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**Russia's role in the development of the
21st century gas sector: *economic and
geopolitical perspective***

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perspective

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Objectives

1. Analyze contemporary trends in the global gas sector by highlighting major milestones in the relationship between energy ‘producer’ and ‘consumer’ states, and assessing eventual development of the gas sector with a special emphasis on Transnational Corporations.
2. Evaluate Russia’s gas market by providing its SWOT analysis (assessment of its strengths, weaknesses, opportunities and threats);
3. Define the impact of Gazprom, the country’s biggest gas company, on Russian and global gas markets;
4. Accumulate and analyze statistical data on gas supplies in order to support arguments to be presented with empirical facts and figures.

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Thesis Project

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1.1 Development trends of the global gas market

1.2 The system of gas market regulation

1.3 Analysis of the currently operating models of the world gas market

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3. Development of Russia’s gas industry

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Overview

The development of the natural gas sector is increasing compared to the production and consumption of other energy resources, according to the analysis of the world oil and gas markets in recent years. It is forecasted by the experts that the share of natural gas in the world energy balance will constitute up to 30 percent by the mid of the 21st century, hence the forthcoming century is frequently called the century of natural gas and liquids.

Energy has become an increasingly important policy issue as the world economy has changed due to rising competition for access to limited resources. This has greatly affected the international energy market and has provoked the shift in the balance of power, dividing the world into ‘producer’ and ‘consumer’ states. Russia, being one of the major gas exporters in the world, emphasizes the importance to promote further development of its energy market in order to be competitive in this field. In this regard, the thesis promotes greater understanding of recent trends in Russia’s gas market, analyses its impact on the global gas industry, and provides evaluation of its energy sector in the future.

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DECLARATION

I hereby declare that I have written this thesis on my own and that all the quotations and sources are duly marked in the text. I cite all background materials and literature in the bibliography. I also state that this thesis has not been used to obtain a different or the same degree.

In Prague, January 12, 2011

Signature

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List of Abbreviations

ARCO	Atlantic Richfield Company
BFG	Baikal Finance Group
BPS	Baltic Pipeline System
BP	British Petroleum
BTC	Baku-Tbilisi-Supsa pipeline
CAC	Central Asia – Center gas pipeline system
CEE	Central and Eastern European countries
CIS	Commonwealth of Independent States
CNOOC	China National Offshore Oil Corporation
CNPC	China National Petroleum Corporation
EDF	Electricite de France
EU	European Union
GDF	Gas de France
GDP	Gross Domestic Product
GTS	Gas Transportation System
LNG	Liquefied Natural Gas
NAFTA	North American Free Trade Agreement
NCPSA	North Caspian Production Sharing Agreement
OECD	Organization for Economic Cooperation and Development
OPEC	Organization of the Petroleum Exporting Countries
RCS	Russian Communal Systems
SINOPEC	China National Petrochemical Corporation
TEC	Techno-Economic Considerations
TNC	Transnational corporation
TNK	Tyumen Oil Company
UAE	United Arab Emirates
UES	Unified Energy System
UGS	Underground Gas Storage
UGSS	Unified Gas Supply System
UNCTAD	United Nations Conference on Trade and Development
WTO	World Trade Organization

Abstract

This thesis focuses on the analysis of contemporary trends in the global gas sector by highlighting major milestones in the relationship between energy ‘producer’ and ‘consumer’ states, and assessing eventual development of the gas sector with a special emphasis on Transnational Corporations.

The research applies a SWOT analysis (the assessment of strengths, weaknesses, opportunities and threats) of the Russian gas sector in order to promote a greater understanding of recent trends in the country’s gas market, analyze its impact on the global gas industry, and provide an assessment for the future of the country’s energy sector. In this regard, the study argues that the Russian gas sector is determined by the large scale of the country’s territory, the dominance of gas in the fuel balance of the country, unstable economy of the gas industry, and emerging trends of the scarcity of gas.

Based on the analysis of opportunities and challenges of creating a ‘gas OPEC’, the study concludes that there are prospects for a creation of such an organization in the long-run, due to growing gas demand. However, the thesis argues that in order for Russia to become a potential member of such an organization and promote further development of the country’s gas sector, there is a need to diversify its gas supplies, find new routes for gas transportation, construct new gas flows, and form the country’s gas strategy.

Anotace

Tato práce se zabývá analýzou momentálních trendů v sektoru globálního plynařství skrze zdůraznění několika stěžejních bodů ve vztahu mezi ‘produkcujícím’ a ‘spotřebitelským’ státem a hodnocení případného rozvoje plynařského sektoru - zvláštní pozornost je věnována nadnárodním společnostem.

Průzkum užívá z anglického jazyka takzvanou SWOT analýzu (ohodnocení silných stránek, slabín, příležitostí a hrozeb) v ruském plynovém sektoru za účelem napomoci lepšímu porozumění stávajícím trendům trhu s plynem trhu zmíněné země; dále za účelem analýzy dopadu jeho aktivit na globální plynařský průmysl a provedení celkové předpovědi pro energetický sektor Ruska. S ohledem na tyto požadavky analýza vypovídá, že ruský plynařský sektor je determinován velikostí země, převahou plynu v celkové rovnováze spotřeby paliv v zemi, nestabilní ekonomickou situací a nově se objevujícím trendu obecného nedostatku plynu.

Na základě analýzy příležitostí a výzev spojených se vznikem ‘plynařské OPEC’ dochází studie k závěru, že existuje pravděpodobnost vzniku takové organizace, a to kvůli zvyšující se poptávce. Avšak studie argumentuje, že k docílení případného členství a dalšího rozvoje svého plynařského průmyslu Rusko potřebuje diversifikovat jeho, najít nové trasy pro přepravu, zajistit nové průtoky plynu a přeformovat plynařskou strategii země.

Introduction

Energy has become an increasingly important policy issue as the global economy has changed due to rising competition for access to limited resources. This has largely affected the international energy market and has provoked the shift in the balance of power, dividing the world into ‘producer’ and ‘consumer’ states.

Russia, being one of the major gas exporters in the world, emphasizes the importance to promote further development of its energy market in order to be competitive in this field. In this regard, the thesis promotes greater understanding of recent trends in the Russian gas market, analyses its impact on the global gas industry, and provides evaluation of the country’s energy sector in the future.

Subject Significance

Relevance of topic being researched is determined by the fact that the energy problem is one of the most complex and controversial in the world economy and international economic relations in the recent decades. In the near future the role of hydrocarbons in the global economy will remain crucial. In addition, the energy security of highly developed states will be determined by availability of reliable sources of raw materials.

Recently there has been an increased demand for natural gas, which can push oil into second place as an energy source, therefore the analysis of trends in the gas market and the role of gas in the global energy business is very vital. Furthermore, analysis of the Russian gas industry and determination of perspective directions of its development, especially in the area of liquefied natural gas production, represents a certain significance in the situation of contemporary economic crisis.

It is also important to study the mechanism of price formation of natural gas and its transportation, as well as identification of opportunities in order to use foreign experience in this field for Russian gas companies’ development. The analysis of changes in Russia’s energy security regime is relevant to call for diversification of Russian gas supplies, find new routes for gas transportation,

construct new gas flows, and form country's gas strategy in the face of economic crisis and post-crisis period.

The main *objectives* of the thesis are to analyze contemporary trends of the global gas market, and evaluate Russia's impact on the development of the current gas sector, by: conducting research on major trends in the gas market development and its role in the world economy; ascertaining the gas market growth prospects in the context of enhancing activities of transnational gas companies in the sphere of exploration and development of difficult-to-access gas fields; assessing necessity to use foreign experience of gas market development for Russia's gas sector improvement; and, finally, determining the prospects of Russian liquefied natural gas production and export development.

In order to achieve these objectives and promote further understanding of Russia's role in the development of the current gas sector, the hypothesis of this thesis argues that: *"Russia, being one of the major exporters of natural gas, uses its energy capabilities to hold a political influence over decisions made in the global community"*.

The object of research includes the global gas market, the sphere of gas production and realization, as well as activities of foreign and Russian gas companies. The regulation of the gas market, the mechanism of gas prices formation in the world markets and Russia, foreign experience in gas industry developing, and gas strategy are, in turn, referred as subject of research.

This thesis applies an empirical and analytical approach, based on both qualitative and quantitative analysis of the data from primary and secondary sources, as a methodology. The qualitative being the study of the major trends in the development of the gas sector in the 21st century with a particular emphasis on the role of TNCs and the quantitative being the statistics concerning reserves, major producers and consumers of natural gas. The research is conducted using both comparative analysis and case study methods. The comparative perspective is based on a SWOT analysis of both the world major gas companies, and the levels of gas production and consumption in different regions, which assists in evaluating the position of a certain country in the particular industry or field; while a case study of Gazprom, Russia's major energy company, promotes greater understanding of Russia's role in the global gas market.

Theoretical and methodological basis of the thesis are works of scholars, specializing on problems of the global energy market, the gas market, gas Transnational Corporations' (TNCs) activities, and price formation. In-depth analysis of these problems has determined the thesis's appeal to works of certain authors. In particular, approaches to the analysis of the gas market, presented in the works of such scholars as John P. Holdren, Andrej Juris, Sanam Haghighi, Steven Lewis, Juurikkala Tuuli, and Ollus Simon-Erik have been used.

The study of the European gas sector is based on "Energy Security: The External Legal Relations of the European Union with Major Oil and Gas Supplying Countries" by Sanam Haghighi. The book offers an assessment of the various measures carried out by the EU to guarantee security of oil and gas supply. Furthermore, it discusses the EU policy in relation to the major oil and gas producing countries. The author argues that the EU's energy security cannot be attained through implementing an internal approach to energy issues, but rather by adopting an external policy, which will cover efficient economic relations as well as experiences of the foreign policies towards energy producing countries.

To analyze the US energy market and the prospects for its future development, the research is mostly based on "Development of Competitive Natural Gas Markets in the United States" by Andrej Juris and "Searching for a National Energy Policy" by John Holdren. Andrej Juris argues that the US enjoys both a highly competitive natural gas market and efficient market for pipeline transportation. In this regard, the country's gas consumers have benefited from changes to both the structure and regulation of the gas sector in the past few decades, since these changes have lowered natural gas prices and broadened the range of services offered by the gas companies. Furthermore, the study provides an overview of the natural gas trading mechanisms in the US. Whilst John Holdren states that the US face an intimidating array of energy-related challenges, associated first of all with depleting energy reserves and environmental damage done by technologies of energy supply. Hence, according to the author, natural gas, the source with the largest short-term and medium-term potential, could provide increasing energy efficiency in the global energy market.

The evaluation of the Asia Pacific region energy capabilities is based on the analysis provided in the research paper of Steven Lewis, called "Chinese NOCs and World Energy: CNPC, Sinopec and CNOOC". The study examines

China's domestic political, economic and social institutions that have shaped the growth of the country's three largest oil and gas companies CNPC, Sinopec and CNOOC. The analysis provides that these companies are competitive with other global energy companies on basic measures of assets, production and performance. However, their further development is highly constrained by the government agencies, which own and regulate their activities. Therefore, the author argues that there is a great need for China's economic system privatization and liberalization. At the same time, while a certain emphasis is put on potential cooperation between China and Russia regarding the energy sector, there are other countries in the region, such as Indonesia and Malaysia, that Russia is interested in collaborating with.

Since the thesis highlights the importance of Russia and its major energy company Gazprom in the development of the current gas sector, multiple sources are used as the basis for the analysis, which is provided in the research. However, the most important contribution to the analysis of the Russian gas sector and its development in the near future is provided in the book "Energy Strategy of Russia for the Period up to 2030", prepared by the Ministry of Energy of the Russian Federation. The significance of the research consists in the fact that: it assesses both the global processes in the energy sector and the prospects for external demand for Russian energy supplies; evaluates the development scenarios for Russia's energy sector; as well as determinates long-term strategic priorities and major policy measures to develop the Russian gas industry.

At the same time, to provide an in-depth estimation of the Russian gas market, the thesis relies on a number of further critical analyses of certain authors. In this regard, the research of Juurikkala Tuuli and Ollus Simon-Erik "Russian energy sector – prospects and implications for Russian growth, economic policy and energy supply" is of great significance. The authors argue that Russian hydrocarbons are not only crucial to the domestic economy but also to European countries depending on energy imports. The work reviews the current state and future prospects of Russian energy production and exports. Hence, the paper assumes that Russian energy will stay high on both the economic and political agenda of the EU and its member countries in the foreseeable future. However, it questions whether there is enough Russian oil and gas for all the new pipelines planned, as well as whether the huge investment needs of the energy sector can

possibly be fulfilled, given the current investment climate and increasing government influence in the country's major energy companies, such as Gazprom.

While most of the theoretical considerations have been derived from the critical analysis of scientific books, research papers and articles, the practical part of the thesis is based on the data taken from periodical sources, such as the Financial Times, Energy Information Administration and Eurostat, which provide the most reliable, comprehensive and up-to-date data.

Practical and theoretical value of this thesis consists in the following:

Assessments of the demand dynamics and price forecasts in the gas market are to be provided. It will be argued that in the European gas market gas prices will depend on the prices of petroleum products and will correlate with oil price forecast in the medium-run. But at the same time the gradual separation between gas prices and prices of oil and petroleum products is expected, as associated with the liberalization of the energy market in Europe and more environmentally qualitative characteristics of gas;

Based on analysis of opportunities and challenges of creating a 'gas OPEC', it will be concluded that there are prospects for a creation of an organization in a long-run, due to growing gas demand, which could be explained by the fact that gas is more environmentally friendly and easier to be accumulated and transported than oil. Establishment of a new gas alliance could possibly mean the creation of an 'influence network' of national oil and gas companies of the contracting countries. The members of the alliance will have opportunity to explore and produce gas in other states, and will have access to a number of fields in the territory of other members by concluding long-term contracts;

Conclusions about the need to reform gas industry of Russia, assessments of Russia's gas strategy in the context of the economic crisis, and conclusions about the country's prospects in the post-crisis period will be provided as well. In this regard certain attention is paid to long-term contracts for Russian gas deliveries, creation of a single export channel, and an access to the final consumer, as a result of gas market liberalization in Europe;

It will be concluded that Russian energy policy should focus on diversification and interchangeability of both suppliers and routes of fuel delivery, which should be chosen in accordance with technical and economic criteria rather than political. Moreover, more attention should be given to development of the

marine transportation of liquefied natural gas, because eventual global trends in the gas market will be based on it rather than on onshore pipelines.

Study of foreign theory and practice of the gas market development is of great importance for Russian gas companies and organizations that enhance energy and particularly gas policy of Russia. Practical developments in this area can be an effective tool for finding competitive advantage for Russian companies.

Thesis Disposition

In order to promote a better understanding of the current state of the global gas sector and provide an in-depth analysis of Russia's role in its development, the thesis is structured into four substitutive chapters.

The first chapter seeks to define the concept of 'security' in general, applying it to the energy sector, in order to lay the groundwork necessary for the following discussion. Neo-realist approach to IR theories is applied in this regard. The five subsidiary sectors to security are considered and followed by an explanation of 'energy security', after which the difference between 'oil security' and 'gas security' is discussed.

The second chapter discusses the current development trends of the global gas market, highlighting the fact that the gas sector is characterized by the high geographical disparity of energy production and consumption. Hence, a great emphasis is put on how hydrocarbon resources are allocated among their major producers and consumers.

The third chapter aims to analyze activities of the major TNCs in the gas sector of different regions. These companies are primarily Gazprom, British Petroleum, Exxon Mobil, Royal Dutch/Shell and Total, which carry an active expansion into markets of both developed and developing countries. A case study of Gazprom, Russia's monopolist in production and export of gas, is provided further in the chapter. It argues that successful activities of the Russian gas giant in the world gas markets demonstrate that the corporation can achieve significant success in the global economy.

In the fourth chapter the comparative analysis of the Russian versus foreign gas industry is provided, which is based on a SWOT analysis of the gas

reserves, production and consumption, as well as levels of energy exports and imports in the different regions of the world. The prospects of the Russian gas market development are also discussed.

Finally, conclusions about the major trends in the development of the current gas sector and Russia's impact on the global gas market, with particular attention to the necessity to diversify the country's gas supplies, find new routes for gas transportation, construct new gas flows, and form the country's gas strategy, are presented. The concluding chapter also evaluates the possibility of a 'gas OPEC' establishment.

1. Theoretical Considerations

In this chapter the basic principles of the neo-realist approach to the International Relations theories will be briefly explained, before a definition of the term ‘energy security’ in the gas sector is given. The following chapters of the dissertation will draw upon this theoretical base and the neo-realist consideration that in the international system, where anarchy has been proved to explain states tendency for security provision, there are increasing tensions between energy ‘producer’ and ‘consumer’ states, due to growing demand for and dependency on the energy in the world.

1.1 Neo-Realist Approach to International Relations Theories

Since the energy shocks of the 1970’s, when the tensions between the states over the distribution of natural resources and energy consumption had been heightened by oil shortages in the petroleum-dependent countries, the issue of energy security has reached a great significance, taking a core place in the debates of the International Relations (IR) theories.¹

Though a number of approaches to international relations focus on the energy security issue, dealing with the role of international economic institutions, price formation factors and economic values in provision and enhancing energy security, a neo-realist approach towards this issue will be applied.² Taking into account the structural asymmetry between energy producing and energy consuming countries, this theory supposes energy supply to become a cause of vulnerabilities.³ Therefore, much analysis will be done on the increasing degree of energy consumption and of the supply dependency concerning the two groups of countries, with a particular emphasis to political discrepancy between them in connection to natural resources.

¹ N. Choucri, V. Ferraro, (1977), *International Politics of Energy Interdependence*, Lexington, pp. 185-186.

² Ibid.

³ Charli, Coon, “Strengthening National Security Through Energy Security”, *The Heritage Foundation*, 9 April 2002.

1.2 Defining Energy Security

Neo-realism has traditionally focused on the definition of international security, which is categorized into five additional sectors: political, economic, military, societal and environmental. Political security deals with the domestic and external stability of states, involved in the international relations in seeking for energy self-sufficiency; economic security is defined by ensuring the states' access to resources and energy markets; military security relates to states' defensive capacities with eventual contribution of state's energy availability; environmental security involves the protection of natural resources from a negative effect resulted from states' economic development; and, finally, societal security is responsible for the protection of the cultural identity from problems caused by energy use, such as nuclear safety and air pollution.⁴

Moreover, according to the basic principles of neo-realism, states act in accordance with their structural power within the international system. Therefore, in a struggle for survival within a system with no global power, security of energy supply has become a matter of security motivation for many developed countries in the aftermath of the oil shocks which took place in the 1970's.

Taking into account the arguments listed above, it can be said that in order to understand the term 'energy security' a number of complex factors, such as international trade, energy supply and resources pricing, should be considered. In this regard, a commonly accepted definition of the term 'energy security' states that "*the energy security is sufficiency of energy supply at a reasonable market price*".⁵ However, this definition should be applied when describing oil market, while energy security in the gas market guarantees that "*all the gas volumes demanded by customers will be available at a reasonable price*".⁶ Hence, the difference between the two energy resources is that gas security does not ensure sufficient supplies of gas in all sectors and can be substituted with other energy resources, whereas oil cannot be currently replaced by other fuels.

⁴ B. Buzan, "*People, States and Fear: an agenda for international security studies in The Post-Cold War Era*", Harvester Wheatsheaf, Second Edition, (1991), p. 235-237.

⁵ Sanam Haghighi, "*The legal dimension of the EU energy policy*", (2006), Florence, pp. 11-13.

⁶ *Ibid.*, p. 13.

2. Recent Trends and State of the World Gas Market

2.1 Development Trends of the Global Gas Market

Regardless of pessimistic predictions about the prospects of the gas industry, it is obvious that the role of hydrocarbons in the global economy will remain crucial for several more decades. Energy security of highly developed countries will be determined by availability of reliable sources of raw materials. While the main consumers of gas are highly developed countries, a significant export production is concentrated in a relatively small group of developing and transition countries.

After oil has pushed coal into second place in the global energy balance, we are now able to observe the beginning of a new era in which natural gas shall overcome oil. Even though the emission pollution of energy production out of oil is more than two times less than out of coal, natural gas, in turn, is three times cleaner than oil. But natural gas will bypass oil only after the process of turning gas it into a global commodity attains full speed.

Currently a new global energy business connected to natural gas is emerging. This business brings new opportunities and risks, creates new interdependencies and geopolitical groups, and will have a far reaching impact on the world economy. As natural gas becomes the subject of world trade, it will be a decisive factor to meet many urgent needs. In this regard, the United States (US) needs natural gas to promote further development and prevent anticipated shortage of energy; Europe needs it to revive its economy; while developing countries require gas to increase their growth rates. Moreover all countries without exception need natural gas in order to live in a cleaner environment.

One of the most disturbing aspects of the emergence of a new global business is that this process could become a reminiscent of changes in the late 1960 - early 1970's, when the US integrated into the global oil market.⁷ Within this time the US turned from a minor receiver into one of the largest importers of oil. Surge in demand for oil in world markets, spurred by the US economy, contributed to the emergence of conditions for the oil crisis of 1970's and

⁷ N. Choucri, V. Ferraro, (1977), *International Politics of Energy Interdependence*, Lexington, Mass.: D.C. Heath pp. 185-186.

established the interdependence between countries, which the world still can not overcome.⁸

Over the last decade a lot of goods became the subject of global business. Natural gas is still an exception. Although the gas trade is a giant business which costs more than 500 billion dollars per year, it has developed only at the local, state and regional levels due to limited length of pipelines and the lack of a world gas market. However this phenomenon is changing, in part to the LNG (Liquefied Natural Gas) consumers will be able to receive gas from the rich but undeveloped fields all over the world.

Just like oil, natural gas is a hydrocarbon which is located either together with oil or in separate fields. Natural gas fuel has the highest degree of combustion. While being burned it slightly pollutes the environment and produces less carbon dioxide, the main greenhouse gas, than oil or coal do. Moreover there is a great amount of gas in the world. The volume of proved gas reserves is more than a trillion barrels of the oil equivalent. Russia, which accounts for 30 percent of known reserves, is known as ‘gas Saudi Arabia’. Another 25 percent is located in Iran and Qatar, where the gas is concentrated in South Pars and North fields. Saudi Arabia and the United Arab Emirates are at the third place in accordance to their gas reserves. The United States, which account for only 3.3 percent of world gas reserves, are at the sixth position.⁹ States with even smaller reserves, such as Indonesia and Malaysia, are yet among the largest exporters of the LNG. Many other countries also have large gas reserves that could form a basis for the production of LNG. It is fair to expect that, due to growing interest in natural gas, even larger deposit will be explored in the near future. For instance, Nigeria, which is generally considered an oil country, is a potentially huge gas province.

