energy companies, e.g. Gazprom, build their position on **vertical integration**.

In the further part of this chapter I will analyse: the EU position on the global gas market, participation of gas in the EU energy fuel mix, growing demand for gas in Europe and in the whole world, available amount of gas on the market in the future, the EU internal gas production and the level of its proven gas reserves. As a next step I will estimate the current and future gas transportation network capacities. Then I will verify the EU gas import dependency in terms of suppliers, structure and potential diversification. Finally I will study the EU legislation in reference to the EU gas market and cooperation with Russia.

The time scope of this thesis refers to the EU(15) and the EU(25). Nevertheless I will refer to the EU(25) in most of the presented data, also before 2004, in order to give comparable picture of trends.

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\(^{20}\) Directive 98/30/EC of the European Parliament

\(^{21}\) Directive 2003/55/EC concerns common rules for the internal market in natural gas
2.1 General trends on the EU gas market

To begin with a sample of figures I will present how substantial for the EU economy is assuring future gas imports. In 2000-2006, the EU(25) participated on average in 17% of the world gas consumption and in 19% of oil consumption. The gas production of the EU(25) in the same time fell down by 13% and in 2006 amounted to 190 bcm. The EU(25) share in the world gas production has steadily decreased from 9% in 2000 to 6.6 % in 2006 (BP, 2007).

Oil and gas are mainly used for energy production and their market share of total energy supply was in 2006 for gas 20.7% and for oil 35% (IEA, 2007). This implies that those two fuels constitute more than half of world energy production.

The EU follows the global trend in the structure of energy consumption. The current and future fuel mix is presented in Figure 2.1. Gas represented 22% in the energy mix in 2000 and will constitute 29% in 2030. Following these figures assuring sufficient gas volumes is a pillar of stable economy.

Figure 2.1 Fuel mix in the EU energy production.


Gas is a strategic asset for energy security in most of the EU countries. This sector is usually controlled and regulated by the government, despite the EU recommendations. Gas sector brings a lot of profits to state budgets and budget of companies who distribute it to the final consumer. The incomes from gas reselling in the EU market are much higher than the incomes from gas production. This is the reason why Gazprom has been undertaking a lot of

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22 The EU residential average gas prices in 2004-2006 were as follows: 520 EUR, 533 EUR and 605 EUR. Author’s calculation on the basis of data from European Commission (EC, 2006c) and BP (BP, 2007).
efforts to take over distribution networks in the EU countries. The profits that may be earned by Gazprom would be much higher than they are today. The next issue is a significant growth of gas prices on the EU market. Such a situation may cause economic difficulties provided this trend continues. The average prices for gas delivered to the EU, in 2000-2006, are presented in Table 2.1. During this time, gas residential and industry prices on the EU MS’s gas markets were partially set by governments and partially by the private companies. Due to increasing prices, liberalisation of the gas market is very important. Only integrated and liberalised market will ensure a final consumer with fair prices, which are a result of real market forces and not a quasi monopoly power of big gas companies.

Table 2.1 Gas prices growth in the EU in 2000-2006 (in USD per 1000 cubic meters and in percentage)

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>price</td>
<td>117</td>
<td>149</td>
<td>125</td>
<td>138</td>
<td>164</td>
<td>226</td>
<td>316</td>
</tr>
<tr>
<td>growth rate</td>
<td>base year</td>
<td>28%</td>
<td>6%</td>
<td>35%</td>
<td>40%</td>
<td>93%</td>
<td>170%</td>
</tr>
</tbody>
</table>

Source: Author’s calculation based on data from BP Statistical Review of World Energy 2007 (BP, 2007). Prices converted from USD per 1 Million British thermal unit (MBtu) into USD per 1000 cubic meters (cm) by indicator 1000cm=36*1MBtu.

### 2.1.1 Demand for gas

In 2000-2006, the EU gas consumption increased by 11%. This process is presented in Table 2.2. Gas has significant position in energy mix production (see Figure 2.1), and demand for gas has grown along with demand for energy.

Table 2.2 Gas consumption growth in the EU in 2000-2006 (in Billion cubic meters and in percentage)

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>bcm</td>
<td>420.0</td>
<td>430.3</td>
<td>431.2</td>
<td>459.1</td>
<td>463.6</td>
<td>473.8</td>
<td>467.4</td>
</tr>
<tr>
<td>growth rate</td>
<td>base year</td>
<td>2%</td>
<td>3%</td>
<td>7%</td>
<td>10%</td>
<td>13%</td>
<td>11%</td>
</tr>
</tbody>
</table>


In a scenario for energy market, where energy mix will not change in coming years, gas consumption would grow by 32% till 2030 in comparison to the level in 2000 (EC, 2000). In order to give more light on the future gas demand in the EU it is worth to compare it with tendencies in other countries. For this analysis data for OECD Europe are included since it gives better perspective of the situation on European gas market and it is in line with the EU indicators.

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23 Since 1st July 2007 prices to both industrial and residential consumers should not be regulated in the EU.
Demand for gas is growing steadily in OECD and developing countries. The consumption of China (196 bcm) and India (102 bcm) in 2030 will be substantially below the demand of OECD Europe (753,2 bcm) (EIA, 2007). However when we sum up the total demand of India, China and Japan, as shown in Figure 2.2, the result indicates significant additional demand in Asian region in the years to come. This demand is expected to be covered with Russian or Central Asian gas production. The EU will also seek to get significant gas volumes from that region even if the dependence on Russian import does not increase. Bearing in mind the numbers from Figure 2.2 the EU should realise that it is not the only one gas importing region.

**Figure 2.2** Natural gas consumption in selected regions; 2004-2030, (in Billion cubic meters)

![Figure 2.2](image)


The predicted gas production, as shown in Figure 2.3, has been keeping pace with growing demand. According to data delivered by EIA, gas consumption would reach 4570 bcm (EIA, 2007) and it would be below expected production volume (see Figure 2.3). Nevertheless, the actual extraction of the known reserves should not necessarily be sufficient enough to cover the global demand. Lower production could take place, due to potential risks associated with security of gas supply.

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24 Data converted into Billion cubic meters from Trillion cubic feet by indicator 100 Bcf=2,8 Bcm, www.bp.com
Having analysed the future trends of the EU gas market it is worth to state that the short-term elasticity of the demand for gas is very low. Long-term demand is believed to be more flexible because of possible usage of LNG, substitutes and introduction of higher efficiency technologies. The demand for gas, in the EU, has developed also as a result of searching for, alternative to oil, energy resource. This situation was caused by the oil crises, namely the unexpected high prices of this resource. Demand for gas will be also generated by environmental issues. Besides renewables, natural gas is the cleanest energy fuel (see sub-chapter 1.2). According to the Kyoto Protocol, the EU has to reduce emissions of gases by 8% below their level in 1990 by 2008-2012 (EC, 2003b) This goal can be hardly achieved without substantial share of gas in the energy fuel mix.

### 2.1.2 Internal gas production of the EU

The EU gas production still covers more than 40% of internal demand, but it is subject to decline trend. The total EU(25) gas output in time 2000-2006 is presented in Table 2.3. The main producers of the internal gas production in 2006 were as follows: the UK 80 bcm, Netherlands 61,9 bcm, Germany 15,6 bcm, Italy 11 bcm, Denmark 10,4 bcm and Poland 4,3 bcm (BP, 2007).

#### Table 2.3  The EU gas production in 2000-2006 (in Billion cubic meters)

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td>bcm</td>
<td>218.4</td>
<td>220.1</td>
<td>215.4</td>
<td>212.0</td>
<td>215.3</td>
<td>199.8</td>
<td>190.0</td>
</tr>
<tr>
<td>growth rate*</td>
<td>base year</td>
<td>3%</td>
<td>-1%</td>
<td>-3%</td>
<td>-1%</td>
<td>-9%</td>
<td>-13%</td>
</tr>
</tbody>
</table>

Source: Gazprom in figures 2002-2006, (Gazprom, 2007)
Internal gas production has substantial impact on the security of gas supply, because it guarantees supplies for a given period of time when external resources are unavailable. In 2000 the EU(25) R/P ratio was 16 years (ENI, 2007) and it fell down to 12.8 years at the end of 2006 (BP, 2007).

Following this, undeveloped gas reserves in the EU may be treated as a measure for ensuring security of gas supply. In fact it is even better to save some of gas reserves and import more gas instead. In case of interruption in gas delivery, internal production will cover supply shortages. An example of this policy is the Groningen field in the Netherlands. It has still substantial gas volumes in the ground. It was the decision of the Dutch authorities after the oil crisis in 1973 to keep the strategic reserves untouched. Only half of the estimated 3000 bcm has been recovered (Asche et al., 2002).

European proven gas reserves are illustrated in Figure 2.4. Norway, as a member of European Economic Area (EEA) and the most reliable gas supplier to the EU, is included in this figure. In order to make better perspective for the EU gas reserves level, I would like to point out, that the total gas reserves in the UK are slightly above the EU gas consumption in 2006.

![Figure 2.4 Remaining proven natural gas reserves in selected European countries at the end of 2006.](image)


Gas production and consumption vary in each EU MS. Detailed information is presented in Table 2.4. Only five MS (including UK) either do not use gas or cover themselves almost total of their needs.
Table 2.4  The EU countries’ own gas production, gas consumption in 2005 (in billion cubic meters) and total import dependence (in %).

<table>
<thead>
<tr>
<th>Country</th>
<th>Own production</th>
<th>Consumption</th>
<th>Total import dependence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>1.66</td>
<td>9.74</td>
<td>83%</td>
</tr>
<tr>
<td>Belgium</td>
<td>-</td>
<td>16.83</td>
<td>100%</td>
</tr>
<tr>
<td>Cyprus</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>0.16</td>
<td>9.15</td>
<td>98%</td>
</tr>
<tr>
<td>Denmark</td>
<td>11.19</td>
<td>5.25</td>
<td>*</td>
</tr>
<tr>
<td>Estonia</td>
<td>-</td>
<td>0.97</td>
<td>100%</td>
</tr>
<tr>
<td>Finland</td>
<td>-</td>
<td>4.29</td>
<td>100%</td>
</tr>
<tr>
<td>France</td>
<td>1.01</td>
<td>48.87</td>
<td>98%</td>
</tr>
<tr>
<td>Germany</td>
<td>16.96</td>
<td>96.43</td>
<td>82%</td>
</tr>
<tr>
<td>Greece</td>
<td>0.02</td>
<td>2.8</td>
<td>99%</td>
</tr>
<tr>
<td>Hungary</td>
<td>2.78</td>
<td>14.42</td>
<td>81%</td>
</tr>
<tr>
<td>Ireland</td>
<td>0.5</td>
<td>4.14</td>
<td>88%</td>
</tr>
<tr>
<td>Italy</td>
<td>11.79</td>
<td>84.27</td>
<td>86%</td>
</tr>
<tr>
<td>Latvia</td>
<td>-</td>
<td>1.62</td>
<td>100%</td>
</tr>
<tr>
<td>Lithuania</td>
<td>-</td>
<td>3.92</td>
<td>100%</td>
</tr>
<tr>
<td>Luxemburg</td>
<td>-</td>
<td>1.41</td>
<td>100%</td>
</tr>
<tr>
<td>Malta</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Netherlands</td>
<td>67.32</td>
<td>42.27</td>
<td>*</td>
</tr>
<tr>
<td>Poland</td>
<td>4.63</td>
<td>14.57</td>
<td>68%</td>
</tr>
<tr>
<td>Portugal</td>
<td>0</td>
<td>4.47</td>
<td>100%</td>
</tr>
<tr>
<td>Slovakia</td>
<td>0.15</td>
<td>6.33</td>
<td>98%</td>
</tr>
<tr>
<td>Slovenia</td>
<td>-</td>
<td>1.1</td>
<td>100%</td>
</tr>
<tr>
<td>Spain</td>
<td>0.17</td>
<td>35.61</td>
<td>100%</td>
</tr>
<tr>
<td>Sweden</td>
<td>-</td>
<td>1.01</td>
<td>100%</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>93.94</td>
<td>101.18</td>
<td>7%</td>
</tr>
</tbody>
</table>


Following Table 2.4 and Figure 2.2, I would like to briefly compare gas consumption and production of the EU countries. The former is high and is expected to grow; the latter is the mirror image of consumption. Despite substantial reserves in Norway, they are not enough to cover the EU future gas demand. The EU should either turn to renewable energy or establish effective external gas policy because its current position in energy resource world is already weak. In terms of gas, it will not change unless the EU creates with Russia a Pan-European gas market with mutual access to energy resources, transportation and distribution network. Further issues concerning gas import dependency are evaluated in sub-chapter 2.4.
2.1.3 Gas and electricity

Gas has reached an important position in electricity generation (Weisser, 2005; Spanjer, 2006). This implies that the security of electricity supply is bound with the security of gas supply. It is also estimated that the share of gas in electricity generation will reach almost 50% in 2020-2030 (EC, 2000). In 2005 gas contributed to 19.7% of the world electricity production and took the second position after coal (40.3%) (IEA, 2007). The fuel mix for electricity generation has to be balanced in accordance with Kyoto Protocol. Total electricity production in 2001 generated 35% of global CO2 emission (Serrallés, 2006). Following this conditions, gas share in power generation will rise in the coming years, because gas is the cleanest natural fuel in this area. Gas is also used in electricity as a substitution of nuclear power generation (Laurila, 2002).

As the result of the above described fuel mix for power generation, the electricity prices depend heavily on the international gas prices (EC, 2000).

The next issue in terms of security of gas supply is that electricity, the same as gas, cannot be stored in large amounts (Serrallés, 2006). Gas needs huge capacity of the storage that is hardly available, whereas electricity storage is bound to substantial energy losses due to warming up of storage facilities.

Concluding, gas supply disruption may cause disruption in electricity generation and its supply to final consumers. The only way for the EU to be protected against this risk is “multi-fuel” power generation or further strengthening cooperation with Russia also in electricity sector.

