



Energy Geopolitics and Security of Supply

*The Opportunities and Impediments for a Strategic
Energy Partnership between the EU and Iran:
The Case of Natural Gas*

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Master Thesis in International Relations

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List of abbreviations

AIOC	Anglo-Iranian Oil Company
bb	billion barrels
bcm	billion cubic meters
BIWGTM	Baker Institute World Gas Trade Model
BJP	Bharatiya Janata Party (India)
BP	British Petroleum
Btu	British thermal units
CEER	Council of European Energy Regulators
CIEP	Clingendael International Energy Programme
CNPC	China National Petroleum Company
EIA	Energy Information Administration (US)
EU-25	European Union, including the 25 Member States (AT, BE, CY, CZ, DE, DK, EE, EL, ES, FI, FR, HU, IE, IT, LV, LT, LU, MT, NL, PL, PT, SI, SK, SE, UK)
EU-15	European Union, including the 15 Member States (AT, BE, DE, DK, EL, ES, FI, FR, IE, LU, IT, NL, PT, SE, UK)
EU-3	FR, DE, UK
EUR	Euro (€)
FDI	Foreign Direct Investment
FYDP	Five-Year Development Plan
GDP	Gross Domestic Product
GECEF	Gas Exporting Countries Forum
GJ	Gig joule
GTE	Grouping of Transmission System Operators
IAEA	International Atomic Energy Agency
IEA	International Energy Agency
ILSA	Iran and Libya Sanctions Act
IMF	International Monetary Fund
IPE	International Political Economy
IR	International Relations
kWh	kilowatt-hour
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
mb/d	million barrels per day
mst	million short tons
mboe	Million barrels of oil equivalent
mtoe	million tonnes of oil equivalent
NIGC	National Iranian Gas Company
NIOC	National Iranian Oil Company
NIORDC	National Iranian Oil Refining and Distribution Company
NIPC	National Iranian Petrochemical Company
OECD	Organization for Economic Cooperation and Development
OSF	Oil Stabilization Fund
OPEC	Organization of the Petroleum Exporting Countries

PPP	Purchasing Power Parity
SCO	Shanghai Cooperation Organization
TCA	Trade and Cooperation Agreement
tcf	trillion cubic feet
tcm	trillion cubic meters
TEN	Trans European Network
TNCs	Trans National Corporations
TNOCs	Trans National Oil Companies
TPA	Third Party Access
UAE	United Arab Emirates
UK	United Kingdom
UN	United Nations
UNDP	United Nations Development Program
US	United States of America
VAT	Value Added Tax



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Preface

This thesis was written as part of the Master in International Relations of the University of Amsterdam. The topic of this thesis is European gas supply security. As a political science student, this topic is of particular interest to me since (the access to) energy is essential for understanding global politics and international relations. Modern industrial states are completely dependent on energy to fuel their economies. Moreover, globalization has made the world more interconnected and interdependent and thus supply disruptions and price fluctuations not just affect a single country but have far wider implications. This was painfully illustrated when Russia cut off gas supplies to the Ukraine at the beginning of 2006, seriously hampering supplies to millions of European consumers. Ever since, the issue of energy supply security has been at the forefront of the European agenda.

With a decline in indigenous production, increasing demand for energy and dependence on a limited number of suppliers, the European Union is aware of the vulnerability of its energy industry. It has therefore made attempts for the formulation of a common energy policy for Europe that addresses energy security in a more integrated manner. One way for increasing the security of energy supply is through diversification of origin. It is in this context that I have set out to write this thesis. Holding the second largest reserves of oil and gas in the world and with proximity to the European market, the Islamic Republic of Iran has the potential to fulfil an important role for increasing European energy supply security.

Pieter Copper
Amsterdam, July 2007



Map 1 The Islamic Republic of Iran



Base 802838AI (C00260) 10-01



1 Introduction

1.1 Background

Natural gas is rapidly gaining in geopolitical importance. Worldwide consumption of natural gas has changed dramatically from a marginal fuel consumed in regionally disconnected markets to a reliable fuel for long distance consumers. Natural gas has several advantages making it increasingly the fuel of choice for many policy makers. Of all fossil fuels, natural gas has the lowest emissions of pollutants and carbon dioxide and its efficiency for many applications cannot be surpassed. Recently the European Union¹ (EU) has set ambitious objectives such as increasing energy efficiency by 20 per cent until 2020 and reducing greenhouse gas emissions by 8 percent below their 1990-level by 2012 (Directorate-General 2007: 7). Worldwide natural gas consumption is expected to double over the coming three decades, trailing coal as the fastest growing primary source of energy and potentially overtaking the share of oil in the energy mix of many large industrialized economies (EIA 2006, *International Energy Outlook*: 37). Many European countries have changed their energy mix into one with a prominent role for natural gas. However, indigenous production in the EU is limited and Member States are increasingly relying on imports from non-EU countries. This increased dependence on imports also raises concerns over security of supply and sometimes prompts immediate assumptions that natural gas could be used as a ‘political weapon’. Such speculations were further grounded when in January 2006 Russia cut off gas supplies to the Ukraine for two days affecting millions of Europeans as the Ukraine is a major transit route for Russian gas destined for the European market. As a consequence of this dispute gas supplies sharply diminished in Italy, France, Hungary, Austria and the Czech Republic (The Economist 2006: 61-63). A common heard argument in Europe for the temporary stoppage of gas supply was that Moscow was flexing its muscles to show the West in general and the EU in particular of its power. Thus Russia was thought to use its vast natural resources

¹ Unless stated otherwise, the terms EU and Europe are used synonymously and refer to the EU-25. For an overview of the respective Member states see Acronyms and Abbreviations.

particularly natural gas for political ends. Ever since, the EU is increasingly aware of the vulnerability of its energy mix.

Anno 2007 efforts to assure safe and affordable energy supplies in Europe are at a crossroads. Even though momentarily there is no immediate crisis in the EU's energy situation, there are a number of short-term and long-term issues which are reason for concern. Specific issues are the increased demand for primary energy specifically natural gas, the high geographical concentration of reserves, the rise in energy prices, the political instability of supplier countries and Europe's energy vulnerability as indigenous oil and gas resources are dwindling and expected to be largely depleted by the end of this decade (Directorate-General 2007: 5). All these issues raise the concern for the security of supply of natural gas to Europe.

1.2 The Problem of Energy (In)Security

The issue of security of supply of natural gas has surfaced on the European agenda for a number of reasons. First of all, the share of natural gas as a percentage of total energy consumption is currently at 24 percent. However, in absolute terms natural gas consumption is projected to double in the next two decades trailing coal as the fastest growing source of energy (EIA 2006, *International Energy Outlook*: 37). With growing demand for natural gas, competition for supply becomes fiercer especially considering the fact that there is a strong geographical concentration of reserves. What is more, the EU has very limited natural gas reserves of its own and therefore heavily relies on the import from non-European suppliers since indigenous gas production is unable to meet current trends in demand. More than half of all natural gas consumed in the EU has to be imported and this figure is expected to rise to two thirds of demand over the next 20 years (Stern 2002: 4).

Nonetheless, import dependency is not the major problem in securing the EU's energy supplies. However, import dependency does not automatically lead to greater insecurity of supply. Japan for instance is completely dependent on energy imports but has a well



developed and successful energy policy. Among the greatest risks for insecurity of supply however is the reliance on just but a few suppliers. In 2005, three countries accounted for half of total natural gas supply to the EU. Russia supplied a quarter of natural gas supplies to the EU, followed by Norway (15 percent) and Algeria (11 percent). To reduce this reliance and prevent natural gas being used as a ‘political weapon’ the EU has to look at opportunities to form a strategic energy partnership with other suppliers. Since Iran holds the second largest reserves of natural gas after Russia, it has the potential to fulfil this need.

Considering the above it becomes clear that the EU is vulnerable with regard to its energy needs. In the light of these trends a policy paper was developed in favour of formulating a common EU energy policy, the first of which was published in 2000. However, a coherent common energy policy has yet to be realized. Bearing in mind the European Union’s energy vulnerability and the potential role of Iran as a major gas supplier, the following research question will be addressed in this thesis:

What are the opportunities and impediments for cooperation between the European Union and Iran with regard to the security of supply of natural gas?

To be able to come to a full understanding of the topic under study and in order to arrive at a well-balanced answer three sub-questions will be addressed:

- What is meant by security of supply and how can this be achieved?
- What are the projected energy needs of the European Union (Member States) and what strategy/policy does the EU maintain in meeting such demands?
- What are the projected energy needs of Iran, what strategy does it pursue with relation to the export of its natural gas and is it willing to guarantee supply for European demand?

It is expected that, given the consumption shift away from oil and to a lesser extent coal towards reliance on natural gas that an integrated global gas market will emerge. In order to strengthen its competitive position the EU Member States should collaborate to

formulate a common energy policy. In doing so, a strategy will be sought to reduce the current vulnerability and dependence on a number of large suppliers of natural gas. A common strategy for securing the supply of natural gas will be developed in which a strategic alliance could be sought with countries such as Iran and Qatar. However, despite relative proximity to the European market and existing pipeline infrastructure, the role of Iran as a potential important supplier of natural gas will depend primarily on the domestic political situation in Iran. The political willingness of Teheran to temper its aggressive foreign policy towards the West will be crucial in this respect.

1.3 Research Objectives

The main aim of this research is to gain insight into the development of a common EU energy policy; specifically the importance of natural gas and the potential role of Iran as a strategic partner in securing supplies of natural gas destined for the European market. By investigating policy proposals and the development of the energy sector in EU Member States, the author hopes to shine a light on impediments and potential areas of conflict constraining the development of a coherent EU energy strategy. This research will explore to what extent Iran as a potential major supplier can play a role in meeting rising European demand for natural gas.

1.4 Theoretical Framework

Geopolitics is a common and well accepted tool in the analysis of energy politics. Despite the term being open for multiple interpretations and dating back more than a century, its actuality cannot be highlighted more in the context of energy politics. As a theoretical framework for this thesis, the role and development of geopolitics in International Relations is dealt with after which a model of energy scarcity is presented.

1.4.1 The Origins of Geopolitics and its Development

Geopolitics cannot be defined in a single manner. For the realist school of International Relations (IR) geopolitics refers to the rivalry between great powers but is also



synonymous for political geography or politics in terms of special dimensions. Still, by others it is seen as the geographic dimension of the foreign policy of a state or the control of a certain geographic area, stressing political and military behaviour in a specific context (Amineh 2003: 11).

The term geopolitics was first coined by the Swedish political scientist Rudolf Kjellén to describe the interconnection between politics and geography. During the nineteenth century, the geopolitical discourse was characterized by a problem-solving form of knowledge and reasoning within academic and military institutions of states that aspired to become Great Powers in world politics (Amineh 2003: 18). As a student of Friedrich Ratzel, Kjellén was influenced by his book *Politische Geographie* and would further elaborate on Ratzel's *organic state theory*. Inspired by Darwin, Ratzel perceived the state as a biological organism that behaved according to biological laws. His conceptualization of states in the international system led to his belief that the growth of a state was a reflection of the struggle for living space, a term which he coined *Lebensraum*. This struggle for living space consequently meant that strong and big states would survive at the expense of small(er) and weak(er) states (Ratzel 1925). One of the most influential scholars in the field of geopolitics was the British geographer Halford J. Mackinder. At the time of the decline of British hegemony Mackinder argued that state rivalry could no longer be carried out by colonizing the world. In an article entitled *The Geographical Pivot of History* Mackinder explores the geopolitical confrontation between land and sea powers. Mackinder identifies the Eurasian landmass as the core area in the struggle for control over the earth's surface. With railway and communication innovations it was possible to control the world's *Heartland* and thus to control entire Asia and consequently the whole world. In classical geopolitical thinking, world politics is essentially a struggle over who controls the Eurasian heartland.

Geopolitics is often widely used as a method of analysis in the field of International Relations, especially in the realist and neorealist approaches within this academic field. These traditions consider the nation-state the principle actor in the anarchic international system and as a result regard global politics a matter of balance-of-power in which states

struggle for influence and dominance over other states. According to Klare, geopolitics has been the driving force in world politics and especially in conflicts around the world for much of the past few centuries. He defines geopolitics as "...the contention between great powers and aspiring great powers for control over territory, resources, and important geographical positions, such as ports and harbours, canals, river systems, oases and other sources of wealth and influence." (Klare 2003: 51)

Although no common definition exists of what comprises geopolitics, generally it is agreed that it entails studying the activities of states but also is concerned with the 'bigger picture' of global politics. Geopolitics can be characterized as being a highly visual political theory because it frequently makes use of maps and other methods for conceptualization to illustrate its findings. In doing so, geopolitics has the propensity to divide the world into discrete spaces often informed by a judgment on hierarchy, which positions some places and peoples as superior to others (Amineh 2003: 19). The above mentioned *Heartland Theory* is illustrative of this.

As Robert Cox noted, "theory is always for somebody and for some purpose" (Cox 1981: 125). Geopolitics is no different. Often, geopolitical theory offers policy advice to states and their governments such as suggestions for new foreign and security policies. Given this point, unsurprisingly geopolitics is sometimes approached from a very nationalistic point of view and rarely embraces cross-cultural and/or cross-regional understandings. In this context it is important to understand that geopolitical theorizing is never divorced from power-knowledge relations and as a consequence there is no neutral or value-free way of viewing the world (Amineh 2003: 21).

1.4.2 Critical Geopolitics

Critics blame traditional geopolitics for being narrowly focused and excessively concerned with the geographical well-being of the nation-state. An often heard critique is that, in an age of globalization the political world can no longer be defined primarily by the actions and activities of nation-states. The increasing importance and influence of international agencies, multilateral organizations and transnational companies has



challenged the capacity of the state to formulate and implement legislation. Therefore, the management of national economies is no longer the sole domain of state elites but coexists with the demands of international money markets, international obligations and globalized flows of capital. Environmental issues, concerns over drugs, unemployment and inflation are transboundary in the sense that no single state can control these concerns itself. As such, the role and function of states as institutions and as forms of governance change over time and in doing so the hegemony of the nation-state too is being challenged (Dodds 2000: 27).

Critical geopolitics does not curtail an ethnocentric en chauvinistic territorially bounded 'us' versus 'them' approach of international politics. The state is no longer perceived as being a biological organism with expansion drift. Instead, space is defined in more social-economic terms with the aim of connecting different regions in such a way as to best serve the nation's interest. Aside from military force, the state uses tools such as market regulation, trade relations, production technologies and control of financial flows to serve these interests. As such, national territory is no longer the sole object under study, the only product of conflict and competition nor the single expression of state power (Amineh 2002: 81).