Despite the relative ‘youth’ of natural gas as a commodity, offered by regional and international markets, today it is clear that gas is characterized by the same geographical imbalance of production and consumption as oil. Thus, although the US is one of the two world leaders in gas production (21.7 percent of world production), they consume more than they are able to produce (some 26.3

⁸ “1970’s Oil Crisis”, *United States Economy & Global Economic Recession*. Available at: <http://recession.org/history/1970s-oil-crisis> (Accessed 5 October 2010)

⁹ “Country Comparison: Natural gas – proved reserves”, *Central Intelligence Agency*. Available at: <https://www.cia.gov/library/publications/the-world-factbook/rankorder/2179rank.html> (Accessed 4 October 2010)

percent).¹⁰ But what is more important is that consumption growth and hence the import of gas in this country is increasing steadily, due to the fact that almost all of the new country's power plants are designed to operate on gas.

The European Union's (EU) countries, which utilize 15.2 percent of total natural gas consumption and produce only 8.3 percent, are heavily dependent on natural gas imports.¹¹ Taking into account the depletion of their own fields, a strategy shift towards natural gas, and the increasing process of gas and electricity sectors convergence in Europe, their dependence on gas imports will slowly but steadily grow. As in the case of oil, the developed countries of Northeast Asia are entirely dependent on imported LNG. For example, Japan, South Korea and Taiwan consume 4.4 percent of the global volume.¹² As for China, in 2004 the country was producing and consuming an equal amount of natural gas, but given the rapid pace of growth and long-term contracts for gas supplies to China it is becoming a net importer.¹³

One of the largest producers and exporters of natural gas in the world is Russia, which accounts for 22 percent of total world gas production. Although its domestic gas consumption reaches 15.3 percent of global volume, the export potential of Russia (the difference between production and consumption) exceeds the total export potential of the three regions of the world – the Middle East, Africa, South and Central America.¹⁴ Thus, the Middle East as a whole produced 9.3 percent of the global volume in 2003, and consumed 8.1 percent.¹⁵ Saudi Arabia, the region's major gas producer, consumes all of its natural gas being produced; whereas, the consumption of Iran is even a little bigger than its gas

¹⁰ "Trends in U.S. Residential Natural Gas Consumption", *Energy Information Administration*, Office of Oil and Gas, Independent Statistics and Analysis, June 2010. p. 1-3. Available at: http://www.eia.gov/pub/oil_gas/natural_gas/feature_articles/2010/ngtrendsresidcon/ngtrendsresidcon.pdf (Accessed 23 September 2010)

¹¹ "Consumption of energy", *Eurostat*, European Commission, September 2009. Available at: http://epp.eurostat.ec.europa.eu/statistics_explained/index.php/Consumption_of_energy (Accessed 8 October 2010)

¹² "International Energy Outlook 2010", *Energy Information Administration*, Independent Statistics and Analysis. Available at: http://www.eia.doe.gov/oiaf/ieo/nat_gas.html (Accessed 8 October 2010)

¹³ Ibid.

¹⁴ "Brief Write-up on Russian Gas Reserves, Production, Consumption and Import-Export Volumes", *Advisory Assistance to the Ministry of Energy of Georgia*, May 2006. p. 5-8. Available at: http://pdf.usaid.gov/pdf_docs/PNADK348.pdf (Accessed 6 October 2010)

¹⁵ "Analysis: Middle East Gas Consumption Outpaces Production", *Rigzone*, September 2010. Available at: http://www.rigzone.com/news/article.asp?a_id=99359 (Accessed 11 October 2010)

production. The only surpluses of gas are in Qatar and the United Arab Emirates (UAE), but until recently they were implemented in neighboring countries within the region. Africa has a slightly higher export potential but only because of Algeria. The most substantial export potential is proved in three countries of the Asia Pacific region – Indonesia, Malaysia and Australia, where 6.2 percent of gas production is counterbalanced by 3.4 percent of gas consumption.¹⁶

To consider how exports of hydrocarbon resources are allocated among their major consumers, Western Europe is the first to be addressed. Western Europe was the major importer of crude oil and petroleum products in 2002. The main suppliers of energy resources coming to the region included Russia and the Commonwealth of Independent States (CIS) (214.6 million tons), Middle East (161.1 million tons), and North Africa (122.5 million tons).¹⁷ In this regard, the African continent is considered highly important in the strategy of diversifying sources of energy imports.

The conjuncture in the European gas market is currently characterized by two different trends, as it was noted by the international association for natural gas “Cedigaz”. On the one hand, there is a process of capital concentration strengthening; on the other hand, a great emphasis is put on the diversification of sources of natural gas supplies. At the same time, in the field of importing, transporting and storing natural gas a great significance is given to energy companies.

Exxon Mobil and Royal Dutch/Shell were the largest producers of gas in Western Europe in the early 2000’s and accounted for 30 percent (86 billion m³) of total gas production in the region (283 billion m³).¹⁸ Together with the state owned Dutch company EBN and Norwegian Petoro, the leading quartet has controlled about half of the European gas production. Moreover, the given companies play a key role in some national markets. For example, Exxon Mobil

¹⁶ “Natural gas consumption by area”, *BP – Statistical Review charting tool*. Available at: http://www.investis.com/bp_acc_ia/stat_review_05/htdocs/reports/report_16.html (Accessed 11 October 2010)

¹⁷ “EU Energy and Transport in Figures”, *Statistical Pocketbook*, European Commission, 2010. Available at: http://ec.europa.eu/energy/publications/statistics/doc/2010_energy_transport_figures.pdf (Accessed 15 October 2010)

¹⁸ “The Outlook for Energy: A View to 2030”, *Exxon Mobil*, December 2009, p.33. Available at: http://www.ExxonMobil.com/corporate/files/news_pub_eo_2009.pdf (Accessed 17 October 2010)

produces 47 percent of the total volume of gas in Germany and 23 percent in the Netherlands.¹⁹

The Italian state company ENI Gas&Power became the largest importer of gas in Western Europe in 2002, having imported 44.8 billion m³, which accounted for 18 percent of total gas imports into the region. The second largest importer of gas was Ruhrgas (43.4 billion, 17.6 percent), followed by 'Gaz de France' (41.3 billion, 16.7 percent).²⁰ These three companies delivered 52.5 percent of the total gas import to Western Europe.

According to Cedigaz, in the markets of individual countries new trading companies become more powerful due to the process of liberalization, while the decisive role is still played by larger companies. In this context, in a country like the United Kingdom (UK), where only one major gas company has operated for some period of time, entrance of any new importer will have a significant impact on the repartition of the market. At the same time in a country like Germany, with a range of participants, including such companies as the Ruhrgas, Wingas, VNG, BEB and Thyssengas, the entrance of a new importer would be extremely difficult.

Although the US accounts for 26 percent of total imports of crude oil and petroleum products, the American government has provided the country with diversified structure of energy imports. In 2009 net imports to the US reached 171.7 million tons of oil from Canada and Mexico, its partners in the North American Free Trade Agreement (NAFTA); 119.2 million tons from South and Central America; 69.1 million tons from Africa; 57.0 million tons from Europe; 9.8 million tons from Russia and the CIS; 12.8 million tons from the Asia Pacific countries; and, finally, 114.7 million tons of gas from the Middle East.²¹ Thus, the US has relatively secured itself from catastrophic developments, for example, in the Middle East. Moreover, unlike Europe, the US has 'spare' oil and gas fields,

¹⁹ Data from the official webpage of Exxon Mobil Corporation, p. 3. Available at: <http://www.valens.nl/pdfs/exxon.pdf> (Accessed 26 October 2010)

²⁰ Armelle Lecarpentier, "The Players on the European Gas Market", *Cedigaz*, 2008 Edition. Available at: <http://www.cedigaz.org/Fichiers/Eur07/Eur07pressrelease.pdf> (Accessed 25 October 2010)

²¹ "U.S. Imports by Country of Origin", *Independent Statistics and Analysis*, official webpage of U.S. Energy Information Administration, 29 November 2010. Available at: http://tonto.eia.doe.gov/dnav/pet/pet_move_impcus_a2_nus_ep00_im0_mbb1_m.htm (Accessed 12 November 2010)

which are situated in Alaska, the development of which is prohibited by US laws. However, the administration could easily overturn this legislation in case of any emergency in the global energy supply arises.

With regard to international flows of natural gas, the situation is slightly different. So far gas has been transported mainly through pipelines, which determines the regional nature of this product. The volume of maritime transportation of LNG is still relatively low. It accounted for 150 billion m³ against 431.35 billion m³ of gas transported to foreign markets via pipelines in 2003.²² In this respect, the lion's share of LNG (103.8 billion m³) is being consumed by the countries of Northeast Asia, such as Japan, South Korea and Taiwan; the share of Western Europe is some 39 billion m³; and the US consumes more than 7.1 billion m³.²³ Dependence of consumers on the supply of LNG from the Middle East is much lower, since the implementation of recently signed contracts on the production and export of gas from the given region will take several years. Until now the amount of gas export from the Middle East constitutes some 33 billion m³.²⁴ Hence, the main suppliers of LNG are the countries of the Asia Pacific region, such as Indonesia, Malaysia, Australia and Brunei, as well as some African countries, such as Algeria, Nigeria and Libya.

Western Europe occupies the leading position in importing pipeline gas. The major non regional gas suppliers to Europe, including Central and Eastern Europe, are Russia, which delivers 128.2 billion m³, and Algeria, which imports 29.38 billion m³, while the latter delivers another 26.13 billion m³ of LNG along with the pipeline gas.²⁵ The second largest consumer of imported pipeline gas is the US, which has imported about 109 billion m³ from Canada.²⁶

²² "Natural Gas Year-In-Review 2009", *Independent Statistics and Analysis*, official webpage of U.S. Energy Information Administration, July 2010. Available at: http://www.eia.gov/pub/oil_gas/natural_gas/feature_articles/2010/ngyir2009/ngyir2009.html (Accessed 16 November 2010)

²³ Ibid.

²⁴ Ibid.

²⁵ Roland Gotz, "Russian Gas and Alternatives for Europe", *German Institute for International and Security Affairs*, Working paper. June 2006. pp. 5-7. Available at: http://www.swp-berlin.org/fileadmin/contents/products/arbeitspapiere/EuroFutureGas_ks.pdf (Accessed November 2010)

²⁶ "Natural Gas Year-In-Review 2009", *Independent Statistics and Analysis*, official webpage of U.S. Energy Information Administration, July 2010. Available at: http://www.eia.gov/pub/oil_gas/natural_gas/feature_articles/2010/ngyir2009/ngyir2009.html (Accessed 16 November 2010)

To assess the prospects for further development of the global oil and gas markets it is also important to take into account the extent of hydrocarbon reserves, which are at the disposal of today's active actors in the world energy market, as well as to determine for how long they would be able to maintain not only the current level of consumption, but also its expected growth. In this respect, the largest proven oil reserves are in the Middle East. They accounted for 685.6 billion barrels or 65.4 percent of world oil reserves in 2003.²⁷ However, in the medium run the Middle East will remain the most volatile region in the world among rapidly developing industrial and postindustrial economies. Therefore, having realized unreliability of the region, most developed nations have begun to actively seek alternative sources of hydrocarbons.

The US with its current reserves of oil is able to only temporarily alleviate the situation, as well as Africa, since its proved oil deposits are even smaller and will last for some 30 years at the present rate of extraction. The situation is even worse in the Asia Pacific region, where reserves of raw materials will run out in the next 10 to 14 years. In the CIS the largest proven oil reserves are in Russia, which may last for less than 22 years. Other countries of this area, such as Kazakhstan, Azerbaijan and Turkmenistan, which frequently appear in the scientific studies as potential alternatives, possess less than 1 percent of world reserves each. Considering such an allocation of oil reserves, it is clear that the desire of the West, especially the US, to establish democracy in the Middle East, is only a diversion in attempt to hide their key interest in petroleum resources of the region.

With regard to natural gas, Russia has the largest proven natural gas reserves, which account for some 30 percent of world reserves and could be sufficient for more than 80 years at the current production rates.²⁸ Other countries in Europe and the CIS account for only 8.7 percent of gas reserves in total. Norwegian reserves could last for 33.5 years, while British fields will be depleted in less than 7 years. Kazakhstan, Turkmenistan and Uzbekistan have a combined

²⁷ "Oil reserves, production and consumption in 2001", *USA Department of Energy*. Available at: <http://www.scaruffi.com/politics/oil.html> (Accessed 17 November 2010)

²⁸ E. Ndefo, P. Geng, "Russia: A Critical Evaluation of its Natural Gas Resources", *Energy Tribune*, 13 February 2007. Available at: <http://www.energytribune.com/articles.cfm/379/Russia-A-Critical-Evaluation-of-its-Natural-Gas-Resources> (Accessed 20 November 2010)

total of 3.7 percent of world reserves, but only Kazakhstan will be able to exploit its deposits for over 100 years.²⁹ In each case, all of these countries are able to provide only the short-term gas needs of Europe. Hence in a distant future Russia has no major competitors.

Iran with a considerable lag is in second place after Russia. This country possesses 14.8 percent of world gas reserves, which will be depleted no earlier than in 100 years. At the same time, due to political reasons, more attention of Western corporations is attracted to Qatar, with its 9.2 percent of world reserves. In addition, foreign consumers are highly interested in gas deposits in the United Arab Emirates, which account for 3.9 percent of world reserves, while Saudi Arabia with its 4.1 percent uses almost all produced gas for domestic needs.³⁰

In Africa attention is addressed to proven gas reserves of Algeria, Nigeria and Egypt. Indonesia and Malaysia, which largely supply LNG to Japan, South Korea and Taiwan, have only 1.7 percent and 1.4 percent of world reserves respectively.³¹ In North America the situation with proved reserves of natural gas is analogous to the situation with oil. The three countries (the US, Canada and Mexico) have 4.6 percent of world reserves, which will last for 9.4 years.³² And they are unlikely to receive substantial support from neighbors in South and Central America, which have 4.5 percent of world reserves. These stocks, however, may be enough for about 68 years, but produced gas will most likely meet the growing intra-regional needs. So far the only exception could be the reserves of Trinidad and Tobago. Small gas deposits of the country still exceed domestic needs, and the US has already signed several contracts for supply of LNG.

Therefore, the US and large corporations representing their gas interests will create an intense competition to countries of Western Europe and Northeast Asia in the international gas market. Moreover if to take into account the fact of

²⁹ E. Ndefo, P. Geng, "Russia: A Critical Evaluation of its Natural Gas Resources", *Energy Tribune*, 13 February 2007. Available at: <http://www.energytribune.com/articles.cfm/379/Russia-A-Critical-Evaluation-of-its-Natural-Gas-Resources> (Accessed 20 November 2010)

³⁰ Ibid.

³¹ Ibid.

³² "Natural Gas Year-In-Review 2009", *Independent Statistics and Analysis*, official webpage of U.S. Energy Information Administration, July 2010. Available at: http://www.eia.gov/pub/oil_gas/natural_gas/feature_articles/2010/ngyir2009/ngyir2009.html (Accessed 22 November 2010)

rapidly growing demand for hydrocarbons in China, Russia's role in ensuring the normal balance of supply and demand in the global natural gas market becomes even more significant.

Change in the world energy market and the tightening of environmental regulations in Western countries has resulted in a reaction of both Majors (common name given to international oil and gas corporations) and the EU leaders, who prepared a new directive on electricity and gas. The worsening of the situation with energy reserves and the collapse of oil prices in the mid-1980s and 1997 to 1999 has led to new waves of mergers and acquisitions. During the first wave American Texaco Inc. absorbed Getty Oil Co., and Chevron Corp. absorbed Gulf Oil Co. The second wave was marked by a number of strategic mergers and acquisitions: British Petroleum (BP) has first absorbed Amoco Production Co. and later ARCO; Exxon Corp., having absorbed Mobil Oil, has become the world's largest oil and gas corporation; French Total SA has joined Majors after the acquisition of Elf Aquitaine and Belgian Petrofina SA; the process of merging Chevron Corp. and Texaco Inc. was completed. The main strategic goal of these mergers and acquisitions was the concentration of efforts and resources on finding and developing new oil and gas reserves in the most remote regions home to harsh natural conditions such as more complex deepwater fields.

Another important feature of Majors' new strategy was associated with a tendency to turn natural gas into a global commodity. This led to an acceleration of the 'gasification' process, during which oil corporations were first reorganized into oil and gas companies (greater emphasis on oil), and more recently into gas and oil companies (greater emphasis on gas). One of the most striking examples of the given trend is the activity of the oldest oil company Royal Dutch/Shell Group. In the total balance of hydrocarbon reserves it has the most advanced ratio of oil and gas, where the last accounts for more than 48 percent and in the next 3 to 4 years the ratio may eventually change in favor of gas due to the recent contracts and officially proclaimed orientation towards natural gas.³³ Royal Dutch/Shell Group is followed by Exxon Mobil. Their gas reserves are roughly equal but Exxon Mobil lags in oil reserves. Nevertheless it surely ranks first

³³ John Donovan, "Energy-Reserve Revisions", *The Wall Street Journal*, December 2008. Available at: <http://royaldutchshellplc.com/2008/12/16/energy-reserve-revisions/> (Accessed 25 November 2010)

among the Majors in gas production. Third place in the world gas production among oil companies is held by BP with 52 percent to 48 percent ratio of oil and gas.³⁴ Moreover, BP accounts for 30 percent of the world LNG trade. Other Majors that have been trying to follow the same pattern include Chevron Texaco and Conoco Phillips.

Adoption of Electricity and Gas Directives by the EU between 1996 and 1998 and especially the beginning of their implementation has served as one of the most important causes of the next wave of mergers and acquisitions in the global energy sector. An entirely new energy situation began to form in Europe in 2001 through 2003. Strategic orientation of the EU towards most environmentally friendly fuel – natural gas – leads to the fact that the newly built power plants more often use gas turbines. This has, in turn, entailed a tendency towards convergence of production and marketing of gas and electricity. The liberalization of energy markets, their greater openness to the third party, and the privatization or commercialization of state-owned energy corporations made national gas and electricity companies face completely new challenges.

Therefore, in order not to become subject to absorption by the Majors, national corporations had to adapt to the given situation and find answers to all these challenges. In this regard, there was a need to enlarge European national corporations and increase their competitiveness before they go to ‘free floating’ in the world’s energy market. Moreover, anti-monopoly requirements of Brussels bureaucracy have encouraged national energy companies to restructure and expand their business by going beyond national boundaries and implementing diversification, as well as by the convergence of gas and electricity sectors.

Regardless of such trends in the EU, there was a very negative situation in the US due to the process of deregulation of the gas industry. The energy crisis in California and then the collapse of large energy corporations, such as Enron, has prevented US companies from actively participating in the third wave of mergers and acquisitions that took place on the European continent. In the US there is still a process of energy business restructuring through selling assets of some companies, such as Enron and El Paso, to American independent oil companies.

³⁴ “Performance for all our futures”, BP Annual Report 2001, 2002, pp. 11-15. Available at: http://www.bp.com/liveassets/bp_internet/globalbp/STAGING/global_assets/downloads/A/Annual_Report_2001_Full_volume.pdf (Accessed 24 November 2010)

Due to these circumstances the third wave of mergers and acquisitions possesses a 'European' character.

This wave resulted in the rapid rise of some European national energy companies to the level of Majors.³⁵ The best example is the recently established German corporation EOP AG. During the third wave it consistently absorbed British Powergen, Swedish Sydkraft, British TXU Europe Group and others. But its main deal was a friendly merger with the German company Ruhrgas in 2002 through 2003. EOP AG had to overcome resistance from Brussels and the local regulatory authorities, as well as from German and other European rivals. However, in the end the leadership of the company has formed a complete vertically integrated corporation that could successfully compete in continental and global markets. That has marked the defeat of Brussels bureaucracy, seeking to divide functions and business of national energy companies;

The EU's energy liberalization policy, which aimed to separate businesses and destruct the monopoly of vertically integrated corporations, had largely affected some energy companies in the UK, such as British Gas Corporation.³⁶ Therefore, during the third wave British companies invariably became victims of acquisitions. The only exception among the major agreements was the merger of gas corporation Lattice Group and transport company National Grid Group. But this domestic deal has just emphasized the failure of all previous liberal efforts to de-monopolize energy sector in the country;

The process of mergers and acquisitions was massive and included national oil, gas and electricity companies from different countries, such as Germany France, Spain, and Italy. Although the restructuring of the European energy sector is far from being completed, many experts come to the conclusion that this wave of mergers and acquisitions will result in the strengthening of the trend of regional monopolization and formation of an oligopolistic structure of the global energy market, which will be attended by traditional Majors and some new European players with global ambitions.³⁷ Thus according to many researchers,

³⁵ "International Energy Outlook 2010", *Independent Statistics and Analysis*, US Energy Information Administration. Available at: http://www.eia.doe.gov/oiaf/ieo/nat_gas.html (Accessed 25 November 2010)

³⁶ Ibid.

³⁷ Ibid.

natural gas consumption in Europe will grow at least 18 percent by 2010, compared to the 2002 level; and the market will significantly change.

Total gas consumption in the European market will be 610 to 640 billion m³, which is at least 76 billion m³ greater than the sum of volumes of European countries' production and the supply of traditional exporters Russia and Algeria, whose combined capabilities are estimated at 534 billion m³.³⁸ Nevertheless gas deficit is not likely in Europe, because the additional volumes of natural gas, needed for the region's sustainable development, could be supplied to the market by other producers from Africa, the Persian Gulf, and some former Soviet states.

African producers are expected to enhance their presence in the European market more aggressively compared with the countries of Central Asia or the Persian Gulf. The latter are more interested in the emerging gas market in the Asia Pacific region, where gas demand is growing faster than the gas demand in Europe. Nevertheless it is not difficult for them to reorient their supplies towards Europe. For the post-Soviet states there are three options of behavior in the global gas market: Independent access to the markets of Europe (Azerbaijan); gas sales to Russia and the actual abandonment of expansion to Europe (Turkmenistan); and the establishment of joint ventures with Russia to cooperate with the European market (Kazakhstan).³⁹

Russia is fully capable to fulfill its existing export commitments, but the strategy of strengthening its presence in the European gas market should be based on domestic market development, potential of the domestic gas industry to develop new projects of gas extraction and transport, and the expansion of Russia's cooperation with Central Asian producers. The implementation of these three provisions will help to preserve and strengthen Russia's role as a key partner of the EU in the energy sector.