2.2 Infrastructure for gas transportation within and to the EU

There are two ways of gas transportation, namely pipelines and LNG vessels, with dominant position of the first one. All the facilities connected with gas delivery constitute transportation network. Actually, sufficient transportation network is a necessary condition for creation of effective internal gas market. If this condition is not fulfilled, even the best external supply term and supply diversification, along with energy efficiency, may end up with substantial gas shortages. A suitable and good quality network also ensures the best utilisation of the gas resources in the internal market. Despite the fact, that networks are usually owned by gas companies, each MS of the EU is responsible for their quality (EC, 2004/67).
It is worth to underline that construction of new transportation facilities:

- is at least a mid-term project,
- involves substantial investments
- should be planned in advance.

Following this, the EU has facilitated construction of new pipelines in the framework of Trans-European Energy Network (TEN). The EU Commission also announced, that the existing pipeline capacity for gas of 330 bcm should be increased by 200 bcm till 2020, because growing demand needs sufficient network for gas supply (EC, 2003a).

The European Commission is also aware of the fact, that the ageing infrastructure in energy sector should be replaced and the expected costs for this operation may reach even one trillion Euros within the next 20 years (EC, 2006g). Such investments need legal, political and economic framework to be performed.

In order to assist those projects, in the EU, there is a special organisation dedicated to facilitate the development of gas infrastructure, namely Gas Infrastructure Europe. This organisation has three divisions, which specialise in gas storage, transmission and LNG sector.

2.2.1 LNG facilities

LNG terminals are situated mainly in the Western Europe, due to LNG oriented importers of that geographic area. The capacity of LNG terminals has been gradually increased. In 2011, a planned increase of the existing terminals capacities will enable delivery of 114,6 bcm. Additionally, in the same year, new terminals will enlarge LNG import capacities by 33,4 bcm.26

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25 The official website of this organisation: www.gie.eu.com
26 Gas LNG Europe, LNG Map Information by entry point, www.gie.eu.com
Table 2.5 LNG terminals in the EU and their capacity in 2007 (in Billion cubic meters)

<table>
<thead>
<tr>
<th>LNG Terminal – delivery point</th>
<th>Capacity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium, Zeebrugge</td>
<td>4.5 bm</td>
</tr>
<tr>
<td>UK, Isle of Grain (Grain LNG)</td>
<td>4.4 bm</td>
</tr>
<tr>
<td>France, Montoir de Bretagne</td>
<td>10 bm3</td>
</tr>
<tr>
<td>France, Fos Tonkin</td>
<td>10 bcm</td>
</tr>
<tr>
<td>Italy, Panigaglia</td>
<td>7 bcm</td>
</tr>
<tr>
<td>Greece, Revithoussa</td>
<td>1.4 bcm</td>
</tr>
<tr>
<td>Portugal, Sines</td>
<td>5.5 bcm</td>
</tr>
<tr>
<td>Spain, Ferrol</td>
<td>3.6 bcm</td>
</tr>
<tr>
<td>Spain, Barcelona</td>
<td>14.5 bcm</td>
</tr>
<tr>
<td>Spain, Huelva</td>
<td>10.5 bcm</td>
</tr>
<tr>
<td>Spain, Cartagena</td>
<td>10.5 bcm</td>
</tr>
<tr>
<td>Spain, Bilbao</td>
<td>7 bcm</td>
</tr>
<tr>
<td>Spain, Sagunto</td>
<td>7 bcm</td>
</tr>
</tbody>
</table>

Source: Gas LNG Europe, 2007, LNG Map Information by entry point, www.gie.eu.com

2.2.2 Pipeline facilities

Pipelines are crucial for gas transportation over continent. Moreover, they are the only way for gas import from Russia. Existing gas pipelines are working at almost full capacity nowadays. To the disadvantage of the internal market, pipelines in Europe are hardly interconnected and only in 20% reversible.\(^{27}\) Reversibility allows easier management of gas supply, especially, in case of smaller interconnecting pipelines between main strings. It is worth to state that, the most advanced gas transportation pipeline network, on the EU market, is situated in Benelux, Germany and the UK.\(^{28}\)

- **Existing connections**

  As the infrastructure is expensive, contracts for building pipelines will bound the EU for years with Russia or other big supplier. Russia however could be treated as a natural direction for regional gas cooperation.

  - **Connection with Russia:**
    - the Yamal-Europe pipeline that goes from Russia via Belarus and Poland to Germany. Its capacity is 31.13 bcm.
    - the pipeline from Russia via Ukraine has capacity of 190 bcm and delivers gas to Slovakia, Poland, Hungary and further on to European countries.\(^{29}\)

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\(^{27}\) Gas Transmission Europe, Operational Procedures Information by entry point, www.gie.eu.com

\(^{28}\) Ibidem

\(^{29}\) INOGATE, Ukraine Overview of Oil & Gas Sector, http://www.inogate.org/en/resources/directory
• Connections with Norway
  - South Artery pipelines: Norpipe, Europipe, Europipe II – capacity 49 bcm. Delivery points in Germany
  - Western Artery pipelines: Zeepipe, Franpipe – capacity 29 bcm. Delivery points in Belgium and France.
  - Vesterled pipeline – capacity 10 bcm. Delivery point in the UK.

• Connections with Algeria
  - Maghreb-Europe Gas (MEG) – via Morocco to Spain and Portugal – 8,5 bcm
  - Transmed – via Tunis to Italy – 30 bcm

### Table 2.6 Planned import pipelines to the EU

<table>
<thead>
<tr>
<th>Name</th>
<th>Route</th>
<th>Capacity</th>
<th>Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nord Stream / Northern Trans-European Gas Pipeline</td>
<td>From Shtokman field in Barents Sea, Vyborg in Russia to Greifswald in Germany, eventually via Netherlands to the UK</td>
<td>first stage – 27,5 bcm final capacity – 55 bcm</td>
<td>12 Billion EUR</td>
</tr>
<tr>
<td>Yamal II</td>
<td>parallel to the first one via Belarus and Poland</td>
<td>30 bcm</td>
<td>n/a</td>
</tr>
<tr>
<td>South Stream</td>
<td>From Russia via the Black Sea to Bulgaria and eventually to Italy</td>
<td>30 bcm</td>
<td>n/a</td>
</tr>
<tr>
<td>Nabucco</td>
<td>from Turkey via Bulgaria, Romania and Hungary to Austria from Caspian Region, Iran and the Middle East</td>
<td>30 bcm</td>
<td>4,4 Billion EUR</td>
</tr>
<tr>
<td>Medgaz</td>
<td>Algeria to Spain</td>
<td>8 bcm</td>
<td>1,1 Billion EUR</td>
</tr>
<tr>
<td>Norway – UK</td>
<td>Norway – UK</td>
<td>20 bcm</td>
<td></td>
</tr>
<tr>
<td>GALSI</td>
<td>from Algeria via Sardinia to Italy</td>
<td>8 bcm</td>
<td>2 Billion EUR</td>
</tr>
<tr>
<td>Trans-Mashrek</td>
<td>from Egypt, Syria and Iraq; to Turkey, eventually connected to Nabucco pipeline</td>
<td>10 bcm</td>
<td>1,6 Billion EUR</td>
</tr>
<tr>
<td></td>
<td>Turkey to Italy through Greece First part – Baku-Tiblisi-Erzurun</td>
<td>22 bcm</td>
<td>6 Billion EUR</td>
</tr>
</tbody>
</table>

Source: Author's preparation on the basis of information from: (EC, 2003a), (EC, 2006b), (CERA, 2007), (EC, 2003a). n/a- not available data.

• Nord Stream project

Despite the agreed priorities for TEN there is not unanimity among MS about executing the controversial Nord Stream project. Baltic States, recently Estonia, within its autonomy to decide about the Exclusive Economic Zone of the Baltic Sea hinders realisation of the

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30 Ibidem and StatoilHydro official website www.statoilhydro.com/
31 IEA, 2002, Caspian Oil and Gas, www.iea.org
33 Dotychczasowe projekty dostaw gazu ziemnego do Polski (Current projects for gas diversification to Poland), www.cire.pl
ongoing project. This behaviour has strong political background and explicitly shows complexity of the EU-Russia relations and possible regional gas market. The Nord Stream has support from the European Commission as it was once again confirmed by the EU decision bodies in 2006 and it is a part of the Trans-European Energy Networks.

- **Yamal II project**
  The string of Yamal II has obtained advocacy from Poland and other Baltic States. Its route has not been decided yet, namely it could be constructed parallel to the first Yamal or via the Baltic States to Poland. The second project has been named Amber. Provided the first project is executed, Russia will relay substantially on Belarus as a transit country. The total capacity of Yamal I and Yamal II potential would be 65.7 bcm. Currently however Russia has focused on the Nord Stream pipeline and is not going to start Yamal II project soon.
  In such a situation Baltic countries and Poland will not earn any transit fees on gas delivered from Russia to Europe. Additionally, Russia could manipulate supply volume via Yamal I, when the construction of Nord Stream is finished. Such a threat is possible, because Russia will no longer be dependent on transit via Belarus and Poland.

- **South Stream project**
  As another project Gazprom and ENI, the Italian gas company, have signed an agreement for building the South Stream gas pipeline. Those negotiations were kept just between companies and the common EU interest was not on the agreement agenda. The new pipeline with a capacity of 30 bcm will be constructed on the bottom of the Black Sea and finally will arrive in Bulgaria. This pipeline was not a part of common EU-Russia projects, but a bilateral agreement between companies.

### 2.2.3 Conclusion

The existing gas infrastructure should be subject to sustainable development. It is especially important, because the EU gas production will decline and additional volumes of imported gas have to be distributed over the market. The planned connections with Russia will enable import of extra 85 bcm and eventually 115 bcm (Yamal II). The total import capacity of pipelines, from Russia to the EU, could reach 335 bcm.

Algeria and Norway will also be able to deliver more gas to the EU market, however without Russia, import capacities will be insufficient. Namely, they could achieve similar to Russia

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37 New Russian gas pipeline deal cuts through EU unity, 2.07.2007, www.euroactiv.com
export capacities, but the expected demand for gas import could be even 555 bcm. In such a situation, the EU would have to cooperate with all the suppliers, with dominant position of Russia as the most resources rich partner.

2.3 **Contracts for gas delivery to the EU**

Gas is delivered usually on the basis of contracts signed between a producing company and a distributor in consuming country. Only long-term contracts constitute favourable environment for investment in new gas transportation infrastructure. The EU has accepted long–term contracts for gas delivery from Russian Federation. Such contracts spread the risk between producers and buyers. A free circulation of gas within the EU internal market will be ensured due to the deletion of the destination clause from gas contracts. The EU reached consensus on this issue with Algeria and Russia in 2003 (IEA, 2004).

Present contracts between the EU’s companies and Gazprom are as follow: E.ON Ruhrgas has prolonged contracts for total volume of 300 bcm till 2035, the Nord Stream supply contract ensures E.ON Ruhrgas gas deliveries of additional volume of 100 bcm till 2036. The contract between ENI, Italian company, and Gazprom will also last until 2035. Wintershall, OMV and GDF have prolonged their contracts with Gazprom respectively to 2030, 2026 and 2030 (Finon, Locatelli, 2008).

Because of huge distances between Russian gas fields and final consumer in the EU, Russian gas is delivered on the basis of long-term contracts with no swing option for gas delivery as is would be unprofitable. This option may be offered by suppliers that are closer to the destination market (Asche et al, 2002); in the EU case by Netherlands or the UK. The swing option is profitable on short distances as the needed spare capacity for satisfying much bigger demand from time to time needs smaller investments.

There is one more aspect why long-term contracts are so essential for Gazprom. The future earnings from signed contracts serve as guarantee for Gazporms’ foreign credits. Some of the Gazprom’s credit agreements have provision that they will be settled up from the gas export incomes (IEA, 2004).

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38 Eurogas, Natural Gas Demand and Supply, Long term Outlook to 2030, www.eurogas.org
39 Destination clause in a contract restricts distribution of the delivered gas only to the area of contracting country. Further reselling of the unused gas is forbidden.
Contracts for gas delivery are not public but it is known that they used to differ substantially in terms of price and volumes for take-or-pay provision before the removal of destination clause. In contracts for natural gas supply the price formula for this fuel is settled. Gas prices can be either linked to oil prices or be on the same level for the whole time of contract. There are more types of contracts signed nowadays. They are not only long-term contracts with gas prices linked to oil ones but also linked to gas spot prices. Such a situation takes place in the UK, but it could spread all over Europe. A crucial meaning for the integration on the gas market has the EU gas Directive 2003/55/EC that opens negotiation to the third party access to the transportation network. (Asche et al, 2002).

2.4 Import dependency on gas and security of its supply

The EU is highly dependent on import of fossil fuels. The internal production can cover just a part of the growing demand. It is worth to state that there is no possibility for the EU of being self-sufficient in this area (EC, 2000). Following trends on the EU market, in 2030 the EU(25) demand for imported energy resources could be as high as 62% in comparison to 47% in 2000 (EC, 2003b) Moreover, the EU gas imports would reach 80% in 2030 (EC, 2006g). Considering all above mentioned conditions the EU is more prone to be passive than active in creating gas supply conditions (EC, 2000).

Moreover, the dependence of the EU on gas import grew with the EU eastward enlargement in 2004. For the EU(15) higher gas import from Russia is a diversification of gas suppliers whereas for the new MS it means a growing dependence on one supplier.

Although, the EU Commission estimated that the net import level of gas will reach 400 bcm in 2020 (EC, 2003a), this amount could be higher. According to IEA, the EU demand for gas import will account for 500 bcm41.42 This amount is almost 2.5 times higher, than the net import in 2000, which amounted to 206 bcm.

The growing dependency on Russia and its transit countries might put at stake the security of gas supply. Europe has faced currently two energy supply interruption – one at the beginning of 2006 – due to the Ukrainian–Russian dispute and the second at the beginning of 2007 because of the Belarusian–Russian rumors. Those situations made Russia less reliable on the international oil and regional gas market.