Critical or neo-geopolitics has emerged as a response to the classical geopolitical approach mentioned above. Scholars of this new approach such as John Agnew, Genaróid Ó Tuathail and Simon Dalby found the traditional approach not all encompassing due to changes in world politics. The origin of this changing political landscape can be traced down to the end of the Cold War, the process of globalization and the de-territorializing consequences of new information and communication technologies (Amineh 2003: 40-41). Consequently, the role of the state and national governments has also changed over time. At the nation-state level, the economic and cultural interdependence reduces the power and effectiveness of governments. Though governments continue to remain of essential importance, especially when it comes to being guarantors of long-term energy contracts, it is widely acknowledged that the role of the state is weakening and the key anchoring role for gas projects is shifting to the private sector (BIS 2005: 7). It is the

transnational corporations (TNCs) and the transnational oil companies (TNOCs) who often play a more important role than national governments. Due to the process of globalization, the relative autonomy of the nation-state in economic but also political matters has been reduced (Amineh 2003: 2). The traditional paradigm neglects the importance of globalization and role of transnational oil companies (TNOCs).

Taking the above developments into consideration, one can no longer understand geopolitics in general and energy geopolitics in particular in the context of classical geopolitics. Instead of merely taking the nation-state as the sole actor in the international system, critical geopolitics proposes a world view in which global space is not only divided into individual states but also takes into account the role of firms, armed forces, terrorist groups, peace movements, human rights activists and environmental organizations. In the light of energy geopolitics, it is not unlikely that conflicts will arise over the control of natural resources such as oil and gas as global energy consumption rises, environmental conditions deteriorate, the availability of such resources decreases and prices for such commodities rise (Amineh 2003: 2-3).

When looking at possible areas of conflict over oil and gas resources, one should not only take into account questions of who dominates production of the resources but also who has control over already existing resources and who will control possible export outlets. Access and control over Iran's natural resources could engender both cooperation and conflict between all forces involved, be it state or non-state actors. A closer look surrounding the geopolitical importance of Iran's natural gas resources and the role of contender states will be taken in chapter 5.

1.4.3 Energy Scarcity

Fossil fuels are the most important source of energy and competition for access to these fossil fuels is fierce since reserves are not ever-lasting. It is exactly this scarcity over which conflict and tension exists. For this purpose the model of energy scarcity is shortly discussed below. This model takes into account three distinct forms of scarcity: demand-induced scarcity, supply-induced scarcity and structural scarcity.



Demand-induced scarcity is caused by three independent factors, the first of which is a growth in global population. The second factor driving demand-induced scarcity is a rise in per capita income in high-income countries and late industrializing countries particularly of South and East Asia since this is where the bulk of the world population lives. Both India and China have populations of over one billion. Finally, technological change has rendered access to fossil energy more important for the production of wealth and power.

Supply-induced scarcity is closely related to demand-induced scarcity and is caused by a decline in fossil fuel reserves. The simple fact that fossil fuel reserves are not infinite is a condition for conflict. This form of scarcity has the potential to provoke a process of competitive power projection by militarily capable and import-dependent nations aiming at gaining control over such reserves or territory in which these reserves are located. They can do this by internally coordinating a regime change or by territorial conquest.

The third type of scarcity which Homer-Dixon and Blitt discuss is called *structural scarcity*. Structural scarcity is similar to supply-induced scarcity but can be caused by the deliberate action of a major power, by non-state actors such as major oil companies, or by producer cartels such as the OPEC. This type of scarcity is created by a major company that manages to gain control over conditions of access by third parties to fossil fuel reserves. In the current world order, the hegemonic position of the US makes it possible for that country to induce scarcity for allies, competitors and enemies alike by interdicting the transport of oil and gas (Amineh & Houweling 2005: 80-82).

Throughout this thesis, the term geopolitics refers to the influence of geographic, cultural, demographic, economic and technological factors on the political discourse among international actors. As a valuable international commodity natural gas makes control over territory rich in such resources of strategic importance. As a result, states as actors bring domestic state-society complexes into the international system. Although states are important actors, they are certainly not the only actors to take into account when

considering geopolitics of energy. Actors ranging from TNOG to human rights movements and environmental lobby groups should also be taken into consideration. The interpretation of geopolitics by this author is one in which relative gains matter but so too do mutual gains from cooperation. As such, geopolitics by this author is not automatically considered to be a competitive zero-sum game played by nation-states in the pursuit of their national interests where one state gains at the expense of another. Rather, as Victor et al note, “[geopolitics] is not simply an endless jockeying for global position, but also the immensely political actions of governments, investors, and other key actors who decide which gas trade projects will be built, how the gains will be allocated, and how the risks of dependence on international gas trading will be managed” (Victor et al 2006: 5). The traditional concept of geopolitics is therefore replaced by a more critical view. One which better explains the importance of international actors and the role they have in the security of supply of natural gas.

1.5 Methodology

This paper bases its findings and assumptions on reports, journal articles and other scientific based literature from (international) institutions and think tanks such as the James A. Baker III Institute for Public Policy, the Clingendael Institute for International Relations and the Center for Energy and Environmental Policy Research. Additionally, policy documents such as those issued by the European Commission and World Bank are used. Empirical data were extracted from official reports published by BP, EIA and IEA in order to explain the current and projected global and regional energy situation. For obvious practical reasons, all empirical data processed in this thesis are therefore secondary data. By using three independent empirical sources the author hopes to extract more objectivity as to the reliability of these sources. The majority of this thesis is based on qualitative research, however, in some instances namely chapter 3 and to a lesser extent chapters 4 and 5 quantitative data is used.

The central theoretical framework employed in this thesis is critical geopolitics, though some theoretical insight is given into the factors contributing to energy scarcity. The



epistemology used in this thesis is not only limited to a positivistic approach but also entails a rationalistic method of conducting research by ‘digging into the facts’. Through a combination of positivism and rationalism the author hopes to better answer the proposed research questions.

1.6 Thesis Structure

This thesis consists of a total of six chapters, the first of which is this general introduction to the research and a theoretical framework concerning geopolitics and energy scarcity. Chapter two analyses the global energy market in terms of resources, production and consumption and sets the scene for projections in this field. Chapter three will take a closer look at the energy security situation of the EU and attempt to sketch out the wider context in which EU energy policy has come about. The central focus will be on energy policy efforts and critical issues that are reason for concern. Chapter four addresses the domestic energy situation of Iran and analyzes the importance of the export of oil and gas for the national economy. Furthermore, a description of the state and society is given and Iranian energy policy is discussed. Chapter five analyses the geopolitical context of competition for Iranian natural gas and set out the main impediments and opportunities for cooperation between the EU and Iran in terms of the security of supply of natural gas. Finally, the last chapter will provide a final conclusion in the form of a reflection of the main outcomes, policy recommendations and briefly present two possible geopolitical scenarios. Final remarks include limitations of this research and suggestions for possible future research.

2 The International Energy Market and its Challenges

“Concern about energy security is widespread. Capacity in most segments of the energy industry remains constrained and perceptions of geopolitical risks have increased”.²

- Lord Browne of Madingley

2.1 Introduction

The world's energy future is increasingly becoming unsustainable. If current trends continue, energy supply to meet the world's growing demand is likely to become highly vulnerable to failure arising from underinvestment, environmental catastrophe or sudden supply disruptions. This chapter takes a closer look at the developments and trends of the global energy market and seeks to explain what causes this increased vulnerability. In an attempt to provide an objective overview of the energy market data used in this chapter is derived from various sources, namely the BP 2006 Statistical Review of World Energy, the EIA's International Outlook 2006, and the World Energy Outlook 2006 of the IEA. This chapter lays out the foundation for understanding developments and trends of the energy market by analyzing consumption and production patterns in relation to current reserves as well as taking into consideration population growth and Gross Domestic Product (GDP) development.

2.2 Global Reserves

2.2.1 Oil

A distinction can be made between proven reserves, undiscovered reserves and reserve growth. Proven reserves are estimated quantities that can be recovered under present technology and prices. Undiscovered reserves refer to resources that remain to be found through exploration and reserve growth is the increase in reserves as a result from (technological) factors that enhance a field's recovery rate. Total worldwide proven oil

² Quoted in BP 2006: 1. Lord Browne of Madingley is Group Chief Executive of British Petroleum.



reserves at the end of 2005 were estimated at 1,200.7 billion barrels, of which 902.4 are located in OPEC countries and 298.3 in non-OPEC countries. OPEC thus holds 75% of the global proven oil stock (BP 2006: 6). Table 2.1 shows fourteen countries which together account for 90 percent of the total global proven oil reserves. The top five countries hold almost two-thirds of the global proven oil reserves, all of which are OPEC members.

2.2.2 Natural Gas

Historically natural gas reserves have trended upward. At the end of 2005 worldwide proven natural gas reserves totalled 6348.1 trillion cubic feet (tcf). The Middle East and Eurasia together hold almost three-quarters of total proven natural gas reserves. The largest reserves of natural gas are found in the Russian Federation, Iran and Qatar. These three nations respectively account for 26.6 percent, 14.9 percent and 14.3 percent of global total proven natural gas reserves (BP 2006: 22). With current reserves and economic conditions natural gas reserves are expected to last another 66 years (OGJ 2005: 24-25).

2.2.3 Coal

Total proved coal reserves at the end of 2005 were estimated at approximately 909,064 million tonnes, at current consumption levels these reserves are expected to last another 155 years. Although recoverable coal reserves are dispersed over more than 70 countries, two-thirds of worldwide reserves are located in only four countries: the US (27 percent), Russia (17 percent), China (13 percent), and India (10 percent) (BP 2006: 32).

2.3 Global Production

2.3.1 Oil

Data on the reserves of fossil fuels is not an indication of production levels. As will become evident, large resources do not automatically imply a prominent role in production. Countries such as Saudi Arabia and Iran hold large proven oil reserves of 22

percent and 11.5 percent of total worldwide oil stock respectively however, their share in global production is limited to 13.5 percent and 5.1 percent. On the contrary, Russia, the US and China are responsible for respectively 12.1 percent, 8 percent and 4.7 percent of global oil production while holding 6.2 percent, 2.4 percent and 1.3 percent of worldwide oil reserves. The bulk of worldwide oil reserves are highly concentrated yet production is more widely dispersed.

Table 2.1 Global Oil Reserves and Production in 2005

Country	Reserves (bb)	Share of world total	Production (mb/d)	Share of world total
Saudi Arabia	264.2	22.0 %	11.0	13.5 %
Iran	137.5	11.5 %	4.0	5.1 %
Iraq	115.0	9.6 %	1.8	2.3 %
Kuwait	101.5	8.5 %	2.6	3.3 %
UAE	97.8	8.1 %	2.8	3.3 %
Venezuela	79.7	6.6 %	3.0	4.0 %
Russia	74.4	6.2 %	9.6	12.1 %
Kazakhstan	39.6	3.3 %	1.4	1.6 %
Nigeria	35.9	3.0 %	2.6	3.2 %
United States	29.3	2.4 %	6.8	8.0 %
Canada	16.5	1.4 %	3.0	3.7 %
China	16.0	1.3 %	3.6	4.7 %
EU-25	6.9	0.6 %	2.5	3.0 %
OPEC	902.4	75.2 %	33.8	41.7 %
Non-OPEC	175.4	14.6 %	47.3	58.3 %
Total World	1200.7	100 %	81.1	100 %

Source: BP 2006: 6-8 & energy charting tool

Given the projected increase in world oil demand as mentioned above, petroleum production worldwide will need to increase to 118 mb/d. This is an increase of 38 million barrels day over the period 2003 to 2030. Whereas OPEC holds 75 percent of total oil reserves it is projected to account for only 38 percent of the rise in production needed to meet world oil demands. In 2030 OPEC is thus expected to produce 45.3 mb/d and non-OPEC countries 72.6 mb/d. Due to the growth of non-OPEC members in world oil supply, OPEC has seen its market share drop from 52 percent in 1973 to 39 percent in 2003 (look for 2006 data). This drop can be explained by a number of developments such as high oil prices, new exploration and production technologies and effective cost-

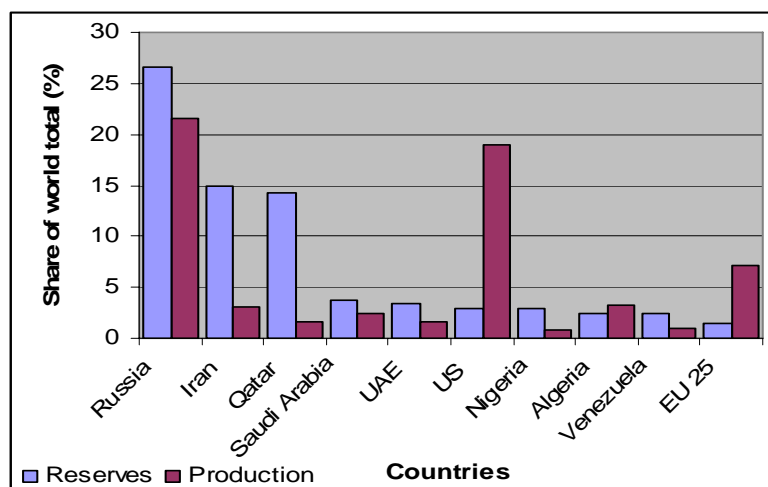


reduction programs in the petroleum industry. At current production levels, oil is expected to last another 41 years.

2.3.2 Natural Gas

The production pattern for natural gas is somewhat similar to oil. In 2003, the Middle East and non-OECD Europe & Eurasia accounted for nearly three-quarters of worldwide natural gas reserves yet ‘only’ held 39 percent of global production. The Russian Federation (21.1 tcf) and the United States (18.6 tcf) are by far the leading suppliers of natural gas, followed by Canada (6.5 tcf), the UK (3.1 tcf) and Algeria (3.1 tcf). While consumption of natural gas is largely concentrated in OECD countries³, production is far less so. In 2003, OECD countries accounted for 52 percent of natural gas consumption and 41 percent of production. The EIA has projected OECD countries to account for 40 percent of consumption and only 25 percent of production by the year 2030. This is the result of an increase of an average of 0.5 percent per year over the projection period, while demand is expected to rise by 1.5 percent per year. Consequently, OECD countries will rely on imports even more so in the future to meet natural gas demand. More concretely this means that in 2030 OECD countries will rely for more than one third on other countries in their demand for natural gas.

Figure 2.2 Natural Gas Reserves & Production in Selected Countries (2005)



Source: Based on BP 2006: 22-24.

³ For an overview of OECD Member States see appendix 1.