Currently there is a tendency of industrial gas reserves' reduction in the countries which are situated in the regions with intensive use of gas. Thus, the proved reserves in Europe and North America have declined by 12 and 21 percent

³⁸ "International Energy Outlook 2010", *Independent Statistics and Analysis*, US Energy Information Administration. Available at: http://www.eia.doe.gov/oiaf/ieo/nat_gas.html (Accessed 25 November 2010)

³⁹ A. Makarov, "Science and technology forecasts of Russia's energy development", *ERIRAS*. Available at: http://www.eriras.ru/index.php?option=com_content&view=article&id=96:2009-08-23-11-15-43&catid=15:articles&Itemid=44 (Accessed 26 November 2010)

respectively over the past 10 years of intense growth in production. At the same time, forecasts for the world gas market development show that demand should increase by 35 to 40 percent in Europe and 30 to 35 percent in the US by 2030.⁴⁰ Compared to other gas importing countries Russia has maintained a stable position in terms of reserves, however, the reserves became worse in quality. At the same time there is a significant increase in the number of proved gas deposits in those countries and regions where natural gas consumption is insignificant and its production is aimed for export. It is primarily the Persian Gulf region, where the volume of proved gas reserves has increased as much as 1.5 times over the past decade, as well as several countries in Africa and the Asia Pacific region, which now play a significant role in the global gas trade.

It is obvious that further development of international trade in natural gas will be carried out due to increased imbalance between production and consumption in industrialized countries and their increasing dependence on gas imports from other regions.

⁴⁰ Daniel Huppmann, Ruud Egging, “The World Gas Market in 2030 – Development Scenarios Using the World Gas Model”, *German Institute for Economic Research*, Discussion Papers, October 2009. Available at: http://www.sophia-ruester.de/files/paper_wgm.pdf (Accessed 27 November 2010)

3. Activities of TNCs in the Gas Industry

At the present time a crucial role in the global economy is played by processes of transnationalization. According to experts of the United Nations Conference on Trade and Development (UNCTAD), the share of added value in the world GDP produced by subsidiaries of TNCs has increased from 7 percent in 1990 to 10 percent in 2005.⁴¹ Taking into account the home country it could be concluded that TNCs provide about 1/5 of the world GDP. Individual TNCs are comparable to independent states by their economic strength.

Economic power of TNCs provides tremendous opportunities not only to influence the development of the world economy and politics, but also to pursue their own interests in other countries. Strengthening of the economic power of the largest TNCs, thus, provides them with additional competitive advantages for foreign expansion, particularly in relation to the significant consolidation of cross-border mergers and acquisitions in recent years. In 2006 the volume of transactions on all mergers and acquisitions accounted up to 3.1 trillion dollars, compared to 2.95 billion dollars in 2000.⁴²

TNCs have become leading players in the global economy over the past fifty years. The UNCTAD's annual 'World Investment Report' notes the increasing role of transnational corporations in the economies of all countries in the world. The top ten largest TNCs of non-financial sector include four TNCs, operating in the petroleum sector, in regard to the number of foreign assets. They are BP, Exxon Mobil, Royal Dutch/Shell and Total.⁴³

In the next section TNCs, operating in the gas industry in various countries and regions, as well as analysis of mergers and acquisitions in the energy sector

⁴¹ "FDI Trends and Prospects", *World Investment Report 2010: Investing in a low-carbon economy*, 2010, p. 19. Available at: 2010, http://www.unctad.org/en/docs/wir2010_en.pdf (Accessed 15 October 2010)

⁴² "CEE M&A Survey 2006: Maturity, momentum and mega-deals", Central & Eastern Europe, *Advisory Services*, PricewaterhouseCoopers, 2007, p. 4-6. Available at: http://www.imaa-institute.org/docs/m&a/pwc_11_central_percent20&percent20eastern_percent20european_percent20cee_percent20mergers_percent20&percent20acquisitions_percent20survey_percent202006.pdf (Accessed 15 October 2010)

⁴³ "FDI Trends and Prospects", *World Investment Report 2010: Investing in a low-carbon economy*, 2010, p. 106. Available at: 2010, http://www.unctad.org/en/docs/wir2010_en.pdf (Accessed 15 October 2010)

will be considered. The main emphasis will be placed on the possibility of Russia's cooperation with different regions, countries and individual TNCs.

3.1 Centralization Processes of TNCs in the Gas Sector

The beginning of the modern centralization of capital in the energy sector relates to the end of 1990s. Since then the flexibility and agility of its capital began to be supplemented by orientation towards expansion, diversification, integration and expansion of the activities scope. Large companies have sought to ensure efficiency gains through mergers and acquisitions both vertically and horizontally. Consolidation of assets has become the dominant trend in the energy sector of the world economy.

Powerful wave of corporate capital consolidation on a global scale began with a merger of the English British Petroleum and the American Amoco-Arco, US Exxon and Mobil, and in subsequent years continued by unifications (mergers) of American Conoco and Phillips, Chevron and Texaco, the Franco-Belgian TotalFinaElf and French Elf Aquitaine.⁴⁴

In terms of pursuing an aggressive policy of capital centralization, BP represents the most illustrative example. Despite the fact that its headquarters is located in London and was created more than 100 years ago as a national company, only 1/5 of its capital (19 billion dollars) is concentrated in the homeland. The US share in the company is 44 billion dollars. At the beginning of the 20th century the UK had less than 15 percent of new BP investments, while the US had some 44 percent and 29 percent of company's investment capital were invested in Asia, Africa and Latin America.⁴⁵

In terms of profit, the disparity is even more contrasting. In 2000 BP's net income accounted to 16 billion dollars, 7 billion dollars or 44 percent of which were derived from activities in the US.⁴⁶ The traditional business, the oil and gas production in the North Sea offshore, oil transporting and refining, as well as

⁴⁴ Philip Mattera, "The Return of Windfall Profits: An Overview of the Oil Industry", *Corporate Research E-Letter*, No. 10, March 2001. Available at: <http://www.corp-research.org/mar01.htm> (Accessed 20 October 2010)

⁴⁵ "Performance for all our futures", *BP Annual Report 2001, 2002*, pp. 14-16. Available at: http://www.bp.com/liveassets/bp_internet/globalbp/STAGING/global_assets/downloads/A/Annual_Report_2001_Full_volume.pdf (Accessed 20 October 2010)

⁴⁶ Ibid.

petroleum products selling to British consumers, which BP had began with, had provided only 2.7 billion or 17 percent of company's net profit.⁴⁷

Ten years ago BP was not yet among the elite of the energy business. It has earned its capital on the development of Forties oil field in the North Sea, as well as fields in Prudhoe Bay, USA. But it did not occupy a significant place on the American continent. Abroad BP carried out only few long-term projects to develop new oil fields in Asia and Africa.

However, from 1998 to 2000 due to several mergers and acquisitions of US companies, such as Amoco and Atlantic Richfield Company (ARCO), BP became a major player in the US energy market. Due to Amoco it has received a large equity stake in the project for transportation of Atlantic LNG in Trinidad, while stocks in ARCO provided the company with control over the large gas project, Tangguh located in Indonesia, with a good prospect to become a major player in the emerging Asian LNG market.⁴⁸ Both these projects are at the stage of rapid development and promise significant profit.

BP has recently started active expansion in Russia. In September 2003 a merger of the Russian companies Tyumen Oil Company (TNK) and SIDANCO, and BP's Russian and Ukrainian assets took place.⁴⁹ As a result a vertically integrated oil and gas corporation TNC-BP with some 100 thousand employees has appeared in Russia's oil and gas industry. Half of its shares are owned by BP and half by a group of Russian investors.

The Russian market is attractive to foreign capital due to the fact that profitability of companies in the energy sector in this country is greater than that of Western companies by 2 to 4 times. The trend towards consolidation of energy companies in Russia has become an important regularity of the industry. The examples could be the 2004/2005 acquisition of Yuganskneftegaz company shares

⁴⁷ "Performance for all our futures", *BP Annual Report 2001, 2002*, pp. 14-16. Available at: http://www.bp.com/liveassets/bp_internet/globalbp/STAGING/global_assets/downloads/A/Annual_Report_2001_Full_volume.pdf (Accessed 20 October 2010)

⁴⁸ "Listing Particulars for BP Amoco-Arco combination", *BP Amoco p.l.c.*, pp. 5-7. Available at: http://www.bp.com/liveassets/bp_internet/globalbp/STAGING/global_assets/downloads/L/Listing_Particulars_for_BP_Amoco-Arco_combination.pdf (Accessed 20 October 2010)

⁴⁹ Abigail Townsend, "BP faces legal action over merger with Russians", *The Independent*, 24 August 2003. Available at: <http://www.independent.co.uk/news/business/news/bp-faces-legal-action-over-merger-with-russians-536940.html> (Accessed 18 October 2010)

by Baikal Finance Group (BFG), which was later bought by Rosneft, and the planned merger of Gazprom with Rosneft.⁵⁰

Due to Russia's eventual entry to the WTO, among economic factors of capital concentration in the Russian energy sector the most important one is the need to create large national companies that would be comparable with foreign corporations in economic power. Russian companies must be competitive, and for this they must have the appropriate assets, organizational structure and other features of competitive struggle.

In the future one should expect continuation of mergers and acquisitions in the Russian energy market. In this process an important role is traditionally played by the Russian government. In any case, whether the state is a shareholder or not, the results of centralization of capital in Russia will be determined by its actions and decisions.

3.2 The Activities of Gas TNCs in Different Regions of the World

European oil and gas industry is characterized by high level of centralization of capital, as it is represented by ten companies among the 50 largest non-financial organizations. Simultaneously it has the leading position in the scale of international activities. European oil and gas companies, which are among the first 100 companies with world largest foreign assets in Europe, surpass the US corporations when applied to the same criteria. Among the European companies this industry is on the second place after telecommunication in terms of foreign assets.

Oil and gas TNCs divide their operations on upstream, which consists in energy production, and downstream, responsible for energy refining and marketing. While the former focuses on exploration activities, production and transportation of hydrocarbons, the latter concentrates on raw materials' processing and delivery of products to consumers.

BP, the European largest oil company, is the world leader in terms of foreign assets, though is inferior to the American Exxon Mobil in terms of sales.

⁵⁰ "U.S. and Russian Government Commentary", *Yukos Minority Shareholder Coalition*, Government Commentary. Speech of Andrei Illarionov from 28 December 2004: Available at: http://www.yukosshareholdercoalition.com/press_room/gov_commentary.html (Accessed 25 October 2010)

Anglo-Dutch Royal Dutch/Shell is in the third place in the world, and the French Total is in the fourth place. To provide comparative analysis of the major energy companies, their activities in Central and Eastern Europe, as well as in the CIS will be further evaluated.

Shell and Total have the leading position in the CEE in terms of their presence in the region; with Shell leading activities in 17 countries while Total operates in 15 countries of the region. BP is present in 11 countries and the Italian ENI has its branches in 10 countries of the region. BP's lag from Shell and Total in terms of geographical range of activities is associated with the fundamental features of the company, which has a strong base in the North Sea and in the US. Shell and Total, while not having such a significant national resource base or developed links with the US economy, actively seek resources and business opportunities worldwide.

In CEE BP is present in Poland, the Czech Republic, Slovakia, Hungary, Slovenia, and Bosnia and Herzegovina; and in the CIS it operates in Russia, Azerbaijan and Kazakhstan. It has the strongest position in the post-Soviet space, especially in Russia, but at the same time it is the largest foreign investor in Azerbaijan, where the company is engaged in the exploration and development of a large group of oil fields, such as Azeri-Chirag-Guneshli, Shah Deniz, Inam, and Araz-Alov-Sharg exploration area.⁵¹ Moreover, BP was the leading member of the consortium aimed to build Baku-Tbilisi-Ceyhan oil pipeline.⁵²

Shell is present in almost all CEE countries, except for Bosnia and Herzegovina, Macedonia and Albania. In the CIS it is represented in all countries with significant hydrocarbon resources, except for Uzbekistan. The company is a key participant in Sakhalin-2 project, under which the first oil production on the continental shelf in Russia was started. The project aims to develop two major fields: Piltun-Astokhskoye and Lunskoye. The total recoverable reserves exceed

⁵¹ "Status of Azerbaijani Offshore Oil and Gas PSAs as of December 2009", *The Azeri Times*, 5 January 2009. Available at: <http://www.theazeritimes.com/site/fuel-energy/3261> (Accessed 20 October 2010)

⁵² "Spanning three countries from the Caspian Sea to the Mediterranean coast", *BP: Baku-Tbilisi-Ceyhan Pipeline*. Available at: <http://www.bp.com/sectiongenericarticle.do?categoryId=9006669&contentId=7015093> (Accessed 22 October 2010)

150 million tons of oil and 500 billion m³ of gas.⁵³ Together with the Russian party Shell leads the development of Salym oil fields in the Khanty-Mansi Autonomous District.⁵⁴ In 1997 it entered an alliance with Gazprom, under which a number of projects for the Polar Field development was implemented.

Shell is involved in the Caspian pipeline consortium and explores natural gas resources in Turkmenistan, planning its supply to the neighboring countries and Greece. In the downstream area the company is pursuing a strategy of massive promotion to the markets in CEE. In 2003 Shell and Total concluded the agreement, according to which the former company has received 70 filling stations in Hungary and 33 in the Czech Republic, while the latter side has obtained 133 filling stations in Germany. Hence, Shell has 200 gas stations in Hungary and 137 stations in the Czech Republic to date. Moreover, it acquired a 49 percent stake in Ceska rafinerska together with the American Conoco and the Italian AGIP, owned by ENI, in the Czech Republic in 2002.⁵⁵

Total has the strongest position in Kazakhstan, where it is allowed to develop Kashagan oil field in the Caspian shelf. It is actively involved in the exploration and development of hydrocarbon resources in the Azerbaijani sector of the Caspian Sea (Lankaran – 35 percent, Absheron – 20 percent and Shah Deniz – 10 percent), and invests in the pipeline BTC (Baku-Tbilisi-Supsa).⁵⁶ Total's major assets are in Russia, where it has 50 percent in developing the Kharyaga oil field in the Nenets Autonomous District.⁵⁷ Together with Rosneft, Total explores deep-sea resources of Tuapse trough, and plans to participate in the

⁵³ “Sakhalin II starts year-round oil export”, *News and Media Releases*, Official webpage of Shell Company, 12 December 2008. Available at: http://www.shell.com/home/content/media/news_and_media_releases/archive/2008/sakhalin_start_s_year_round_export_12122008.html (Accessed 19 October 2010)

⁵⁴ “Shell / Salym Petroleum Launch Production at West Salym”, *Industry News, Analysis and Editorial*, Rigzone, 25 November 2005. Available at: http://www.rigzone.com/news/article.asp?a_id=27252 (Accessed 22 October 2010)

⁵⁵ “Southern stars shine in the Czech Republic”, *Association for Foreign Investment*, 4 February 2009. Available at: <http://www.afi.cz/aktuality/southern-stars-shine-in-the-czech-republic.html> (Accessed 25 October 2010)

⁵⁶ “Status of Azerbaijani Offshore Oil and Gas PSAs as of December 2009”, *The Azeri Times*, 5 January 2009. Available at: <http://www.theazeritimes.com/site/fuel-energy/3261> (Accessed 20 October 2010)

⁵⁷ “Russia: Total transfers a 10 percent interest in Kharyaga field to Zarubezhneft”, *energy-pedia general news*, Source: Total, 29 November 2009. Available at: <http://www.energy-pedia.com/article.aspx?articleid=138024> (Accessed 23 October 2010)

development of Shtokman gas field in the Barents Sea. In the downstream area Total shows less interest to the countries of the region than other companies.

The Italian company ENI, in contrast, seeks to gain a foothold in CEE. In the Czech Republic it owns a 16.33 percent stake in Ceska rafmerska.⁵⁸ In the petrol market the company operates through its subsidiary AGIP, which has a wide network of filling stations in the Czech Republic, Slovakia, Romania and Slovenia, and is also represented in Russia. In Hungary the ENI owns a controlling stake in the gas company Tigas. In the upstream area ENI controls the Ivana gas field in the Adriatic Sea and the main gas pipelines in Slovenia.

In the CIS ENI's strongest position is in Kazakhstan. According to the North Caspian Production Sharing Agreement (NCPSA) the company is the only operator in the entire area with its own participation accounted to 18.52 percent. It also owns 32.4 percent in the consortium, responsible for the development of the oil and gas field Karachaganak in northwestern part of Russia, and stands as a co-investor of the Baltic Pipeline System (BPS) in Azerbaijan.⁵⁹ In Russia, ENI is involved in construction of oil and gas pipelines. Together with Gazprom it has built Dzhubga Samsun gas pipeline of the 'Blue Stream' project under the Black Sea, participated in pipelines construction in Sakhalin. Moreover, the company participates in the development of fields in the Rostov region and Astrakhan.⁶⁰

Norwegian Statoil has a great interest in the CEE and the former Soviet space. Most thoroughly the company is established in Azerbaijan, where it has received the same share in the development of the Shakh Deniz field as BP (25.5 percent). Another Norwegian company Norsk Hydro specializes less on oil and gas industry, whilst a significant part of its business is focused on the production of aluminum and polymers. However, at the same time the exploration and processing of hydrocarbons provides the company with its major income. Together with Total Norsk Hydro develops Kharyaga field in Russia, cooperates

⁵⁸ "Southern stars shine in the Czech Republic", *Association for Foreign Investment*, 4 February 2009. Available at: <http://www.afi.cz/aktuality/southern-stars-shine-in-the-czech-republic.html> (Accessed 25 October 2010)

⁵⁹ "Eni in the World", *official webpage*, August 2010. Available at: http://www.eni.com/en_IT/eni-world/eni-world.shtml (Accessed 15 November 2010)

⁶⁰ Ibid.

with Gazprom in the Shtokman gas field, and owns aluminum plants in Poland and Hungary.⁶¹

With regard to large Russian TNCs, Gazprom has subsidiaries in Armenia, Kazakhstan and Moldova in the CIS, and in CEE it has branches in all Baltic States, Poland, Slovakia, Hungary and Slovenia. This company owns a number of gas mains and distribution networks.

Lukoil is present in fewer countries but its area of operation is wider. In the CIS its major subsidiaries are in Kazakhstan, Azerbaijan and Ukraine. In the CIS the presence of Lukoil is primarily associated with exploration and production. In Azerbaijan the company owns 10 percent in the development of the Shakh Deniz field and 80 percent in the Yalama project; and in Kazakhstan it has 15 percent in the Karachaganak project and 50 percent in the Kumkol project. Lukoil also owns 50 percent in the Tyub-Karagan and Atash deposits, where exploration works have just started to begin, and 2.7 percent in the development of the Tengiz field. In 2004 Lukoil signed an agreement with Uzbekistan on development of country's Kandym, Khausak, Shady and Kungrad gas fields with a share of 90 percent.⁶² In addition Lukoil owns gas stations in Europe, USA and the CIS.

The energy balance of Latin America is characterized by rapidly growing share of the gas industry. Unlike oil, all extracted gas is consumed within the region. At the beginning of the 21st century the major exporters of natural gas were Trinidad and Tobago, Bolivia, Argentina, and Peru. There are new opportunities for the development of the gas industry in the region, especially in Brazil and Mexico, due to growing consumption of LNG. The development of the integration processes in the energy sector of the Latin countries has identified the leadership role of Mercosur. The member states of this block have largely advanced in the formation of the common power grid and gas market, engaging Venezuela, Peru and Bolivia in these initiatives.

⁶¹ "Merger of Hydro Petroleum with Statoil", *Merger Plan*, May 2007, p. 22. Available at: http://www.hydro.com/upload/Documents/Reports/Other_percent20reports/US_Prospectus.pdf (Accessed 28 November 2010)

⁶² Stephen O'Sullivan, Pavel Kushnir, "Lukoil: Kazakhstan Field Visit", *Russia Oil & Gas Comment*, Unites Financial Group. Available at: <http://www.lukoil.com/materials/doc/investor-trips/Karachaganak-UFG-eng.pdf> (Accessed 30 November 2010)

In the last two decades of the 20th century Asia turned into one of the fastest growing gas markets. Financial and economic crisis in the Asian countries in 1997 to 1998 had a considerable impact on energy consumption, resulting in a significantly decreased rate of production and the devaluation of national currencies. The rise in the cost of energy supply has led to a large decline in the energy consumption in South-East Asia, as well as in Japan and the Republic of Korea. At the same time China, whose economic and foreign trade performance has been hardly affected by the Asian crisis, managed to avoid a significant downturn in its economy. A crucial role in achieving sustained economic growth of this country was played by the state economic regulation and reliance on internal resources, rather than by external loans.

The share of China, Japan, India, and Korea accounts for about 75 percent of the total energy demand in Asia.⁶³ Though there is a great imbalance between supply and demand of natural gas in Asia. Total gas consumption in the region exceeds its production, therefore countries have no other choice than to import energy resources from the US and countries of the Middle East. Natural gas reserves in the region account for only about 7 percent of the world. However, taking into account Asia's high interest in gas use, due to the growing problem of energy security and environmental degradation, one could expect an increase in proven natural gas reserves in the region and the raise of its share in energy consumption in the near future. For example, according to the Organization for Economic Cooperation and Development (OECD) estimates, the share of Asia's total energy consumption will increase from the current 17 percent to 26 percent by the end of 2010.⁶⁴

As an important feature of the Asian gas market it is necessary to highlight the region's resource and export potential, which is concentrated in such countries as Indonesia, Malaysia, Brunei and Thailand, whose share of gas in total energy consumption varies from 20 to 40 percent. On the other hand, other countries of the region such as Japan, Korea, Taiwan and Singapore to name a few, are almost entirely dependent on gas imports.

⁶³ "World Energy Demand and Economic Outlook", US Energy Information Administration. Available at: <http://www.eia.doe.gov/oiaf/ieo/world.html> (Accessed 30 November 2010)

⁶⁴ "International Energy Outlook 2010", *US Energy Information Administration*, Independent Statistics and Analysis. Available at: http://www.eia.doe.gov/oiaf/ieo/nat_gas.html (Accessed 20 November 2010)

The dynamic development of the Chinese economy over the past two decades produces steady increase in energy demand. Currently the share of natural gas in primary energy consumption in China is very small, accounting for some 2 percent, compared to coal (75 percent) and oil (20 percent).⁶⁵ The natural gas industry of China is at its initial stages of development. Thus, over the past decade gas consumption in China grew by less than 50 percent and amounted to 24.2 billion m³ in 2000. It is a very tiny growth, as the total use of gas in all Asian countries has increased by 80 percent during this period. According to Chinese experts, potential geological resources of natural gas in China reach 46.2 trillion m³. In the near future the China National Petroleum Corporation (CNPC), the country's leading gas producer, intends to bring the proven gas reserves up to 2.8 trillion m³.⁶⁶

The natural gas industry in China is vertically integrated; therefore gas marketing is under strict government control. CNPC accounts for around 67 percent of the total gas production in the country. The share of the China National Offshore Oil Corporation (CNOOC) is about 15 percent, while the remaining 14 percent is being developed by the China National Petrochemical Corporation (SINOPEC).⁶⁷

In order to advance development of the gas industry of the national economy, Chinese government has identified three priorities to meet the growing gas demand in the domestic market: 1. Increase of domestic production of gas; 2. Construction of gas infrastructure for the formation of gas consumption market, primarily in the eastern regions of the country; 3. Provision of the natural gas imports in the amount necessary for compensation of its deficit through both pipelines deliveries from neighboring countries and imports of LNG.⁶⁸

Several of China's largest oil companies recently entered the gas business. The Italian company ENI has expanded its participation in gas projects in China,

⁶⁵ "International Energy Outlook 2010", *US Energy Information Administration*, Independent Statistics and Analysis. Available at: http://www.eia.doe.gov/oiaf/ieo/nat_gas.html (Accessed 20 November 2010)

⁶⁶ Ibid.