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41 Data from the source are converted from Million tones of oil equivalent (Mtoe) into bcm by indicator 1,11; www.bp.com
However, from the EU side no further steps towards Russia, besides some political statements were taken. This was a result of the fact, that there is almost no reasonable alternative for Russia as the gas supplier to the EU. Additionally Russia counterbalances the EU oil import dependence on OPEC.

The growing EU demand for gas can be covered by imports from Russia, the Middle East and African countries without substantial constrains, however the EU market should be attractive enough for the producing countries in order to develop and export the additional gas volumes (IEA, 2004). This incentive environment for sufficient gas delivery is necessary regardless M&I or R&E storylines. Main difference is in background reasoning, namely in M&I it will be simple economic factors - the cooperation just has to be profitable and with low associated risk level whereas in R&E good political/diplomatic relation with gas producing “islands” would be more important.

The EU in cooperation with Russia is prepared to both storylines as the result of the ongoing EU-Russia energy dialogue, Partnership and Cooperation Agreement (PCA) and negotiation concerning prolongation of PCA. For Russia, as the producer country, export to the EU based on long term contracts diminishes potential risk of insufficient demand and at the same time guarantees delivery of gas even if Russia will not be going to integrate more with the EU energy market.

### 2.4.1 Volumes and suppliers

In an investigation of gas import dependency it is important to define total volume of import, main suppliers, and the transportation capacity of import facilities.

The EU has three main external gas suppliers which market share differs over the years, however, with dominant position of Russia. Gas is imported to the EU both by pipelines and as LNG. In 2006 the EU imported 249 bcm by pipeline and almost 48 bcm of LNG which constituted 19% total gas import (BP, 2007). Volumes imported from each supplier are constrained not only by production capacities but also by the available transportation connection. The import capacities existing in 2001 are presented in Table 2.7. These capacities were sufficient for that time but the EU authorities, European gas companies and gas suppliers were aware that new pipelines and LNG terminals had to be built. The reason for extension of capacities was growing demand for gas. The planned capacities for gas transportation that should be available in 2010-2020 are presented in Figure 2.5. As it could be easily observed Russia prevails in terms of imports capacity presently and in the future.
This natural direction of common gas market between the EU and Russia will be underpinned by the further construction of North and South Stream pipelines.

Table 2.7 Import capacities to the EU in 2001

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Existing capacity</strong></td>
<td>Russia</td>
<td>Algeria</td>
<td>Norway</td>
<td>LNG imports</td>
</tr>
<tr>
<td></td>
<td>180</td>
<td>39</td>
<td>75</td>
<td>43</td>
</tr>
</tbody>
</table>

Figure 2.5 Supply capacities for Europe in 2010-2020 (in billion cubic meters)

Source: Eurogas, Marcogas; 2004, Natural Gas the energy for a sustainable future, www.eurogas.org

The complete structure of the EU gas import in 2006, both in volumes and their percentage market share, is presented on Figure 2.6 and Figure 2.7. Those figures refer to the exported volumes not export capacities. In 2006 Algeria had dominant position in LNG export to the EU and was rank as the third supplier in terms of pipeline delivery. Russia and Norway have stable position in the EU suppliers’ mix. However Norway could be more flexible in the gas deliveries (Asche et al, 2002) and is treated as the most foreseeable and reliable non-EU gas producing country.
Provided the situation in North Africa and the Middle East is stable the import of LNG is prone to grow substantially especially in case of Qatar and Iran (see Table 2.9). It is worth to point out that Gazprom has been interested in cooperation with Qatar and common investments in LNG projects in Qatar. This implies that LNG imports from Qatar can be indirectly connected with Russia.

Figure 2.6       Gas exporters to the EU in 2006 - LNG (in Billion cubic meters and in percentage)

![Graph showing LNG exporters to the EU in 2006]  
Source: Author’s calculation based on data from BP Statistical Review of World Energy 2007 (BP, 2007)

Figure 2.7       Gas exporters to the EU in 2006 - pipelines (in Billion cubic meters and in percentage)

![Graph showing pipeline exporters to the EU in 2006]  
Source: Author’s calculation based on data from BP Statistical Review of World Energy 2007 (BP, 2007)

The structure of the import dependency on main external gas suppliers for each EU Member State is presented in Table 2.8. The Baltic States do not produce any gas and are completely dependent on imports from Russia. In 2005 they consumed 5.59 bcm. In Baltic States, Finland and Greece Russia has almost monopolistic position in gas sector. The Table 2.8 presents only the volumes imported from the main suppliers.
Table 2.8 The EU countries’ dependence on gas imported from Russia, Norway and Algeria, 2005,

<table>
<thead>
<tr>
<th></th>
<th>Import in volumes in bcm</th>
<th>Share of imported gas in total consumption</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Russia</td>
<td>Norway</td>
</tr>
<tr>
<td>Austria</td>
<td>6.8</td>
<td>0.78</td>
</tr>
<tr>
<td>Belgium</td>
<td>6.3</td>
<td>8.5</td>
</tr>
<tr>
<td>Cyprus</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>7.13</td>
<td>2.35</td>
</tr>
<tr>
<td>Denmark*</td>
<td>-</td>
<td>0.08</td>
</tr>
<tr>
<td>Estonia</td>
<td>0.97</td>
<td>-</td>
</tr>
<tr>
<td>Finland</td>
<td>4.2</td>
<td>-</td>
</tr>
<tr>
<td>France</td>
<td>11.5</td>
<td>14.2</td>
</tr>
<tr>
<td>Germany</td>
<td>36.54</td>
<td>26.3</td>
</tr>
<tr>
<td>Greece</td>
<td>2.4</td>
<td>-</td>
</tr>
<tr>
<td>Hungary</td>
<td>8.32</td>
<td>-</td>
</tr>
<tr>
<td>Irland</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Italy</td>
<td>23.33</td>
<td>5.72</td>
</tr>
<tr>
<td>Latvia</td>
<td>1.75</td>
<td>-</td>
</tr>
<tr>
<td>Lithuania</td>
<td>2.93</td>
<td>-</td>
</tr>
<tr>
<td>Luxemburg</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Malta</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Netherlands*</td>
<td>2.97</td>
<td>6.16</td>
</tr>
<tr>
<td>Poland</td>
<td>6.4</td>
<td>0.54</td>
</tr>
<tr>
<td>Portugal</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Slovakia</td>
<td>6.4</td>
<td>-</td>
</tr>
<tr>
<td>Slovenia</td>
<td>0.56</td>
<td>-</td>
</tr>
<tr>
<td>Spain</td>
<td>-</td>
<td>2.1</td>
</tr>
<tr>
<td>Sweden</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>11.55</td>
<td>0.45</td>
</tr>
</tbody>
</table>

Author’s calculation based on data from World Oil and Gas Review 2007 (ENI, 2007), * - country covers internal demand by own production.

It is also important to underline that gas delivered to Europe is sold by national companies Russian Gazprom, Norwegian Gassforhandlingsvtvalget – a national committee of gas producers and Algerian state-owned company Sonatrach. In order give better insight to this situation the Netherlands distribute gas also by national company - Gasunie. The EU can have effective impact on the behaviour and deregulation of production of the Dutch and Norwegian (in EEA framework) companies the other ones are out of its effective control (Petroleum Economics, 1998).

The main EU gas suppliers have proved that they are prepared for the growing gas demand. Russian export facilities to Europe are and will remain on the dominant position among all the exporters. The fact that Russia will extend export capacity indicates that it should be able to deliver contracted amount of gas. Otherwise undertaken in pipeline investments will not be
profitable. In case of all African LNG exporting countries, their political and security situation is not stable and they may be exposed to military actions and terroristic attacks.

### 2.4.2 Potential supply diversification

Supply diversification is very vital for security of supply. It is important to underline that the EU has been actively looking for alternative sources of gas supply, but the position of main suppliers has not changed too much, besides a growing import volume from Russia. One of possible way for gas supply diversification is LNG technology. In 2006 regasification capacity of the EU LNG terminals is 77 bcm and it is planned to be expanded to 158 bcm in 2010.\(^{43}\)

The EU countries may import gas from areas in Africa or Asia without building pipelines. This is also solution suggested by the EU Commission. Apart/ besides Russia

According to the EU Commission the growing demand for gas in the EU should be backed with stronger cooperation and North Africa the same as with the Middle East and Central Asia (EC, 2000).

The actions concerning gas supply diversification should have in scope analysis of political and economic stability of a gas producing country/region, level of proved reserves, reserves R/P ratio, number and quality of transit countries, gas extraction and transportation facilities. Level of proved gas reserves of selected countries at the end of 2006 is presented in Table 2.9. All those countries, besides EU(25) have R/P ratio over 30 years and for the most promising producers of the Middle East it is even over 100 years. However stability of Iran and Qatar is doubtful. Supply diversification with volumes contracted in those countries is exposed to many risks concerning security of supply and not necessarily would bring positive result.

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\(^{43}\) The European Union of the European Gas Industry EUROGAS; Natural gas demand and supply, Long term Outlook to 2030; www.eurogas.org
Table 2.9 Proven gas reserves and R/P ratio of selected countries and the EU (25) at the end of 2006 (in Trillion cubic meters).

<table>
<thead>
<tr>
<th>Country</th>
<th>Proven gas reserves</th>
<th>R/P ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russian Federation</td>
<td>47.65</td>
<td>77.8</td>
</tr>
<tr>
<td>Iran</td>
<td>28.13</td>
<td>*</td>
</tr>
<tr>
<td>Qatar</td>
<td>25.36</td>
<td>*</td>
</tr>
<tr>
<td>Algeria</td>
<td>4.50</td>
<td>53.3</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>3.00</td>
<td>*</td>
</tr>
<tr>
<td>Turkmenistan</td>
<td>2.86</td>
<td>46.0</td>
</tr>
<tr>
<td>EU 25</td>
<td>2.43</td>
<td>12.8</td>
</tr>
<tr>
<td>Uzbekistan</td>
<td>1.87</td>
<td>33.7</td>
</tr>
<tr>
<td>Azerbaijan</td>
<td>1.35</td>
<td>*</td>
</tr>
<tr>
<td>Ukraine</td>
<td>1.10</td>
<td>57.7</td>
</tr>
</tbody>
</table>

Source: BP statistical review full report workbook 2007, (BP, 2007). Reserves-to-production (R/P) ratio – this indicator shows for how many years the reserves would last if the production level would be the same as during the last year, * - it means that R/P ratio is over 100 years.

Following the reasoning that countries prefer to have deliveries from the stable and predictable sources, Italy and Spain have expressed their interest in gas deliveries from Norway. Although Algeria is much closer and there are less transit countries to whom the transit tariffs are to be paid, Italy and Spain want to diversify their gas suppliers. (Asche et al, 2002).

The Caspian Sea region can also contribute to the EU gas supply diversification. It can be performed via the planned route called Nabucco. Provided the Nabucco pipeline is constructed it will transport 30 billion cubic meters a year of gas. The planned areas of supply for Nabucco are Central Asia, the Middle East and North Africa. This project however has not included Russia and this caused many obstacles concerning available gas supply volumes for this pipeline.

The long term strategy of assuring security of gas supply should take into account the fact that Norway and Algeria gas reserves are limited and by 2020/2030 most of gas import would come from Russia by pipeline and from the Middle East, Latin America and West Africa as LNG (IEA, 2004).

Since there is no common EU external energy policy each MS has tried to diversify gas delivery on its own following only own particular business. This may lead to deeper dependence on gas delivery from Russia as the diversification activities would not be managed on the EU side and Gazprom as a very active player on the gas market may adjust MS’ strategies to its own one.
2.5 **Common external EU gas policy**

This part of thesis I would like to start with a citation that shows a direct reason for a creation of common external policy. “*An approach based solely on 25 individual energy policies is not enough*” (EC, 2006g). The Commission suggests in Green Paper that the EU needs “*a clear policy on securing and diversifying energy supplies*” (EC, 2006g). In the scope of such a policy there are: new gas pipelines along with new LNG terminals, maintenance of the existing energy facilities, interconnection between states, contracts for gas delivery and one policy towards all external gas suppliers. A stronger regional position of the EU, its neighbours and partners will convert into the same position on the International Energy Scene (Maňě-Estrada, 2006). The European Commission admits the fact that the common European energy policy should be developed because the combination of particular policies of each Member State does not bring the expected results. The initiative of Common European Energy Policy was already stated by Andris Piebalgs, the EU Energy Commissioner. According to the Energy Policy for Europe there should be built a secure energy zone around the EU.\(^{44}\)

The EU authorities have prepared documentation and have activated the countries to go in the direction of the common energy policy especially as the external one. It is underlined that the long term sustainability, security of supply and economic competitiveness are the main goals that are to be achieved in the framework of common external energy policy (EC, 2006f). The common external energy policy is more and more important because Europe currently is not energy self-sufficient. It could change in the future when technology and researches find alternative energy sources or make better use of the current ones, e.g. renewable energy sources, but it is rather long term perspective. As the dependence on energy import will grow, negotiations towards the producer countries should be conducted by one voice from the EU side. This would underpin the EU position towards the gas producing countries. Foreign energy policy should include diplomacy, foreign trade standards and all security aspects. Development of a system or a way of coping with energy issues that will secure a stable supply of the energy resource is needed. Nevertheless the creation of such a policy will be more in line with R&E storylines; in M&I those activities will not be necessary.

Despite awareness of the necessity for introducing the common external energy policy for the European countries, it has not still been developed. Every country takes care of its needs. The

efforts of the EU Commission and the EU Council for building one common policy have been undertaken but so far with not significant result. The input of the Energy Charter should not be underestimated, but in the context of gas issues, it cannot be used for the international arbitrage or disputes, as long as Russia ratifies it.

Energy is a strategic issue for each country and needs a lot of diplomacy and good will to achieve real cooperation among different states. It is worth to underline that the attitude to the energy security policy of the each EU country is not the same. The reason is very simple; they do not share the same sources of supply. As the technology of LNG is developing for the southern European countries a very natural partner in energy field becomes e.g. Egypt. Spain is also not so interested in the energy cooperation with Russia but with e.g. Norway. Russia tries to build the relation in energy sector with each country separately – one of the examples could be the Russian–German initiative to build the pipeline on the bottom of the Baltic Sea and in this way avoiding transit through Belarus, Lithuania, and Poland. The issue whether new pipelines are to be built seems to be not only an economic but more political decision and depends very highly on the Russian current foreign policy.