Table 2.3 Global Natural Gas Reserves and Production in 2006

Country	Reserves (tcm)	Share of world total	Production (bcm)	Share of world total
Russia	47.65	27.2 %	598.0	21.6 %
Iran	28.13	15.8 %	87.0	3.1 %
Qatar	25.36	14.7 %	43.5	1.6 %
Saudi Arabia	7.07	3.9 %	69.5	2.5 %
UAE	6.06	3.5 %	46.6	1.7 %
US	5.90	3.3 %	525.7	19.0 %
Nigeria	2.21	2.9 %	21.8	0.8 %
Algeria	4.50	2.6 %	87.8	3.2 %
Venezuela	4.32	2.5 %	28.9	1.0 %
Iraq	3.17	1.8 %	NA	NA
Kazakhstan	3.00	1.6 %	23.5	0.9 %
Turkmenistan	2.86	1.6 %	58.8	2.1 %
Indonesia	2.63	1.6 %	76.0	2.8 %
Norway	2.89	1.3 %	85.0	3.1 %
China	2.45	1.3 %	50.0	1.8 %
EU-25	2.49	1.4 %	199.8	7.2 %
Total World	181.46	100 %	2763	100 %

Source: BP 2006: 22-24 & Energy Charting Tool

The figure 2.2 highlights the relationship between proven natural gas reserves and production. Evident is that Russia is the sole country with extensive resources and high production. The other two major gas holding countries in terms of reserves, Iran and Qatar, have a far lower production levels. Noteworthy is the high production level of natural gas in the US compared to proven reserves. This is also the case for the EU, but to a lesser extent.

2.3.3 Coal

Since coal reserves are far more widely spread than either oil or gas, production is often limited to national boundaries. Most countries that consume significant amounts of coal hold their own domestic coal reserves. As a result, trade in coal tends to be small relative to worldwide coal consumption. The bulk of coal is produced in Asia Pacific where most of it is also consumed. As the below graph illustrates, coal consumption and production show a parallel development.

**Table 2.4 Global Coal Reserves and Production in 2005**

Country	Reserves (million tonnes)	Share of world total	Production (mtoe)	Share of world total
US	246 643	27.1 %	576	20.0 %
Russia	157 010	17.3 %	137	4.7 %
China	114 500	12.6 %	1108	38.4 %
India	92 445	10.2 %	200	6.9 %
Australia	78 500	8.6 %	202	7.0 %
South Africa	48 750	5.4 %	139	4.8 %
Ukraine	34 153	3.8 %	41	1.4 %
Kazakhstan	31 279	3.4 %	44	1.5 %
Poland	14 000	1.5 %	69	2.4 %
Brazil	10 113	1.1 %	2	0.1 %
Germany	6 739	0.7 %	53	1.8 %
Colombia	6 611	0.7 %	38	1.3 %
Canada	6 578	0.7 %	34	1.2 %
Czech Republic	5 552	0.6 %	24	0.8 %
Total World	909 064	100 %	2887	100 %

Source: BP Statistical Review 2006, pp. 32 & pp. 34.

2.4 Global Consumption

2.4.1 Oil

Fossil fuels are the world's main source of energy. Currently oil is the dominant energy source and given its importance in the industry and transportation sectors it is expected to remain so the coming decades. However, rising oil prices could jeopardize this leading position as alternative, cleaner and more competitive resources are sought. In 2005 worldwide oil consumption lay at 82 mb/d (BP 2006: 11). The bulk of oil consumption is concentrated in three areas namely North America, Asia Pacific and Europe & Eurasia⁴. According to the 2006 BP Statistical Review of World Energy consumption of oil in North America in 2005 reached 24.9 mb/d followed by the Asia Pacific and Europe & Eurasia regions, consuming on average 24.0 mb/d and 20.4 mb/d respectively. The Middle East, South & Central America, and Africa on the other hand consume far less: respectively 5.7 mb/d, 4.8 mb/d and 2.8 mb/d. In other words, 29.4 percent of the total share of global demand for oil came from North America, 29.1 percent from Pacific Asia

⁴ For an overview of the respective geographical regions see Appendix 1.

and 25.1 percent from Europe & Eurasia. Thus 83.6 % of global demand for oil comes from these three regions. On country level of analyses, the US ranks highest in the list of oil consuming countries, accounting for nearly a quarter of world oil consumption in 2005 (20.7 mb/d), followed at a distance by China (7.0 mb/d), Japan (5.4 mb/d), the Russian Federation (3.4 mb/d), Germany (3.2 mb/d) and India (3.0 mb/d) (BP 2006: 11-12). World oil consumption is expected to grow to 98 million barrels a day in 2015 to 118 million barrels a day in 2030. The total level of petroleum consumption in 2030 is projected to be 38 million barrels a day higher than the level in 2003. Of this increase OPEC producers are expected to provide 14.6 million barrels a day in order to meet the projected growth in oil consumption. As previously mentioned, the growth in oil consumption is highly influenced by world oil prices. The projection of world oil consumption is based the EIA price of \$57 per barrel in 2030 (EIA 2006, *International Energy Outlook: 2*). Consequently, the share of oil in world primary energy use is expected to drop from 39 percent to 33 percent.

Among OECD nations, the largest increase in oil consumption is expected in North America. Primary energy consumption in Mexico and oil consumption in the US is projected to increase annually by 1.7 and 1.2 percent respectively. Canada is projected to show a much lower growth rate of 0.6 percent per year. The result is that oil consumption in North America will increase on average by 1.2 percent per year to 33.4 mb/d. In industrialized Asia⁵, oil consumption is projected to increase from 8.8 mb/d in 2003 to 10.1 mb/d a day in 2030, which corresponds to an annual increase of 0.5 percent. Oil consumption over the projection period in Japan is expected to decrease by 0.1 percent. Nevertheless, Japan will remain responsible for 63 percent of total oil consumption in OECD Asia. Projected increase in oil demand is the lowest in OECD Europe where annually a rise in consumption is expected of only 0.2 percent. Consumption will rise from 15.5 mb/d to 16.3 mb/d. Total increase in oil consumption in industrialized countries is projected to increase by 0.8 yearly. Oil consumption in non-OECD countries is expected to rise at a much higher rate compared to industrialized countries. Non-OECD

⁵ Industrialized Asia here is referred to Japan, South Korea, Australia & New Zealand.



Asia is projected to be responsible for an annual rise in consumption levels by 3 percent. India and China are the main drivers of this process, with a projected increase at an annual average of 2.4 percent and 3.8 percent respectively. The result is a projected rise in consumption level to 4.5 mb/d in India and 15 mb/d in 2030 (EIA 2006, *International Energy Outlook: 25-26*).

As a result of few competitive alternatives to petroleum, the overwhelming majority of world oil demand is for the use in the transportation sector. This percentage is projected to further increase over the coming decades. Half of the projected increase in world oil demand is expected to come from the transportation sector. The industrial sector is expected to be accountable for a 39 percent share of the projected increase in world oil consumption, mostly for chemical and petro-chemical processes.

2.4.2 Coal

Coal consumption also shows a steady upward pattern. In 2003 coal accounted for 24 percent of total energy consumption and this share is expected to increase annually by 3 percent up to 2015. In 2030 coal is projected to fulfil 27 percent of world energy demand. As a result of the expected slowdown of economic growth in non-OECD Asia, global coal consumption between 2015 and 2030 is projected to slow down to a 2 percent increase per year. Over the entire projected period, the increase in coal consumption in non-OECD countries is responsible for 81 percent of the global growth in coal consumption. The growth in coal consumption in OECD countries is projected to be much slower. In 2003 the OECD countries were responsible for the consumption of 2.5 billion tons⁶. In 2015 and 2030 this figure is estimated to rise to 2.8 billion tons and 3.4 billions tons respectively. The vast majority of this expected rise is projected to come from US demand for coal. Coal consumption in OECD Europe and Japan is expected to remain constant while a moderate rise in coal demand is expected for the other OECD countries. In 2003 the US was responsible for 91 percent of coal demand in North America and 44 percent in OECD countries as consumption totalled 1.1 billion tons. Projections are that US demand for coal will rise to 1.8 billions tons in 2030. OECD

⁶ Tons here is referred to short tons (2,000 pounds)

Europe is expected to remain a core market for coal yet demand is expected to rise only by 40 million tons up to 2030. In 2003 OECD Europe was responsible for 36 percent of total coal use. The real rise in the demand for coal is expected to come from non-OECD countries as consumption is expected to rise by 140 percent from 3 billion tons in 2003 to 7.1 billion tons in 2030. This sharp rise in demand is the result of strong economic growth and the rising demand for energy in China and India. This expected rise in coal consumption in non-OECD countries accounts for 81 percent of the projected increase in global total coal consumption.

2.4.3 Natural Gas

In 2005 global natural gas consumption stood at 97 trillion cubic feet (tcf) and is expected almost double to 182 tcf in 2030. This corresponds to an annual increase of 2.4 percent over the projection period and as a result natural gas is expected to trail coal as the fastest growing primary source of energy. Natural gas has several advantages over other fossil fuels and is therefore expected to be the fuel of choice in many regions of the world as it is more environmentally friendly and it burns more efficiently than coal. The share of natural gas as a percentage of total energy consumption is expected to increase from 24 percent in 2003 to 26 percent in 2030 (EIA 2006, *International Energy Outlook: 27*).

Worldwide natural gas consumption is concentrated in North America and Europe & Eurasia. In 2005 these regions were responsible for 28.2 % and 40.8 % of the total share of global gas demand respectively. Consumption of natural gas was far lower in Pacific Asia (14.8%), the Middle East (9.1%), South & Central America (4.5%) and Africa (2.6%) (BP 2006:27). The consumption pattern as percentage of the total share in 2005 shows a different picture when compared to oil. Yet again demand was by far the highest in the US where 23% of total gas demand comes from. The Russian Federation is responsible for 14.7 % of total gas consumption and ranks second followed by the UK (3.4%), Canada (3.3%) and Germany (3.1%).

The OECD countries are considered 'mature' gas consumers with well developed infrastructure and consumption patterns. Annual growth in gas consumption is projected



to be on the low side. Natural gas consumption in North America is expected to grow annually by 1.1 percent, in OECD Europe by 2 percent and in Industrialized Asia by 1.2 percent. Natural gas consumption and developments in infrastructure in non-OECD countries on the other hand is expected to take a different trajectory. Despite current consumption levels in non-OECD countries being fairly low, projections forecast high growth rates in the demand for natural gas as investments in infrastructure are on their way. The biggest annual increase in natural gas consumption is expected in China (6.8%), India (5.9%) but also in Brazil (4.6%). Calculations made by the EIA project annual growth rates in non-OECD countries to be more than twice as high compared to OECD countries. On average, annual growth rates in consumption of natural gas in non-OECD countries are projected at 3.3 percent from 2003 to 2030 compared to 1.5 percent for the OECD countries. The demand for natural gas in non-OECD countries is expected to be responsible for 73 percent of the total increment in global natural gas consumption (EIA 2006, *International Energy Outlook*: 38).

The two main gas consuming sectors are the industrial and electric power sectors. The total share of global natural gas consumption by these sectors in 2003 totalled 44 percent and 31 percent respectively. Moreover, these two sectors are projected to show the highest increase in global consumption of natural gas. In the projection period natural gas consumption is expected to increase yearly by 2.8 percent in the industrial sector and 2.9 percent in the electric power sector. In these two sectors the share of natural gas in total energy demand is projected to increase. The EIA predicts natural gas to become the main source of energy in the industrial sector by the year 2030, thereby overtaking oil as the dominant fuel. However, despite the increasing importance of natural gas in the electric power sector, gas will remain a distant second to coal in electricity generation (EIA 2006, *International Energy Outlook*: 37).

2.5 Projections Until 2030

The International Energy Outlook 2006 of the Energy Information Administration (EIA) has calculated that world energy consumption will increase by a staggering 71 percent in

the period 2003 to 2030. In its report the EIA has predicted an annual growth rate of world energy consumption of 2 percent, rising from 421 quadrillion British thermal units (Btu) in 2003 to 563 quadrillion Btu in 2015 and 722 quadrillion Btu in 2030 (EIA 2006, *International Energy Outlook*: 1). World energy consumption is expected to grow despite the relative high world oil prices of \$47 to \$59 per barrel (based on real 2004 US dollars). The increase is a result of a steady economic growth especially in the newly industrialized countries of Asia. The most rapid growth in world energy consumption is expected to come from non-OECD nations, especially the Asia Pacific region. Based on EIA calculations energy demand is expected to grow at a rate of 3.7 percent per year for non-OECD Asia, 2.8 percent for Central and South America, 2.6 percent for Africa, 2.4 percent for the Middle East and 1.8 percent for non-OECD Europe and Eurasia. OECD nations show a different energy consumption pattern. Since OECD countries have industrialized at an earlier stage and contain well established infrastructures their economies are generally moving away from energy intensive industries towards a service orientated economy. Furthermore, population growth in general is much slower in OECD nations. As a consequence, OECD nations are projected to deliver a much lower growth rate in world energy consumption, on average 1 percent per year over the period 2003 to 2030 as compared to 3 percent per year for non-OECD countries.

Two basic factors are responsible for the rise in demand for natural resource: the growth in global population and the rise in world GDP levels. Population growth affects the pattern and size of energy demand. According to the population division of the United Nations the world population has increased from 2,535,093 in 1950 to 6,514,751 in 2005 and is expected to rise to 8,317,707 in 2030 (UN 2006: 2). This means that more people will be competing for fewer resources. Over the past three decades, global energy demand has tended to rise broadly in line with GDP growth. An increase of 1 percent in GDP expressed in terms of purchasing power parity (PPP) ever since the 1990s was trailed by an increase of 0.5 percent in primary energy consumption (IEA 2006: 58). In spite of record high oil prices in the past recent years, the economies of many countries around the world have continued to grow steadily. In 2006, the world economy grew by 3.8 percent (UN 2007: 1). The economies of developing and transition countries have



enjoyed above average rates of GDP growth. China's GDP grew by a impressive in 10 percent both 2004 and 2005, while India experienced a growth of 8 percent. Until 2030 GDP is projected to grow on average by 3.4 percent per year (IEA 2006: 58). These factors are essentially what drives demand and supply induced scarcity in natural resources.

2.6 Conclusion

Momentarily fossil fuels are the dominant source of energy and are expected to remain so for the coming two decades throughout the world. The share of oil as a percentage of total primary energy is expected to decrease; nonetheless oil will remain the dominant fuel trailed by coal and natural gas. In fact, the share of both coal and natural gas as a percentage of total energy consumption is projected to rise steadily. In this light it is important to analyze the role producer countries or potential producer countries have in meeting demand. It has become clear that reserves, especially of natural gas and to a lesser extent of oil are highly concentrated, namely in countries surrounding the Caspian region and the Persian Gulf. This while consumption is mainly concentrated in the Western hemisphere and during the last few years has shifted eastward to also include India and China.

In other words, global consumption of primary energy will rise sharply over the next two decades driven by population expansion and GDP growth while the main resources to fuel this consumption, namely oil and natural gas, will run out shortly. The reserves-to-production ratio for the former is estimated at 41 years while for the latter it is calculated to be approximately 66 years. Coal is more abundant and more widely spread and reserves should be enough to last another 140 years. It is important to note, however, that such estimates vary from institution to institution and that they are based on the current level of technology. Many oil and gas reserves are located in remote areas making them hard to exploit. With the help of technological innovations reserves-to-production ratios are likely to increase.

Despite production levels being relatively low compared to other countries, the Islamic Republic of Iran has the potential to play a prominent role in meeting increased demand of both oil and gas. Iran holds the second largest reserves of both oil and natural gas, after Saudi Arabia and Russia respectively. The question is to what extent Teheran is able and willing to exploit this potential.