⁶⁷ "Developing China's National Gas Market: The Energy Policy Challenges", *International Energy Agency*, 2002, p. 64. Available at: <http://www.oecdchina.org/OECDpdf/chinagas2002.pdf> (Accessed 25 November 2010)

⁶⁸ Ibid. pp. 17-18

having signed production sharing agreement with PetroChina, which covers an area of 7000 km² in the central part of the country. According to Italian experts' estimations, there is up to 250 billion m³ of gas in this area. ENI is already engaged in active exploration works in South China Sea and Tarim Basin.

According to CNPC, the Royal Dutch/Shell Company will become the first foreign distributor of natural gas in China. In September 1999 a 3 billion dollar contract on joint development of gas fields in Ordos Basin in northwest region of China was signed. The contract enables Shell to provide consumers in Beijing, Hebei and Shandong with some 3 billion m³ of gas per year.⁶⁹

Development of China's gas industry and increase in the share of gas in the total primary energy consumption (up to 10 percent by 2020), as well as the widespread use of gas for energy production will help to reduce the dominant role of coal in the energy sector of the country and prevent environmental pollution. Therefore, it is fair to conclude that China's changing attitude towards natural gas will stimulate rapid development of energy and the country's economy as a whole.

The potential contribution of foreign capital in the development of gas industry in China could be rather effective, in case if it is implemented in all areas, from energy production to energy processing. Total investments in the gas industry of China is estimated as very significant, especially considering the establishment of distribution networks and facilities of the processing sector. However, China cannot afford these financial costs. The country's leadership expects to receive assistance from international financial institutions and to attract foreign business and loan capital. To fulfill the tasks set before the sector large-scale exploration and development of gas fields is to be implemented.

The current level of gas production in China does not satisfy the demand of the country's fast-growing industry that makes importation of significant volumes of both gas and liquefied natural gas inevitable. According to various estimates, gas imports could reach 30 to 50 billion m³ by the end of 2010, and some 60 billion m³ by 2020.⁷⁰ In 1995 Shell conducted research on the potential

⁶⁹ "Developing China's National Gas Market: The Energy Policy Challenges", *International Energy Agency*, 2002, p. 215. Available at: <http://www.oecdchina.org/OECDpdf/chinagas2002.pdf> (Accessed 25 November 2010)

⁷⁰ *Ibid.* p. 72

demand for LNG in China's provinces where alternative energy source for electricity production is imported coal. The analysis has showed that the price of electricity, resulting in the application of LNG as a fuel, is rather competitive with the coal alternative. Therefore, along with electricity plants gas could be used in municipal gas networks to replace the usage of coal. To provide further expansion of gas consumption the country can use its local reserves, as well as imports of gas via pipelines from Russia and Central Asia, and the LNG. In this regard, potential gas demand in China is so great that both kinds of gas could be easily sold. Projected increases in gas imports are quite realistic, in the case of when the projects of the pipeline constructions are fulfilled.

Thus China, one of the fastest-growing countries in the Asian region, a neighbor and longtime trading partner of Russia, has a very perspective natural gas market. The country has developed and started implementing a concept of a substantial increase in natural gas consumption. Rapidly growing demand for natural gas in China will overtake the level of its production. According to calculations of the Chinese side, defined reserves of their own resource base will last only for the next 10 to 15 years.

Therefore, the absence of China's national gas pipeline system and the distance between places of production and consumption creates a real basis for the country's mutual cooperation with Russia in the gas sphere, particularly in the construction of the national gas network, gas gathering centers and warehouses. It must be stressed that Russia and China have much in common in terms of magnitude of forming the gas supply system tasks, namely a large territory and remoteness of the main areas of consumption from the resource base. Russia has created an efficient, unparalleled unified gas supply system and has exceptional experience in solving problems similar to those faced by China in this area in coming decades.

The cooperation of the leading Russian gas company Gazprom and the Chinese partners CNPC and PetroChina is based on the Agreement between the governments of the two countries on continuation of cooperation in the energy sector, signed on 18 July 2000. The main objectives of this cooperation are currently: participation in the West-East gas pipeline construction in China; drawing up a project for developing the Kela-2 gas field in Xinjiang Uighur Autonomous Region of China; and, finally, implementation of techno-economic

considerations (TEC) to create a system of the underground gas storage (UGS) in Northeast China.⁷¹

In January 2001 Gazprom applied to participate in the first qualifying stage of the tender for the project 'East-West', having the following aims:

- Access gaining to the rapidly growing gas market in China and creation of a basis for the development of multilateral cooperation;
- Creation of necessary conditions for Russian gas supplies to China with access to the end consumer;
- Gasification of Russian regions in the case of decision to supply Russian gas and construct Novokuznetsk-Shanshan junction;
- Provision of economic pressures on European consumers of Russian gas.⁷²

Currently, in order to ensure a common approach to cooperation with China and other Asian countries, Gazprom is involved in the development of gas resources in Eastern Siberia and Far East; as well as the construction of gas pipelines in the unified gas supply system structure with the possibility of gas supplies to China and other countries in the Asia Pacific region through an unified export channel. It is assumed that Gazprom will be granted the status of coordinator for implementation of the concept.

Turkmenistan is another country that represents a great interest for Russia in energy sector. This country, considering Russia a strategic partner in the gas sector, however, seeks to find other purchasers of its 'blue fuel'. Until now, Ashgabat, the country's capital, was not able to find any importers, due to several reasons. Firstly, foreign investors interested in the development of gas fields of the republic, faced a lack of opportunities for independent commercial gas sales. Second, the prospects for opening the new Turkmen gas fields on land are small, while hydrocarbon potential of the Turkmen sector of the Caspian Sea has been researched insufficiently.

⁷¹ Mark Smith, "Current Russo-Chinese Relations", *Conflict Studies Research Centre*, January 2003, pp. 9-10. Available at: <http://www.da.mod.uk/colleges/arag/document-listings/russian/F81> (Accessed 20 November 2010)

⁷² Ibid. p. 10

However, in recent years, the situation began to change. In 1996 through 2005 the American WesternGeco company carried out seismic surveys covering the entire territory of the Turkmen sector of the Caspian Sea. Research has showed that the hydrocarbon potential of the Turkmen part of the Caspian Sea is estimated at 11 billion tons of oil and 5.5 trillion m³ of gas.⁷³ Moreover, this estimate does not consider the data of already contracted blocks.

There are 10 natural gas fields opened in the Turkmen shelf of the Caspian Sea. Geologists predict a high probability of finding new large oil and gas fields, given that the main areas of oil and gas deposits in the Turkmen sector are still poorly explored, and considerable depth make it difficult to detect them. Ashgabat actively invites foreign TNCs to participate in the development of offshore fields and seeks to solve the problem of gas export. And there is a strong likelihood that Turkmenistan will be able to do so, as it was evidenced by the practice of Malaysian Petronas Company, which owns the license to develop part of the shelf in the country.

In 2005 the company held negotiations in Ashgabat on opportunities of independent gas exports. The negotiations have resulted in Ashgabat's readiness to provide the company with the state's gas transportation network to export gas in case Petronas finds purchasers itself. This decision indicates that change of course in the investment policy of Turkmenistan, as previously Ashgabat rejected the possibility of gas exports by foreign investors. This news significantly increased the activity of foreign investors. Thus, the company Dragon Oil (UAE / UK), which produces oil in the offshore Cheleken block, plans to start gas production there and to bring it up to 1.5 billion m³ per year by the end of 2010.⁷⁴

At this time Ashgabat discusses the conditions of resource development in the new fields with several foreign companies. Among them are German Wintershall, Dutch Berlanga Holding, Canadian Buried Hill Energy, China's CNPC, Ukrainian Naftogaz, and Russian Gazprom and Lukoil.

It is obvious that foreign companies-investors will soon face the problem of produced gas export, due to the development of new gas fields in

⁷³ Igor Effimoff, "The oil and gas resource base of the Caspian region", *Journal of Petroleum Science and Engineering*, Volume 28, Issue 4, December 2000, pp. 157-159

⁷⁴ "Turkmenistan - Dragon Oil In Cheleken", *CBS Interactive Business Network*. Available at: http://findarticles.com/p/articles/mi_hb6478/is_13_75/ai_n55394943/?tag=content;coll (Accessed 1 December 2010)

Turkmenistan. The existing Central Asia – Center gas pipeline system (CAC) is not able to satisfy such needs, as its capacity is currently limited to 45 billion m³ of gas per year. Therefore, it is planned to reconstruct the pipeline, increasing its capacity up to 80 to 90 billion m³, while 30 billion m³ will be reserved for export of the Uzbek and Kazakh gas, and Turkmenistan will be able to use the remaining amount of 50 to 60 billion m³.⁷⁵ At the same time, since Gazprom is the operator of the CAC gas pipeline system on the territory of Uzbekistan and Kazakhstan, the final decision on who and how much of gas will be transported through the pipeline is to be made by the Russian company, which is not interested in providing its gas transportation capacity to export gas of foreign investors in Turkmenistan.

This, in turn, leads foreign companies to elaborate on new possibilities of the construction of new gas pipelines from Turkmenistan. In this respect, by ensuring the possibility of exporting the gas produced by foreign investors, the Turkmen side would further increase the likelihood of gas pipelines construction. Meanwhile, Gazprom successfully controls the situation with the export of Turkmen gas. However, its leadership does not seem as indestructible as it was a few years ago. It is necessary for Gazprom to shift from its tactics of ‘gas transport vacuum’ retention around Turkmenistan and begin to participate more actively in the development of Turkmenistan’s gas fields. Probably this would guarantee foreign companies, operating in the gas sector of Turkmenistan, the ability to export the produced gas in the next few years.

There is another solution to Turkmenistan’s gas export problem, which depends on foreign investors. To preserve the monopoly on Turkmen gas transit Gazprom could offer its services of foreign investors’ gas transportation to Europe with the use of the CAC gas pipeline and the Russian gas transportation system. Moreover, Gazprom could propose a project to build a new export pipeline from Turkmenistan through Russia or, if Turkmenistan would oppose to a Russian pipeline route, to take an active part in the tender struggle for the construction of the pipeline on any other route. In other words, if the construction of a new export

⁷⁵ Martha Brill Olcott, “International Gas Trade in Central Asia: Turkmenistan, Iran, Russia and Afghanistan”, *Program on Energy and Sustainable Development*, Stanford University. Available at: http://www.rice.edu/energy/publications/docs/GAS_InternationalGasTradeinCentralAsia.pdf (Accessed 1 December 2010)

pipeline from Turkmenistan is inevitable, Gazprom should and will try to obtain the greatest possible control over the new route of Turkmen gas exports.

3.3 The Impact of Gazprom on Russian and Global Gas Markets

Gazprom is Russia's state gas monopoly, which controls about 16 percent of the world gas reserves. The share of Gazprom accounts for around 90 percent of the total gas production in Russia, and 20 percent of the world gas production.⁷⁶ Natural gas reserves owned by Gazprom are estimated to be 28.8 trillion m³, which is nine times greater than the overall figure for the European Union (EU) countries.

In the domestic market prices on gas produced by Gazprom are regulated and kept at a very low level (in 2006 cost about 40 dollars per 1000 m³), and the dynamics of domestic prices do not reflect the dynamics of the global market. Since the creation of foreign trade in the gas sector in 1973, the overall volume of Russia's natural gas export has reached 2.47 trillion m³ in April 2003.⁷⁷

About 70 percent of natural gas exports from Russia are accounted for the countries of Western Europe. In 2002 Gazexport, Gazprom's subsidiary, delivered 87.8 billion m³ of gas to markets in the region, while the major importers were Germany (32.2 billion m³), Italy (19.3 m³), Turkey (11.8 billion m³) and France (11.4 billion m³).⁷⁸ Turkey reached the three largest Western European importers in 2001, having bought 11.1 billion m³ of natural gas and hence overtaking France in the volume of gas being imported in to the country.⁷⁹ The completion of the Blue Stream gas pipeline as well as works to expand the capacity of the trans-

⁷⁶ "Gazprom", *Russia Profile.org: Unwrapping the Mystery Inside the Enigma*. Available at: <http://www.russiaprofile.org/page.php?pageid=resources-business-russiancompanies-gazprom.wbp> (Accessed 1 December 2010)

⁷⁷ Ibid.

⁷⁸ Eirik Lund Sagen, Marina Tsygankova, "Russian Natural Gas Exports to Europe: Effects of Russian Gas Market Reforms and the Rising Market Power of Gazprom", *German Institute for Economic Research*, Discussions Papers, June 2006, Berlin, pp. 4-6. Available at: http://www.diw.de/documents/publikationen/73/diw_01.c.44434.de/dp597.pdf (Accessed 10 December 2010)

⁷⁹ "EU Energy and Transport in Figures", *Statistical Pocketbook*, EC, 2010, p. 23. Available at: http://ec.europa.eu/energy/publications/statistics/doc/2010_energy_transport_figures.pdf (Accessed 2 December 2010)

Balkan pipeline will enable gas supplies to Turkey in the amount of 30 billion m³ in both directions starting from 2010.

Russia also supplies natural gas to the countries of Central Europe. In 2002 Gazexport exported 41.6 billion m³ to the region, accounting for almost 90 percent of total gas purchases by Central European countries. The major importers in the region are: Hungary (9.1 billion m³), Slovakia (7.7 billion m³), the Czech Republic (7.4 billion m³) and Poland (7.3 billion m³).⁸⁰ These countries import over 75 percent of the Russian gas supply to Central Europe.

European countries can be divided into three groups according to the degree of their dependence on Russian gas supplies. The first group consists of countries of Western Europe such as France, Germany and Italy, which satisfy a significant proportion of their gas needs by Gazprom; however, have other sources of supply, such as Northern European countries and Algeria. They are interconnected with these sources of supply by the existing pipelines.

The most dependent country in this respect is Germany, due to the high share of Gazprom's supplies in the country's gas consumption, which amounted to 44 percent in 2005, while the level of dependence of the other two countries varies from zero to 25 percent.⁸¹ Gazprom supplies gas to these countries in accordance with long-term contracts at prices that are tied to the price of petroleum products in Europe with approximately a six-month lag.

It is in Gazprom's high interest to continue supplies to these countries because they are the main source of income and cash flows of the company. In fact, the sale of gas to foreign markets, which accounts for one third of Gazprom's total gas production, provides two-thirds of the company's gross profit. This is explained by the fact that in the domestic market gas is sold at very low regulated tariffs. Gas prices in the Russian internal market are expected to gradually increase from 35 dollars per 1000 m³ in 2005 to 60 dollars per 1000 m³ in 2010, but they are still far below the prices at which Russia sells gas to countries of the EU, which currently account for more than 200 dollars per 1000 m³.⁸²

⁸⁰ "EU Energy and Transport in Figures", *Statistical Pocketbook*, EC, 2010, p. 23. Available at: http://ec.europa.eu/energy/publications/statistics/doc/2010_energy_transport_figures.pdf (Accessed 2 December 2010)

⁸¹ Ibid.

⁸² Eirik Lund Sagen, Marina Tsygankova, "Russian Natural Gas Exports to Europe: Effects of Russian Gas Market Reforms and the Rising Market Power of Gazprom", *German Institute for*

Additional options of gas supply to this group of countries are associated with the activity of some Western European companies which in order to ensure energy security, create joint ventures with Gazprom. For instance, the German company BASF AG signed a mutual agreement in 2006, under which Gazprom has increased its share in the joint venture Wingas GmbH in Germany from 35 percent to 50 percent in exchange for 35 percent of stakes in Yuzhno-Russkoye gas field in Western Siberia.⁸³

The second group includes Central and Eastern European (CEE) countries, such as the Czech Republic and Poland, which import the bulk of gas they need from Gazprom at prices close to market level. The ability of these countries to diversify sources of energy supplies in the future largely depends on how the prices at which they buy gas will be close to market level, as well as their desire and opportunity to invest in economically viable gas pipeline infrastructure.

The third group is formed by some former Soviet Union countries, especially Ukraine and Belarus, which consume almost only Russian gas at low and subsidized prices. The two countries were paying Gazprom 50 dollars and 46.68 dollars per 1000 m³ respectively until 2005.⁸⁴ Provision of subsidies could be explained by political reasons and essentially means that Gazprom has a mandate to sell cheap gas to these countries. While the average selling price of Russian gas to Western Europe for the first nine months of 2005 amounted to 181 dollars per 1000 m³, the volume of subsidies given to Ukraine and Belarus in 2005 amounted to about 3.3 billion dollars and 2.6 billion dollars respectively.⁸⁵

Due to low prices on gas these countries have little interest in implementing energy-saving technologies, which were integrated in the developed countries already in the 1970s. For this reason, the former Soviet Union countries

Economic Research, Discussions Papers, June 2006, Berlin. Available at: http://www.diw.de/documents/publikationen/73/diw_01.c.44434.de/dp597.pdf (Accessed 10 December 2010)

⁸³ “Wingas GmbH & Co. KG”, the official webpage of Wingas Company. Available at: http://www.wingas.de/fileadmin/pdf/Profile/WINGAS_Profil_2010_en.pdf (Accessed 2 December 2010)

⁸⁴ Eirik Lund Sagen, Marina Tsygankova, “Russian Natural Gas Exports to Europe: Effects of Russian Gas Market Reforms and the Rising Market Power of Gazprom”, *German Institute for Economic Research*, Discussions Papers, June 2006, Berlin, pp. 6-7. Available at: http://www.diw.de/documents/publikationen/73/diw_01.c.44434.de/dp597.pdf (Accessed 2 December 2010)

⁸⁵ Ibid.

continue to be characterized by wasteful use of energy, especially in industry, while the gas remains a key component of their fuel and energy balances. This increases their dependence on Russian gas supply and simultaneously increases their sensitivity to price increases in the gas market.

Ukraine is the most vulnerable in this group because of country's highest level of energy consumption in the region. In January 2006, Gazprom raised prices on gas for Ukraine up to 230 dollars per 1000 m³, but the average effective price at which Ukraine was buying gas in the first half of 2006 was only 95 dollars per 1000 m³.⁸⁶ This is explained by the fact that Ukraine was buying a mixture of Russian and Central Asian gas, while the latter is much cheaper.

The Russia-Ukraine gas dispute of 2009, which resulted in supply disruptions in European countries, has triggered further instability in gas prices. Gas supply pricing, which Gazprom and its customers do not disclose, continues to be individual for each country-importer. At the same time Russian Prime Minister Vladimir Putin was the one to publicly describe the gas pricing formula: *"The prices for Russian gas are determined not voluntarily, but by the market. Hence, the price of gas for each country is calculated as a sum of average market gas price of the previous year plus a small coefficient, average price of gasoline plus a small coefficient and average price of heating oil"*.⁸⁷ However, this formula differs from country to country, depending on whether it is calculated each quarter or every six months. In each case the price of gas is also tied to the price of petroleum products.

At the same time there are some countries which do not fit into any of the groups. Several CEE countries, for example Bulgaria and Romania, occupy an intermediate position between the second and third groups. Although it is profitable for Gazprom to sell gas to these countries, the selling price is lower than in Western Europe. This is due to transport costs and the fact that historically

⁸⁶ Eirik Lund Sagen, Marina Tsygankova, "Russian Natural Gas Exports to Europe: Effects of Russian Gas Market Reforms and the Rising Market Power of Gazprom", *German Institute for Economic Research*, Discussions Papers, June 2006, Berlin, pp. 6-7. Available at: http://www.diw.de/documents/publikationen/73/diw_01.c.44434.de/dp597.pdf (Accessed 2 December 2010)

⁸⁷ Pavel Arabov "Secret Formula of Russian Gas", translated from Russian language. Available at: [http://fin.izvestia.ru/articles/126/article1252888/?hyperrealurl=http percent253A percent252F percent252Fwww.finiz.ru percent252Foil percent252Farticle1252888](http://fin.izvestia.ru/articles/126/article1252888/?hyperrealurl=http%20percent253A%20percent252Fwww.finiz.ru%20percent252Foil%20percent252Farticle1252888) (Accessed 5 December 2010)

Gazprom has been paying part of transit cost for delivering gas through these countries by gas.

Gas consumption in Russia is growing faster than it is provided by Gazprom's programs. In particular, in 2010 real consumption of Russian domestic gas market has increased by 4 percent against the planned growth by 1 percent. In this respect the monopoly plans to increase production from 548 billion m³ in 2005 to 560 billion m³ by the end of 2010.⁸⁸ But most experts agree on the idea that company will face the stagnation of production, while consumers will be demanding more gas. So, this year Gazprom provided domestic industry with 100.5 billion m³, which is 11 billion m³ less than in 2005, while it was claimed by the company that at least 140 billion m³ of gas, and ideally 160 billion m³, should be produced to support growing gas market.⁸⁹

Currently Gazprom supplies Europe with some 30 percent of the total consumption of natural gas there, which was about the amount of 154 billion m³ in 2008. In situation when following the gas crisis in January 2009 many European countries, in particular Bulgaria, Slovakia and the Balkan countries, were affected, Gazprom made an attempt to ensure stable and constant gas flow to its customers by increasing supply through 'non-Ukrainian' gas pipelines, but this eventually proved impossible, since 80 percent of Russian supplies to Europe goes through Ukraine.⁹⁰

It seems that for such a monopoly, as Gazprom, to provide additional volume of gas is not a problem. However, it is in the company's agenda to increase exports from 151 billion m³ in 2005 to 180 billion m³ in 2010; thus the gas shortage in the country will be inevitably growing.⁹¹ In this respect Gazprom is trying to solve this problem by enhancing production. According to the chairman of the management committee, Alexey Miller, Gazprom is able to achieve an annual production level of 620 billion m³ this year, while the company's potential gas reserves of 29.1 trillion m³ enable Gazprom to produce

⁸⁸ Pavel Arabov "Secret Formula of Russian Gas", translated from Russian language. Available at: [http://fin.izvestia.ru/articles/126/article1252888/?hyperrealurl=http percent253A percent252F percent252Fwww.finiz.ru percent252Foil percent252Farticle1252888](http://fin.izvestia.ru/articles/126/article1252888/?hyperrealurl=http%20percent253A%20percent252Fwww.finiz.ru%20percent252Foil%20percent252Farticle1252888) (Accessed 5 December 2010)

⁸⁹ Ibid.