2.6 The EU legislation and documentation in the energy sector

The EU legislation concerning security of energy supply is delivered in a form of Green Papers, Directives and Communications. One of the issues addressed by these documents is very high dependency on fossil fuels in the EU.

The first Green Paper – *Towards a European strategy for the security of energy supply* was created in 2000. The long-term strategy for security of supply stipulated in this document was about ensuring the energy supplies with respect to the welfare of citizens, prosperity of the economy, permanent availability of energy products on the market at reasonable prices, with regard to environmental issues and sustainable development – according to Article 2 of the Treaty on European Union (EC, 2000).

The EU in Green Paper states that the security of supply is not to be achieved by energy independence or smaller import dependence. It is about reduction of associated with the import risks. A construction of new import routes and strengthening strategic stocks are suggested as a solution (EC, 2000). The definitions of risks connected to security of supply have been already presented in sub-chapter 1.5.1.
The most important recommendations for reduction of risks associated with security of gas supply are:

- development of substitutes, i.e. a balanced fuel mix,
- effective utilisation of substitute fuels, namely technical possibility of using other fuel instead of gas in e.g. electricity generation
- decoupling of growth of GDP from usually related higher energy consumption,
- development of energy production from renewable sources;
- creation of the internal energy market,
- solidarity between Member States in case of energy supply disruption,
- creation of a European Energy Supply Observatory,
- ensuring sufficient level of gas reserves,
- common external energy policy.

Closer cooperation with Russia will ensure diversification in oil, uranium and coal which can substitute gas. Russian participation in Energy Supply Observatory will enhance its effectiveness.

The issues related to the gas infrastructure were covered by the European Commission Communication on *Energy Infrastructure and Security of Supply* (EC, 2003b).

The EU authorities recognised the significant increase of gas consumption and importance of coordinated policy of security of gas supply. As a result of this process the Council Directive 2004/67/EC *concerning measures to safeguard security of natural gas supply* was issued. This Directive is especially important in the light of the internal market for gas. Guidelines included in this document underline the necessity of transparent and non-discriminatory security of supply policies, distinction of the roles and obligations of all market players, along with the internal market prosperity. This Directive facilitates also solidarity between MS and encourages them to undertake bilateral agreements in order to assure storage capacities. This part of security of gas supply is subject to public service obligation. Prevention and management of major supply disruption has been also addressed by this document.

Issues, that may directly regard cooperation with Russia, are acceptance of long-term contracts, suppliers’ diversification along with diversification of transport method. Till the end of 2006 Russia was not active in LNG market and as the main gas supplier was not a diversification source. Nevertheless long-term contracts for gas delivery between main European gas companies and Gazprom were prolonged and accepted by the EU authorities.
The Green Paper – *A European Strategy for Sustainable, Competitive and Secure Energy*, issued in 2006 has confirmed the previously accepted measures however put pressure on their execution. According to this document new pipeline and LNG terminals should be constructed. Trade relations with diversified mix of gas producing country should be also developed. This Paper has also delivered further argumentation for building common external energy policy that will inter alia assure better access to the global energy resources in global market. Nevertheless the substantial position of Russia and its role in security of energy supply currently and in the future has been acknowledged.

In the Country Strategy Paper on Russian Federation it is underlined that the EU should facilitate the Russian role as a secure and reliable supplier.\(^45\)

### 2.7 Conclusion

Consumption of gas in the EU will grow. In order to ensure stable deliveries of gas to final consumers, the EU undertakes measures focused on liberalisation of gas market, construction of pipelines network and LNG terminals, assigning responsibilities for maintenance of the existing infrastructure and diversification of gas suppliers. The EU also established legal framework for dealing with issues connected with security of gas supply. Additionally, the EU facilitates energy efficiency technologies and most effective utilisation of gas resources. There is still, however, a need for establishment of common foreign energy policy because this measure will diminish most of risks associated with security of gas supply. The EU is one of the biggest energy consuming markets and will import substantial part of energy resources in the near future. This fact may be, however, an advantage in negotiating contracts for gas supply, when the EU speaks as one body.

3. Security of gas supply from Russia

Russia as an energy empire regains its position in the world of international affairs. This country is the biggest gas producer. Moreover, Russia is self-sufficient in terms of energy. It is able to produce almost all final gas products. Additionally, it can quite easily influence downstream and upstream processes in gas sector, as an owner of significant gas reserves, transportation network and production capacities (Mañé-Estrada, 2006). However, Russia does not extend its gas production capacities. In 2000-2006 Russia experienced economic growth which resulted in higher energy consumption. Unfortunately, along with growing domestic and external demand for gas, Russian gas production has not increased sufficiently. In this chapter I will evaluate whether Russia should be a strategic supplier of gas to the EU. I will analyse Russia in terms of its current position on global gas market, its gas production and export capacities, gas reserves, domestic demand for gas, gas prices, policy towards Gazprom and relations with former Soviet Union countries. I will also verify Russian ability to overcome risks associated with security of gas supply.

3.1 Russia – an energy empire?

After the collapse of the Soviet Union, Russia lost its status of global empire. Currently Russia has been rebuilding its position on the basis of energy resources. The course of Russian foreign energy policy can be summarised with Vladimir Putin’s statement that “energy is the most important force of world economic progress. It always was and will be for a long time. (...) Russia has no other area in which to claim leadership”.46

It should be mentioned that Russia is the biggest producer and exporter of gas and it has the riches gas reserves in the world. In these new circumstances, Russia sometimes treats gas issues as a tool of foreign policy and its new “military” power. Moreover, Russia is the second, after Saudi Arabia, oil producer and exporter; nevertheless it is not a part of OPEC.

- Gas Exporting Countries Forum

In terms of international associations, Russia is a participant of the Gas Exporting Countries Forum (GECF) which was established in 2001.47 According to the Member State of GECF,

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47 Gas Exporting Countries Forum official website, http://www.gecforum.org/
one of the aims of this cooperation is to support large gas export projects with fair pricing system.\footnote{Ibidem}

This organisation, however, according to GECF should not cause any shocks of gas price. Nevertheless, it may increase gas prices and in this way it would enlarge economic risk in security of gas supply.\footnote{The GECF participating countries on the session in April 2007 in Doha had decided to create a high-level group of gas prices. – The Washington Post, Gas Exporters Soften Talk of Cartel, 10.04.2007, www.lexisnexis.com, www.baser.dk} Additionally this action may influence substantially situation on the global gas market, because in hands of GECF countries are 75\% of proven world gas reserves and 90\% of total gas export.\footnote{Russia – The Gas Export Forum, 30.08.2004, www.goliath.enext.com} The situation on a global gas market can be even more unstable because GECF members; Russia, Qatar and Iran; have already expressed their willingness to form “gas OPEC”.\footnote{The three gas exporting countries Russia, Qatar and Iran established an organisation similar to OPEC in March 2007. They together are owners of 57\% of gas reserves. Countries from GECF are likely to join this initiative. Algeria and Venezuela are supposed to be the next to join the “gas OPEC”. (see more in Gas OPEC theme high on agenda, but has no final shape yet-Medvedev, ITAR-TASS News Agency, 29.06.2007, http://web.lexis-nexis.com, www.baser.dk/professional/}

- **Russia and LNG**

Russia has been more & more involved in the global cooperation within GECF. It has taken steps for closer relations with Qatar\footnote{In 2006 Qatar exported 31,09 bcm (ENI, 2007).} – the biggest exporter of liquefied natural gas (LNG).\footnote{Minister of Industry and Energy holds talks with Minister of Industry and Energy of the State of Qatar, SKRIN Market & Corporate News, 04.07.2007, http://web.lexis-nexis.com, www.baser.dk/professional/} Those two countries can combine their experience in pipeline and LNG technologies into a sound cooperation. This activity will pave a way for Russian presence on LNG market and will strengthen its position on the global market. Additionally, those two countries will be able to set rules on both pipeline and LNG market, also in terms of gas prices increase and volumes available on the market. I underline this, because all initiatives, namely GECF, gas OPEC and agreements between Russia and Qatar take place separately.

- **Russia and former Soviet Union countries**

Besides restoring its position on a global market, Russia tries to re-establish it locally in former Soviet Union countries. Russia does it by promoting energy dominance and import dependency. Additionally, Russia pays particular attention to all political and economic decisions taken by the former Soviet Union countries. Provided those decisions are not in line with Russian strategy, Russia uses political persuasion, announces possible increase of gas prices or turns off gas delivery. In January 2006 Gazprom suspended gas delivery to Ukraine (Stern, 2006) Moldova, Armenia and Georgia, because those countries refused to pay much
higher price for gas. In case of Moldova, it was also taking more control of gas transportation companies in Moldova (Thomas, 2006).

A risk of sudden increase of Russian gas prices should not concern the EU directly, because those gas prices are already on the world level. Additionally, the EU-Russia relations are stable and without unhealthy interdependence. However this tool of Russian foreign policy, can affect security of gas supply to the EU, when it is used towards a transit country, namely Belarus or Ukraine.

- **Rules for foreign investors in Russian gas sector**

Russia has also executed its dominant position in cooperation with foreign companies on its territory. In order to get 51% ownership of the ongoing projects, Russia found some artificial reasons for removal of European companies from development of gas fields. For example, in Kovykta project, BP was said to break the contract rules because of too low production. In reality at that time, BP had a limited access to transportation network and did not have significant storage capacity. In such circumstances there was no reason for higher production. In Sakhalin II project, Shell was accused of not fulfilling environmental requirements and this caused changes in the project agreement.

- **Russian gas contracts with the EU countries**

In export policy to the EU, Russia has a strategy of concluding bilateral agreements with European countries, but in fact companies. This is a very favourable situation to Russia since European companies become its allies in the EU market. In this way Russia has opportunity to influence each country’s policy and to prevent the EU from launching the common external energy policy. In my opinion, Russia has been gaining the advantage over the EU not only because the gas dependency is growing but because Russia found a path to disintegrate the EU in the energy issues. Unfortunately to the EU such course is closer to the R&E scenario.

- **Conclusion**

Russia is an energy empire on the global market. This situation is associated with political and economic risks. Russia may manipulate gas prices, stop deliveries and in this way execute its power. However Russia earns substantial incomes from energy resources only when it actually sells them. Thus, in a long run it is very unlikely that Russia will stop its export to the EU or irresponsibly increases gas prices. Following this, a growing position of Russia in the world should not influence negatively security of Russian gas supply the EU.


3.2 **Russian energy market**

Russian economy is significantly dependent on energy sector. Russia has been aware of the fact that its energy sector needs to be reformed and should be a subject to substantial investments in order to avoid structural risk in security of gas supply. This is especially important because all contracts for gas delivery, signed between the EU Member States and Russia, concern a long-term perspective. Trends on Russian energy market should be compatible with the future supply obligation. The R/P ratio in Russia was 77.8 years at the end of 2006 (BP, 2007). In these circumstances the EU-Russia cooperation seems to be promising.

### 3.2.1 Production and export of gas

Russian gas consumption and export have been rising. Taking this into regard in the long-term strategy, Russian government plans a range of measures facilitating gas production, change of fuel mix in favour of other energy resources and also introduction of energy efficient technologies. Such an approach is acceptable for the EU because it means that Russia is not acting spontaneously, but does have a strategic action plan.

- **Strategy for gas sector**

  This plan assumes development of deeply deposited gas reserves, development of small and medium size fields, along with effective exploitation of matured fields. In such a situation, Russia will be able to meet both domestic and the EU demand for gas in the future, even if they grow substantially. There is however a threat that, if the planned projects and modernisation of existing production facilities will not be conducted, production would not be much higher than 530 bcm (Mastepanov, 2002). This volume will not be sufficient for the expected increase of demand for gas. This is explicitly connected with structural risk.

  It will be good if Russia introduces in its gas sector a solution similar to the Dutch model, i.e. using big fields like a buffer and at the same time exploiting small fields. Small fields are usually unprofitable if they are not used to the highest capacity from the very beginning. However production from small and medium fields will be insufficient for peaks of demand during the whole year. In these moments, additional gas production from giant fields is necessary. The Russian small and medium fields will be probably developed by companies other than Gazprom. In such circumstances this solution requires legal framework and

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operational execution of Third Party Access (TPA) to the pipeline network. Provided Russia will follow this model the security of gas supply will increase significantly.

- **Gas reserves in Russia**

The next issue important for security of gas supply to the EU is a level of proven gas reserves in Russia. They are located across the country in six inland areas (West Siberia, Timan-Pechora Basin, Volga-Ural Basin, North Caucasus, Yamal and East Siberian Basin) and three offshore (Barents Sea, Kara Sea and in the Sea of Okotsk) (IEA, 2004). The currently exploited fields in West Siberia constitute over 90% of the whole gas amount produced in Russia (CERA, 2007). The output of three giants in West Siberia has started to turn down: Medvezhye at 76%, Unrengoi at 65% and Yamburg at 54% of maximum production rate (IEA, 2004). The production of the three giants fell down in the period of 2000-2006 by 92 bcm\(^57\) (CERA, 2007). Gazprom has already developed new fields: Zapolyarnoye, Pestsovoye and Tarko-Sale. These fields are in the neighbourhood of the three giants and they use the existing infrastructure for gas transportation. Gas production from those fields is expected to fill the space of decreasing output of the three giants till the year 2010 (Finon, Locatelli, 2008). Afterwards, Gazprom is going to start using fields on the Yamal Peninsula, Arctic Shelf, East Siberia and Russian Far East (CERA, 2007). The possible extraction was planned to start in 2008, with expected annual output of 190 bcm by 2020 and with estimated peak of 250 bcm by 2028. Yamal is a difficult but quite promising area with proven reserves at the level of 10,5 tcm which constitute 22% of total Russian reserves (IEA, 2004).