The next chapter takes a look at the energy situation in the European Union. It will concentrate on issues and questions regarding the EU's dependence on imported energy, the composition of its energy mix and the policy measures that are being taken to guarantee security of supply for the coming decades. The chapter thereafter will focus on Iran's domestic energy situation and its potential to become a global player in terms of energy supply.



3 The Energy Security Situation in the European Union

“The increasing dependence on natural gas imports raises significant concerns as regards the EU security of supply in the long run. Diversification of suppliers and routes is therefore a key part of the EU energy supply security strategy.”⁷

- Andris Piebalgs

3.1 Introduction

The unequal distribution of the world’s natural resources, as spelled out in the previous chapter, provides complications for Europe’s efforts in securing energy supplies. Such efforts, to assure safe and affordable energy supplies, are at a crossroads. While there is currently no immediate crisis in the European Union’s energy sector, a number of pressures are building up that are reason for concern. Specific issues are an emerging gap between demand and supply, the instability of supplier countries and the EU’s increasing dependence on energy imports. This chapter will provide an insight into the European Union’s energy situation and the related policies that Brussels maintains to secure its needed energy supplies. Newcomers Bulgaria and Romania, which joined the Union as of the 1st of January 2007, are not touched upon as insufficient data obstructed the analysis of their respective markets.

3.2 The Vulnerability of European Energy Supplies

3.2.1 Europe’s Energy Basket

Although never abundant, indigenous reserves of European oil and gas are dwindling and will be largely depleted within a decade. The situation is slightly different for coal as this has always been Europe’s most abundant resource. But where coal doesn’t face problems of depletion it struggles with problems of environmental acceptability. The same holds for the possibility of developing nuclear energy. Table 3.1 outlines the EU-25 Member States with the largest reserves of oil, gas and coal.

⁷ Speech at the conference to promote Trans Saharan Gas Pipeline, Brussels on 9 July 2007. Piebalgs is the European Union’s Energy Commissioner.

Table 3.1 Largest Reserves of Oil, Gas and Coal in EU-25

Oil (bb in 2006)	Natural Gas (tcf 2007 estimates)		Coal (mst in 2004)		
United Kingdom	3.875	Netherlands	50.000	Poland	15,432
Denmark	1.277	United Kingdom	17.000	Germany	7,428
Italy	0.600	Germany	9.000	Czech Rep.	6,120
Germany	0.367	Poland	5.820	Greece	4,299
Spain	0.150	Italy	5.800	Hungary	3,700
Total EU-25	6.698	Total EU-25	92.774	Total EU-25	38,980

Source: EIA 2006

Total indigenous production of primary energy in EU-25 is expected to decline continuously up to 2030. As illustrated in table 3.2, the decline is more pronounced in fossil fuels, while renewable energy forms are expected to grow during this same period. In fact, due to intense efforts by the European Commission to reduce CO₂ emissions (see also § 3.3), the share of renewable energy, though presently modest, is expected to genuinely rise over the coming years to become the second most important indigenous energy source (after nuclear energy) in the EU-25 energy system.

Table 3.2 Primary Energy Production in EU-25 (mtoe)

	1990	2000	2010	2020	2030
Oil	120.3	163.5	131.7	102.1	86.5
Natural Gas	139.6	196.6	196.9	147.6	117.1
Coal	350.8	203.4	153.8	126.4	102.5
Nuclear	196.9	237.7	245.3	213.5	185.3
Renewable energy	69.2	96.1	132.7	151.3	169.5
Total EU-25	877	897	860	741	661
EU-15	708	761	743	635	573
New Member States	169	136	117	105	88

Source: Directorate-General 2004: 39.

Whereas the production of natural gas and nuclear power as a percentage of the total share of primary energy production in the EU-25 has increased significantly, the opposite



is true for the production of coal. The production of nuclear energy is expected to grow slowly up to 2010, thereafter it is likely to decline significantly as a result of the closure of nuclear plants with safety concerns in some new Member States and the nuclear phase-out policies decided in certain EU-15 Member States.

Since the 1990s energy consumption in the EU has been growing at a much slower rate compared to GDP which resulted in a decrease in energy intensity⁸ levels by 1.4 percent per annum. A decline in energy intensity implies better energy efficiency as well as structural change toward more services and less energy intensive industries.

Table 3.3 Primary Energy Consumption in EU-25 (mtoe)

	1990	2000	2010	2020	2030
Oil	596	636	654	672	674
Natural Gas	259	376	507	598	628
Coal	431	303	244	253	300
Nuclear	197	238	245	214	185
Renewable energy	69	96	133	151	169
Total EU-25	1554	1651	1784	1889	1960
EU-15	1321	1453	1576	1657	1719
New Member States	234	198	208	232	140

Source: Directorate-General 2004: 39.

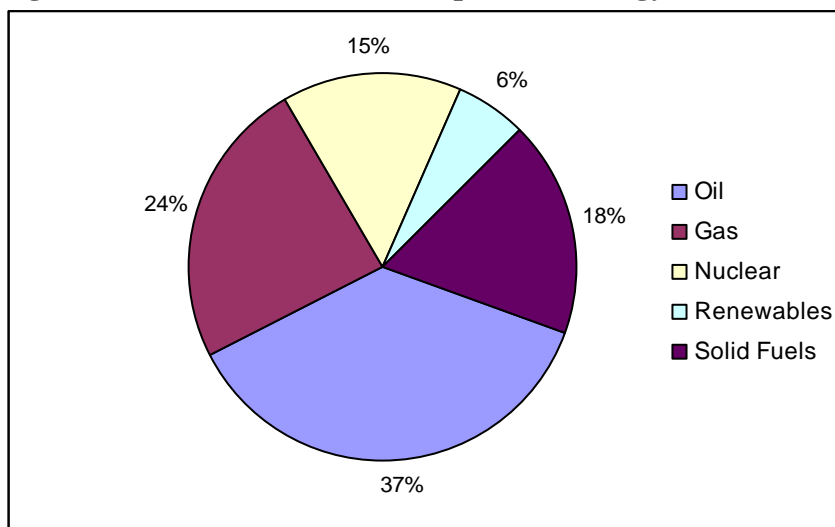
The 1990s can be characterized as a period in which the energy economy in the EU Member States has been changed significantly. This is particularly true for the new Member States. Between 1990 and 2000, primary energy consumption rose approximately 6 percent, with very different trends in EU-15 and the new Member States. This is certainly noteworthy, since prior to the 1990s these countries had the highest energy intensity after the former Soviet Union. The rapid decline of primary energy consumption in the new Member States was triggered by the slowdown of economic activity in this region, the massive closure of energy-inefficient factories and the increase of energy prices. In the old Member States (EU-15) substantial changes also occurred.

⁸ Energy intensity is the ratio between energy demand and GDP.

Despite overall energy consumption growing by 10 percent between 1990 and 2000, solid fuels declined by 29 percent. In contrast, consumption of natural gas grew by 52 percent. Since 2000 natural gas has been the fastest growing fuel in the EU, averaging a 2.8 percent increase per year.

Natural gas and renewable energy are projected to be the fastest growing sources of energy in the EU-25, growing at rates three times faster compared to overall energy needs over the projection period. The consumption of liquid fuels is expected to remain constant, while the demand in solid fuels shows an upward and downward trend. After a strong decline up to 2010, solid fuels are projected to regain some of its market share it lost during the 1990-2000 period. Though the share of nuclear energy as a percentage of total primary energy demand is expected to increase steadily up to 2010, thereafter it is expected it will slightly decrease. Renewable energy will in the reference case scenario will growth moderately. However, this projected scenario does not take into account legislation adopted at Community level such as the objectives outlined in the Commission's Green Paper. It is likely therefore that the share of renewable energy sources as a percentage of total primary EU energy demand will be greater.

Figure 3.4 Gross Inland Consumption of Energy in EU-25 (2004)



Source: Eurostat 2007: 30.



The energy consumption of the EU-25 predominantly consists of fossil fuels. Oil is the dominant source of fuel accounting for 37 percent of total energy consumption. Oil is predominantly used in the transport sector (56 percent of oil consumption), in services and households (joint share of 23 percent) and in petrochemical processes (15 percent). Natural gas is the second most important fuel, accounting for 24 percent of total energy consumption. Natural gas is mainly used in power generation (29 percent), households (29 percent), industry (25 percent) and other final energy demand. Third in line come solid fuels with a share of 18 percent in total energy consumption. Solid fuels are mostly used for power generation (74 percent) and in heavy industries (Directorate-General 2007: 9).

3.2.2 Import Dependency

The combined affect of declining primary production and an increase in primary energy consumption results in a significant growth of import dependency for the EU-25 Member States. In 2002, import dependency in the EU stood at 48 percent and is projected to increase to more than two-thirds by 2030 (EP 2006: 2). As table 3.5 also illustrates, import dependency for oil will remain the highest out of all energy sources. By 2030, approximately 88 percent of EU-25 oil demand will be met by imports.

Table 3.5 Import Dependency in EU-25 (%)

	1990	2000	2010	2020	2030
Oil	80.9	76.6	81.3	86.0	88.3
Natural Gas	47.6	49.5	61.2	75.3	81.4
Coal	17.5	30.1	36.9	50.0	65.8
Total EU-25	44.8	47.2	53.1	61.9	67.3
EU-15	47.6	49.4	54.3	62.9	67.8
New Member States	28.3	30.8	44.0	54.8	63.6

Source: Directorate-General 2004: 39.

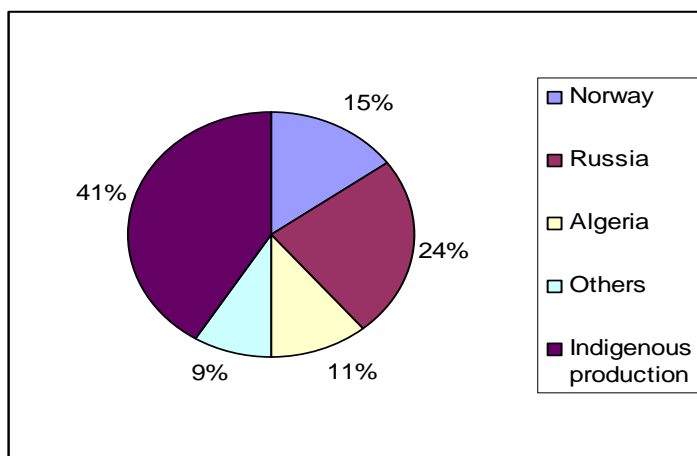
As with oil, Europe's external dependency in terms of natural gas will show a similar trend but rise even sharper and increase to over 80 percent by 2030. Notwithstanding the significant rise in import dependency for coal, its levels will remain lower compared to

oil and gas. In spite of the much better current position of the new Member States with regard to import dependency, by 2030 it is projected that the EU-15 and the new Member States will roughly have similar levels. This is the result of faster growing energy needs in the new Member States combined with a steep decline of indigenous production.

Taking a closer look at the import dependency level for natural gas reveal that gas production in the UK is projected to decline steeply to the point where it may be up to 40 percent dependent on imports by the year 2010 and rising to as much as 80 percent by 2020. Dutch natural gas production is expected to remain stable until 2010-2015 with output from the long-established Groningen gas field compensating for declines in smaller fields. After this period it is projected that both the Groningen gas field and smaller fields will experience a gradual decline in production (Stern 2006: 2).

Natural gas accounts for approximately a quarter of total primary energy use in the EU. Around 41% of this gas comes from indigenous production, in particular the UK, the Netherlands and Denmark. The remaining 59% has to be imported from non-EU countries and this proportion is growing. The EU is fortunate to be surrounded by three major gas producers: Russia, Norway and Algeria. These three countries are traditionally the most important sources of suppliers of gas to the EU (Eurogas 2006: 8). The figure below illustrates the most important import countries for natural gas to the EU.

Figure 3.6 Breakdown of EU Natural Gas Supplies in 2005



Source: Eurogas 2006: 28.



The Union's increasing dependence on the imports of fossil fuels from non-EU suppliers raises significant concerns regarding the security of supply of these resources in the medium to long run. This is even more so for natural gas, given the increasing dependence upon a limited number of suppliers as depicted in figure 3.6. This concern is further rooted in the need for long distance transport infrastructures to bring natural gas to the European market and furthermore by the overall increase in the demand for natural gas in other parts of the world.

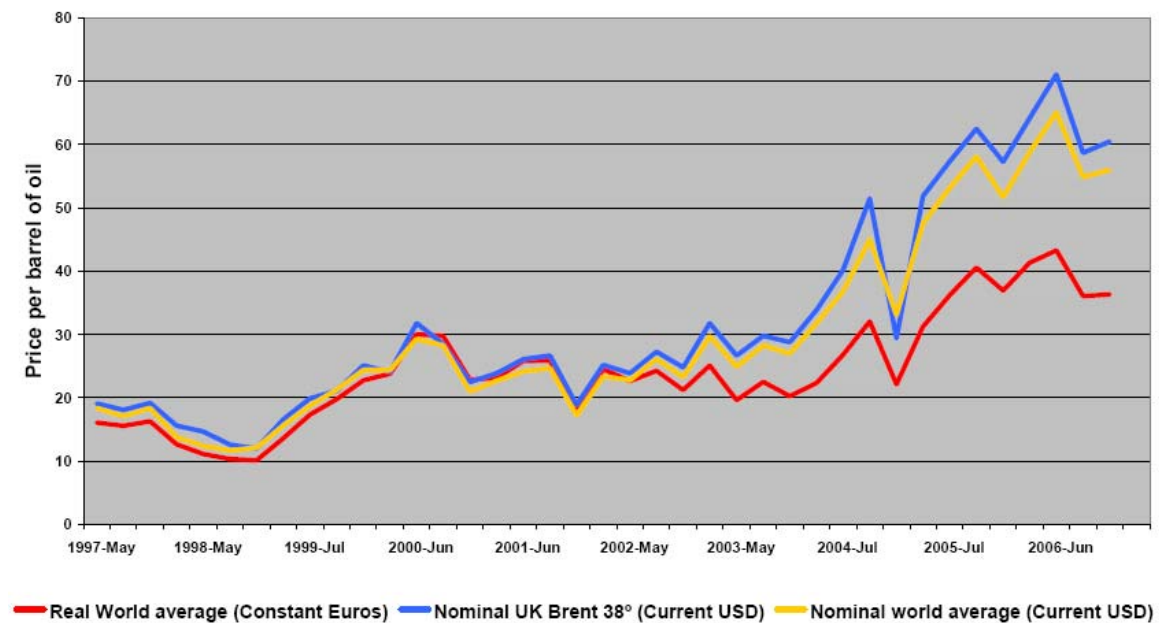
3.2.3 Energy Prices

As with any commodity, prices of energy affect how much of it is demanded and as such is an important element of the EU's security of supply policy. The price elasticity of demand for different sources of energy varies per sector and over time and depends on a number of factors. Factors such as the scope of substitution (switching to another fuel), adopting more efficient technology, tax rates but also the need for the energy service all have an influence on energy price levels. Since primary energy sources are traded on international markets, their prices are further influenced by market forces even in cases of which the market is not entirely free. Generally speaking, retail prices not controlled by governments move in line with international price levels (IEA 2006: 62).