⁹⁰ Ibid.

⁹¹ Ibid.

up to 900 billion m³ per year.⁹² However until recently Gazprom preferred to invest in increasing its monopoly power by enhancing natural gas exports, but not in production. Therefore, Gazprom has already faced the problem of satisfying needs of clients from abroad as well as the interests of Russian consumers. Thus, unless Gazprom introduces new production capacity and provides further development of gas transportation system a new gas crisis can emerge.

Signed long-term contracts ensure the preservation of Gazprom's market share for the future. The duration of some agreements for the supply of gas to European countries reaches 25 years and covers the period far beyond 2010. Their importance can hardly be overestimated, since they focus on long-term international economic relations and are an example of stable cooperation. In a liberalized market long-term contracts are most able to cover the growing demand for gas import in Europe, because only such contracts, which are based on 'take or pay' principle, guarantee payback of multi-billion dollar investments in export-oriented gas projects. Hence, the development of Russian natural gas export and achievement of the appropriate level of its production will be determined by the size of demand, price level and of course the degree of risks beared by partners.

The Russia-Ukraine gas dispute led to redistribution of the gas market in Europe in order to decrease the value of fuel supply from Russia. As a result Gazprom has lost some two billion dollars due to termination of gas transit and compensations which it had to pay for gas supply disruption. In order to prevent further possible energy conflicts and give new opportunities for gas sector development, combining of financial strength, technical, technological and marketing 'know-how' in international projects is essential. Optimization of gas flow using the resource base and transportation infrastructure of the partner countries provides more efficient distribution of gas in the interests of both producers and consumers, as well as the development of the market as a whole. In this context strategic alliances between Gazprom/Gazexport and Royal Dutch/Shell, ENI and BASF are based on the principles of strengthening of the market positions of each party. These alliances provide for cooperation in gas and oil marketing, as well as gas production and transportation not only in Russia but also abroad. Alliance with the Italian ENI, in particular, creates conditions for joint

⁹² Gazprom's Press Center, Alexey Miller's column. Official webpage of Gazprom, 21 June 2010. Available at: <http://www.gazprom.com/press/miller-journal/946339/> (Accessed 6 December 2010)

work to improve efficiency of gas transportation systems; provides conditions for the construction of power plants, working on gas; allows for a joint search for new hydrocarbon fields in Asia and Africa, with a possibility of future pipelines building; and has enabled the construction of the Blue Stream gas pipeline.⁹³

Since 2002 Gazexport operates with the gas coming from Central Asian states, including its purchase, transporting organization and implementation in the states of CIS and far abroad. Involvement of Central Asian gas could be explained by several economic factors, such as existence of a common system of gas pipelines with Russia, increasing gas production in the Central Asian region, as well as the commercial attractiveness of this gas, given rising costs to increase gas production in difficult-to-access northern oil fields in Russia.⁹⁴

Moreover, Gazexport has begun preliminary studies of economic feasibility of the Russian gas supplies in the Asian direction. The explored reserves of natural gas in Eastern Siberia, South Yakutia and Sakhalin are located in close proximity to large potential gas markets of China, Korea and Japan. The demand for gas import in these countries is estimated at 150 to 200 billion m³ per year, and they represent a serious interest in terms of diversification of domestic exports. The resources of Sakhalin, Kovykta and in the longer term Yamal gas fields will be aimed to fulfill gas demand of China and Korea, countries which are proved to be the most promising markets in Asia.⁹⁵

Gas markets in Finland, Sweden and to some extent in Denmark are of great interest of Gazprom. In order to transport Russian natural gas to these countries, Gazprom plans to build an additional branch of Trans-Baltic North European pipeline, which will import reserves of the Stockman gas field, Yamal and Ob-Taz Bay Peninsula.⁹⁶ In this respect long-term contracts, under which such projects as the Yamal-Europe and Blue Stream are implemented, are essential for Gazprom's gas export ambitions.

⁹³ "Gazprom and Eni mark 40th anniversary of Russian gas supplies to Italy", Gazprom's official webpage. Available at: <http://www.gazprom.com/press/news/2009/december/article72874/> (Accessed 7 December 2010)

⁹⁴ "Energy Strategy of Russia for the Period up to 2030", *Ministry of Energy of the Russian Federation*, Moscow, 2010, pp. 76-78. Available at: [http://energystrategy.ru/projects/docs/ES-2030_\(Eng\).pdf](http://energystrategy.ru/projects/docs/ES-2030_(Eng).pdf) (Accessed 6 December 2010)

⁹⁵ Ibid.

⁹⁶ Ibid.

Together with Anglo-Dutch Royal Dutch/Shell Gazprom is now involved in the tender for construction of the West-East gas pipeline in China. The agreement on strategic alliance between the two companies was signed in 1997. Their rivals are the other two international consortiums – BP with the Malaysian Petronas and the US Exxon Mobil with Hong Kong CLP Enterprises. The strongest competitor to Gazprom is BP which has achieved remarkable results in the Chinese gas market, in particular by creating joint enterprise with China in the North-East and South China.

The project “West-East” includes the construction of trans-China gas pipeline from Xinjiang Uygur Autonomous Region to Shanghai with a capacity of up to 20 billion m³ per year.⁹⁷ The total project cost is estimated at 18 billion dollars, including 12 billion dollars for the costs of the exploration and development of gas fields in Tarim gas basin, and 6 billion dollars to build the pipeline.

On December 25, 1997 Russia, China, South Korea, Japan and Mongolia signed a five-party memorandum on the preparation of agreement for construction of a pipeline from Kovykta gas field to China.⁹⁸ On November 3, 2000 China National Petroleum Corporation (CNPC) together with Russia Petroleum (its main shareholder is Anglo-American British Petroleum) and the South Korean Cogas signed an agreement to elaborate a feasibility study for the field development.⁹⁹ South Korea confirms a desire to participate in the project at all stages of its implementation, expressing willingness to purchase from 5 to 7 billion m³ of gas annually. In January 2001 Russia adopted a law on introducing Kovykta into the list of fields being developed under production sharing agreements. Such agreements are the basis for foreign companies to invest money into the field exploration.

Kovykta, which is located 350 km from Irkutsk, is one of the twenty largest gas deposits in the world. The total reserves of Kovykta are estimated at

⁹⁷ Steven Lewis, “Chinese NOCs and World Energy Markets: CNPC, Sinopec and CNOOC”, *James A. Baker III Institute for Public Policy*, Rice University, March 2007, p. 19. Available at: http://www.rice.edu/energy/publications/docs/NOCs/Papers/NOC_CNOOC_Lewis.pdf (Accessed 7 December 2010)

⁹⁸ “China Country Analysis Brief: China Economy Overview”, *World Law Direct*, 3 July 2008. Available at: <http://www.worldlawdirect.com/article/504/china-country-analysis-brief.html> (Accessed December 2010)

⁹⁹ Ibid.

about 2 trillion m³. Kovykta project is one of the largest international projects to develop gas fields and natural gas exports in the Asia Pacific region. Costs of its implementation are estimated at 10 to 12 billion dollars. According to the agreement amount of gas being transported to the Russian border with China is expected to be at least 20 billion m³ per year.

Kovykta project is of strategic importance for Russia. Its implementation could contribute to the economic development of Siberia and the Far East, gasify Irkutsk and Chita regions and the Republic of Buryatia, provide Angarsk petrochemical complex with raw materials, stimulate the development of engineering and metallurgy industries, producing equipment for constructing gas pipeline, as well as attract significant foreign investment. Furthermore, according to preliminary estimates, Russia will be given an opportunity to export from 20 to 30 billion m³ of gas to China and South Korea.

In July 2001 Russian-Chinese commission on cooperation in the energy sector confirmed their mutual interest in promoting the Kovykta project and the subsequent supply of produced materials to China. Simultaneously the commission came to a consensus that the coordination of the export of Russian gas supplies to China should be exercised by one company – Gazprom. The functions of the state coordinator of all export projects were assigned to the Russian Ministry of Energy. Currently there are projects on the construction of four pipelines from Russia to China at different stages of elaboration: the pipeline from Kovykta gas condensate field in Irkutsk region to transfer 20 billion m³ during 30 years; the pipeline from the south part of Western Siberia to feed West-East trans-China gas pipeline, which will supply 8 billion m³ of gas per year; the pipeline from the Republic of Sakha to transfer 20 billion m³ for 25 years, starting from 2005; and finally, the pipeline from Sakhalin to supply up to 10 billion m³ annually.¹⁰⁰

The Kovykta project is significant for China as well. According to Chinese economists' forecast total consumption of gas in China is expected to reach 95 billion m³ per year by the end of 2010 and 140 billion m³ by the year 2020. At the same time China's capability for natural gas production is estimated at 72 billion

¹⁰⁰ Michael Jones, "Northeast Asia's Kovykta Conundrum: A Decade of Promise and Peril". Available at: http://www.nbr.org/publications/asia_policy/Preview/AP5_Kovykta_preview.pdf (Accessed 8 December 2010)

m³ in 2010 and 95 billion m³ in 2020.¹⁰¹ Consequently, China's need to import gas will be more than 20 billion m³ in 2010 and at least 45 billion m³ in 2020. In the future China's demand for imports may rise up to 80 billion m³ per year. For comparison, the majority of Gazprom's Western partners receive approximately 130 billion m³ annually or 25 percent of its annual production.¹⁰² Taking into account the proximity of Kovykta to Russian-Chinese border, the involvement in the project of BP and Gazprom is considered as very promising and realistic by China.

Since gas export is a business with enormous risks, one of the best ways of their neutralization is export diversification. In this regard, the value of the Chinese gas market for Russia will grow steadily and in the next few decades China could become a major consumer of Russian natural gas, taking into account the ongoing process of liberalization of Gazprom's main Western partners. In these circumstances, the implementation of joint projects in the gas industry between the two parties can bring the Russian-Chinese economic cooperation to a qualitatively new level.

It must be emphasized that the selection of priority investment targets is dependent on such economic conditions as the balance of supply of and demand for gas in a given country, the presence of long-term contracts and reliable financial resources, as well as economic efficiency of the entire project. Of course, one cannot ignore the position of the leadership of countries and companies - partners with whom negotiations are in the process. Hence, both potential perspective projects and possible consequences of the European gas market liberalization are currently considered.

Contemporary gas market is characterized by increased competition between the largest TNCs, which is expressed in various forms of centralization of capital, such as mergers, acquisitions, alliances, strengthening of marketing activity, as well as horizontal and vertical integration. Nowadays the five largest TNCs: Exxon Mobil, British Petroleum, Royal Dutch/Shell, Total, Chevron

¹⁰¹ Michael Jones, "Northeast Asia's Kovykta Conundrum: A Decade of Promise and Peril". Available at: http://www.nbr.org/publications/asia_policy/Preview/AP5_Kovykta_preview.pdf (Accessed 8 December 2010)

¹⁰² Ibid.

Corporation, control about half of the global energy market, and the 15 largest TNCs industry control nearly 90 percent of world energy market assets.¹⁰³

Another factor of profitability increase and the reason for centralization is economy of scale, which could be achieved due to the fact that the average cost of output per unit decreases as the volume of production increases. One of the sources of such efficiency is the distribution of fixed costs to a greater number of units. Centralization of capital and economy of scale make it possible to establish a unified policy of raw materials and intermediate goods purchase, thereby reducing manufacturing costs. Certain efficiency, especially in the short run, is due to a uniform policy of sales of the joint company, the centralization of marketing and sales, new opportunities to offer distributors a broader range of products, and use of the common marketing materials.

Decrease of the number of legal entities, improved business processes, and eliminated duplicative functions, all these enable companies to reduce staff and expand the functions of the remaining employees by eliminating duplication and centralizing such operations as accounting, financial controls and record keeping. Subsequently both qualification of the remaining staff and the overall strategic management of the company could be significantly improved. For instance, as a result of reorganization and liquidation of duplicative services and functions carried out after the merger of BP and Amoco, companies saved some 2 billion dollars.¹⁰⁴

Through strategic mergers, acquisitions, the buying up of assets and participation in several energy sectors of the economy, oil and gas companies secured the possibility of their further growth. However, at the same time there was a process of selling assets and a shift towards the development of new energy and mineral resources markets. Diversification is another important component of a successful centralization, which leads to a decrease of the overall business risk throughout the production chain. This is particularly true for gas companies which seek to enter the electricity business.

¹⁰³ Barbara Melbourne, "Transnational Corporations", *Geofile online*, January 2006. Available at: <http://www.school-portal.co.uk/GroupDownloadFile.asp?GroupId=40076&ResourceId=242463> (Accessed 9 December 2010)

¹⁰⁴ "Mergers and acquisitions – Amoco", *official webpage of British Petroleum plc*. Available at: http://www.bp.com/liveassets/bp_internet/globalbp/STAGING/global_assets/downloads/A/Amoco_Presentation.pdf (Accessed 7 December 2010)

Oil and gas companies are pushed to merge by the growing costs associated with search and exploration of new oil and gas fields. As a result, mining and processing companies are increasingly turning to the development of new emerging markets, primarily in northern and far eastern fields in Russia. One of the most important technological causes of centralization is the higher efficiency of power plants working on gas compared to coal fired and nuclear power plants. Tendency of gas companies to penetrate into the sphere of electricity leads to further mergers or acquisitions.

Another technological reason for centralization of capital in the energy sector is the development of information technology which made business more mobile and increased the speed of decision-making. Moreover, it has reduced costs spent on the turnover of goods, services and capital; exchange of information has become more rapid; and telecommunication services became cheaper.

With invention of such information technologies as electronic wholesale and retail trade in goods and services, electronic stock exchange, plastic cards, and electronic signature, the ability of capital to flow anywhere in the world has increased dramatically. Hence, borders of capital growth have expanded significantly. Created over the last ten years effective and relatively cheap networks of communication services allow energy companies to place some of their production units in different countries without undermining control over them.

Thus the centralization of capital has allowed energy companies to take full advantage of opportunities created by privatization, liberalization, deregulation, and scientific-technological revolution. By joining with their competitors or technologically related firms, energy companies do not only concentrate greatly increased economic strength in the hands, but also become able to provide more pressure on the government.¹⁰⁵

In order to ensure a strong competitive position, the number of oil and gas companies implements horizontal integration, which brings them to the electricity market. For example, Shell intends to invest billions of dollars in electricity

¹⁰⁵ Barbara Melbourne, "Transnational Corporations", *Geofile online*, January 2006. Available at: <http://www.school-portal.co.uk/GroupDownloadFile.asp?GroupId=40076&ResourceId=242463> (Accessed 9 December 2010)

development because, according to company management, such investments are most promising. In the 2009 annual report it was stated that Shell delivers energy and petrochemical products of extremely wide range. It includes crude oil, petroleum products and natural gas, fuel for ships and aircraft, the production of electricity.¹⁰⁶

The merger of two British national distribution and sales companies Electricity National Grid Group and gas Lattice Group, exclusively owning electricity grids and pipeline system of the country, became the largest in the UK. While the most significant cross-border merger in Europe was the acquisition of British company Innogy Holdings, the second largest supplier of electricity and gas in the country, by German company RWE in 2002.¹⁰⁷ Along with Western companies Russia's Gazprom is also involved in property redistribution. In March 2002 Gazprom together with Gas de France and the German Ruhrgas purchased 49 percent stake in Slovenian gas company Slovensky Plynarensky Priemysel.¹⁰⁸

In some countries joint gas and electricity companies were established only recently after the opening of markets to competition, as it was the case in the UK. Forms of cooperation of such companies might vary drastically, including the establishment of common legal entities. In other countries, gas-electric companies were established a few decades ago. For example there was a merger of electricity company IVO and the gas company Neste in Finland in 1998.¹⁰⁹ The new company was called Fortum. At the same time, one more diversified energy company Tractebel was established in Belgium after the merger of electricity company Electrabel and gas company Distrigas.

Large cross-sectoral collaboration, including creation of joint companies, is observed in France, where the main business partners are the Electricite de

¹⁰⁶ "Royal Dutch Shell plc Annual Report", *Shell's official webpage*, p. 24. Available at: http://www.annualreportandform20f.shell.com/2009/servicepages/downloads/files/all_shell_20f_09.pdf (Accessed 8 December 2010)

¹⁰⁷ Barbara Melbourne, "Transnational Corporations", *Geofile online*, January 2006. Available at: <http://www.school-portal.co.uk/GroupDownloadFile.asp?GroupId=40076&ResourceId=242463> (Accessed 9 December 2010)

¹⁰⁸ "Energy profile of North-Central Europe", *The Encyclopedia of Earth*, 24 September 2008. Available at: http://www.eoearth.org/article/Energy_profile_of_North-Central_Europe (Accessed 10 December 2010)

¹⁰⁹ "Energy Policies of IEA Countries: Finland 1999 Review", *International Energy Agency*, p. 24. Available at: <http://www.iea.org/textbase/nppdf/free/1990/finland99.pdf> (Accessed 11 December 2010)

France (EDF) and Gas de France (GDF).¹¹⁰ EDF sells natural gas, heating, and builds power plants in many European countries, China and South East Asia.

To survive contemporary electricity companies must enter global markets not only of production but also of services. Gas and electricity trading, game with price difference between them, and the cost savings due to vertical integration have become highly profitable business and a prerequisite for a company to offset such effects of liberalization as imbalance between supply and demand and price instability.

Recently major energy companies begin to implement projects to further diversify their business by joining such sectors as the public water supply systems, waste utilization, telecommunications and others. For example German energy groups RWE and E.ON actively explore the feasibility of entering water supply sector. Similar processes are observed in Russia. In 2003 the Unified Energy System (UES) of Russia together with Gazprom, Interros and other influential industrial groups in the country established a new company Russian Communal Systems (RCS).¹¹¹ The goal was to apply vertical integration of energy and utility companies and networks in order to reduce the costs of production and consumption at all stages of chain from producer to consumer.

Thus, consolidation of assets has become the main form of energy companies' development since it allows taking full advantage of globalization. Priority objective of further production costs reduction, especially in the situation of increasing cost of exploration activities, could foresee further corporate mergers and acquisitions in the energy sector of the global economy, which will promote the development of the global gas market.

Hence, in the world gas industry there is a number of rather powerful, influential and dynamically developing multinational companies, which hold high positions in international rankings of the largest non-financial TNCs. These companies are primarily British Petroleum, Exxon Mobil, Royal Dutch/Shell and Total, which carry an active expansion into markets of both developed and

¹¹⁰ Barbara Melbourne, "Transnational Corporations", *Geofile online*, January 2006. Available at: <http://www.school-portal.co.uk/GroupDownloadFile.asp?GroupId=40076&ResourceId=242463> (Accessed 9 December 2010)

¹¹¹ Alla Startseva, "Putin and Chubais Move to Clean House", *Moscow Times*, 15 May 2003. Available at: <http://www.cdi.org/russia/johnson/7185-12.cfm> (Accessed 11 December 2010)

developing countries.¹¹² An example of a Russian company, which is the country's monopolist in production and export of gas, is Gazprom. Successful activities of the Russian gas giant in the world gas markets demonstrate that the corporation can achieve significant success in the global economy.

Gazprom's cooperation with Latin American and Chinese oil and gas companies is sufficiently promising to gain control and expand into new markets, as well as further strategic cooperation with Turkmenistan to develop new fields and export natural gas.

¹¹² Barbara Melbourne, "Transnational Corporations", *Geofile online*, January 2006. Available at: <http://www.school-portal.co.uk/GroupDownloadFile.asp?GroupId=40076&ResourceId=242463> (Accessed 9 December 2010)

4. Development of Russia's Gas Industry

4.1 Comparative Analysis of Russian versus Foreign Gas Industry

The state of the gas sector has its own peculiarities, determined by the particular qualities of natural gas as an energy resource in the world. In 2005 Russia had more than a quarter of global natural gas reserves. It is expected that the proven gas reserves will suffice for some 80 years.¹¹³

The current state of Russia's natural gas resource base is characterized by high field deterioration in Western Siberia. Its share in total gas production in Russia amounted to roughly around 92 percent in 2004. Most of the Russian gas is extracted from the three giant Siberian fields Medvezhye, Urengoy and Yamburg. However, at least two of them had almost exhausted their peak production capacity. These fields moved into a mature stage of development and production of gas that annually reduce by 20 to 25 billion m³. The share of these fields will account for less than 30 percent in the country's total gas production by 2020.¹¹⁴ Despite the foregoing, Western Siberia is still the country's main resource base of the gas industry and the center of gas production for the foreseeable future. Tactic solution to compensate falling gas production levels in the basic fields for the next 7 to 8 years is the development of relatively small fields-satellites. They are usually located near the infrastructure created for the giant fields' exploration.

In solving the problem of long-term maintenance of the necessary levels of production, the development of new gas production regions, such as the Yamal Peninsula, deposits of Ob and Taz Bays fields, as well as the Shtokman field, is at the core.¹¹⁵ Existing hydrocarbon reserves in Eastern Siberia and the Far East provide the possibility of a new oil and gas center establishment in the east of the country. Under favorable conditions, natural gas production in Eastern Siberia and the Far East could reach 50 billion m³ by the end of 2010, and a 100 billion m³ by

¹¹³ E. Ndefo, P. Geng, "Russia: A Critical Evaluation of its Natural Gas Resources", *Energy Tribune*, 13 February 2007. Available at: <http://www.energytribune.com/articles.cfm/379/Russia-A-Critical-Evaluation-of-its-Natural-Gas-Resources> (Accessed 25 October 2010)

¹¹⁴ Euan Mearns, "The European Gas Market", *The Oil Drum: Europe*, 11 December 2007. Available at: <http://www.theoil Drum.com/node/3283> (Accessed 25 October 2010)

¹¹⁵ Jonathan Stern, "The Future of Russian Gas and Gazprom", *Oxford Energy Forum*, The Oxford University Press, 2005. Available at: http://energy.sipa.columbia.edu/PDFs/OEF_63stern.pdf (Accessed 27 October 2010)

2020.¹¹⁶ To develop gas industry in Eastern Siberia and the Far East the Russian government decided to create a unified system of gas extraction, transportation and supply with the possibility of exporting energy to China and other countries of the Asia Pacific region.