All those above mentioned new areas of gas extraction are connected with much higher production costs. This means that the time of cheap gas in Russia is coming to the end because of objective factors as exhaustibility of the easily accessible giant fields. This factor will influence both domestic and export prices. With higher gas prices there is connected a threat that countries will turn to either alternative suppliers or energy sources. In terms of growing prices for gas delivered by pipelines, LNG production becomes more attractive.

- **Gas production and export volumes**

Russian gas production according both to international analysis and national energy strategy should increase from 584 bcm in 2000 by about 100 bcm till 2020. The expected changes in production volumes are presented in Table 3.1, with volumes adjusted in 2002 to the situation of not enough capitalised gas sector. The earlier expectation quoted by the same source were more optimistic, namely production in 2020 was to reach 850 bcm.

\(^{57}\) The Russian volumes converted into the international standard gas volumes by indicator 0,84 – in accordance with information in the source, (CERA, 2007).
Table 3.1  Gas production in Russia, 2000-2020 (In Billion Cubic Meters)

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<tr>
<td></td>
<td>584</td>
<td>580-600**</td>
<td>615-655**</td>
<td>640-690**</td>
<td>650-700**</td>
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For the security of gas supply to the EU, besides production, crucial is the amount of gas export projection. The expected Russian total gas export is illustrated in Table 3.2.

Table 3.2  Russian gas export, 1990-2020 (In Billion Cubic Meters)

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<tr>
<td></td>
<td>213</td>
<td>191</td>
<td>217</td>
<td>245-260**</td>
<td>245-275**</td>
<td>260-280**</td>
<td>275-270**</td>
</tr>
</tbody>
</table>

Source: International Energy Agency, Russia Energy Survey 2002, * export in 2005 was 232,7 bcm (Gazprom, 2007); ** production in pessimistic scenario and in optimistic scenario.

In the Russian strategy till 2020, it was planned that the production of Gazprom will stay at the same level as in 2005, namely 530 bcm in favourable scenario, and the growth of production and export will come from independent gas producers (Mastepanov, 2002). The amount of possible gas export in both scenarios is similar, however, in the period 2010-2015 “pessimistic” production could be even 20 bcm lower than “optimistic” one (Mastepanov, 2002).

It is also predicted that production of independent companies will rise till 170 bcm in 2020 (Mastepanov, 2002). Gas export of independent producers will strengthen Russian dominance on the EU gas market, but at the same time will guarantee some competition between companies, better prices and conditions for gas importing countries.

- **Gas flaring**

During oil extraction in some fields there is also a side production of gas, but usually this gas is not utilised. In Russia there is a problem of gas flaring although it is illegal and subject to fines. A reduction of gas flaring would enable Russia to sell more gas, even 17 bcm\(^{58}\). Although gas flaring is forbidden, companies are not so enthusiastic about undertaking expenses for additional equipment for associated gas transportation and its gathering. This problem is under consideration from the side of Russian authorities and should be solved in the near future (CERA, 2007).

\(^{58}\) The Russian volumes converted into the international standard gas volumes by indicator 0,84 – in accordance with information in the source, (CERA, 2007).
• **Export markets**

The EU is not the only potential importer of Russian gas. Russia has been planning to expand its export to the U.S. and Southeast Asia. Export to the U.S. will however demand LNG infrastructure that Russia has not developed yet. Russia is also going to supply to China and the Asian Pacific region about 60-80 bcm of gas. Those volumes will be transported by two planned new pipelines that Russia has promised to construct. India has already in 2004 looked for cooperation with Russia in assuring its security of gas supply. Cooperation encompasses both technology assistance and possible gas export in the framework of Sakhalin I project. Proven gas reserves in Russia are sufficient for further fruitful cooperation in gas trade between the EU and Russia. Russia has been developing new fields in order to keep production on satisfactory level. Those fields are close to Europe that diminishes risk of Russian turn to Asian markets. Eventually Russia has long-term strategy for a proper development of its gas market.

• **Gas infrastructure facilities**

The existing and planned pipeline routes, between Russia and the EU, have already been covered in sub-chapter 2.2. Here I will refer mainly to the current state of infrastructure and its influence on security of supply.

According to IEA, the forecasts for the needed investments in Russian energy sector till 2030 may reach 1 Trillion USD. The level of investments in gas facilities is unfortunately constrained by Gazprom profits and Russian resistance to foreign investments projects based on mutual advantage. Russian giant Gazprom makes profits only on the exported gas because domestic residential prices for gas are on a level close to production costs or even below them and industrial prices are still below possible market level. However, for the security of supply the low price level is not as important as the available level of investment.

The Russian export pipeline via Ukraine to the EU has capacity of 230 bcm. Currently this pipeline transports 190 bcm and has still free space. The future demand for Russian gas in the EU is supposed to rise by more than 90 bcm (Spanjer, 2006). In such a case new ways of gas supply should be developed. New pipelines or LNG terminals could be a solution; in fact it is up to the EU and Russia to solve the problem of future lack of transportation capacity.

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63 Ibidem
In order to offer a bigger amount of gas to the EU countries, Russia should also invest in gas production facilities, because the present ones are not expected to meet the future demand level. It is important to underline that investments in infrastructure are not restricted to pipelines but also concern accommodation, roads, airports, and telecommunication etc. in the area of gas extraction. In Sakhalin region, where there are substantial gas fields, there was no accommodation for employees and their families. The current works in Sakhalin region are focused on building a town for workers.64

3.2.2 Growing domestic demand for energy and gas

- **Demand for energy**

Russia has experienced a positive economic growth in 2000-2006. The percentage growth of GDP is presented in Table 3.3. This situation implies increasing energy consumption since developing economy needs more “energy products”. In 2000-2006 gas took over 53% of total energy consumption. The complete structure of energy fuel mix is presented in Figure 3.1. All this information indicates that higher demand for energy will also cause higher demand for gas.

### Table 3.3 Russian Gross Domestic Product growth in 2000-2006, (in percentage)

<table>
<thead>
<tr>
<th>Year</th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
<th>2003</th>
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<th>2005</th>
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<tr>
<td>GDP growth</td>
<td>7.7</td>
<td>5</td>
<td>4.7</td>
<td>6.8</td>
<td>7.1</td>
<td>6.4</td>
<td>6.7</td>
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### Figure 3.1 Energy consumption fuel mix in 2000-2006, (in percentage)

![Energy consumption fuel mix in 2000-2006](image)

Source: Author’s calculation based on data from BP statistical review full report workbook 2007, (BP, 2007).

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Russian industry still uses huge amount of energy. The Energy Strategy of the Russian Federation to the year 2020 assumes that the participation of the energy intensive sector in production will decrease. Energy efficient technologies in industry will be introduced (Mastepanov, 2002). As it is illustrated in Figure 3.2, industry consumes 30% of total gas production. This implies that this sector may influence substantially available gas volumes on the market.

Figure 3.2   Russian gas consumption by sector, 2003.

Source: Security of gas supply in open markets LNG and power at turning point, (IEA, 2004)

- Demand for gas

Total gas consumption in Russia amounted to 432,1 bcm in 2006 and rose by 14% in comparison to 2000(BP, 2007). This factor cannot be neglected while discussing the security of gas supply to Europe. Currently about 55% of total energy consumption is generated in Russia from gas (BP, 2007). Export to Europe according to contracts should reach 180 bcm in 2010.65 The structure of gas consumption in 2003 is presented in Figure 3.2. This comparison shows the role of gas in power generation and industry in Russia. According to Russian strategy, the residential demand for gas should increase. This will be a result of declining gas consumption in power sector and industry. This change is expected to bring lower demand for gas in total.

Russian internal demand for gas has grown substantially. The trend of domestic consumption is presented in Figure 3.3. Because of the fact that there are possible shortages for gas supply in the 10–year–perspective, Russian energy strategy was adjusted in 2007 to include more coal and reduce gas consumption.66

3.2.3 Price discrepancies of gas – on domestic and export market

Russian government has a policy of prices differentiation depending on the consumer type and destination in terms of region or country.67 There are differences in export prices for the former Soviet Union countries, former Soviet Block countries and the EU countries. Level of prices of the energy resources is a tool for the foreign policy of Russia. Countries from former Soviet Union that are closely cooperating with Russia are offered advantageous gas prices are kept at a more than acceptable level (Thomas, 2006).

- Gas prices on Russian market

Gas prices on the domestic market have been subsidised by Russian government.68 In this way government stimulates development of economy and enhances its competitiveness. It is

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67 In Russia there is special Federal Tariff Service, created in 2004, that sets the gas prices (Spanjer, 2006).
68 Gazprom is in 50,01% state owned company, Gazprom official website www.gazprom.com
worth to underline that energy is a component of a final price of any product and, as I have already presented in sub‐chapter 3.2.2, energy is produced in about 53% from gas. On the other hand only politically and economically stable Russia can be a reliable partner in securing gas supply to the EU and in this situation subsidising of Russian economy has positive results.

The EU, however, does not find any argumentation for justifying such low prices on the Russian domestic market, although recently they refer mainly to the residential sector. The EU wants Russia to change its internal gas prices policy and use unified prices for all buyers, where the difference in costs is based only on distance (i.e. transportation costs), import duties and taxes. This will be a next step towards common energy market (EC, 2005a).

- **Prices differentiation and the EU security of gas supply**

  This substantial price discrepancy could be also an advantage for the EU. This difference makes the EU market so attractive to Russia. In different circumstances, namely when the prices for gas on European and Russian markets are equal, or prices for gas on Asian and European markets are equal, Russia will have no incentive to deliver gas to the EU (Spanjer, 2006). This situation is worth to underline, because Russia has a limited production capacity and will not increase it substantially in medium-term perspective. It is better for the EU to be attractive enough, for receiving most of Russian gas export, instead of competing for gas with Asian countries.

- **Environmental issues**

  The EU authorities have also to think about the environmental issues while forcing Russia to change gas price policy. More expensive gas will cause a turn to cheaper energy sources like coal. This change will result in higher environmental pollution. Eventually every country will suffer from the polluted environment and the greenhouse effect, despite of the region of their origin. Since it is easier to destroy environment than to recover it afterwards, the aspect of high usage of gas in Russian industry should be treated as a complex aspect.

- **Gas and oil prices**

  Gas prices on the EU market are not a result of market forces. Gas prices are linked to oil prices and oil prices are strongly influenced by OPEC. To sum up, there is no real market price for gas. The only problem is that gas on the Russian market is sold below production costs69 and this constrains founds for investments in gas facilities.

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69 Mandil C., 2004, Securing the Russian (..) op.cit.,
3.3 Gazprom and independent gas companies

Gazprom is the leading Russian gas company. In 2006 Gazprom took the eighth position in terms of world’s most profitable companies and the third among energy companies (Thomas, 2006). It produces about 550 bcm annually, possesses 25% of world’s gas reserves, 60% of Russia gas reserves (Thomas, 2006), its gas output constitutes 20% of global production (BP, 2007) and it is a supplier of about 25% of the EU’s total gas demand. In Russia, Gazprom is the owner of most of the transmission and distribution grids, storage facilities, compressor stations, transportation network, inter alia 144000 km of pipelines (Paillard, 2007), the same as export facilities. It has conducted substantial investments in upstream and downstream gas market facilities. Currently it is able to control the whole production and distribution chain in Russia.

Since 2005 Gazprom is state-owned in 50,01% and from that time Gazprom is synonymous with Russian gas sector. For this reason Gazprom’s decisions in gas export are politically driven. Those decisions have, however, to be profitable, because Gazprom pays taxes to the state budget. Incomes from Gazprom constitute over 25% of the budget. German E.ON is the only foreign share-holder of Gazprom - it owns 6,5% of shares and has one sit on the Board of Directors (Thomas, 2006).

Gazprom’s main goal is to build its position in the Euro-Asian region. In order to give a better overview of the Russian presence in the world gas sector, I will specify countries where Gazprom in 2006 had investments in gas sector:

- Commonwealth of Independent states: Armenia, Belarus, Kazakhstan, Moldova, Ukraine, Uzbekistan;
- The EU MS: Austria, Finland, France, Greece, Netherlands, Germany, the UK, Estonia, Lithuania, Latvia, Poland, Slovakia, Czech Republic, Hungary;
- The EU Candidate Countries: Bulgaria, Serbia, Yugoslavia, Romania, Turkey;
- Other countries: India, Vietnam, Iran, Venezuela (Loskot-Strachota, 2006).

In order to achieve a dominant position on global gas market, Gazprom has invested a lot in foreign gas markets instead of developing its domestic production. This resulted in undercapitalisation of Russian gas sector. The current Gazprom’s gas production capacity is

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71 Gazprom is the only Russian company that has access to gas export. The total amount of Russian gas exported to the EU and the gas exported by Gazprom are equal.
73 Kupchinsky R., Russia: Gazprom - A Trouble Giant, 05.01.2006, http://www.rferl.org/
too low to meet the contracted volumes (Paillard, 2007). It seems to be the right moment for the Russian government to start execution of the Russian energy strategy.

**Figure 3.4 Russian gas production in 2000-2006 by producer (in percentage)**

![Image of gas production chart](chart.png)


Gazprom is forced to import gas from Central Asian countries in order to meet export obligations. In 2006 Russia imported 44 bcm\(^74\) (CERA, 2007). Unfortunately, gas from Turkmenistan, Uzbekistan and Kazakhstan enables Gazprom to remain the sole exporter from Russia to the EU. In these circumstances Gazprom is not forced to compete with other Russian gas companies or to intensify gas extraction from its domestic resources. Such a situation hinders development of independent gas producers. Russian government has no incentives for changing the law or facilitating expansion of other than Gazprom companies, since the contracted by the EU gas volumes are currently available on the market. In the long perspective, however, the attitude of Russian government should change. Import of gas from other CIS countries when the internal production is too low, should be treated as an incidental remedy and not as praxis.

The EU, having in mind its best interest, should encourage Russia either to liberalise or to allow access of some domestic independent companies to the gas export. This would be in line with the Russian energy strategy and the EU expectations. Gazprom is one of the most important aspects of the EU-Russia energy dialogue and security of gas supply is a function of its performance.