The average IEA crude oil import price in 1998 stood at \$ 12,- per barrel in real 2005 prices and rose sharply to well over \$ 30,- per barrel in 2000 before dropping back to \$ 26,- per barrel in 2002. Oil prices in 2003 were again on the rise, surging to new highs in 2006, where a record of \$ 70,- per barrel was reached (IEA 2006: 270-272). IEA projections predict world crude oil prices to decline slowly in real terms (2005 US \$) from a 2006 average of more than \$ 69,- per barrel to just under \$ 50,- per barrel in 2014. This is due to new supplies entering the market. By 2030 the price per barrel of crude oil is expected to have increased lightly to \$59,-. Reasons for the high level oil prices are the temporary shortages of experienced personnel, equipment and construction materials in addition to a rise in demand due to the recent period of strong economic growth in major consuming nations. Geopolitical tensions in oil producing regions such as the Middle

East, Africa, Russia and Latin America have combined to push oil prices further up. The EIA anticipates substantial increases in oil production in several OPEC and non-OPEC countries over the coming 10 years, as well as substantial development of unconventional production over the next 25 years that will lead to the price development mentioned above (EIA 2007: 4). However, it must be noted that prospects for oil prices remain extremely uncertain due to it being highly volatile and should therefore be looked at with great caution.

Figure 3.7 Real and Nominal Oil Prices

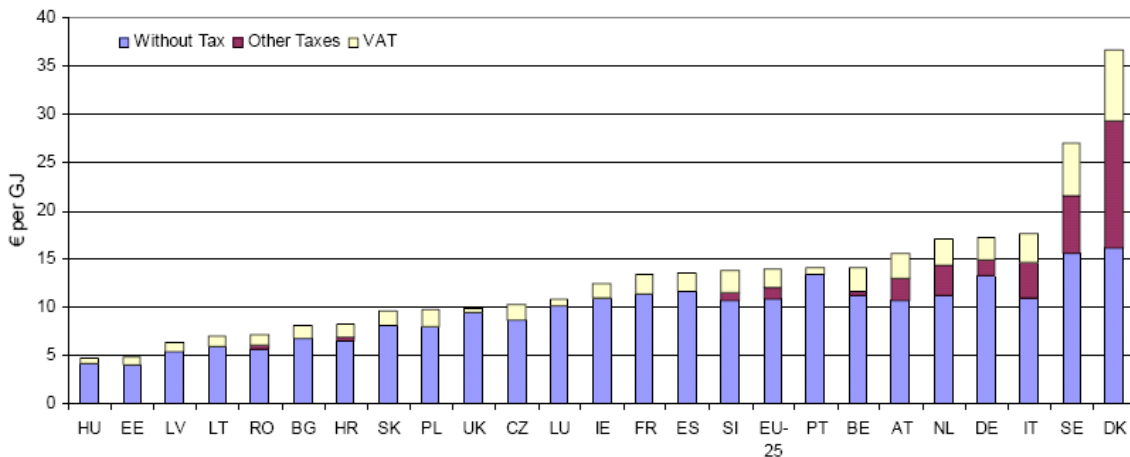


Source: Directorate-General 2007: 13.

The overall development in the price for natural gas has generally risen in line with crude oil prices since 1999, but is different compared to the development of the price of electricity. In terms of EU household consumption of natural gas over the period 1995-2005, prices without taxes showed a very similar trend compared to prices where taxes are included. The percentage growth of prices of natural gas without taxes grew by 28 percent while the increase in prices without value added tax (VAT) and all taxes grew by 31 percent and 33 percent respectively.



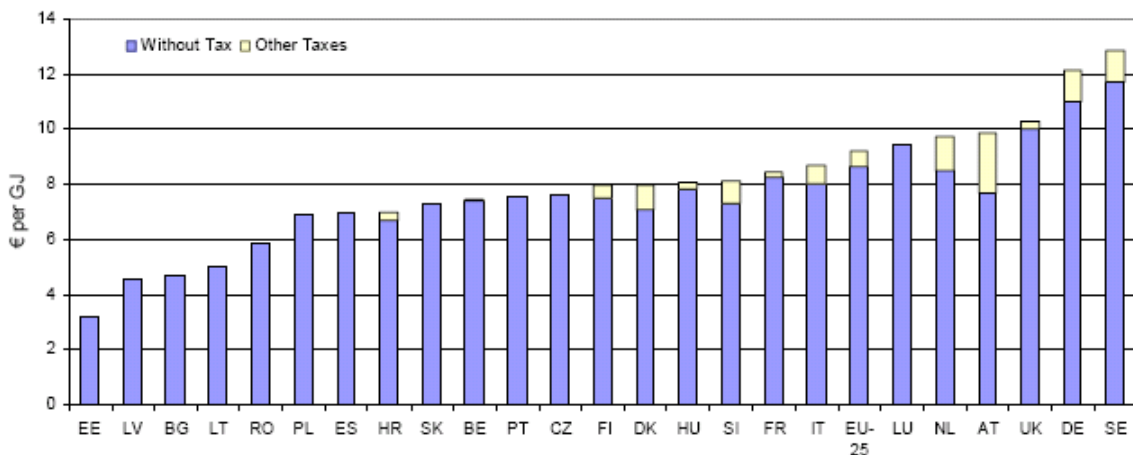
Figure 3.8 Composition of Gas Prices for Domestic Consumers on 1st July 2006



Source: Eurostat 2006: 3.

As the above figure indicates, European households clearly have different prices to pay according to country. On July 2006 gas prices for household consumers were the most expensive in Denmark and Sweden reaching levels of EUR 36,60,- and EUR 27,- per GJ respectively. In contrast, prices were the lowest in Hungary and the three Baltic states of Estonia, Latvia and Lithuania.

Figure 3.9 Composition of Gas Prices for Industrial Consumers on 1st July 2006



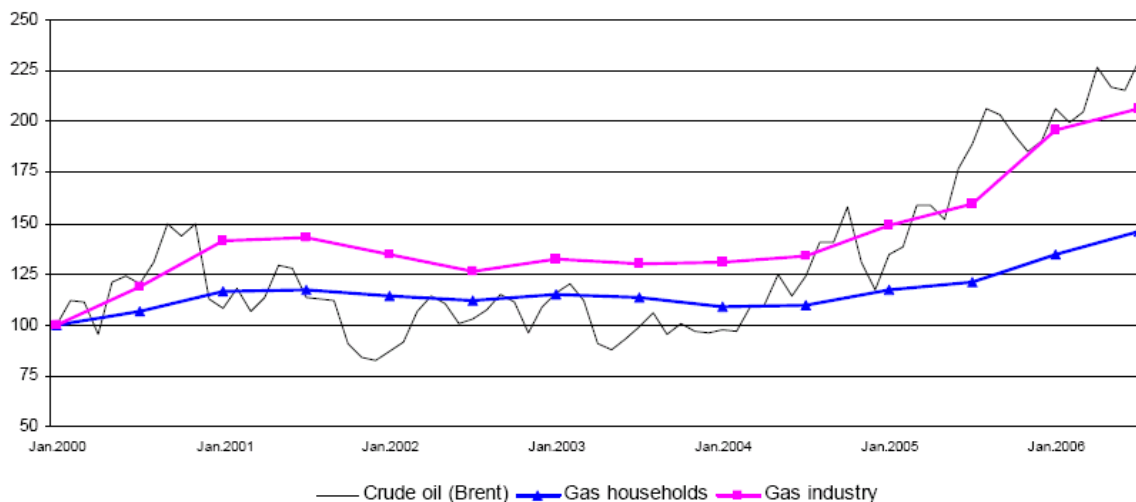
Source: Eurostat 2006: 3.

The share of taxes as a percentage of the total price of natural gas is the lowest in the UK and in Portugal. Here a relatively low VAT tax rate of 5 percent is charged to the basic

price and no energy or other taxes are applied. Luxembourg also applies low taxes in the final gas prices paid by end-users. Though Sweden and Denmark have similar price levels of natural gas before tax, the price paid by the final consumer in Denmark is significantly higher. This is due to the fact that Denmark applies far higher taxes on natural gas, 56 percent compared to 42 percent in Sweden. The average EU natural gas price, which is weighted with 2004 annual national consumption of the domestic sector is EUR 14,- per GJ.

Gas prices for industrial consumers in the EU show a different pattern, though not drastically different. Taxes on natural gas for industrial consumers do not include VAT because it is deductible for industrial and commercial consumers subject to the general tax system. As indicated above, gas prices for industrial consumers on 1st of July 2006 were the most expensive in Sweden, Germany and the UK all of which were above EUR 10,-. The Baltic States and Bulgaria charge industrial consumers the least. Especially in Austria a significant proportion of taxes in the final prices is observed (22 percent), followed by the Netherlands (13 percent) and Denmark (12 percent). Noteworthy is furthermore that nine Member States do not charge taxes other than VAT on natural gas. Although figure 3.8 seems to indicate otherwise, Belgium does apply a small tax of 1.1 percent on natural gas making near to invisible to see on the displayed graph.

Figure 3.10 Development of EU-15 Gas Prices Compared to Oil Prices 2000-2006



Source: Eurostat 2006: 6.

Figure 3.9 shows the development of the price of natural gas for domestic and industrial customers over the period 2000-2006. As numerous of the Member States which acceded on the 1st may 2004 have only started reporting gas prices since this date, only EU-15 average prices are shown in the graph. The average price paid by domestic consumers in the reference case increased steadily between January 2000 and January 2001 yet remained relatively stable up to July 2004. In the period thereafter a price increase of about 34 percent has occurred. With regard to industrial consumers a significant price increase can be noted between 2000 and 2001, much stronger when compared to the price set for households. The gap was reduced as the price paid by industry at EU-15 level for a GJ of gas fell by 9 percent. However, a massive price increase of 57 percent between January 2004 and July 2006 further widened the gap between industrial and domestic prices for natural gas.

Projections for the price of natural gas are broadly assumed to follow a similar trend as the projected oil prices. This is due to the continued widespread use of oil price indexation in long term gas supply contracts and because of competition between different fuels for end-use markets. However, some divergence will be expected between the two commodities. It is expected that increasing gas to gas competition will have a downward affect on gas prices relative to oil in some markets. What is more, increased trading in Liquefied Natural Gas (LNG) will enhance competition and consequently exert pressure towards further lowering gas prices.

Final electricity prices are derived from marginal power generation costs and non-generation of supply. A significant share of the total cost of electricity supply is made up of non-fuel costs and as such an increase in generating fuel costs leads to a much smaller increase in the final price of electricity. In the EU the price for electricity is heavily influenced by the tax regimes the Member States pursue. From 1995 the average price of electricity (excluding all taxes) at the level of EU-15 decreased until 2000 and remained stable up to 2004. However, the price of electricity including all taxes dropped but took an upward swing in 1999. Since 2004 all price categories showed the same upward trend.

But whereas the price without taxes remained 2 percent under the 1995 level, those that include taxes were more than 4 percent higher. The gap in price levels between prices without tax and those with taxes can be explained by a noticeable increase in taxes on electricity in various Member States, namely Germany, the Netherlands and Sweden. Despite the Electricity Directive⁹ being adopted, making it possible for all households to choose their supplier by 1st July 2007 it does not touch upon the national particularities regarding taxes and duties on electricity.

3.3 European Energy Policy

3.3.1 Past Efforts

In almost every industrialized country it is common practice for governments to involve themselves in the energy sector, and especially in the activities of the electricity and gas industries. There are several reasons that explain this involvement. First of all, due to the successive character of the activities of these industries (i.e. generation or production followed by transmission, distribution and supply/retail) elements of natural monopoly in transmission and distribution activities have evolved which have led to vertical integration of the activities within a single company. Moreover, in return to receiving exclusive rights of supply over a specific area or region, those companies have traditionally been obliged by governments to provide and supply electricity and gas. This obligation stems from the fact that energy supply is traditionally seen as essential for communities and safeguarding it as a national interest because the energy sector is of strategic importance for the overall economy and military capability of the nation-state. The energy sector, furthermore, is a capital intensive industry with a high degree of technical complexity. As such, entry barriers are high and a strong emphasis is laid on reliability of transmission and delivery. This is particularly the case in the electricity sector. Electricity cannot be stored and rapid changes in demand can occur during any given day. This makes the electricity sector especially vulnerable so that government involvement is seen as a necessary counter measure to act as a stabilizing factor in the industry. The strategic importance of the energy sector for a national economy and the

⁹ EU Directive 96/92/EC



nature of production led to the assumption that it was economical to have a single company responsible for the construction of the system facilities and for operation. In other words, the model was based on a centrally controlled and vertically integrated monopoly to ensure stability, reliability of supply and public service (Cameron 2002: 5-6).

However, government energy policy has changed over the years. In order to provide a full picture, the historical development and evolution of government relations with the energy sector in the EU in general is shortly mentioned. Three main stages in the evolution of energy policy in Europe can be distinguished. The first stage can be identified as the period of reconstruction and expansion after the Second World War. This period was marked by the conviction that the pillars of the economy (which included the energy industry) were essential in the process of reconstruction and of the new post-war society. Accordingly, energy companies were nationalized so as to create very close relationships between government and state-owned or controlled energy companies. In such a manner national governments had strict control to ensure that the high costs of investments were made to meet rising demand for energy. The energy market in this period thus had a monopolistic character, excluding or strictly limiting entry of new players into the market. Government involvement and energy policy in the EU changed barring under influence of the energy crises of the 1970s. The issue of security of supply increasingly became a focus point during this period, especially with regard to oil supply as many countries relied on oil imports from OPEC countries. Oil at that time was the principal fuel for electricity generation after coal and consequently the reliability of that oil was called into question. Many instances of government intervention followed, most of which were aimed at changing the energy mix in order to reduce the dependence on imported oil supplies. Alternative sources were sought and consequently some EU countries such as France introduced expensive programmes to fund the construction of nuclear power plants. Diversifying the energy mix meant that politically inspired disruptions to supply were more difficult, hence decreasing the energy vulnerability. From the mid 1980s national energy policies once again were challenged. This time policy change was driven by two independent forces namely globalization and

liberalization of the energy market. One of the most accepted features of globalization is the expanded role of financial actors and markets which globally operate on a real-time basis. Another common feature of globalization is the relationship to the spread of information technology and transformation notions of time and space. Consequently, debates on the future (and role) of the nation-state were triggered. According to Cameron, the nation-state has not declined merely its functions have transformed, some into a depoliticized global space others into supranational entities. As such the nation-state remains the most important agent in international space (Cameron 2002: 10-15).