However, new deposits are located in remote inaccessible areas with difficult climatic conditions. Cost of extracting gas from these fields will be considerably higher than from the existing fields. Moreover, individual pipelines of the country's gas transportation system (GTS) have the capacity deficit, due to a high degree of depreciation and lack of adequate financial resources for their timely expansion, reconstruction and modernization.

With regard to the current state of Russia's gas market structure, it is primarily characterized by the presence of the monopoly company Gazprom in the market. In the late 90's the company controlled more than a 1/3 of world natural gas reserves, 80 percent of continental European stocks, and 34 percent of world natural gas trade.¹¹⁷ Currently the ratio of natural gas production in Russia between Gazprom, as a natural monopoly, and independent gas producers is about 9:1. Independent producers extract some 11 percent which account for about 64 billion m³ of gas.

While the share of independent producers gradually increases, Gazprom's production in the traditional fields continues to decline, and such reduce tends to accelerate. Steps to stabilize the production, undertaken by the monopoly's leadership, has not yet given any result. Meanwhile, Gazprom plans to stabilize the rate of gas production at 530 billion m³, which should ensure the export obligations of Gazprom. However, one must take into account the possible growth of the domestic natural gas consumption, in which case Gazprom would not be able to provide the country with efficient energy volume.

In Russia Gazprom also controls gas transportation and distribution facilities. In the Soviet past Russian gas was exported mainly to Eastern Europe, while today its orientation has changed towards the EU countries, whose consumption accounts for 80 percent of the total Russian gas exports. In 2005

¹¹⁶ Jonathan Stern, "The Future of Russian Gas and Gazprom", *Oxford Energy Forum*, The Oxford University Press, 2005. Available at: http://energy.sipa.columbia.edu/PDFs/OEF_63stern.pdf (Accessed 27 October 2010)

¹¹⁷ Ibid.

Gazprom's share in the German, French and Italian gas markets accounted for 39.9, 13.2 and 21.9 billion m³ respectively¹¹⁸. The remaining 20 percent of gas exports were consumed by countries that are not the EU members. In this respect, the EU will remain the main importer of Russian gas in the near future.

Russia is not only the most significant natural gas exporter, but also gas consumer. Approximately 2/3 of the produced gas is consumed by the country's internal market at prices that are much lower than which are used to sell gas abroad. The share of gas demand of the population and the industrial sector is almost equal; and the transportation industry is the third largest consumer. In Russia the gas is also a very important resource for energy production. In 2003 the share of gas in the consumption of the primary energy resources rose from 52 percent to 52.5 percent.¹¹⁹ The increasing share of gas in the consumption of energy resources could be explained by low prices of gas, which allow consumers to use one of the most environmentally friendly fuels almost with no limitations, and without carrying about the electricity and gas saving or paying attention to technical and technological improvement of production. Therefore, it is expected that natural gas will be even more significant for the domestic market in the future. In this regard it is estimated that the share of natural gas in the country's total energy supply will grow from 52 percent in 2000 to 56 percent by 2030.¹²⁰

In fact, low prices do not allow investing in developing new fields, building new pipelines, and the reconstruction of existing facilities, while without this it is inconsiderable to develop the gas industry. Current gas prices in Russia do not allow the country to cover the costs of production, transportation and gas sale. Such a policy limits the possibility of investing in reproduction of mineral resources and sustainable development of the gas industry as a whole.

In order to identify the possible directions of Russia's gas market development, it is important to take into account both positive and negative experiences of the gas industry in foreign countries. The Western European market is characterized by a limited number of gas suppliers, represented by a few

¹¹⁸ Jonathan Stern, "The Future of Russian Gas and Gazprom", *Oxford Energy Forum*, The Oxford University Press, 2005. Available at: http://energy.sipa.columbia.edu/PDFs/OEF_63stern.pdf (Accessed 27 October 2010)

¹¹⁹ Tuuli Juurikkala, Simon-Erik Ollus, "Russian energy sector – prospects and implications for Russian growth, economic policy and energy supply", Finland, 2006, p. 5

¹²⁰ Ibid.

national companies, such as Gaz de France in France, Gasunie in Netherlands, and Ruhrgas and Wingers in Germany, which have a monopoly position in their countries. This situation remains unchanged, despite the adoption of the directive on the liberalization of the gas market by several countries in Western Europe. In reality programs of the gas market demonopolization are rather modest in these countries, and the market remains closed.

In most countries the reliability of energy supply is provided by national governments. Hence, the state creates conditions for the energy market formation and regulation of competition. At the same time, experience of the gas market reforming in countries which have a developed market economy demonstrates that competition can have adverse effects on the efficiency and functioning of the gas sector, when there are no conditions for a competitive market and their creation requires extremely high investments. One of the examples could be the UK, where despite the fact that the law allowing the government to sell part of its assets was passed in 1982, the liberalization of the gas market in this country started only in 1995, when the government decided to divide British Gas into the company responsible for gas transportation and storage, and the company working in the field of marketing. However, creation of equal conditions for gas suppliers and the opening of the domestic market to competition has not yet led to a steady decline of prices in the UK market.

It is important to highlight that while overcoming the monopoly in the production, transportation and other activities, natural gas companies in developed market economies have moved to higher levels of monopoly – the tough financial centralization of all revenues and expenses. For example in the US, the major gas companies have subsidiaries responsible for extracting, transporting, and processing gas; in such a state with centralization of all revenues and expenditures, the monopoly does not prevent the development of the market relations between companies. The experience of countries with developed market economies also shows that the national strategy of the gas market development should primarily include: reliable consumers' supply; creation of favorable conditions for the development of new fields and gas transportation systems;

development of a competitive environment between the different types of fuel; as well as a very slow de-monopolization of the gas industry.¹²¹

Moreover, conditions of the gas industry functioning in Russia are quite different from those in other states. Russia's gas market is characterized by high concentration of natural gas production, the country's status of a net exporter, the strategic role of gas as an export resource, and long-distance transportation of gas from production areas to the main gas consuming regions. Therefore, all this makes it impossible to consider international reform model applicable to the Russian gas market.

However, international experience strongly suggests that some basic principles of public policy reforms should be considered an integral component of an effective program of the gas market modernization in any country, including Russia. Such principles include the need to mitigate state's regulation and liberalize gas prices as an essential prerequisite for creating an attractive regime for investment in the gas sector. In some countries liberalization of prices and the rejection of other measures of state's regulation has become the main tool for economic motivation of investment in gas production. This was the case of the US, where in order to prevent the outflow of investments from the gas industry as a result of strict regulation of prices, the Natural Gas Policy Act, which determined the terms and conditions of deregulation of prices, was introduced in 1978.¹²²

Furthermore, it should be emphasized that excessive government regulation, as well as total price control throughout the supply chain, demonstrates a clear negative effect on the gas market development. In this regard the overall liberalization of gas prices carried out in several countries of the EU during 1998 to 2001 has not led to a decrease in gas prices; while average prices in the most liberalized markets increased by some 20 percent during the period 1999 to 2002.¹²³

¹²¹ Tuuli Juurikkala, Simon-Erik Ollus, "Russian energy sector – prospects and implications for Russian growth, economic policy and energy supply", Finland, 2006, p. 14

¹²² "Natural Gas Policy Act of 1978", *US Energy Information and Administration*. Available at: http://www.eia.doe.gov/oil_gas/natural_gas/analysis_publications/ngmajorleg/ngact1978.html (Accessed 12 December 2010)

¹²³ Paula Ferreira, "Liberalization, consumption heterogeneity and the dynamics of energy prices", pp. 1-4. Available at: http://repositorium.sdum.uminho.pt/bitstream/1822/5490/1/EP_PF_2005.pdf (Accessed 12 December 2010)

Thus, considering the international experience of reforming the gas market, Russia should avoid mistakes that could lead to extremely negative consequences, taking into account the scale of the country's territory, the dominance of gas in the fuel balance of the country, the unstable economy of the gas industry, and emerging trends of gas scarcity.

4.2 Prospects of the Russian Gas Market Development

The ongoing discussion on the prospects of the gas industry development boils down to two issues: the restructuring of Gazprom and access of independent producers to the gas transportation system. At the same time, such transformations cause a number of debates among the participants of the Russian gas industry.

According to Gazprom, approaches to the formation of the gas market, based on the indispensable division of Gazprom into various companies with different activities; and the appointment of the new owners of the Unified Gas Supply System's (UGSS) industrial property, could provoke a set of risks including the disruption of the UGSS.¹²⁴ The smooth functioning of the gas supply system and Russia's energy security could be guaranteed by the preservation of the Gazprom's integrity as a vertically integrated company, which carries out gas production, transportation, storage, supply, and centralized supervisory control over these processes.

Gazprom consistently implements policies aimed at improving its governance structure. It is planned by the company's administration to create Gazprom's subsidiary organization, engaged in underground gas storage; as well as to separate gas production and processing from its transportation in certain subsidiaries. In addition, Gazprom's distribution networks are to be concentrated in Regiongazholding.¹²⁵ Moreover, in order to be flexible in both the developing of fields in new gas producing regions within Russia and maintaining the share of Russian gas in European energy markets, when the country's total gas production declines, Gazprom has signed long-term contracts to purchase gas from

¹²⁴ Alexander Karasevich, Alexander Terekhov, "Energy Saving in Natural Gas Distribution and Utilization in the Russian Federation", *Promgaz*, Gazprom Group. Available at: http://www.unece.org/se/pdfs/GasS&U_Karacevich.pdf (Accessed 28 October 2010)

¹²⁵ Ibid.

Turkmenistan and Uzbekistan.¹²⁶ Thus, according to Gazprom, the development of the gas industry is to be achieved through the optimization of gas production in light of independent producers, as well as the enhancement of gas production, transportation, processing and storage facilities.

To ensure the efficient development of the gas industry, it is of great importance for Gazprom to provide a single export channel functioning. As the gas market enhances, Gazprom considers the possibility of providing independent producers with the right to supply gas to the foreign countries, given that they fulfilled their social objectives to ensure sufficient volumes of energy for the domestic market consumers. To guarantee a reliable gas supply to Russian consumers, fulfillment of commitments to supply natural gas for export, and the maintenance of the Russian UGSS's efficiency, Gazprom has offered to include the general scheme of the gas sector development into the "Complex of measures to develop the transport infrastructure of hydrocarbons in the Russian Federation".¹²⁷ Adoption of the scheme would provide further opportunities and prospects for transportation facilities' development, respond to the growing natural gas demand in both domestic and foreign energy markets, and prevent shortages of gas transportation capacities. On the top of that, such approach would eliminate the possibility of individual market participants' interests opposing the interests of the energy security of the state as a whole.

The development of the Yamal Peninsula gas fields, which are located closer to European consumers than other fields, and the construction of new gas pipelines will significantly reduce transportation costs of gas, which will in turn increase competitive advantages of Russian gas in the European market. It is also necessary to implement a project on the establishment of a reliable infrastructure in the region, in order to increase its investment attractiveness. In this respect, a gas pipeline system from Nadym-Pur-Taz region to China, Korea and Japan, capable to transport up to 100 billion m³ of gas annually, is of great importance.¹²⁸

¹²⁶ Alexander Karasevich, Alexander Terekhov, "Energy Saving in Natural Gas Distribution and Utilization in the Russian Federation", *Promgaz*, Gazprom Group. Available at: http://www.unece.org/se/pdfs/GasS&U_Karacevich.pdf (Accessed 28 October 2010)

¹²⁷ "On the prospects of the development and use of hydrocarbons' transportation systems", *Ministry of Industry and Energy of Russian Federation*. Translated from Russian language. Available at: <http://www.lawtek.ru/analysis/state/30336.html?print> (Accessed 2 November 2010)

¹²⁸ *Ibid.*

This pipeline will cross the oil and gas fields of Krasnoyarsk, Irkutsk and Yakutia regions.¹²⁹

Yamal-China gas pipeline system will both give powerful impetus to the development of the oil and gas industry in Eastern Siberia, and provide a basis for the construction of oil and gas pipelines, electricity lines, roads and other infrastructure. Such energy corridor will create favorable conditions for attracting domestic and foreign investments to develop oil and gas fields located near the corridor. Construction of a pipeline to China will help solve the problem of independent gas producers' access to export pipelines, which are mainly focused on developing gas fields in the Yamalo-Nenets Autonomous District.¹³⁰ Therefore, in order to build Yamal-China gas transportation system, it is advisable to establish a consortium that would include the Russian government, Gazprom, independent gas producers, and domestic and foreign investors.

To provide reliable functioning and sustainable development of the gas industry, it is important to restore capacity of worn-out gas pipelines by carrying out repair and reconstruction of existing pipelines. According to Russian experts, these measures must be implemented within the next 5 years, otherwise further decline in the productivity of the transportation system and major disruptions in gas supplies will be inevitable.¹³¹

The scale and timing of required reconstructions of the main gas pipelines are comparable to those in the period of accelerated development of Russia's domestic gas industry in 1980's.¹³² Therefore, it requires serious financial support from the government, which could be provided by raising both tariffs on gas transportation and gas prices. Hence, repair and reconstruction of gas pipelines have become a central objective for sustainable development of the gas industry, and a prerequisite for providing independent gas producers with access to gas pipelines.

At the same time, one should not forget about the problem of increasing natural gas efficiency. In this regard, accelerated modernization of the electricity

¹²⁹ "On the prospects of the development and use of hydrocarbons' transportation systems", *Ministry of Industry and Energy of Russian Federation*. Translated from Russian language. Available at: <http://www.lawtek.ru/analysis/state/30336.html?print> (Accessed 2 November 2010)

¹³⁰ Ibid.

¹³¹ Ibid.

¹³² Ibid.

system, which includes the substantial reduction of losses in heating systems, the decentralization of heat supply in the gasified regions, along with other measures and technical solutions to significantly reduce costs of gas utilization is essential.

As for the prospects of the gas market development, it is essential to solve the problem of nondiscriminatory access to pipelines of independent suppliers. Therefore, it is important to correctly establish the tariff on gas transportation from the place of production to the consumer, and to generate the gas price based on two components: tariffs on transportation and distribution, and gas prices set by the supplier.¹³³

However, with the intention of Russia to join the World Trade Organization (WTO), significant changes may occur in the directions of the country's gas industry. At the same time, despite demands and claims of foreign partners on Russia's accession to the WTO, in fact, Russia has not taken any new obligations in the gas sector. Moreover, Russia has developed strategies and arguments to counter the requirements of foreign partners, including: to increase domestic gas prices up to the world level, eliminate Gazprom's monopoly on gas exports, ensure freedom of gas transportation through the Russian gas pipeline systems, adjust tariffs on gas for exports and domestic consumers, permit the construction of private pipelines and their further exploitation by foreign investors, as well as to eliminate export duties on gas or radically reduce them.¹³⁴

It should be also noted that the process of Russia's accession to the WTO is not over yet; therefore, this does not preclude new demands to reform the Russian gas sector. Most of the requirements of the foreign partners to change the system and some parameters of the Russian gas industry concern key issues of Russia's energy security. Hence, there cannot be a compromise against them. The strategic development of the country's gas industry defines following priorities: development of the gas processing facilities; expansion of export opportunities

¹³³ "On the prospects of the development and use of hydrocarbons' transportation systems", *Ministry of Industry and Energy of Russian Federation*. Translated from Russian language. Available at: <http://www.lawtek.ru/analysis/state/30336.html?print> (Accessed 2 November 2010)

¹³⁴ "Russia's Accession to the WTO", *Russian Union of Industrialists and Entrepreneurs*. Translated from Russian language. Available at: <http://www.rgwto.com/wto.asp?id=3674> (Accessed 5 November 2010)

with the use of Russian pipeline systems; development of the domestic gas market; and, finally, development of electricity networks using natural gas.¹³⁵

In conclusion, it is important to highlight that the current state of Russia's gas industry can be characterized as a pre-crisis, due to the fact that there are many problems in the gas production and transportation spheres. However, there are still prospects for positive developments. Therefore, in order to improve the current situation in the gas industry, it is important to focus on a number of measures; including attracting the independent producers to implement gas projects, as well as intensifying the government's efforts to adapt the country's energy market to the current state of the gas balance and the global energy conjuncture.¹³⁶

Having analyzed Russia's gas industry and transportation system, and having considered the prospects of their development, the main features of the existing gas market in Russia could be highlighted as follows:¹³⁷

Russia's internal gas market is not competitive. Gazprom, the owner of the gas transportation system, possesses a dominant position in both production and the marketing of gas in the country's domestic market;

Currently Gazprom is the country's monopoly gas exporter to Western countries. Independent gas producers are limited in their ability to compensate for low profitability of the domestic gas market; and consequently, have no incentives for production increasing. Volumes and prices of gas, supplied by Gazprom, are established on the basis of intergovernmental agreements between respective countries and Russia;

Independent producers and suppliers of gas have the right to sell gas to the domestic market at negotiated prices (in this case only transport fares are regulated). However, in circumstances when the bulk of the gas is supplied to consumers at low regulated prices, independent producers' possibility of benefiting from the exercise of this right is very limited. The situation is exacerbated by the fact that Gazprom regulates the access of independent

¹³⁵ "Russia's Accession to the WTO", *Russian Union of Industrialists and Entrepreneurs*. Translated from Russian language. Available at: <http://www.rgwto.com/wto.asp?id=3674> (Accessed 5 November 2010)

¹³⁶ "Energy Strategy of Russia for the Period up to 2030", *Ministry of Energy of the Russian Federation*, Moscow, 2010, pp. 76-78. Available at: [http://energystrategy.ru/projects/docs/ES-2030_\(Eng\).pdf](http://energystrategy.ru/projects/docs/ES-2030_(Eng).pdf) (Accessed 6 December 2010)

¹³⁷ *Ibid.*, pp. 76-78.

producers to the gas pipeline. This, in turn, limits their presence in the gas market and the competition between them (producers);

Commercial relationship between independent companies and Gazprom are regulated by contracts on transporting gas through Gazprom's gas transportation system in accordance with tariffs regulated by the Federal Tariff Service (FTS) of Russia;

Russia's energy sector is characterized by the absence of an 'gas services' market, which means that producers cannot offer customers additional services in gas supply (such as certain mode of supply, reliability, etc.) at negotiated prices.¹³⁸

Thus, the analysis of existing economic relations in the gas sector illustrates that there are still many flaws that need to be reformed. In this regard it is essential to consider the purposes and the main concept of the Russian gas sector reformation, putting emphasis on the problem of the country's domestic gas market organization.

The reform of Russia's gas market should provide investment resources for sustainable development of the industry with the least costs for both competitiveness of producers and the welfare of the population. This requires an increase of gas prices on the basis of forming a balance of interests between owners of the gas supply systems, producers and consumers, investors, and the state.¹³⁹ It must be emphasized that the goal of reforming Russia's gas industry is opposite to the goal of gas markets liberalization in the West, where the task was to reduce the price on gas in order to increase the competitiveness of goods and services. Understanding this difference is important to select the correct path of reforming the Russian gas market.

Debates about the reform of the Russian gas industry include different concepts and proposals. While agreeing that the reform should follow the path of creating a competitive environment in the gas market, experts have great disagreement about the depth and pace of market reforms. Thus, the Ministry of Economic Development offers a radical liberalization of the gas market with the

¹³⁸ "Energy Strategy of Russia for the Period up to 2030", *Ministry of Energy of the Russian Federation*, Moscow, 2010, pp. 76-78. Available at: [http://energystrategy.ru/projects/docs/ES-2030_\(Eng\).pdf](http://energystrategy.ru/projects/docs/ES-2030_(Eng).pdf) (Accessed 6 December 2010)

¹³⁹ Ibid.

division of Gazprom into mining and transportation companies. The Russian Union of Industrialists and Entrepreneurs (RUIE) and the Gas Union see liberalization as a result of long-term evolution, whilst the Federal Energy Commission of Russia, Gazprom and Non-profit Partnership “Gas Market Coordinator” preclude the division of monopoly at all.¹⁴⁰

The Energy Research Institute of the Russian Academy of Sciences (ERIRAS) has conducted research on improving economic relations in the gas industry, using modern methods of mathematical modeling to quantify the impact of proposed changes on:

- The dynamics of energy saving and gas demand;
- Development of energy production and the financial state of Gazprom and other independent gas producers;
- The pace and structure of economic growth, the development of gas consumers and living standards in Russia.¹⁴¹

This research claims that in order to meet domestic gas demand and fulfill export obligations, the reform should provide gas companies with secure funding. At the same time, gas prices and terms of its delivery, set as a result of the reform, should be feasible for Russian consumers, providing them with the required rate of return.¹⁴² The study has resulted in a model of the gas market, which is characterized by: preservation of the institutional integrity of Gazprom, while increasing economic independence of its subsidiary joint-stock companies; Gazprom’s role as the country’s leading investor and guarantor of regulated external and internal gas markets; preservation of regulated but steadily increasing prices on gas for social sphere consumers; non-regulated prices on natural gas for all other consumers (in this regard, the government should reduce gas supplies from the regulated sector of the country’s gas market); equal access of independent producers of natural gas to the country’s GTS (this will in turn

¹⁴⁰ “Energy Strategy of Russia for the Period up to 2030”, *Ministry of Energy of the Russian Federation*, Moscow, 2010, pp. 76-78. Available at: [http://energystrategy.ru/projects/docs/ES-2030_\(Eng\).pdf](http://energystrategy.ru/projects/docs/ES-2030_(Eng).pdf) (Accessed 6 December 2010)

¹⁴¹ “Regional Energy Programs”, official webpage of ERIRAS, April 2008. Translated from Russian. Available at: http://www.eriras.ru/index.php?option=com_content&view=article&id=59:-&catid=30&Itemid=49 (Accessed 27 November 2010)

¹⁴² Ibid.

stimulate the development of independent gas producers); and, finally, introduction of unified transportation tariffs, regulated by the state, for all market participants.¹⁴³

Such model would allow the state to control the reform process, while avoiding both excessive burden on consumers, and the worsening of gas supply sustainability. Furthermore, this model, despite the rejection of the classical liberalization and the preservation of Gazprom's dominance in gas production and transportation, would provide reasonable dynamics of the domestic gas price growth, allowing the state to monitor the socio-economic consequences of reform.¹⁴⁴

Thus, if to consider Russia's gas industry as the biggest gas exporter in the world, it is affected by numerous external factors. There are three major risk factors: uncertainty concerning future gas prices, uncertainty concerning capacity of export markets for natural Russian gas, and the cost of gas transportation.

The first and most important risk factor in the development of export strategy is the dynamics of gas prices in the European market. It is important to note that export prices for Russian gas accounted for some 60 dollars per 1000 m³ in 1999, compared to 146 dollars per 1000 m³ in 2005.¹⁴⁵ Despite the dominant role of Russia in the given market, the Russian natural gas is not a determinant of prices in this case. Uncertainty in foreseeing natural gas prices could be explained by several factors, most important of which is the highly unpredictable dynamic of oil prices, which can trigger both increase and decrease of gas prices. Currently exports of Russian gas to Europe are carried out on the basis of long-term contracts, prices of which are tied to the prices of oil and petroleum products.