Additionally, Gazprom is investing in gas production capacities all over the world and in the future, there will be a possibility that the EU will buy gas from Gazprom despite the chosen export country.

\(^{74}\) The Russian volumes converted into the international standard gas volumes by indicator 0,84 – in accordance with information in the source, (CERA, 2007).
3.4 Transit countries on the way from Russia to the EU

Transit countries, regardless of their internal and international situation, increase risks associated with security of gas supply to the EU. Russian gas is delivered to the EU via Ukraine in 80% and via Belarus in 20% (Kjärstad, Johnsson, 2007).

Ukraine and Belarus are especially risky transit countries, because their relations with Russia are not stable. Additionally in the region of former Soviet Union countries, energy fuels are treated as foreign policy instruments. Below I would like to elaborate this question in more detail.

3.4.1 Ukraine

Ukraine is often called an “energy bridge” that connects producing and consuming countries. On Ukrainian territory is the second, after Russia, largest gas pipeline network. The total capacity of the system is 190 bcm\(^75\) where 135 bcm have their destination in central and western European markets (IEA, 2004). Unfortunately this gas transit system has been ageing and could become insufficient in the future as most of the pipelines are older than 25 years and have not been subject to regular maintenance.

Ukraine has not decided how to establish its relation with the EU and Russia. It wants to integrate with the EU countries and obtain their investments and assistance. At the same time however, Ukraine takes advantage of closer cooperation with Russia in gas sector, namely in a form of lower prices. This situation causes difficulties in terms of cooperation with Russia.

In order to make Ukraine more Russian-oriented, Russia uses “gas prices argumentation”.

At the end of 2005, Ukraine had dispute with Russia over transit tariffs. It did not seek any international support to execute its rights. Eventually, Ukraine accepted Russian conditions for quite low tariff fees (Stern, 2006). Additionally, Russia was going to raise the gas price for Ukraine from 50 USD to 250 USD per 1000 cm. Frictions those two countries resulted in gas supply reduction to Ukraine, but in fact supply reduction was observed also in other countries in the period between 1\(^{st}\) to 3\(^{rd}\) January 2006 (e.g. Poland, France and Italy – decline of 25%, Austria – decline of 33%) (Spanjer, 2006).

3.4.2 Belarus

The situation with Belarus as the transit country is more complex. It used to have very close relations with Russia. Both countries planned even to create a union or one country in 1999.\(^76\)

\(^{75}\)INOGATE, Ukraine Overview of Oil & Gas Sector, http://www.inogate.org/en/resources/directory

At present, the situation has changed, and although Belarus is still in the area of Russian influence, it does not benefit so much from this fact. Belarus is importing most of energy resources from Russia. Unfortunately, Belarus is not able to pay for energy goods even at lower prices than European countries. When the level of debts is too high for Russia, negotiations over the payment settlement take place. Gazprom is very eager to take control over the gas transportation network in each country and Belarusian Beltransgaz is not an exception. 77

Nevertheless, there is still mutual advantage in this cooperation. Belarus has lower prices for gas and Beltransgaz charges Gazprom for transit about a third part of the usual tariff. 78

However in 2011, Russia will establish gas prices for Belarus on the European level. This is an outcome of bilateral agreement between Russia and Belarus. 79 Lower gas prices have made some of Belarusian foreign and domestic policy decisions very Russian oriented.

3.4.3 Diversification of transit routes

Russia does not want its creditability to be damaged by any transit country. Additionally, Russia is not eager to pay the FSU countries transit fees for gas transportation, for historical reasons (Laurila, 2002). Levels of transit fees were also subject to conflicts and delivery interruption. For those reasons it decided to invest in two pipelines by-passing unpredictable neighbours: the South Stream Pipeline 80 on the bottom of Black Sea and the Baltic Pipeline on the bottom of Baltic Sea to Germany (called also the Northern Branch or Nord Stream). There is also planned the second string of Yamal-Europe Pipeline through Belarus or Baltic States to Poland and Germany.

3.5 Russia and Central Asia countries

Despite the brake down of Soviet Union has very tight bounds with the FSU countries in Central Asia. Those relations are based mainly on political issues and cooperation in energy sector. Although Kazakhstan, Azerbaijan, Turkmenistan and Uzbekistan have signed and ratified the Energy Charter Treaty, they have not become gas exporters for Members of

77 Belarus eventually agreed on the takeover of 50% of Beltransgaz.; (Gazprom to acquire 50 percent in Beltransgaz, 17.01.2007, The Russian Oil and Gas Report, www.lexisnexis.com,www.baser.dk)
80 Actually it was to be the extension of Blue Stream and this pipeline would deliver gas to Turkey. However Turkey wanted to raise the transit tariffs and Russia was not eager to have some difficulties with the next transit country. Russia signed an agreement with ENI – the Italian company for building the South Stream pipeline in order to avoid the transit countries. This action took place in 2007 however they are important for the thesis.
Energy Charter Conference. They prefer to build relation with Russia even without such matured legal framework.

This kind of regional cooperation could be a preliminary stage to both M&I and R&E however political “union” is closer to R&E. Actually, regardless the situation in the world, Euro-Asian regional gas market could behave as M&I environment. Internal processes in the region will be more in M&I storyline. Eventually, well-developed transportation network and integrated gas market of the FSU countries can be easier incorporated into future EU-Russian energy market. This will however depend on Russia’s future decisions.

Russia’s neighbours – Kazakhstan, Turkmenistan, Uzbekistan and Azerbaijan - have substantial gas reserves (see Table 2.9). The EU perceives them as potential gas suppliers. Nevertheless, the existing gas connections from Central Asia countries go to Europe via Russian territory. Additionally, Russia has signed long-term contracts with these countries for gas deliveries. It is worth to state that Central Asian gas is cheaper than Russian and this is one of the reasons, why Russia does not develop its own production (Laurila, 2002). Contracted volumes are close to total export capacities. In this way Russia prevents European countries from effective supply diversification, namely bypassing Russian territory, like the planned Nabucco gas pipeline.\(^81\)

3.5.1 Caspian Region

Russia and Caspian Sea countries Kazakhstan and Turkmenistan agreed to build a gas pipeline parallel to the existing Caspian gas pipeline which needs some maintenance and has too low capacity. The new pipeline will have annual capacity of 30 bcm.\(^82\) The current Central Asia–Centre pipeline has capacity of 56 bcm. The expected capacity of this pipeline, after the new string construction, should reach 80 bcm before 2020.\(^83\) This project could be seen from two opposite points of view: as a natural integration of the Central Asia region or preventing the EU and the US from closer cooperation in gas trade with the Caspian countries.

However, the Caspian Sea has unregulated legal status and any project that envisages construction of pipeline on the bottom of this sea will face legal obstacles. The territory is not divided among littoral countries and neither country is entitled to take autonomous legally binding decisions.

\(^81\) Mandil C., 2004, Securing the Russian (..) op.cit.
\(^82\) Kazakhstan, Russia and Turkmenistan agree to renovate the Caspian gas Pipeline, 17.08.2007, http://en.government.kz/site/news/052007/16
3.5.2 Kazakhstan

Kazakhstan possesses 3 trillion cubic meters (Tcm) of proven gas reserves (1.7% of world’s gas reserves) and 39.8 billion barrels (Bbbl) of proven oil reserves (3.3% of total oil reserves) (BP, 2007). In comparison with oil, gas seems hardly utilised resource, since not even 2% of gas reserves have been developed (Kaiser, Pulsipher, 2007). In 2006 Kazakhstan produced 23.9 bcm that is 0.7% of its total gas reserves (BP, 2007).

Presidents of Russia and Kazakhstan have cooperated very closely in the area of energy sector. President of Kazakhstan Nursultan Nazarbayev admitted that transportation of oil and gas from Kazakhstan to the final receivers via Russia’s territory is a strategic matter for Kazakhstan.84 This shows that Kazakhstan’s energy policy is driven more by political than economic factors. Closer relations with Russia are more important to the authorities than well-being of the energy sector (Kaiser, Pulsipher, 2007).

3.5.3 Turkmenistan

Turkmenistan had 1.6% of world proven gas reserves in 2006 (BP, 2007). It exports gas to Iran, Russia, Poland and Ukraine. It undertook to deliver 40 bcm to Ukraine and 30 bcm to Russia.85 The Ukrainian agreement, which is said to be more in a verbal form and with quite unrealistic data, caused misunderstandings and a gas crisis between Russia and Ukraine at the beginning of 2006 (Stern, 2006).

In 2006, Turkmenistan exported to Russia 42 bcm via the Central Asia–Centre (CA-C) pipeline. This is a pipeline that connects Central Asian countries with Russia.86 Turkmenistan exports gas also to Iran via the Korpedzhe-Kurt Kui pipeline, which does not go via Russian territory because of the objective geographical aspects.

Russia and Turkmenistan have already signed a contract according to which Turkmenistan will deliver annually 50 bcm in time 2008-2028.87 This agreement will enable Russia to deliver some contracted gas volumes to Europe. Actually Russia has been using Turkmen gas for its contract commitments from 1997.88 This is also a way for preventing gas export from Turkmenistan to East Asian countries, especially to China that is very interested in Central Asian resources. Despite Russian policy,

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88 Energy Information Administration, Country Analysis Briefs Russia, www.eia.doe.gov
Turkmenistan has already signed contract with China National Petroleum Corporation for delivery of 30 bcm a year from 2009 till 2039\(^\text{89}\) – this could be a beginning for competition of energy resources between Russia and China.

Turkmenistan has been also involved in the project of Trans-Caspian Gas Pipeline (TCGP). It is planned to transport gas from Turkmenistan, via the Caspian Sea to Azerbaijan, Georgia and eventually to Turkey and is supported by the US (Mavrakis et al., 2006).

### 3.5.4 Azerbaijan

According to statistics Azerbaijan had in 2006 gas reserves of 1,35 tcm (BP, 2007). The total annual capacity of the 4500 km pipelines was 30 bcm (Mavrakis et al., 2006). Turkey and Azerbaijan signed an agreement for gas delivery that should have started at the end of 2006 with initial amount 2 bcm and finally reaching 6,6 bcm. This agreement could provide diversity in gas supply to Europe. Transportation infrastructure – South Caucasus Pipeline (SCP) is to bring gas from Sngachal terminal via Georgia to Turkey in Erzurum (Mavrakis et al., 2006). SCP will be supplied with gas from the field Shah Deniz, which has proven reserves of 460 bcm.\(^\text{90}\) This pipeline is also called the Baku-Tbilisi-Erzurum pipeline (BTE). This may be a diversification in gas deliveries to the EU.

### 3.5.5 Uzbekistan

Uzbekistan had 1% of global gas reserves in 2006 (BP, 2006). Due to lack of democracy and repressive domestic policy Uzbekistan’s relations with western countries are strained. The U.S. and the EU imposed sanctions on this country when it refused to launch investigation on use of force against civilians in Andijan in May 2005. This incident made Russian–Uzbek relation closer, because Russia gave political support to Uzbek leader Islam Karimov. It also influenced the energy relations as Uzbekistan is a transit country and also supplies some of its gas (in 2006 about 9 bcm\(^\text{91}\)) to Russia. Consequently, Uzbekistan will probably cooperate only with Russia in gas sector.

### 3.6 Conclusion

Russian tendencies to build an energy empire should not damage the EU-Russian relation in gas sector. However, using gas as a foreign policy tool is risky in terms of security of gas supply via transit countries. Russia has a long-term strategy for development of its gas sector,

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but unfortunately does not execute it sufficiently. Russia neither invests in gas production capacities nor accepts foreign investments in this sector. Additionally both domestic and foreign demand for gas will rise. This may result in gas shortages on the Russian market, despite the biggest gas reserves in the world. Gazprom builds its position in the world by investing in gas producing and transporting companies. This can cause a difficult situation for the EU with hardly any supply diversification in the future, because most of the gas projects will involve Gazprom. Russia does not facilitate higher production of independent domestic gas companies. Instead, it imports gas from Central Asian countries, which are in its strong influence area. The EU tries to make this region a gas supply diversification but with limited results.

Concluding, Russia will be able to fulfil its gas contract obligation but not with internal production. It can remain the EU strategic partner, because it eventually ensures gas delivery. Development of the EU – Russia cooperation may influence positively reforms of gas sector in Russia and enhance security of gas supply in the future.
4. Development of cooperation between the EU and Russia – in terms of security of gas supply

The EU and Russian gas markets have already been described in regard to their political and economic circumstances. In this chapter I will present the tools of cooperation between the EU and Russia in 2000-2006, namely Partnership and Cooperation Agreement and the EU-Russia Energy Dialogue. This cooperation will be verified in terms of its effectiveness in securing gas supply to the EU.

As a basis for further integration in gas market I will discuss the issue of interdependence between the EU and Russia in gas sector along with possible integration between the EU and Russian gas markets. Eventually I will present two initiatives, namely INOGATE and the Energy Community of the EU, which currently do not include Russia but are connected with it indirectly. Those initiatives have also impact on the security of gas supply from Russia to the EU.

4.1 Partnership and Cooperation Agreement

The Partnership and Cooperation Agreement (PCA) was set up to enhance cooperation between the EU and Russia. According to PCA Russia is the EU’s strategic partner in trade. Within PCA there are stipulated common principal and objectives, a framework for bilateral agreements, grounds for dialogue and activities in many areas. The main principles advocated by PCA are development of political and economic freedom, support for international peace, security and democratic norms. PCA was signed in 1994 and came in force in 1997. This partnership has proven that closer relations with Russia have positive results in economic and political aspects. Many issues of energy cooperation and trade in energy have not been however regulated by PCA. Those issues were subject to the Energy Charter Treaty (ECT). Russia has still not ratified ECT although it has signed it in 1994 (EC, 2004c). In order to cover that crucial part of the EU-Russia relations which is trade in energy a special tool, namely Energy Dialogue was established.