3.3.2 Current Policy

The European Commission is aware of the vulnerability of its current energy basket and in line with this has developed a combination of internal and external policies to secure energy supplies to the EU. The general understanding is that external energy relations cannot be separated from the wider European Union's energy policy (CEC 2006, *An External Policy to Serve Europe's Energy Interests*: 1). That is why several policy papers have been developed, the most influential being the *Green Paper*¹⁰. These policy documents underscore the urgent need for investments of around one trillion euros over the next 20 years in order to fulfil the need to meet expected demands and to replace ageing infrastructure. The most recent *Green Paper* identifies six key areas where action is necessary to address the energy challenges the Union faces (CEC 2006, *Green Paper*: 5-17):

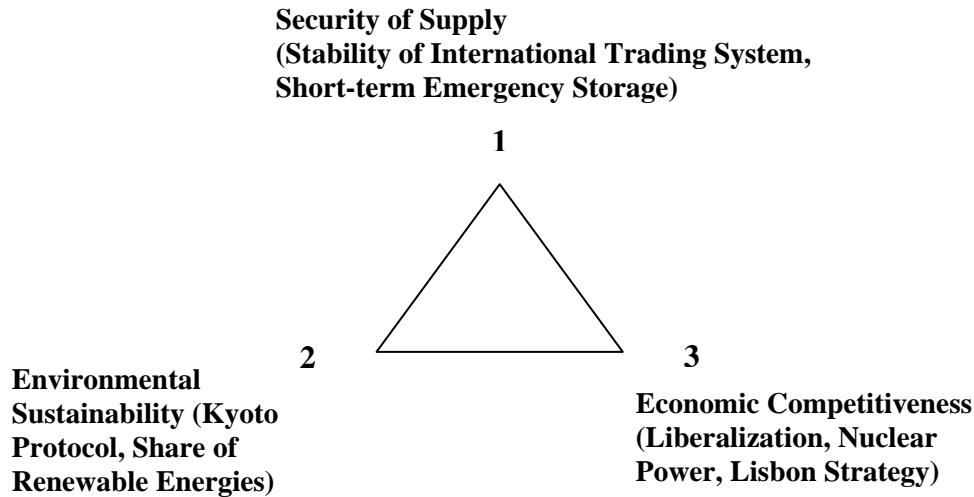
1. Completion of the internal European electricity and gas markets
2. Solidarity between Member States
3. The focus on more sustainable, efficient and a diverse energy mix
4. An integrate approach in tackling climate change
5. Encouraging innovation
6. The need for a coherent energy policy

¹⁰ *Green Paper: A European Strategy for Sustainable, Competitive and Secure Energy*. The first *Green Paper* was published in 2000 but was later replaced by the second version which came out in 2006.



A fully competitive European internal energy market is still absent and thus EU citizens and businesses at this moment in time do not enjoy all the benefits of security of supply and lower prices. One way of enhancing security of supply is by opening the market. A liberalized internal and competitive market sends the right investments signals to industry participants. A prerequisite is that the market is transparent and predictable (CEC 2006, *Green Paper*: 9). At this moment it is too early to determine what kind of impact of the recent process of market liberalization has had on the gas industry. However, what does seem evident is that market liberalization has altered the balance between risk and reward for buyers and sellers of gas. At both ends the gas market (demand and supply) needed to adapt to the newly evolving business environment. By July 2007 all customers will become eligible making it possible for them to choose the most attractive gas suppliers. By this time it is important that the opening of the market provides all consumers with the same degree of reliability and comprehensibility in regard to the way they are charged for the service. Not only does the internal market strongly improve efficiency, it also contributes to the objectives of security of supply. The prospect of a fully integrated gas market with common rules and regulation is a strong incentive for new investments. Furthermore, liberalization has made markets more competitive. This in turn will enhance diversification since flexibility to react to market conditions is encouraged.

Both European and national policymakers struggle to decide between competing and often contradictory objectives. Realizing security of supply and developing a common energy policy seem to go hand in hand, but so too do the objectives of reducing greenhouse gasses, reducing energy subsidies, decreasing import dependence, phasing out nuclear power, augmenting the use of renewable energies, liberalizing energy markets and increasing economic competitiveness. These are but a few examples of topics on the wish-list of energy policy makers (Directorate-General 2007: 6). Where policy makers struggle in their decision-making, is to reach consensus about the trade-offs between competing policy objectives. The diagram below shows a simplistic overview of the core aspects of European decision-making surrounding energy policy.

Figure 3.11 Triangle of European Energy Decision-Making

Source: Directorate-General 2007: 6.

The triangle of energy decision-making in Europe can be seen as a pressure field in which different overall objectives need to be taken into consideration before coming to a decisive conclusion. Every European energy policy will be weighted according to these three overall objectives; what does it mean in terms of security of supply, what are its environmental impacts and how does it affect the European economic competitiveness? Often, a policy will be in line with one or two of these objectives but hamper another. For instance, with regard to increasing the share of natural gas in European energy consumption one can say that it fulfils objectives two (environmental objectives) and three (competitiveness) but is a constraint in reaching the first objective (security of supply). Natural gas is more environmentally friendly than oil and coal as it produces less greenhouse gasses and in many cases is also cheaper to produce than oil and nuclear power increasing the economic competitive of natural gas over these sources. However, in the case of the EU, increased natural gas consumption means increased import dependency and thus constrains objective one. Precisely this conflict of interests and the inability to define lasting trade-offs between the above mentioned objectives implies a continuing drift in energy policy.



Another way of improving energy security is by diversifying energy sources and geographical origin as well as the accompanied transit routes. The EU focuses on facilitating the maintenance and upgrade of existing energy infrastructure in neighbouring countries of key importance to the EU as well as the development of new infrastructure. New energy corridors and new import capacity can alter the share of the current share of the EU's gas consumption. As previously mentioned, the construction of new LNG terminals offers a particular contribution to security of gas supply alongside the development of major international pipelines (CEC 2006, *An External Policy to Serve Europe's Energy Interests*: 3).

3.3.3 A Coherent Policy in the Making?

Although much has been done to promote a common European energy strategy, it has to be acknowledged that at this moment in time the EU is still far from reaching this objective. A true internal energy market where every EU consumer has the legal right to choose between suppliers is realized on paper but in practice remains underdeveloped. This right has yet to be real, effective and easily exercised. Due to a continued lack of integration of markets and missing infrastructural links, customers have only been able to change to other domestic suppliers with the result that penetration of national markets by foreign companies is disappointing. Generally speaking, foreign suppliers in EU Member States represent less than 20 percent of the market share. Exceptions are those markets which are reasonably well integrated with bordering countries or otherwise where the main suppliers have been privatized and purchased by foreign countries. In many Member States the gas market is dominated by merely one or two companies with an often inadequate capacity for cross border competition. Even in a situation where there are several suppliers, competition between them may be rather ineffectual if they are all purchasing from the same wholesaler. What is more, the EU is currently unable to guarantee to any EU company the right to sell gas in any Member State on equal terms without discrimination or disadvantage. Specifically, non-discriminatory network access and an equally effective level of regulatory supervision are missing (CEC 2007: 7).

Another major obstacle for the development of the internal market is the continued existence of long term reservations of transmission capacity. Investments in the right level of new infrastructure based on a common stable regulatory framework in support of the internal market have not been adequately addressed by the EU. The problem lies in degree of coordination between national networks which are necessary to permit cross-border trade to function effectively. In this regard inadequate attention is given to technical standards, balancing rules, gas quality, contract regimes and congestion management mechanisms. To transport gas from Zeebrugge in Belgium to Budapest in Hungary, for instance, would require the use of at least five different networks and the complexity in calculating the charge significantly impedes competition in some areas (CEC 2005: 4-7).

As a result of the above mentioned shortcomings gas companies largely maintain the dominant positions they have on 'their' home markets. This in turn has led many Member States to retain strict control on the prices charged to the final consumer. Such control over gas prices seriously hinders competition and prevents the internal energy market from fully functioning (CEC 2007: 9).

What further hinders a successful common strategy is the fact that current EU legislation allows individual Member States to pursue their own external relations for ensuring security of supplies and to choose their internal energy mix. This at times constrains the development of a coherent and focused external EU energy policy and consequently also the energy security opportunities. A better developed internal policy in this regard is a precondition for meeting the EU's external energy interests.

3.4 Conclusion

It has become apparent that due to a decline of indigenous production of primary energy and an overall increase in demand, Europe is leaning heavily on the import of energy from non-EU suppliers. By the year 2030, 67 percent of total primary energy in the EU will come from abroad. Out of this, 88 percent of oil and 81 percent of natural gas will



have to be imported. Thus the EU will increasingly be dependent on foreign suppliers in meeting domestic demand. The situation is even more precarious with regard to the supply of natural gas, given the increasing dependence on a very limited number of suppliers.

To overcome such obstacles, the European Union is working hard towards creating an extensive energy community, which goes beyond its borders based on common rules and practices. However, despite progress this goal is far from complete. The EU itself continues to struggle to form a coherent stand with regard to energy policy as part of a still missing common foreign policy. The nature of the political structure in the EU hinders this development. Multi level politics of supranational interests often clashes with interests at the national level and this makes it hard to come to terms with each other in forming a common strategic energy agreement.

Another critical issue remains investment in infrastructure and the sound operation of networks in support of the competitive market. The development of the market will continuously be shaped by the decisions of independent regulators regarding network tariffs and other important market rules. The legal and functional unbundling as currently required by EU legislation is far from sufficient to ensure that a real competitive European gas market can develop. Although the supply of natural gas via pipeline is dominant and will continue to dominate the EU gas market, LNG has an important role to play both in enhancing diversity of supply and in meeting future growth in demand.

Given the above, one can conclude that Europe's current energy basket is vulnerable for disruptions in the security of supply and also for price instability. However, the European Commission is aware of this vulnerability and continues to search for opportunities to diversify its energy imports in order to enhance the security of supply, both for oil and natural gas. As we shall see in the next chapter, the Islamic Republic of Iran has the potential, in theory at least, to meet Europe's increasing energy demands given its vast oil and gas reserves. The real weight of this potential and the opportunities and impediments for a strategic energy partnership with Iran will be discussed in chapter 5.

4 The Political Economy of Energy in Iran

“The Iranians have not realized the export potential of their gas resources over the past 30 years. Whether they will choose to do so and succeed in doing so over the next 30 years, remains to be seen.”¹¹

- Jonathan Stern

4.1 Introduction

With a young, well educated population of close to 70 million (UN Population Division 2007) and the second largest proven reserves of oil and natural gas in the world, the Islamic Republic of Iran has the potential to climb up the developmental ladder by exporting this potential and using energy generated revenues to reform its economy. Given Europe’s increasing energy needs and its dependence on imports in addition to the relative proximity of Iranian reserves to the European market, this potential seems the perfect recipe for a strategic energy cooperation between the two. However, the political picture is far less bright, especially since the election of President Ahmadinejad in 2005. His hard line attitude has provoked a series of protests and made the possibility of cooperation seem farther away than ever before.

This chapter will attempt to provide an overview of state and society in the Islamic Republic of Iran in the post-revolution era. It will furthermore shine light on the structure of the oil and gas sector and discuss Iran’s dependence on oil generated income. An insight is given into Iran’s energy policy and current regulatory framework. This is necessary in order to fully understand the potential of Iran as an exporter of natural gas to Europe.

¹¹ Quoted in: Howard 2007: 9. Jonathan Stern is Director of Gas Research and Professor at the Oxford Institute of Energy Studies



4.2 State & Society in Post-Revolution Iran

4.2.1 Formal Power Structure

The formal power structures of the Islamic Republic of Iran are grounded in the constitution and governmental regulations and consist of state institutions. The most important of these of which are the Supreme Leader, the Assembly of Experts, the President, the Majlis (parliament), the Council of Guardians and the Expediency Council (see figure 4.1 below).

The Supreme Leader, as is evident in its title, stands at the top of Iran's power structure and is represented by Ayatollah Ali Khamenei, who succeeded Ayatollah Ruhollah Khomeini. The Office of the Supreme Leader is by far the most powerful institution in Iran. It is based on the *Velayat-e Faqih* system mentioned below which was developed by Ayatollah Khomeini. By means of Article 107 of the 1979 constitution the *Velayat-e faqih* was implemented against all opposition and granted the Office of the Supreme Leader political power that far exceeded even that of the Shah. In his position, the Supreme Leader has the responsibility of protecting and perpetuating the Islamic Republic and for supervising general politics in the country. He is authorized to intervene in nearly all aspects of political, economic and cultural life (Brumberg & Ahram 2007: 22) which means that he sets the tone and direction of Iran's domestic and foreign policies. Furthermore, he has the formal responsibility to act as commander in chief of all armed forces, controls the intelligence and security, declares war or peace and has the power to appoint and dismiss high ranking officials. There is no precise or institutionalized process of becoming a grand Ayatollah. Ayatollahs are elected by their clerical peers through a extensive, informal process of recognition that can take up to two to three decades to complete (Buchta 2000: 46).

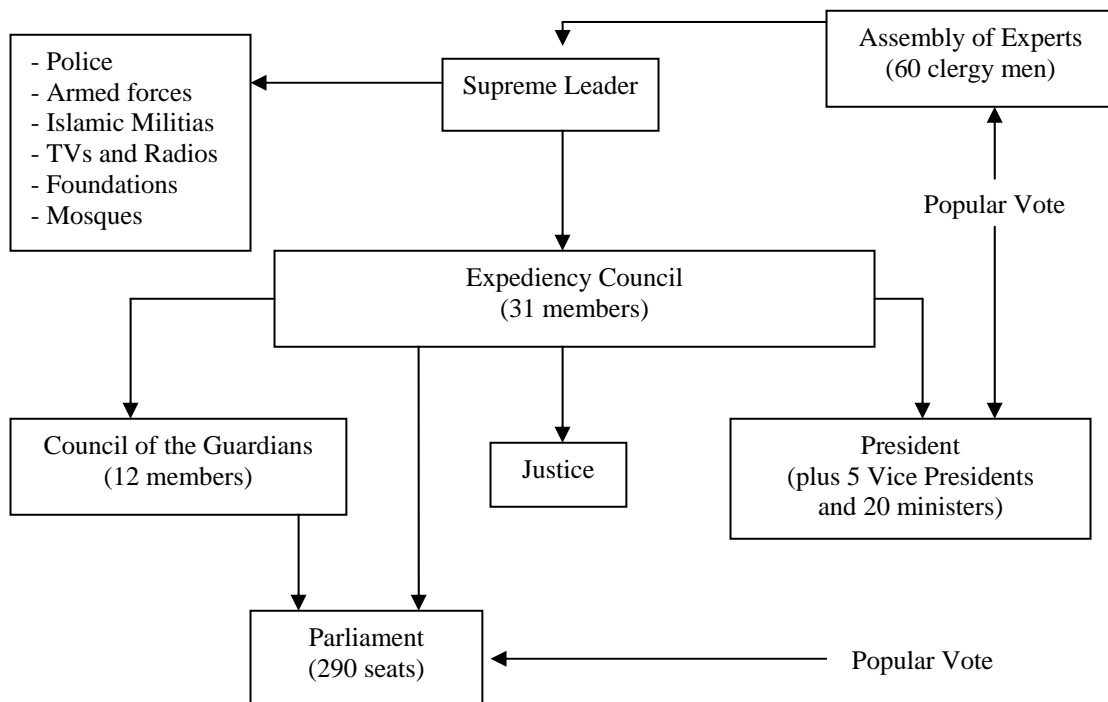
The President is the head of government and the chief of the executive branch and the highest directly elected official in the country. The President is elected by popular vote for a period of four years and appoints and supervises the Cabinet and coordinates government decisions. He is furthermore responsible for setting the countries economic policies. The political importance and responsibilities of the president are a direct result

of the constitutional revision implemented in July 1989, following the death of Ayatollah Ruhollah Khomeini. Prior to this revision the presidency was just a mere subordinate power centre. In its current form, the president is without doubt the second most powerful and influential official in the Islamic Republic. His influence primarily concern social, cultural and economic policies of the country yet does not include the foreign policy portfolio (Buchta 2000: 23). However, as will become apparent, an Islamic revolutionary leadership of Shiite clerics and other religious persons control both the formal and informal power centres in Iran (CIEP 2004: 189). The current president is Mahmoud Ahmadinejad who came to power in 2005 after winning the presidential elections. As a devout Muslim and loyalist to the regime, he is seen as a child of the revolution and has worked his way up through the rank and file of government positions. His political stand is often characterized as being populist as he seeks to roll back corruption, return Iran to the Islamic revolutionary ideology of Khomeini himself and divide the country's wealth evenly among the Iranian people. Ahmadinejad is the first non-clerical president of the Islamic Republic (Vakil 2006: 54).