Forecast of gas prices is greatly complicated by the need to address the impact of gas markets' liberalization. In this regard, the Second EU Gas Directive and Madrid Forum are aimed at accelerating the formation of a common liberalized EU internal gas market, which includes several Eastern European

¹⁴³ "Regional Energy Programs", official webpage of ERIRAS, April 2008. Translated from Russian. Available at: http://www.eriras.ru/index.php?option=com_content&view=article&id=59:-&catid=30&Itemid=49 (Accessed 27 November 2010)

¹⁴⁴ Ibid.

¹⁴⁵ Ibid.

countries since the EU's Eastern enlargement in 2004.¹⁴⁶ Therefore, the range of natural gas prices in the EU, provided by different companies, will vary from 78 to 165 dollars per 1000 m³ by 2020.¹⁴⁷

The second risk factor is the dynamics of demand for Russian gas supplies. Uncertainty of the European market's capacity for natural gas from Russia consists of two components: uncertainty about the future volumes of gas demand in Europe and uncertainty about the share which Russian gas will be able to get in the market. In this respect, the EU's demand for natural gas imports will be defined by: price elasticity of demand (factors, such as oil prices and the course of liberalization, which affect prices, will also affect the volume of demand); rate of economic development of the EU (rapid economic growth of the EU entails a higher demand for gas); environmental requirements, which may contribute to more rapid growth of gas demand, while a policy to improve energy efficiency, in contrast, slows the growth of gas consumption; and, finally, gas consumption in electricity that will remain the key engine of aggregate demand (in this regard the EU's policy towards nuclear power plants is critical).¹⁴⁸ While the share which Russian gas will be able to get in the EU market is determined by the dynamics of domestic gas production, competition with alternative gas suppliers, and the EU's policy to diversify sources of gas supply, which is aimed at reducing dependence on supplies from the traditional regions, such as Russia.¹⁴⁹

The third risk factor consists in gas transportation. Transit of gas, particularly through CIS countries, where it is associated with a complex of uncertainties and political factors, is Russia's longstanding problem. The uncertainty about transit fees occurs due to unpredictable increase in tariffs for transit; bargains, the payment for the transit by counter gas supplies at prices below market prices; and unauthorized consumption of gas.¹⁵⁰

¹⁴⁶ Nadine Haase, "Regulation for competition in European gas markets: the impact of European law and facilitating factors", *ECPR Standing Group on Regulatory Governance*. Available at: <http://regulation.upf.edu/utrecht-08-papers/nhaase.pdf> (Accessed 29 November 2010)

¹⁴⁷ "Regional Energy Programs", official webpage of ERIRAS, April 2008. Translated from Russian. Available at: http://www.eriras.ru/index.php?option=com_content&view=article&id=59:-&catid=30&Itemid=49 (Accessed 27 November 2010)

¹⁴⁸ Ibid.

¹⁴⁹ Ibid.

¹⁵⁰ Ibid.

Thus, based on the analysis of the Russian gas industry, a conclusion about the need for its reform and regulation by the state could be made. Organization of the country's gas market leads to its inefficient functioning. Internal and external risks also affect the state of the gas industry. Therefore, in order to improve the functioning of the gas industry, it is important to consider all the risks and adapt the organization of the gas market.

Conclusion

Significant structural transformations of the gas sector took place in a large number of countries throughout the world in recent decades. Assessment of the international experience of gas sector transformations in such countries as the US, Canada, the UK and the EU must occupy an important place in the chain of decision-making on the reform of the gas market in Russia.

At the same time, conditions of the gas market functioning in Russia and other states that have passed or still processing transformation are very different. Essential features of Russia's gas industry include: high concentration of natural gas production, the country's status of a net exporter, the strategic role of gas as an export resource, and long-distance transportation of gas from production areas to the main gas consuming regions. Therefore, all this makes it impossible to consider any international reform model applicable to the Russian gas market.

However, international experience strongly suggests that some basic principles of public policy reforms should be considered an integral component of an effective program of gas market transformation in any country, including Russia. Such principles contain: the need to mitigate state's regulation and liberalize gas prices as an essential prerequisite for creating an attractive regime for investment in the gas sector. The excessive government's regulation of prices hinders the development of all subjects of the gas market in Russia, while liberalization of gas prices stimulates investments and increases the possibility of demand management.

The monopolistic structure of the gas market and lack of trade transparency prevent inclusion of natural market forces to protect the interests of gas consumers, pressure of competition on prices and, hence, improvement of services' quality (reliability of gas supply). The excessive monopoly has provoked both drastic reduction of the financial stability of gas companies and security of supply as a result of the lack of market incentives to improve efficiency, and excessive pricing and other forms of monopoly power abuse. Therefore, the gas sector reform should include measures to both promote competition within the gas market and stimulate the appearance of mutually independent economic agents, interested in gaining market share by offering customers better services at a lower and more stable price. In this regard, it is

necessary to ensure both trade openness and the compliance of market participants with established standards of information disclosure about supply, demand and prices of transactions.

A specific direction in the development of the gas markets is their mutual integration, primarily in order to provide mutual trade openness and reciprocity. Therefore, given the intensive process of the gas markets opening in the EU countries, the main consumers of Russian gas exports, and the prospect for Russia's entry into the WTO it is important to assess more carefully the need to provide both mutual openness of the gas trade and functioning of their markets based on similar principles, in order to promote further cooperation between the two sides in the energy sector.

It is also crucial to address the prospects of the demand and prices forecast of natural gas. In the near future the natural gas prices in the European and Asian energy markets will change under the influence of various factors. In the European energy market the gas prices will depend on the prices of petroleum products and correlate with forecasts of world oil prices in the medium-run. On the other hand, the liberalization of the energy market in Europe will create conditions to reduce gas prices in the EU. However, international experts predict a rise in demand for the gas in this region in the period after 2010, especially for the need of electricity. This, in turn, will trigger the necessity to attract additional and more expensive resources from Russia, Africa and the Middle East to the European gas market. Moreover, a gradual separation between the gas prices and prices on oil and petroleum products is expected, due to the market liberalization and more environmentally qualitative characteristics of this fuel. Therefore, for the period 2010 to 2020 the minimum European gas price is projected to constitute 93 to 102 dollars per 1000 m³ and the maximum of 142 dollars per 1000 m³.

The Asia Pacific gas market is currently dependent on the supply of LNG, the price of which is indexed according to the price of crude oil. The gas prices in this region are higher than those in Europe by about 20 percent. The projected increase in the demand for the gas fuel will lead to the rapid development of the region's energy market, which will provide new supplies of both LNG from the Middle East and Russia, and natural gas from Russia and other CIS countries.

The selling of gas has its own specifics. It is produced, sold and consumed on the regional basis rather than globally. Deliveries of the gas to the US market are carried out mainly by American companies, although almost all imports account for Canada and the Caribbean countries. With regard to the European gas market, the main sources of supply in this case are Russia, North Africa, and countries of the North Sea basin. In Asia the main gas suppliers are Malaysia, Indonesia and Australia. The only exporter that is able to qualify for the global geography of sales is Qatar, the world's leading supplier of the LNG to the Asian, European and North American markets. At the same time, the gas reserves also play a significant role, because depletion of deposits will lead to the monopolization of all gas supplies by several countries, including Russia and Iran, which possess over 40 percent of proven gas reserves in the world.

Russia clearly understands the importance of oil and gas as a political tool, which enables Russia to hold a political influence in the global community. After the gas incidents with Belarus and Ukraine, the whole world is concerned with further possible energy supply disruptions; while the eventual creation of the 'gas OPEC' and the changing nature of the global energy market towards natural gas make such worries even more plausible. The demand for gas is growing due to the fact that it is more environmentally friendly than other fuels and it could be easily stored and transported, especially with the possibility of its liquefaction. Moreover, the natural gas consumption in the world will rise from 2.75 trillion m³ in 2005 to 5.16 trillion m³ in 2030. The use of gas is increasing by 2.4 percent annually and its share in the world energy balance will account for 26 percent in 2030.

The possibility of an international 'gas OPEC' creation was already discussed in 2002, when the leaders of Kazakhstan, Turkmenistan, Uzbekistan and Russia made a joint statement on cooperation in the energy policy and protecting the interests of the gas producing countries at the summit of CIS leaders in Almaty. Given that most natural gas reserves are located in the countries controlled by authoritarian or semi-authoritarian rulers, such as Iran, Algeria, and Kuwait, the prospect of combining their natural gas reserves and terms of delivery is estimated as critical.

In fact, it is about creating a 'network influence' by concluding long-term contracts, based on which the national oil and gas companies of the contracting

countries will have an opportunity to explore and produce gas in each others territories. However, the creation of such an organization is unlikely in the near future, due to the fact that Qatar, one of the world's biggest gas exporters, opposes the creation of the organization; while Russia, another large gas supplier, sees it impossible to control gas production or prices for the next 5 or 10 years since the majority of natural gas supply agreements are long-term contracts.

Today relatively small volumes of gas are realized according market conditions. For the most part the gas is bought and sold under long-term contracts, many of which have terms of up to 20 years. Therefore to influence the price by controlling production volumes under such conditions is very difficult. Hence, it is more profitable for the producer to conclude a long-term contract in order to guarantee his profits for the future. In this respect, it is impossible for Gazprom to renounce its long-term contracts on gas supplies.

The specificity of Gazprom also affects the possibility of creating such an alliance. The fact that the organization will have a global scale, supposes the Russian gas monopolist to sell its fuel worldwide. However, Gazprom has no alternatives to selling gas within European countries, which consume only about one third of the produced gas, but provide the company with 70 percent of its income. To export gas to other major customers, Gazprom has no pipelines or infrastructure for the natural gas liquefying. Thus, Gazprom remains tied to Europe. In this regard, in order to establish a complete 'gas OPEC' there is a need to connect 'producer' and 'consumer' countries by the pipeline systems; while it is impossible due to Gazprom's reluctance to provide foreign companies with access to its transportation flows.

Moreover, the establishment of the alliance is further complicated by the problem of subsidizing the construction of the pipelines and paying the compensation to transit countries for polluting the environment. Therefore, Gazprom is highly unlikely to support the project and, hence, to pay the economic price for increasing the political influence of Russia, since it already has a large profit from selling cheap Central Asian gas at European prices.

In terms of implementation, the project cannot resist the critics; the lack of infrastructure, the need for large investments, political risks and possibility of worsening the relations with the West, all these factors make the establishment of the organization unachievable. Most likely the 'gas OPEC' will not come into

force; however, this does not mean that Russia by means of Gazprom and several of its other major companies will not attempt to further strengthen its influence on the world energy markets, trying to unite and lead the energy-producing countries.

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Appendices

Table 1: World proven reserves of natural gas

Natural gas: world proved reserves (trillion cubic meters)				
	1987	1997	2006	2007
US	5.30	4.74	5.98	5.98
Canada	2.69	1.81	1.62	1.63
Mexico	2.12	1.80	0.39	0.37
Total North America	10.11	8.34	7.99	7.98
Argentina	0.69	0.68	0.45	0.44
Bolivia	0.14	0.12	0.74	0.74
Brazil	0.11	0.23	0.35	0.36
Colombia	0.10	0.20	0.12	0.13
Trinidad & Tobago	0.30	0.52	0.48	0.48
Venezuela	2.84	4.12	5.10	5.15
Total S. & Cent. America	4.67	6.21	7.64	7.73
Azerbaijan	n/a	0.84	1.26	1.28
Denmark	0.07	0.11	0.12	0.12
Germany	0.38	0.26	0.16	0.14
Italy	0.30	0.27	0.09	0.09
Kazakhstan	n/a	1.87	1.90	1.90
Netherlands	1.77	1.79	1.32	1.25
Norway	2.29	3.65	2.89	2.96
Romania	0.20	0.37	0.63	0.63
Russian Federation	n/a	45.17	44.60	44.65
Turkmenistan	n/a	2.71	2.67	2.67
Ukraine	n/a	0.98	1.03	1.03
United Kingdom	0.64	0.77	0.41	0.41
Uzbekistan	n/a	1.63	1.74	1.74
Total Europe & Eurasia	45.06	61.02	59.37	59.41
Bahrain	0.20	0.14	0.09	0.09
Iran	13.92	23.00	27.58	27.80
Iraq	1.00	3.19	3.17	3.17
Kuwait	1.21	1.49	1.78	1.78
Qatar	4.44	8.50	25.64	25.60
Saudi Arabia	4.19	5.88	7.07	7.17
Syria	0.13	0.24	0.29	0.29
United Arab Emirates	5.68	6.06	6.11	6.09
Yemen	0.11	0.48	0.49	0.49
Total Middle East	31.18	49.53	72.95	73.21
Algeria	3.16	4.08	4.50	4.52
Egypt	0.31	0.93	2.05	2.06
Libya	0.73	1.31	1.49	1.50
Nigeria	2.41	3.48	5.22	5.30
Total Africa	7.39	10.62	14.46	14.58
Australia	1.07	1.48	2.49	2.51
Bangladesh	0.35	0.30	0.39	0.39
China	0.89	1.16	1.68	1.88
India	0.55	0.69	1.08	1.06
Indonesia	2.37	2.15	2.63	3.00
Malaysia	1.49	2.46	2.48	2.48
Pakistan	0.63	0.60	0.85	0.85
Papua New Guinea	0.09	0.43	0.44	0.44
Thailand	0.18	0.21	0.33	0.33
Vietnam		0.17	0.22	0.22
Total Asia Pacific	8.45	10.73	13.82	14.46
TOTAL WORLD	106.86	146.46	176.22	177.36

Source: "BP Statistical Review of World Energy", *BP Company*, June 2008. Available at: http://www.bp.com/liveassets/bp_internet/globalbp/globalbp_uk_english/reports_and_publications/statistical_energy_review_2008/STAGING/local_assets/downloads/pdf/statistical_review_of_world_energy_full_review_2008.pdf

Table 2: Natural gas production

Natural gas production (billion cubic meters)					
	1997	2000	2005	2006	2007
US	535.3	543.2	511.1	523.2	545.9
Canada	168.6	182.2	187.4	188.4	183.7
Mexico	31.7	36.1	38.9	42.8	46.2
Total North America	735.5	761.6	737.4	754.4	775.8
Argentina	27.4	37.4	45.6	46.1	44.8
Brazil	6.0	7.2	11.0	11.3	11.3
Colombia	5.9	5.9	6.8	7.3	7.7
Trinidad & Tobago	7.4	14.1	30.3	36.4	39.0
Venezuela	30.8	27.9	28.1	27.9	28.5
Other S. & Cent. America	2.6	3.5	4.8	5.3	6.1
Total S. & Cent. America	82.8	99.2	138.6	147.2	150.8
Azerbaijan	5.6	5.3	5.3	6.3	10.3
Germany	17.1	16.9	15.8	15.6	14.3
Italy	17.7	15.2	11.1	10.1	8.9
Kazakhstan	7.6	10.8	23.3	24.6	27.3
Netherlands	67.1	57.3	62.9	65.3	64.5
Norway	43.0	49.7	85.0	87.6	89.7
Poland	3.6	3.7	4.3	4.3	4.3
Russian Federation	532.6	545.0	598.0	612.1	607.4
Turkmenistan	16.1	43.8	58.8	62.2	67.4
Ukraine	17.4	16.7	19.4	19.1	19.0
United Kingdom	85.9	108.4	88.2	80.0	72.4
Uzbekistan	47.8	52.6	55.0	55.4	58.5
Other Europe & Eurasia	13.3	11.2	10.8	11.5	11.0
Total Europe & Eurasia	897.5	958.5	1060.6	1076.3	1075.7
Iran	47.0	60.2	100.9	108.6	111.9
Kuwait	9.3	9.6	12.3	12.9	12.6
Qatar	17.4	23.7	45.8	50.7	59.8
Saudi Arabia	45.3	49.8	71.2	73.5	75.9
Syria	3.8	4.2	5.4	5.5	5.3
United Arab Emirates	36.3	38.4	47.0	47.4	49.2
Other Middle East	3.3	3.4	4.4	5.6	5.5
Total Middle East	175.4	206.8	317.5	339.0	355.8
Algeria	71.8	84.4	88.2	84.5	83.0
Egypt	11.6	18.3	34.6	44.7	46.5
Nigeria	5.1	12.5	22.4	28.4	35.0
Other Africa	4.9	6.2	9.0	9.2	10.7
Total Africa	99.4	126.8	165.6	181.6	190.4
Australia	29.8	31.2	37.1	38.9	40.0
Bangladesh	7.6	10.0	14.5	15.3	16.3
China	22.7	27.2	49.3	58.6	69.3
India	22.3	26.4	29.6	29.3	30.2
Indonesia	65.7	65.7	68.7	69.3	66.7
Malaysia	38.6	45.3	59.9	60.2	60.5
New Zealand	5.2	5.6	3.5	3.6	4.0
Pakistan	19.8	22.8	30.2	30.5	30.8
Thailand	16.2	20.2	23.7	24.4	25.9
Vietnam	0.5	1.6	6.9	7.0	7.7
Other Asia Pacific	3.4	3.6	7.2	10.7	13.1
Total Asia Pacific	245.0	274.1	355.8	373.7	391.5
TOTAL WORLD	2235.7	2427.0	2775.5	2872.2	2940.0

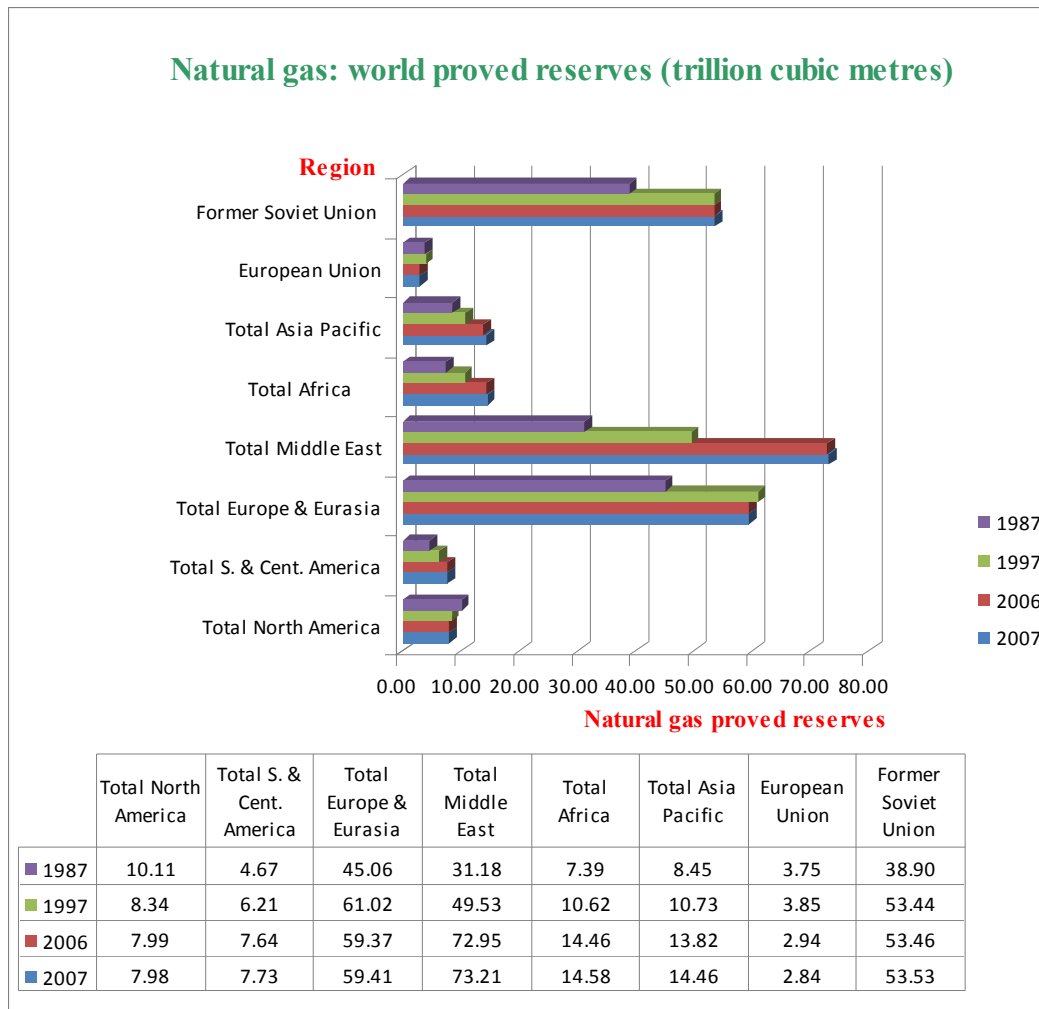
Source: "BP Statistical Review of World Energy", *BP Company*, June 2008. Available at: http://www.bp.com/liveassets/bp_internet/globalbp/globalbp_uk_english/reports_and_publications/statistical_energy_review_2008/STAGING/local_assets/downloads/pdf/statistical_review_of_world_energy_full_review_2008.pdf