PCA was signed for 10 years and will not be valid after 2007. The EU and Russia have been currently working upon new post 2007 PCA. Both partners have changed substantially in

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92 In the scope of PCA there are issues as political dialogue, trade in goods and services, business and investment, financial and legislative cooperation, science and technology, education and training, energy, cooperation in nuclear and space technology, environment, transport, culture and prevention of illegal activities. (EC, 2007c)
economic and political terms since 1997 and the new agreement should be adjusted to a present situation. One factor is however stable, namely the respect for common values. In the new Partnership and Cooperation Agreement with Russia the energy issues will be certainly included. There is a possibility that this part of PCA will be based on some of ECT provisions. In my opinion, issues connected with security of energy supply and measures for prevention of gas delivery interruption should be also included in this new agreement.

PCA contributed to the development of Russian economy. By making Russia a more reliable partner, PCA indirectly enhanced security of gas supply to the EU.

4.2 Energy Charter Treaty

The Energy Charter Treaty (ECT) was signed on 17th December 1994 and entered into force in 1998. It was the first multilateral agreement after the end of Cold War. The aim of ECT was to form a competitive market for trade in energy products along with a legal framework for foreign investments (Sodupe, Benitoto, 2001) and it was quite a new solution in this sector. In the perspective of the EU regional cooperation, ECT was especially important for securing investment of the Western Companies in the Eastern Europe and Russia. (Axelord, Gudipati, 1996).

The countries that were subject to ECT possessed 8.6% of oil and 44.7% of gas reserves (Sodupe, Benitoto, 2001). This implies that gas sector has been more internationally unified, and gas may be treated as a more secure resource.

The Energy Charter is an example of performing M&I model where countries created one common law for trade in energy and tend to act as one market. ECT in Article 7 puts high importance to smoothing the process of transit for energy resources, regardless of their origin, destination and ownership. It is also in the responsibilities of the Contracting Parties (CP) to maintain, develop and interconnect the transportation infrastructure in this common market.

To the advantage of R&E storyline is the fact that Russia has not ratified ECT and is not even going to do this. The EU has put a lot of efforts to change this uneasy for the EU countries’ situation, especially in investments area, but with no positive effects.

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94 Member States of Energy Charter Treaty Conference: Albania, Armenia, Australia*, Austria, Azerbaijan, Belarus*, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, European Communities, Finland, France, Georgia, Germany, Greece, Hungary, Iceland*, Ireland, Italy, Japan, Kazakhstan, Kyrgyzstan, Latvia, Liechtenstein, Lithuania, Luxembourg, Malta, Moldova, Mongolia, Netherlands, Norway*, Poland, Portugal, Romania, Russian Federation*, Slovakia, Slovenia, Spain, Sweden, Switzerland, Tajikistan, The former Yugoslav Republic of Macedonia, Turkey, Turkmenistan, Ukraine, United Kingdom, Uzbekistan. *- in September 2004 those Member States were did not ratify ECT (ECS, 2004).
There can be stated a question, how the Energy Charter will influence the cooperation between Russia and the EU in the area of security of energy supply, provided it is ratified by Russian Parliament. One of the most important issues will be better predictability of possible movements in the Russian energy sector and transparent law for foreign investments in Russian gas sector. The next and maybe the most important thing will be easier access to Russian energy resources. However, this was one of main reasons why Russia has not ratified this Treaty.

4.3 EU – Russia Energy Dialogue

The energy dialogue between the EU and Russia was established as a complementary tool for PCA after the failure of Russian ratification of ECT. The Dialogue, which was started in October 2000, can be a measure to achieve a pan-European energy market and a common European economic space.\textsuperscript{95} The EU–Russia Energy Dialogue was called by Commissioners Lamy and Patten as “a pioneer for wider relations” (EC, 2004c).

Energy dialogue is an executive measure for goals stipulated in Green Paper “Towards a European Strategy for the security on Energy Supply” adopted in 2000. In the framework of the energy dialogue the following issues as follow are to be developed:

- Introduction of transparent rules and legal framework for companies operating in both markets,
- Establishing environment for investments in both markets
- Securing long term energy supply
- Construction of new transportation infrastructure and maintenance of the existing one
- Ensuring safety of the transportation network.

Energy dialogue is a suitable measure to achieve all those goals because it brings together the European Commission, the Russian Government, the EU Member States and representatives of the EU and Russian Industry. Russia and the EU have different way of dealing with business, treating energy issues and analysing economic processes; the energy dialogue has helped to overcome almost all possible misunderstandings and to find a common way in the energy sector, especially security of energy supply. Security of energy supply is now a common thing for which both parties are responsible.

\textsuperscript{95} An interim report, To be presented on the EU-Russia Summit 25 May 2006, by the parties of the EU-Russia Energy dialogue, \url{http://ec.europa.eu/energy/russia/joint_progress/doc/2006_05_25_interim_report_en.pdf}
Stable and predictable energy suppliers along with stable neighbourhood are very important for security of gas supply. Russia is both a gas supplier and a country in the direct neighbourhood. In order to find the best common solution for all the issues that are covered by energy dialogue, special groups of experts are organised with people both from private sector and national administration. Such a mechanism of common decision has been not developed with any other the EU supplier. This guarantees the quality of decisions, mutual understanding and gives advantage to EU-Russia relations over other suppliers. As a result of the energy dialogue Russia has better access to the European market and Russian companies invest in the EU energy sector. It will be however more important to secure reciprocal rights for investments in gas sector in both regions. Those actions will give the relationship more economic dimension and wise economic dependency. It is a path that the EU could follow despite the possible M&I or R&E storyline.

Within the energy dialogue issues like the long term contracts, destination clauses, and Russia membership in WTO are, among others, deeply discussed and examined. Difficulties that have come up during realisation of the Nord Stream pipeline project have been also settled in the framework of Energy Dialogue.

The next very useful tool that is to be established as an effect of cooperation in the energy dialogue is the Energy Market Observation System. This system will monitor internal and external oil, gas and electricity supplies to the EU and will enhance the security of supply and appropriate functioning of the internal energy market. Potential risks for any disruption will be also analysed. This will go along with assuring proper functioning of internal energy market (EC, 2004c). This kind of cooperation is also a huge advantage to the EU.

The EU-Russia Energy Dialogue is also aiming at energy efficiency,96 exchange of information about advanced energy technologies and harmonisation of energy policy. To this aim the EU-Russia Energy Technology Centre in Moscow was established in 2002. This Centre promotes usage of renewable energy in Russia (EC, 2004b).

The rules of cooperation are adjusted to changing conditions. After the EU enlargement in 2004 the “Joint Statement on EU Enlargement and the EU-Russia Relations” was signed in April 2004. This agreement helped to set the most important energy aspects as long-term contracts, restriction on hydrocarbon imports etc. (EC, 2005a). It was agreed that restrictions of the amount of oil and gas that may be imported from Russia to the EU (25) were no longer in force. The EU may import more than 30% of one fossil fuel from Russia (EC, 2005a).

96 Additional assistance on energy efficiency in the framework of TACIS is performed in Archangelsk, Astrakhan and Kaliningrad (EC, 2004b).
These things have made the bounds between the EU and Russia even stronger and deeper. Since the new member states are mostly dependent on the energy from Russia, the regional cooperation in the energy area seems natural.

Actually, the real participants of the energy dialogue are European gas companies. They conduct business with Russian giant Gazprom. Gazprom is the only company that may export gas – so it is the right business partner. Currently Gazprom is cooperating very closely in Russia and in Europe with: Total (French company that is a probable partner in development of Astrakhand field and already possesses 25% in Shtokhman field’s development company), BASF (Germany); Rurhgas (Germany; owner of 7% of Gazprom shares), Eni and Enel (Italy; Eni is a partner of Gazprom in South Stream pipeline project)\(^97\)

The EU–Russia energy dialogue brings positive results and the Commission feels that new and more effective energy partnership with Russia should be developed (EC, 2006g). Within the Energy Dialogue both sides are involved in the project of Trans-European Energy Network. This is an example of combination of the EU and Russian strategies.

There is no doubt that the dependence on fossil fuels from Russia will rise, as the whole EU’s fossil fuels import. The main objective for the dependence on Russia in accordance with the existing Energy Dialogue is to make this dependence constructive and mutually advantageous. A strategic Energy Partnership with Russia could secure the position of the EU and assure security of energy supply no matter what scenarios come true.

**4.4 Interdependence of EU and Russia in the energy sector**

Interdependence between these two regions can exist provided that there is an area of common interest mutually profitable for both sides. Some of the most important factors of the interdependence between the EU and Russia in the gas sector are gathered in Table 4.1.

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Table 4.1 The EU and Russia interdependence

<table>
<thead>
<tr>
<th>The EU</th>
<th>Russian Federation</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Small gas reserves</td>
<td>• Substantial gas reserves</td>
</tr>
<tr>
<td>• Gas “hungry” region</td>
<td>• Currency “hungry” region</td>
</tr>
<tr>
<td>• Security of supply</td>
<td>• Security of demand</td>
</tr>
<tr>
<td>• The EU imports 25% of gas from Russia</td>
<td>• Incomes from trade in gas constitute 20% of Federal Budget</td>
</tr>
<tr>
<td>• The internal gas production declines and the gap between production and demand increases – additional import is needed. It could be performed by Russia</td>
<td>• The EU is the most profitable gas market for Russia</td>
</tr>
<tr>
<td>• Growing demand of gas will easily absorb surplus of production in Russia</td>
<td>• Russia has contracts for stable income from gas trade in the EU</td>
</tr>
<tr>
<td>• Gas is an attractive fuel in the energy mix as it is environment friendly – Russia can deliver it on acceptable terms and in sufficient volumes</td>
<td>• Gazprom for crediting its investments has used contracts for gas as a collateral – so they have to be stable</td>
</tr>
<tr>
<td>• European companies have long-term contracts for gas delivery (E.ON-Ruhrgas, BASF-Wintershall, the Austrian OMV, ENI, GDF, The Danish DONG)</td>
<td>• The planned production will rise more than in the Russian strategy till 2020. Gazprom needs a market that will absorb additional production.</td>
</tr>
<tr>
<td>• The only fully stable and predictable gas supplier to the EU is Norway but it has limited reserves. Russia can be ranked as a second stable supplier</td>
<td>• Domestic market is huge but unprofitable for trade in gas, since it is subsidised by government</td>
</tr>
<tr>
<td></td>
<td>• Investments in upstream and downstream gas facilities in the EU market</td>
</tr>
</tbody>
</table>

Source: Author’s analysis.

The EU and Russia from the very end of Cold War have developed mutual economic and political relations. The currently existing economic interdependence between EU and Russia is really substantial. In 2006, the EU export to Russia amounted to 72 Million Euro and that constituted 6% of the total EU export. In the same time Russian export to the EU amounted to 136 Million Euro and that represented 59% of the total Russian export.98 Russia took the third position as the Major EU Trade Partner.99 Fossil fuels take a significant share in this trade. The interdependence between the EU and Russia could be illustrated as follow. Gazprom sells 70% of gas on domestic market and 30% on the European market. The situation with revenues is however the mirror image: the revenues from Russian market amount to 30% whilst from the Europe to 70%.100

Having in mind that 20% of the Russian budget comes directly from the Gazprom revenues it underpins the role of the EU and gas in Russian economy (Spanjer, 2006). Russian federal budget is in 40% made up of the incomes from the export to the EU. About 45% of Russian

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energy is exported to EU. Russia on its territory possesses one third of global proven gas reserves. Energy dialog will help the EU securing the deliveries of gas.

The EU does not have enough gas resources to meet its growing domestic demand. Russia does not have sufficient financial resources to cover the state budget expenses. For the reason described above and as the EU has also underlined it – the cooperation between EU and Russia in the energy sector should be called in fact – interdependence. The EU and Russia are both in favour of long term energy cooperation, including long term contracts; however the energy partnership should be up to the both sides’ expectations.

The EU needs to secure gas supply whereas Russia requires investments in gas sector. The real partnership between the EU and Russia will make way for substantial long-term investments in the energy sector and will contribute to the higher gas production capacity (EC, 2006g). One of the most important factors for the cooperation is mutual trust and predictable situation on both gas markets.

There are, however, concerns about EU growing dependence on energy cooperation with Russia. It may prevent the EU from criticising Russia or taking international actions against it, if the latter violates democratic rules, human rights etc. However the EU in cooperation with Russia is not only focused on energy issues, but also on all aspects connected with a stable development of Russia. Good relations with Russia are important but not in case of acceptance of its undemocratic behaviours. They finally may make Russia too risky for further cooperation in gas sector.

While analysing the relation between the EU and Russia the fact that both partners are interested in stability and security of energy supply on the whole European continent is more than obvious. It is also a point of view represented by IEA. According to Mr. Mandil, Executive Director of IEA, Russia has already proved that the EU can rely on the energy supplies from Russian territory.

Interdependence between the EU and Russia in gas sector is based on economic issues. As long as Russia will earn profits from gas export security of gas supply is assured. The EU may increase interdependence by further integration with Russian gas sector.

4.5 Regional gas market

In my thesis I have already delivered argumentation, that despite globalisation process in trade of goods, gas market is a regional issue. In this part I will refer to a regional gas market between the EU and Russia. Both markets have already been described separately in details. Here, I will concentrate on a possible integration of them. This aspect will be presented in reference to the security of gas supply.

The EU and Russia in their cooperation dated from 2000 have shown that they both have been interested in creation of a pan-European gas market. This initiative is a part of a wider project of a common economic space between the EU and Russia. In gas sector this process includes transfer of technology, co-investment in maintenance and development of existing infrastructure. Following this Russia should be a reliable gas supplier that should be able to deliver to the EU bigger gas volumes in the future (EC, 2003a).

Both the EU and Russia support the process of integration between their gas markets. They understand the opportunities of business development, enhancement of security of supply and competition (EC, 2003c). Cooperation in gas sector between EU and Russia is to huge extent a result of geographically, geologically, economically and logistically favourable conditions. According to President Vladimir Putin’s statement “unity of the continent can never be achieved until Russia (...) becomes an integral part of the European process” (EC, 2007c). In terms of gas sector it is more about the security of gas supply, but with the same reasoning.