The Council of Guardians is vested with the authority to interpret the constitution and to determine whether the laws passed by parliament are in line with the Shari'a. Thus the Council of Guardians has a veto power over parliament. The Council furthermore has the responsibility to examine presidential and parliamentary candidates and to determine their legitimacy to run for a seat. During the latest presidential elections, only 8 of over 200 candidates were allowed to go on the ballot paper. The Assembly of Experts in turn consists of 86 clerics elected by the public for a term of eight years. These clerics meet one week every year and have the authority to elect the Supreme Leader. Created in 1988 by Ayatollah Khomeini, the Expediency Council mediates disputes between the two bodies of the Council of Guardians and the Parliament. It furthermore serves as an institution for macro policy debates and in recent years has become active in the formulation of policies. In 2004, it was responsible for a reinterpretation of the constitution in order to facilitate privatizations (Ghezelbash 2005: 23). All 31 members of the Expediency Council are elected directly by the Supreme Leader and furthermore act as an advisory body to the Supreme Leader. Finally, the Iranian Parliament is the

legislative body with consisting of 290 members whom are elected by the public every four years. As mentioned earlier, the Parliament introduces and passes laws that are checked and approved by the Council of Guardians. Moreover, the Parliament is responsible for impeaching Cabinet ministers and of approving of the national budget (Jahanbegloo 2005:8-9).

Figure 4.1 Iranian Formal Power Structure



Source: Jahanbegloo 2005: 8

The Islamic Revolution fundamentally changed the composition of the political structure in Iran, replacing secular oriented political elites by mainly traditionalist clergies and lay persons. Despite this change in the political structure, Iranian state-society relations were not dramatically changed. The political structure that ever since existed can be characterized as totalitarian, giving absolute supremacy over public life to the ideology of political Islam. In this sense it can be seen as authoritarian. Paradoxically however, some democratic elements are also visible such as a certain degree of pluralism and the right to vote in parliamentary and presidential elections. This ambiguity is further apparent in the

theocratic mode of rule based on the *velayat-e faqih* system (Governance of Jurisconsult) institutionalized according to the 1979 constitution whereby the Supreme Leader is granted the right of ultimate decision-making. On the other hand, Iran's political institutions are based on the modern state with its origins dating back to the 1906 constitution.

There are no legal political parties in Iran. Therefore it is the political factions that represent the different ideas on political, economic, foreign relations and cultural issues (Rakel 2007: 111). This absence of political parties can sometimes complicate the factional affiliation of some prominent Iranian politicians and clerics and makes it hard to categorize their political position. The reformists come from an Islamic leftist background and generally have an ambiguous attitude toward economic reform. However, after assuming power in the 1990s some reformers have timidly embraced the free market as an inevitable side effect of political reform. Nonetheless, it is hard to speak of a clear consensus among reformists about economic issues (Brumberg & Ahram 2007: 23). The members of these factions share the common experience in the opposition to Shah Mohammad Reza Pahlavi's regime and further by a loyalty to Ayatollah Ruhollah Khomeini, the founder of the Islamic Republic.

4.2.2 Informal Power Structure

Contrary to the formal institutions, the informal power structure in Iran consists of revolutionary organization, the religious foundations (Bonyâds), the Revolutionary Guards, the Bassij militia, security forces and the media. Other examples of organs which politically are very influential are *General Secretary of the Friday Preachers in Ghom*, the *Organisation for Islamic Propaganda*, the *Ansar-e Hezbollah* (the supporters of the Party of God).

As such, the political power in Iran is not held by a single individual group or institution. Despite Iran's formal power structure being in the hands of the Islamic Revolutionary elite composed of Shi'i clerics and laypersons, they certainly do not control the monopoly of power over the practice of politics. This is further highlighted by the fact that there are



several power centres which exist adjacent to that of the President. These power centres are loosely connected and in some instances operate relatively autonomous and can partially or completely deprive the President of his control over policy. This multi-polar political and economic system is a legacy of the hierarchical but decentralized structure of the politicized shi'i clergy, which was put in place after the Islamic Revolution (Buchta 2000: 6).

According to a report issued by the *Institute for Security Studies*, 80 percent of the Iranian economy is in the hands of the clerical conservative establishment. It further mentions the key role of the Bonyâds who are officially bodies independent of the state but in practice form a state within a state. Although there are no official data on their activities as they are only obliged to provide information to the religious leader Khamenei, estimates on the share of the state budget they control vary between 25 and 58 percent. They control their own airline, have interests in extensive foreign trade, tourism and the production of the popular *Zamzam* cola (Posch 2006: 32).

The dualism present in the structure of the Iran is the direct result of the revolution and cannot be better illustrated in the formal title of the country. The title Islamic Republic of Iran refers to an elected republican body with a President and Parliament functioning in the same political structure but it also refers to the unity and brotherhood of all Muslims, reinforcing Iranian nationalism. This has resulted in the constitution giving predominance to the Shari'a and authority based on the divine will, yet at the same time incorporates the will of the people and their sovereignty. This mixture is the source of many contradictions, particularly in terms of parliamentary legislation which conflicts with the Shari'a and the authority of the jurist overriding legitimate constitutional structure. In sum, the Iranian constitution is therefore in reality two constitutions: one with the emphasis on people's authority and rights and the other on a divine clerical right (Jahanbegloo 2005: 7).

4.2.3 Decision Making/Taking

Decision making on a political level in Iran is a complex process (as described earlier in § 5.2.1). Generally speaking, there are two main lines of authority regarding energy policies. The president is head of the executive branch of power. The president and his cabinet are responsible for developing an energy policy. Before being adopted, the Iranian parliament has to approve this policy. The cabinet thus formulates the energy policy, with four Ministries and the Organization of Atomic Energy each having a task. The Ministry of Petroleum has responsibility over oil and gas and all downstream activities, the Ministry of Energy is solely responsible for electricity, the Ministry of Mining and Manufacturing for coal, the Ministry of Agriculture for rural renewable energy and the Organization of Atomic Energy for renewable and atomic energy. As has become apparent, energy plays a vital role in the Iranian economy and planning of long term energy matters and the yearly budget allocation which is prepared by the individual ministries, are coordinated by the Office of Management and Planning. This office is under the direct responsibility of the president. However, clear coordination of energy policies between these institutions is virtually absent (Moghaddam 2003: 44).

OPEC also plays a role in Iran's energy policy as it affects Iran's opportunities in the international oil market by setting quotas. The quota's that are set up by OPEC function as a stabilizer for the price of oil. Twice a year the ministers of petroleum of the Member States meet to decide upon these quotas. In 2005 Iran had a production quota of 4.110 mb/d (EIA 2006, *Country Analysis Briefs*: 2). However, since this quota covers all production, it needs to be reviewed in the light of developments in domestic consumption and production capacity decline.

4.2.4 Economic Indicators

Prior to the Islamic Revolution of 1979, Iran's average growth rate was nearly four times higher than growth in the first two decades after the Revolution. Per capita income stagnated in the years that followed and also during the second phase of the Five-Year Economic Development Plan (1994-98). The most significant eclipse of growth came in the first half of the 1990s during the brief period of post war economic reconstruction and



economic reforms. However, this short period of economic revival ended abruptly amidst the debt crisis of the mid-1990s (Karshenas & Hakimian 2005: 69). In 2004, the GDP per capita was \$ 2,320 and PPP was \$ 7,530 (Rivlin 2006: 1).

Despite it suffering from myriad problems, Iran's economy nevertheless performed well in aggregate terms over the past few years, with a moderate growth in the last 15 years including a healthy GDP and per capita growth in investment. In the period 2002 to 2006, aided by a rise in oil prices, Iran experienced a growth rate of 5.5 percent per year. Additionally, the GDP per capita in the same period has doubled (Posch 2006: 22). These developments in turn have stabilized the current account, trade balance and external debt obligations and strengthened the foreign exchange reserves. However, Iran's long period of poor economic performance has negatively influenced inflation and employment rates. Throughout the 1990s and 2000s the inflation rate averaged 23 percent. More recently this figure has been brought down to 15 percent. Unemployment rates currently stand at around 16 percent with even higher rates among young educated Iranians. The current government has clearly not succeeded in generating sufficient jobs to meet the needs of Iran's young, educated population. The high unemployment rate combined with current young population puts significant pressure on Iran's economy. The World Bank has calculated that Iran needs growth rates above 7.5 percent per year in order to reduce the unemployment rate to 10 percent by the year 2010 (Karshenas & Hakimian 2005: 70). The persistent high level of unemployment is generally seen as the Achilles' heel of the Iranian economy and as such is considered by many to be as a potential cause for social and political instability.

Moreover, foreign direct investment (FDI) is another perceived area of weakness as it is insignificant both in absolute terms but also relative by any comparative means. In 2001, the total net amount of FDI in Iran equalled \$ 32 million (Karshenas & Hakimian 2005: 71). Fluctuation in the investment rate strongly correlates with oil revenues. This becomes apparent when looking at the historical investment rate. During the 1970s the investment rate rose substantially while in the 1980s the average investment rate fell to very low levels. These low investment levels are a direct effect of the Iran-Iraq War of

1980-1987. After the war the investment rate shortly rebounded but declined again in the late 1990s due to lower oil prices and the fact that foreign debt repayment did not leave sufficient foreign exchange resources to finance capital investment on a large scale. More recently, the tables have turned once again as a result of the recovery in the price of oil. Consequently, the investment rate in Iran rose to nearly 30 percent in the first half of the 2000s (Jalali-Naini 2005: 96).

That said, the level of poverty and inequality by international standards, especially compared to that of other developing countries is considered low. Currently, Iran is experiencing growth in the non-energy sector particularly in manufacturing, agricultural and service sectors. The Ahmadinejad administration, however, has not taken the necessary steps needed to diversify its economy by producing consumable goods for export (Cambell 2007: 2)

4.3 Iran's Oil and Gas Sector

4.3.1 A Brief History

In 1901 the British millionaire William d' Archy gained a concession from Mozzaffar ed Din Shah for the exploration of oil in the Southern provinces of Iran. In return for the exclusive rights to explore and exploit oil, in this concession it was agreed that d' Archy would pay 20,000 pounds sterling up front, the value of 20,000 pounds sterling in stock and 16 percent of future profits to Iran. The outbreak of the First World War and the insecurity about the availability of petroleum supplies prompted the British government to move from being a sponsor of d' Archy's Anglo-Iranian Oil Company (AIOC) to become a full-fledged partner. In order to guarantee the security of its energy supplies, Great Britain purchased equity interests in the AIOC. The AIOC exploited oilfields, the transport network, refineries and decided upon export, marketing and prices. Thus, Iran's foremost financial income was largely under British control. From an Iranian perspective, the AIOCs transition from a privately held Iranian oil company to a British owned national oil company contradicted with Iran's national interests. The first significant challenge to the AIOC came with the rise of Reza Khan to the position of Shah in 1925.



Under his leadership, Iran demanded a renegotiation with the AIOC on the basis that the original concession lacked the necessary parliament approval and was thus acquired illegally. Under intense negotiations the AIOC and the Iranian government agreed to limit the scope of the concession and guarantee Iran a greater share of the profits in return for extending the duration terms (Brumberg & Ahram 2007: 9-12).

Popular discontent and the fragile position of the Iranian state with regard to foreign TNOCs drastically changed when Mohammad Mosaddeq took office in 1951 and proposed to nationalize the oil industry in Iran to assume control over oil wealth on behalf of the Iranian people. The parliament ratified his proposal on the 29th of April 1953, nationalized the AIOCs properties and infrastructure and established the National Iranian Oil Company (NIOC) as its successor. The British government heavily protested against the nationalization policy, despite Iran's offers to compensate AIOC shareholders and an international crisis resulted. As a result, oil exports stagnated and production dropped from 665,000 barrels per day to a mere 350,000 barrels per day. However, after the coup of 1953 Iranian oil was once again integrated into the international oil market as agreed upon in the treaty of 1954 with the international consortium. In a new agreement the NIOC split 50 percent of the profits from sale of Iranian oil with the international consortium (Amineh 1998: 236).

While this agreement was an improvement compared to the concession of 1933, it still did not live up to popular belief that control of oil was a core component of Iran's sovereignty. It soon became clear that under this agreement the NIOC still did not have total control over output or marketing. Moreover, many regarded the process a humiliation to Iran as the agreement was accepted by an increasingly autocratic and unpopular Shah rather than by Mossadeq. Increasingly, NIOC grew as a player in the global oil market and as a symbol of Iranian national pride. In 1957, the Iranian parliament empowered NIOC to take control of all Iran's dealing with the international oil consortium and to develop different types of contracts with which to attract foreign investors. Furthermore, the NIOC expanded its operations to gas, petrochemicals and domestic refining and launched a number of overseas joint-ventures with the aim of

improving in-house technical expertise and decrease its reliance on the international consortium. The establishment of OPEC, of which Iran is a founding member, further strengthened the position of Iran as a producer nation. By 1973, the international consortium had dissolved and the NIOC was thus free to contract with any firm it chose (Brumber & Ahram 2007: 15).