Table 3: Natural gas consumption

Natural gas consumption (billion cubic meters)					
	1997	2000	2005	2006	2007
US	643.8	660.7	623.3	613.1	652.9
Canada	87.2	92.8	98.1	96.9	94.0
Mexico	32.3	38.3	46.2	51.4	54.1
Total North America	763.3	791.8	767.6	761.4	801.0
Argentina	28.5	33.2	40.4	41.8	44.1
Brazil	6.0	9.3	19.3	20.6	22.0
Colombia	5.9	5.9	6.8	7.3	7.7
Venezuela	30.8	27.9	28.1	27.9	28.5
Other S. & Cent. America	8.5	11.9	19.5	23.8	24.9
Total S. & Cent. America	82.7	95.1	124.3	131.3	134.5
Austria	8.1	8.1	10.0	9.4	8.9
Azerbaijan	5.6	5.4	8.9	9.4	8.3
Belarus	14.8	16.2	18.9	19.6	19.4
Belgium & Luxembourg	12.5	14.9	16.6	17.0	16.9
Czech Republic	8.5	8.3	9.6	9.8	8.9
France	34.6	39.7	45.8	44.1	41.9
Germany	79.2	79.5	86.2	87.2	82.7
Hungary	10.8	10.7	13.2	12.5	11.8
Italy	53.1	64.9	79.1	77.4	77.8
Kazakhstan	7.1	9.7	19.4	20.9	19.8
Netherlands	39.1	39.2	39.5	38.3	37.2
Poland	10.5	11.1	13.6	13.7	13.7
Romania	20.0	17.1	17.6	18.2	16.4
Russian Federation	350.4	377.2	405.1	432.1	438.8
Spain	12.3	16.9	32.4	33.7	35.1
Turkey	9.7	14.6	26.9	30.5	35.1
Turkmenistan	10.1	12.6	16.6	18.9	21.9
Ukraine	74.3	73.1	73.0	67.1	64.6
United Kingdom	84.5	96.9	94.9	90.0	91.4
Uzbekistan	45.4	47.1	44.0	43.2	45.6
Other Europe & Eurasia	14.7	13.5	16.1	16.4	16.8
Total Europe & Eurasia	936.3	1013.5	1128.3	1151.5	1155.7
Iran	47.1	62.9	102.4	108.7	111.8
Kuwait	9.3	9.6	12.3	12.9	12.6
Qatar	14.5	9.7	18.7	19.6	20.5
Saudi Arabia	45.3	49.8	71.2	73.5	75.9
United Arab Emirates	29.0	31.4	41.3	41.7	43.2
Other Middle East	19.6	22.1	30.9	35.0	35.3
Total Middle East	164.9	185.4	276.8	291.4	299.4
Algeria	20.2	19.8	23.2	23.7	24.4
Egypt	11.6	18.3	25.8	29.2	32.0
Other Africa	14.4	17.3	24.3	25.0	27.1
Total Africa	46.1	55.5	73.3	77.9	83.5
Australia	19.3	20.5	21.9	24.0	25.1
Bangladesh	7.6	10.0	14.5	15.3	16.3
China	19.5	24.5	46.8	56.1	67.3
India	22.3	26.4	35.7	37.3	40.2
Indonesia	30.6	30.2	32.7	34.9	33.8
Japan	64.1	72.3	78.6	83.7	90.2
Malaysia	16.7	24.3	28.9	29.6	28.3
Pakistan	19.8	22.8	30.2	30.5	30.8
South Korea	16.4	21.0	33.7	35.6	37.0
Thailand	16.2	22.0	32.5	33.3	35.4
Other Asia Pacific	4.3	5.1	13.1	13.4	15.0
Total Asia Pacific	251.8	296.1	395.0	420.9	447.8
TOTAL WORLD	2245.1	2437.3	2765.2	2834.4	2921.9

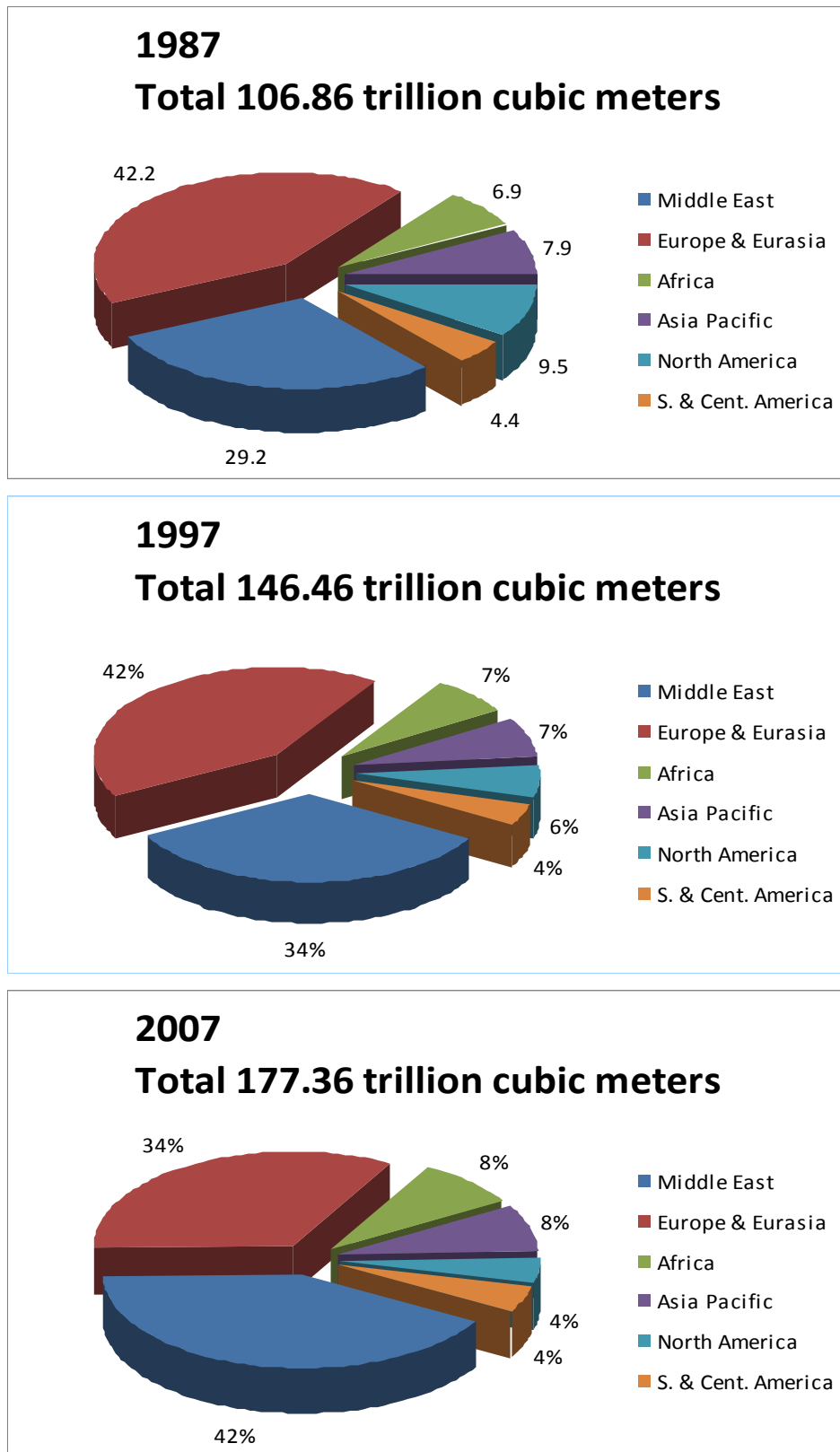
Source: "BP Statistical Review of World Energy", *BP Company*, June 2008. Available at: http://www.bp.com/liveassets/bp_internet/globalbp/globalbp_uk_english/reports_and_publications/statistical_energy_review_2008/STAGING/local_assets/downloads/pdf/statistical_review_of_world_energy_full_review_2008.pdf

Figure 1: Distribution of proved gas reserves in trillion cubic meters



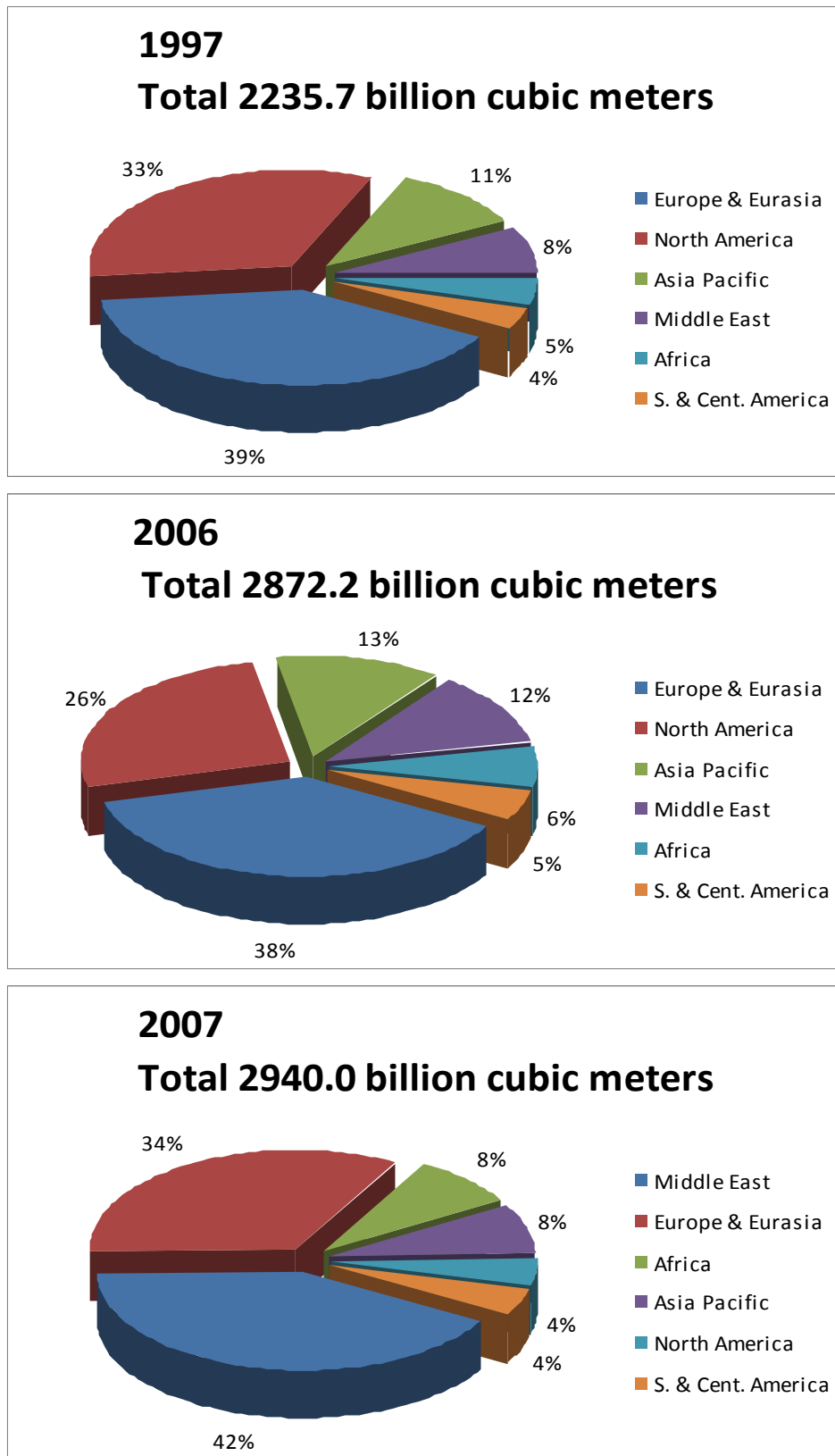
Source: “BP Statistical Review of World Energy”, *BP Company*, June 2008. Available at: http://www.bp.com/liveassets/bp_internet/globalbp/globalbp_uk_english/reports_and_publications/statistical_energy_review_2008/STAGING/local_assets/downloads/pdf/statistical_review_of_world_energy_full_review_2008.pdf (Accessed 20 December 2010)

Figure 2: Distribution of proved gas reserves in 1987, 1997, 2007 (percentage)



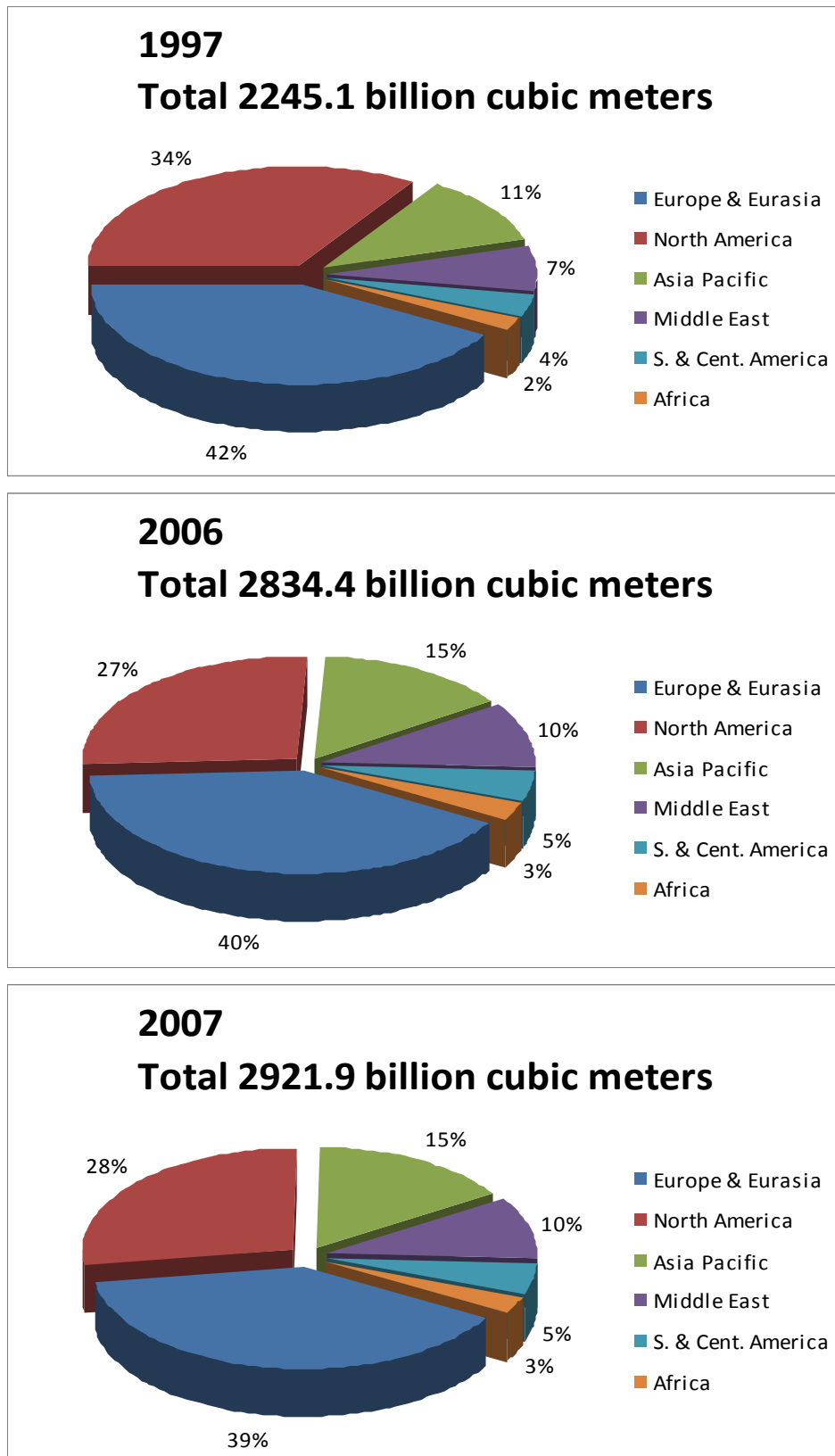
Source: “BP Statistical Review of World Energy”, *BP Company*, June 2008. Available at: http://www.bp.com/liveassets/bp_internet/globalbp/globalbp_uk_english/reports_and_publications/statistical_energy_review_2008/STAGING/local_assets/downloads/pdf/statistical_review_of_world_energy_full_review_2008.pdf (Accessed 20 December 2010)

Figure 3: Distribution of natural gas production in percentage



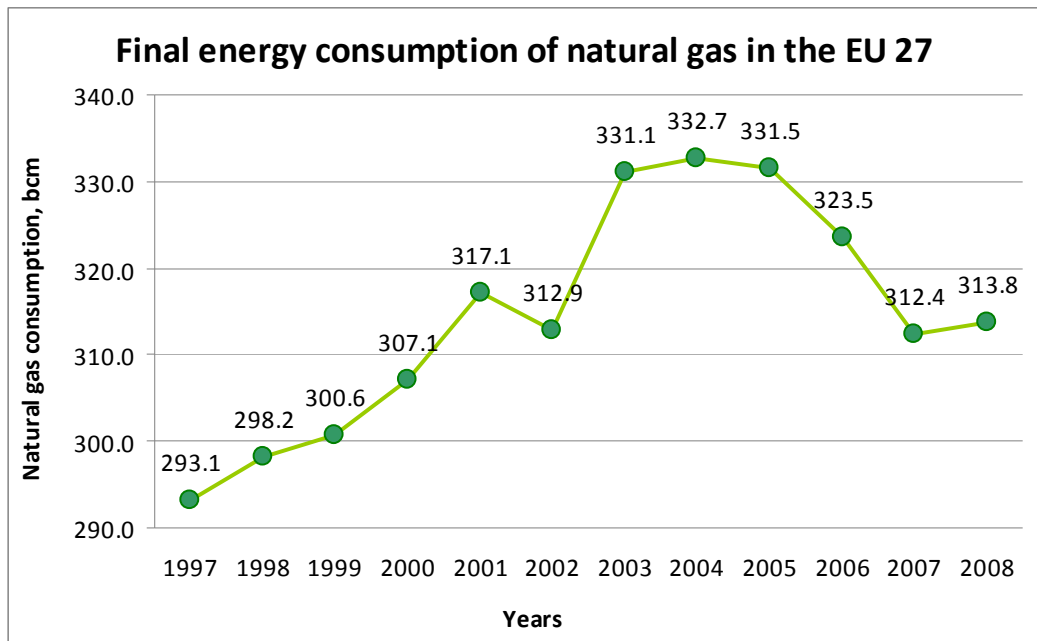
Source: “BP Statistical Review of World Energy”, *BP Company*, June 2008. Available at: http://www.bp.com/liveassets/bp_internet/globalbp/globalbp_uk_english/reports_and_publications/statistical_energy_review_2008/STAGING/local_assets/downloads/pdf/statistical_review_of_world_energy_full_review_2008.pdf (Accessed 20 December 2010)

Figure 4: Distribution of natural gas consumption in percentage



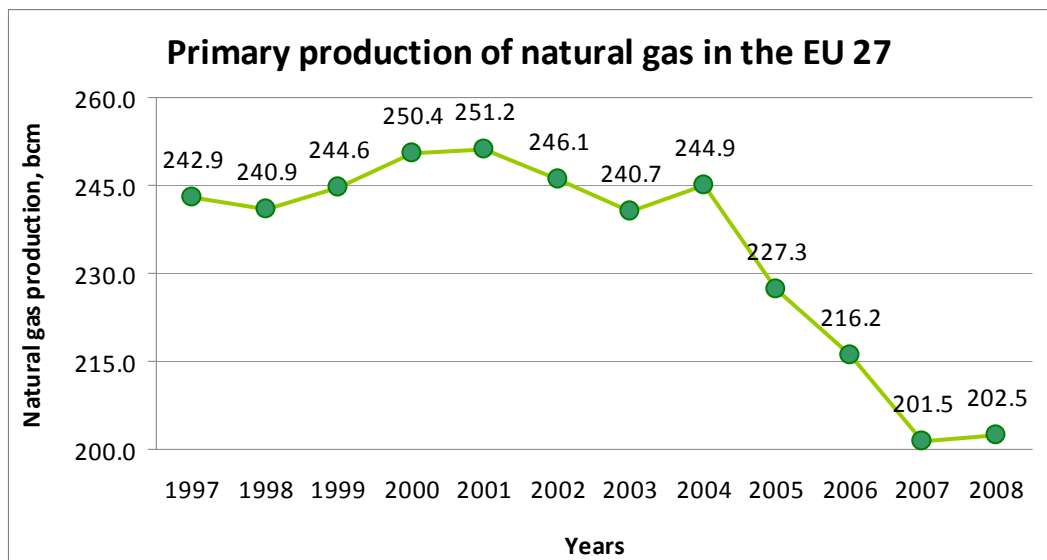
Source: “BP Statistical Review of World Energy”, *BP Company*, June 2008. Available at: http://www.bp.com/liveassets/bp_internet/globalbp/globalbp_uk_english/reports_and_publications/statistical_energy_review_2008/STAGING/local_assets/downloads/pdf/statistical_review_of_world_energy_full_review_2008.pdf (Accessed 20 December 2010)

Figure 5: Final energy consumption of natural gas in the EU 27



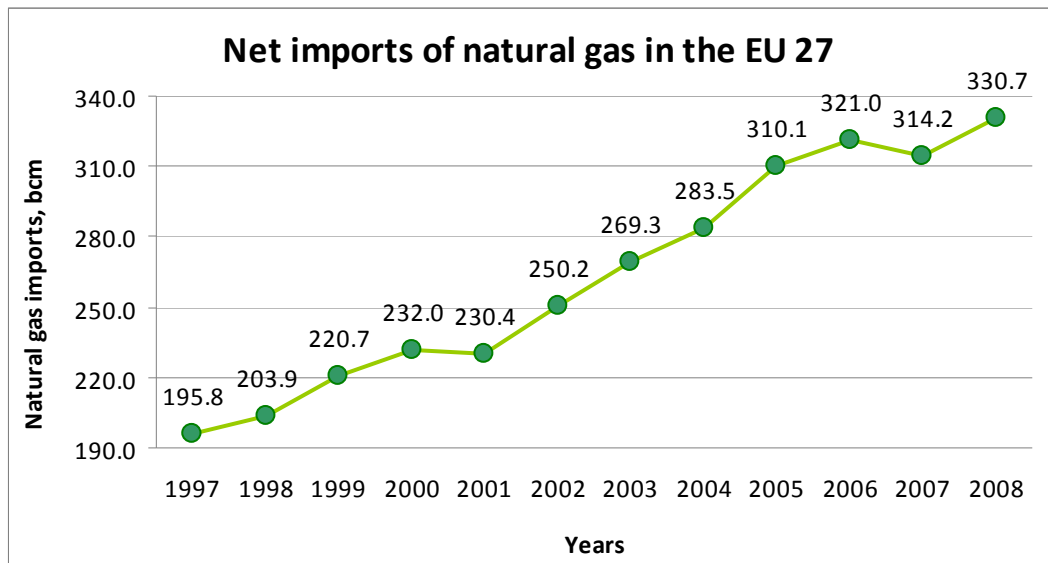
Source: Based on data from “Final energy consumption of natural gas”, Energy Statistics, Eurostat. Available at: http://epp.eurostat.ec.europa.eu/portal/page/portal/energy/data/main_tables (Accessed 22 December 2010)

Figure 6: Primary production of natural gas in the EU 27



Source: Based on data from “Primary production of natural gas”, Energy Statistics – quantities, Eurostat. Available at: http://epp.eurostat.ec.europa.eu/portal/page/portal/energy/data/main_tables (Accessed 22 December 2010)

Figure 7: Net imports of natural gas in the EU 27



Source: Based on data from “Net imports of natural gas”, Energy Statistics – quantities, Eurostat. Available at: http://epp.eurostat.ec.europa.eu/portal/page/portal/energy/data/main_tables (Accessed 22 December 2010)

Figure 8: Baku-Tbilisi-Supsa pipeline map



Source: <http://www.worldculturepictorial.com/blog/category/tags/war?page=7>

Figure 9: Nabucco gas pipeline map



Source: <http://www.payvand.com/news/09/jul/1131.html>

Figure 10: Blue Stream gas pipeline map



Source : <http://www.gazprom.com/production/projects/pipelines/bs/>