In 2000-2006 the EU was very interested in getting access to the Russian gas reserves. The EU has focused on extending the common rules for trade, transit and environment to its neighbouring countries in gas sector (EC, 2006a). Unfortunately Russia was not in favour of those European investments. Even though Russia seemed to be quite open to integration with the EU, this strategic sector was in fact kept as an internal issue. Russia many times expressed its willingness to coordinate with the EU development of its gas sector, but actually it was more about Russian investments in the EU upstream and downstream gas facilities. The EU has unsuccessfully tried to persuade Russia to introduce common rules in the framework of Energy Charter Treaty. However the new Partnership and Cooperation agreement may provide legal basis for the future integrated regional gas market (EC, 2006a).

The EU gas market has been subsequently liberalised and free flow of gas has become a reality. Russian Gazprom has been more & more involved in this market relying on the EU law. However without reciprocal legal adjustments on the Russian side. Possible integration between liberalised and monopolistic market will be hard to achieved, with advantage to the
first one. That is the reason why the EU should build one external policy, what is more in R&E scenario, and in this way execute the already taken decisions in the EU-Russia energy dialogue. The EU will have to persuade Russia to introduce Third Party Access rule to its transportation network and liberalise its internal market - first for all Russian gas companies, and then for European ones. TPA will be important for transport of gas from the Caspian region via pipelines on the Russian territory, when gas is not sold to Russia or produced by Russian company.

There are some conditions that may serve as a basis for regional EU-Russia gas market. Despite obstacles, Russian gas sector is very attractive to European companies. They have been participating in project concerning new gas fields extraction and construction of new transportation facilities. Although there is a risk associated with investing in Russia, those undertakings are profitable to European companies. In this way the EU also secures gas delivery. Additionally Russian gas sector needs investments and eventually Russia will have to accept presence of foreign companies on its market. Otherwise production of this sector will decline. Following this subsequent interdependence between the EU and Russia will have more & more features of integrated market.

Integrated and eventually liberalised market will give advantages both to Russia and the EU. The free flow of gas will contribute to the most favourable prices for consumers and security of supply. Integrated market will ensure maintenance and development of the gas infrastructure. This will be guaranteed by stable environment for investments, common interest and adjusted legal environment in the EU and Russia.

The next argument for future integration is that the entire Russian infrastructure is directed towards the EU. This transportation network is not in an excellent shape, but so far it has not caused any difficulties. However it will be to advantage of both sides when pipelines are maintained regularly with both sides commitment.

Europe has already Eurogas organisation that coordinates issues in gas sector among gas companies. Eurogas may act as a partner to Russian Gazprom on a way for establishing common management of gas sector in the EU and Russia, before real integration of gas markets takes place. It can be an ally in construction of storages and transportation facilities. 22 states participate in Eurogas and 19 of them are also members of the EU.104

There are, however, other aspects that should be taken into consideration in the process of gas market integration. Russia has no direct dependence on gas imports although it covers some

part of its contracted export volumes by import from FSU countries. This is an advantage that cannot be overestimated. Additionally Russia regulates prices on the internal market and differentiates gas export prices to FSU countries. This situation cannot be accepted in the EU-Russia integrated gas market.

Russia planned de-monopolisation of Gazprom in 2001 that should be completed in 2005\textsuperscript{105} but the situation changed completely in 2006. Russia has refused to reduce Gazprom’s monopoly and to allow Third Party Access to the pipeline network during the EU-Russia Summit in 2006 (Finon, Locatelli, 2008). This indicates that Russia has restrained to integrate with the EU in gas sector.

In the analysis of integrated gas market also transit countries have to be taken into consideration. Their relations both with Russia and the EU are complex. Actually this issue will be easier to solve, if Russia decides that it has pro European attitude in international relations. Following this Ukraine will be more stable transit country and Russia will not stop gas delivery through Ukrainian territory.

Integration between the EU and Russia market would result in increased security of supply. There would be sufficient investments in gas production and decisions would be taken on economic basis. Following this there would be no shortages in gas delivery. The first stage of integration process would be more in the R&E scenario as the EU and Russia have to discuss this aspect as equal partners. When the Russian market guarantees similar condition for the European companies as Gazprom obtains in the EU, cooperation should change in the direction of M&I activities and gas sector will be managed by market forces.

Nevertheless the main conclusion is that the EU is more interested in integration of gas market than Russia, because Russia may develop without integration with Europe. For Russia the only important thing is incomes from export to the EU and security of gas demand. Russia has already invested in the European market and has secured its position as an important supplier. Currently the EU has to secure gas delivery and persuade Russia that they should contribute to this together.

4.6 INOGATE

Interstate Oil & Gas Transport to Europe (INOGATE) is an international initiative for facilitating transportation of those fuels to Europe. INOGATE is also an instrument for enhancing the EU’s security of supply. Russia is not a member of INOGATE. INOGATE

program has a coordinating body, which is the INOGATE Technical Secretariat in Kiev. INOGATE supports investments in Caspian region and Central Asian states and has been strengthening supply networks to the EU. INOGATE advocates regional integration of existing pipelines in the region.

The EU welcomes new initiatives that will assure diversification of suppliers. One of such initiatives is at the moment the Baku Initiative that is coordinated by INOGATE. In this project take part the EU, the Caspian and the Black Sea countries and their neighbours. In 2004 those countries agreed to harmonize legal and technical standards in order to create integrated market; to increase safety and security of supply; to modernise existing infrastructure and to build a new one, and to make power generation more environmentally friendly. The aim of the INOGATE program is to improve security of supply in the EU, the Caucasus and Central Asia.\textsuperscript{106}

INOGATE has conducted a technical audit of the state of existing gas pipelines. The acceptable condition of pipelines is a very important point in this program activity. INOGATE is prepared to offer legal, technical and even financial help on project preparation for new transportation infrastructure. INOGATE in the scope of its activity has pointed out strategic routs for Pan-European connections.

INOGATE adjusts its undertakings to the parallel actions of the EU-Russia Energy Dialogue.\textsuperscript{107} According to INOGATE, priority for the construction, have inter alia pipelines: Nord Stream and a second Yamal string.

All activities coordinated by INOGATE contribute to creation of unified and in the future even common gas market. Those activities indirectly influence also security of gas supply from Russia because they support activities undertaken within the Energy Dialogue.

4.7 Energy community of the EU

The new EU initiative is the energy community. The Energy Community Treaty extends the EU legislation, inter alia on energy issues, to the territories of the Contracting Parties, at present to the Western Balkan countries. The Energy Community Treaty entered into force on the 1\textsuperscript{st} July 2006. It covers energy security, competition and environment. A decision to establish such a community was undertaken in order to assure stable environment for the investments in the energy sector in the Contracting Parties. In the Treaty security of supply

\textsuperscript{106} INOGATE Developments 2001-2004... and New Perspectives, 06.2004, www.inogate.org

\textsuperscript{107} Ibidiem
was highlighted.\textsuperscript{108} This Treaty will support the development of regional gas market. The Treaty establishes a legal and economic network for Energy Network development. It is very important for the countries to build one stable and reliable network for transfer of the energy goods, i.e. oil and gas. Network Energy is understood as electricity and gas sector issues that are in the scope of European Community Directives 2003/54/EC and 2003/55/EC.

The inclusion of Norway and Ukraine, which have already formally applied to join the Energy Community Treaty, will be very crucial for effective execution of regional energy cooperation. Turkey, the expected future transit country for gas coming from the former Soviet Union countries, is at present an observer state. The idea of energy community seems even more viable when we take into account the possible Ukrainian or Turkish accession to the EU.

Russia is not a member of the Energy Community since the initiative was initially addressed to Mediterranean region. This initiative, however, could be the beginning of the pan-European energy market including Russia. Actually the EU should promote the European energy community in a wider European area. The further step could be free flow of energy goods among all members of the Energy Community (Maňč-Estrada, 2006).

### 4.8 SWOT analysis for security of energy supply with closer EU – Russia cooperation in the gas sector

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<th>Strengths</th>
<th>Weaknesses</th>
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<td>• Well-established framework for cooperation – the EU-Russia energy dialogue</td>
<td>• Regionalisation of the gas market</td>
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<td>• Russia as a strategic supplier with the biggest gas reserves in the world</td>
<td>• Existing import capacity below the expected demand for Russian gas</td>
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<td>• Economic interdependence of the EU and Russia</td>
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<td>• Russia as a reliable energy supplier to the EU for a long time</td>
<td>• Diversification of gas delivery from Central Asian countries blocked by Russia - by long term contracts for gas import</td>
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<td>• Long term contracts for gas delivery from Russia</td>
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<td>• Long term strategy for utilisation of all-size gas fields in Russia</td>
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<td>• Regionalisation of the gas market</td>
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<td>• Economic interdependence of the EU and Russia</td>
<td>• Growing demand for Russian gas in Asian countries</td>
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<td>• Russia as a strategic supplier with the biggest gas reserves in the world</td>
<td>• Growing costs of gas production</td>
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Source: Author’s analysis.

The EU and Russia worked out a suitable way for cooperation in gas sector. Most of the weaknesses and threats may be overcome as a result of the Energy Dialogue. Integrated gas market would diminish threats connected with underinvestment of gas sector in Russia. The most important advantage of higher dependence on Russia is the fact that Russia has the biggest gas reserves in the world and is able to cover the EU demand for gas in a long-perspective. Moreover, growing economic interdependence between the EU and Russia constitutes stable basis for future market integration.
Conclusion

Security of gas supply is a complex issue and includes both internal and international aspects. Ensuring security of gas supply is getting more and more significant, along with the EU growing import dependency on gas. The EU gas reserves are insufficient in order to cover its internal demand. The EU gas production will decline sharply after 2010. Following this, import of gas is expected to reach 80% of gas consumption in 2030. In such circumstances, the EU has to establish a long term strategy for cooperation with gas producing countries. A dependency on external suppliers for strategic resources is always associated with more cons than pros. Developing trade in gas sector between the EU and Russia is associated a range of risks which however can take place despite a supplier.

This paper provided an answer to the question whether development of cooperation in gas sector between the EU and Russia ensures security of gas supply to the EU. The theoretical evaluation of the future situation in the world, namely M&I versus R&E, brought a conclusion that cooperation between the EU and Russia is necessary for security of gas supply, regardless of the storyline. The empirical analysis showed that gas import from Russia can be only diversified, but not substituted. The next issue, that underpins Russian position in the EU exporters’ portfolio, is level of proven gas reserves. Russia has the biggest gas reserves in the world. Additionally, substantial part of them is located in Western Siberia. Consequently, Russian position as the EU strategic gas supplier is not only a political decision but has reasonable argumentation behind. As a result of this paper’s studies, development of cooperation with Russia is recommended not as an option, but as a necessity. The above mentioned reasoning will be described in more details below.

First, present situation on the global gas market may develop in two opposite direction in terms of M&I and R&E storyline. In case of M&I, the already started cooperation with Russia, will speed up creation of integrated gas market. Abundant Russian gas reserves will be utilised in accordance with market forces on the EU-Russian market. On the other hand, R&E will prevent any form of the EU access to the Russian gas market. The EU will have to develop measures for effective cooperation with Russia, including common external energy policy. Additionally, due to political decisions and lack of investments in Russian gas sector, growing gas production will be restrained. Following this, competition for Russian gas resources will increase significantly among all importers. In these circumstances long-term
contracts for gas delivery from the biggest gas producer are a solution that ensures security of gas supply.

Secondly, in order to fulfil Kyoto Protocol obligation, the EU has to change its fuel mix towards more gas-oriented. Many EU MS are already highly dependent on gas imports from Russia. The EU changed its legislation in order to facilitate gas import from Russia, namely revoked a provision that import dependency on one fossil fuels’ supplier cannot be higher than 30%. In this way, the EU expressed its willingness for further development of trade in gas with Russia. Moreover, in 2000-2006 all the EU documents, concerning security of gas supply, stated that Russia is a strategic partner for gas delivery. Additionally, after the deletion of destination clause from gas contracts signed with Russian, gas may be freely traded on the EU internal market. As a result, gas available on the EU market can be effectively utilised. Nevertheless, the EU should facilitate common external energy policy towards Russia, in order to be an equal partner in case of a creation of integrated regional gas market.

Thirdly, empirical analyses show that the EU future demand for gas can be covered only by a combined import form Russia and the other suppliers. Following this Russia guarantees sufficient gas supply to the EU. Actually, the EU commercial companies and governments of their countries decided to signed long-term contracts for gas delivery from Russia.

Next, verification of stability and reliability of Russian Federation, as the main energy resources supplier to the EU, showed that Russia is able to deliver the contracted gas volumes to the EU. Additionally, Russian foreign policy towards the EU is not associated with political risk of gas delivery disruption. High European prices for Russian gas underpin security of gas supply from Russia. Moreover, Russia in order to diminish transit risk builds, in cooperation with the EU companies, pipelines bypassing unstable transit countries, like Ukraine and Belarus. On the other hand, Russia, however, re-establishes its position in the FSU countries in a political way. It also contracted most of the gas exported from Central Asia countries. This situation hinders direct access of the EU countries to Central Asian gas reserves; but it also prevents flow of gas towards Asian markets. Eventually there is more gas for export to Europe.

Last, but not least this paper gives evidence for added value from the EU-Russia cooperation in the framework of PCA and the EU-Russia energy dialogue. Within these both initiatives, the EU and Russia learnt how to find solutions acceptable for both partners. Outcomes, of the EU-Russia energy dialogue, constitute a unique framework for dealing with gas issues. Both partners agreed that creation of Pan-European energy market is their common goal.
Additionally, it is expected that a new PCA will include issues concerning gas sector and security of gas supply, in a form that will bring mutual advantage to both partners. Moreover, interdependence between the EU and Russia indicates that their economic relations are stable and will develop in the future.

Concluding, no other supplier will be able to deliver to the EU gas volumes comparable to Russian ones. Further development of cooperation with Russia will enhance the EU security of gas supply, because it is based on healthy and stable rules between equal partners.
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