4.3.2 Reserves, Production, Consumption & Exports

Based on the latest available information, proven oil reserves in Iran totalled 137.5 billion barrels at the end of 2006. These estimates include the recent discoveries made in the Kushk and Hosseineih fields of Khuzestand province and means Iran ranks second after Saudi Arabia, holding approximately 11.5 percent of the total proven oil reserves in the world (BP 2006: 6). The overwhelming majority of Iran's crude oil reserves are located near the Iraqi border, in the massive onshore fields in south western Khuzestan. In total, Iran has 27 onshore and 13 offshore producing fields. These oil fields have an estimated natural decline rate of 8 percent per year for onshore fields and 10 percent per year for offshore fields. The fields are heavily in need of upgrading, modernization and enhanced oil recovery efforts, for instance gas re-injection. Recovery rates of between 24-27 percent are far below the world average of 35 percent.

**Figure 4.2 Iranian Oil Reserves, Production, Consumption and Exports
1970- 2030**

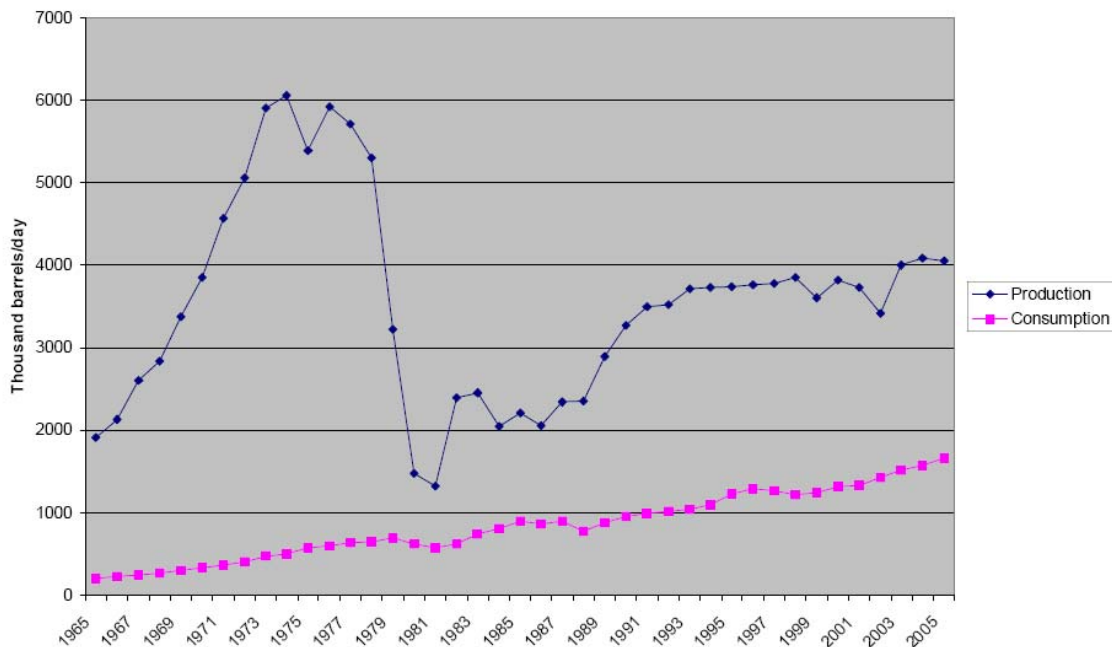
Oil	Reserves (bb)	Production (million barrels/d)	Consumption (million barrels/d)	Exports (million barrels/d)
1970	-	3.848	331	3.517
1980	58.3	1.479	625	0.854
1990	92.9	3.270	951	2.319
2000	99.5	3.818	1.319	2.499
2006	137.5	4.343	1.669	2.674

Source: BP 2006

The share of Iranian oil as a percentage of world production is 5.1 percent, producing 4.34 million barrels per day. This share is much less than its 11.5 percent share in world reserves (BP 2006: 6-8). Though peculiar, this paradox is certainly not unique to Iran alone but common among various Middle East oil producers. According to EIA

calculations, Iran's crude oil production is projected to increase to more than 5 mb/d by 2010. This is still nowhere near the production level prior to the Islamic Revolution. As figure 4.3 depicted below shows, the production level of crude oil in 1974, for instance, stood at 6 mb/d (EIA 2006, *Country Analysis Briefs*: 2-3). With the current level of production and technology, the reserve to production ratio is calculated to last about 93 years. If Iran sincerely wants to increase production levels then it should seriously consider the search for new oil as only a few exploitation wells were being drilled in 2005.

Figure 4.3 Iranian Domestic Oil Consumption and Production



Source: BP 2006.

Over the period 1974 to 1998 domestic primary energy consumption in Iran grew by more than 458 percent, increasing from 142.4 mboe to 795.1 mboe respectively. A similar trend is noticeable with respect to oil consumption in the period that followed. Between 1998 and 2005, domestic oil consumption in Iran grew on average by 4.5 percent per year and at the end of 2005 stood at 1.7 mb/d (BP 2006: 11).

As with oil, Iran contains vast reserves of natural gas. In 2006, Iran contained an estimated 28.13 trillion cubic metres (tcm) in proven natural gas reserves, which places

the country second in terms of proven natural gas reserves, surpassed only by Russia. However, the downside is that 62 percent of Iranian natural gas reserves are located in non-associated fields and have not yet been developed. The main gas fields include the South Pars with an estimated 280-500 tcf of gas reserves, North Pars (50 tcf) and Kangan-Nar (23.7 tcf) (EIA 2006, *Country Analysis Briefs*: 10). In 2006, Iran produced 105 bcm of natural gas which ranks the country as the fifth largest producer of gas in the world. With the current level of technology and production, the production-reserve ratio is approximately 160 years.

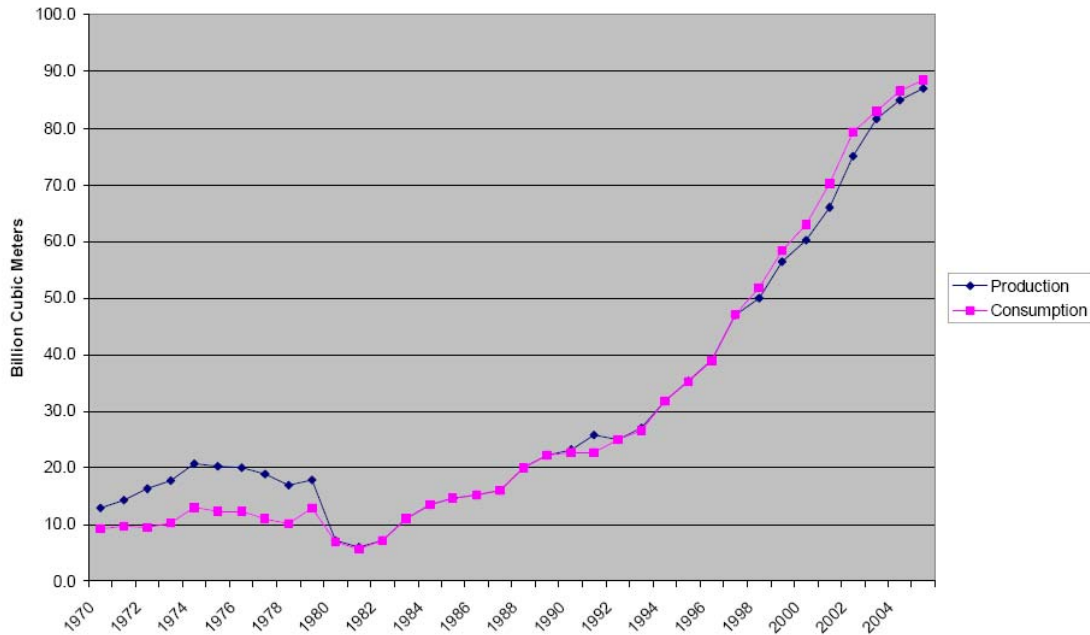
Figure 4.4 Iranian Natural Gas Reserves, Production, Consumption & Exports 1970-2006

Gas	Reserves (tcm)	Production (bcm)	Consumption (bcm)	Exports (bcm)
1970	-	12.9	9.2	3.7
1980	14.1	7.1	6.9	0.2
1990	17.0	23.2	22.7	0.5
2000	26.6	60.2	62.9	- 2.7
2006	28.1	105.0	105.1	- 0.1

Source: BP 2006 energy charting tool

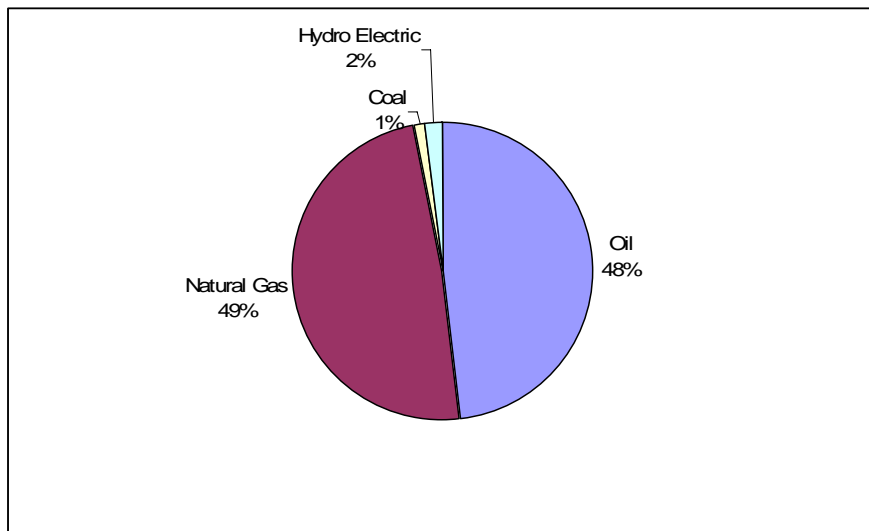
According to BP, in 2005 Iran consumed 105 bcm of natural gas. This figure represents nearly half of Iran's total energy consumption as the pie chart below indicates, and the government is planning to invest billions in coming years to increase this share (EIA 2006, *Country Analysis Briefs*: 10). As illustrated by the figure 4.4, Iran became a net importer of natural gas in the 2000s, an unthinkable position for a country holding such vast reserves. According to a report issued by *The James A. Baker III Institute* by the year 2015 Iran will no longer be able to export oil (Brumberg & Ahram 2007: 3).

As the above figure regarding consumption and production of oil and gas indicates, Iranian consumption in both circumstances is high, this despite a policy to concentrate domestic consumption on natural gas (see also § 4.4.5). This can certainly be regarded as one of Iran's major obstacles in maximizing its energy potential.

Figure 4.5 Iranian Domestic Gas Production and Consumption

Source: BP 2006.

Currently the shares of hydroelectricity and coal in Iran's total primary energy consumption are 2 percent and 1 percent respectively. The share of renewable energy and non-commercial fuels such as wood and charcoal are negligible. The share of natural gas and oil as a percentage of total primary energy consumption on the other hand is significant, accounting for 49 percent and 48 percent respectively (BP 2006: 15). In 2003, the residential and commercial sector was the largest consumer of energy in Iran, responsible for a share of 36 percent. The two other major energy consuming sectors are transport and industry, responsible for respectively 25 percent and 24 percent of energy demand. The agricultural sector only accounts for approximately 5 percent of energy demand in Iran (Moghaddam 2003: 28).

Figure 4.6 Iranian Domestic Energy Demand

Source: BP Statistical Abstract 2006

In spite of its vast oil and gas reserves, Iran does not fully maximize its export potential. As table 4.4 illustrates, the domestic demand for oil and gas in the Islamic Republic is extremely high. Consequently, the volume available for export is heavily drained. In fact, in the case of natural gas, Iran had to import 10.6 bcm in 2006 to be able to meet domestic demand.

4.3.3 Pipeline Complex

To the Northeast of Teheran runs the Neka-Teheran pipeline which holds a capacity of 300,000 barrels of oil per day. This 340 km pipeline links the Caspian Sea to the Teheran refinery. The pipeline is used for the so-called oil swaps from the Caspian Sea. This arrangement holds that Caspian oil is delivered to refineries in Northern Iran and used for local consumption while an equivalent amount of oil in turn is exported through Persian Gulf terminals. However, since the Neka-Teheran pipeline does not meet total demand, another pipeline with a much greater transferring capacity is under construction with the help of a Chinese consortium (Iran Daily 2006: 1). By upgrading existing facilities the Islamic Republic hopes to significantly expand the oil swap capacity first to 370,000 bb/d and then to 500,000 bb/d. From Neka, over 40,000 barrels of oil per day are sent to Teheran and roughly 80,000 barrels of oil per day are sent to Tebriz in Northwest Iran



(EIA *Country Analysis Briefs* 2006: 4). Running South and Southwest from Teheran, an extensive network of pipelines connect the country's capital to the vast oil fields along the Persian Gulf and Iraqi border.

As reserves of natural gas are geographically highly concentrated in Iran, so too is the pipeline infrastructure. A North-South axis connects the Southern port of Kangan to Teheran via Esfahan. In the North, a pipeline runs from Mashhad in Eastern Iran via Neka to Tabriz. This pipeline corridor connects with Turkmenistan in the East and with Azerbaijan, Armenia and Turkey in the West. Furthermore, an export route to Iraq via the city of Abadan exists. On the basis of its oil and gas pipeline infrastructure, one can say that Iran is predominantly focused on its Western neighbours for the oil and gas exports.

4.3.4 Export Routes

Iranian oil is exported via four main terminals. These are the Lavan Island, Sirri Island, Ras Bahregan and the Kharg Island terminal, the latter being by far the largest. The Abadan and Bandar Mahsharh terminals are responsible for the export of refined products. Many of these terminals were damaged during the war with Iraq but have been rebuilt ever since. Iran's oil tanker fleet comprises an estimated 29 ships including very large crude carriers and is considered to be largest of all OPEC members. The fleet is under the control of the National Iranian Tanker Company, a subsidiary of the NIOC.

In 2006, Iran exported 2.5 mb/d of oil, of which 60 percent was destined to OECD countries. It is noteworthy that Iran's top three export destinations for oil are all Asian countries. As indicated in table 4.7, Iran's most important oil export partners are Japan, China and South Korea. Historically Japan is by far the largest importer of Iranian oil. In 2005, Iranian oil exports to Japan amounted 571 thousand barrels per day compared to 285 and 196 China and South Korea. The most important importers of Iranian crude oil into the European Union are Italy (194 mb/d), France (143 mb/d) and the Netherlands (139 mb/d). The Neka oil terminal in Mazandarn plays an important role in Iran's efforts to increase the export of crude oil through the oil swap deals mentioned above and is

designed to receive, store, refine and transfer oil from Kazakhstan, Turkmenistan and Russia.

Table 4.7 Top 10 Iranian Oil Export Destinations (barrels per day)

Country	2003	2004	2005
Japan	685,034	630,462	570,604
China	247,235	263,446	284,830
South Korea	171,563	173,144	195,654
Italy	194,055	188,033	193,935
France	115,209	128,892	142,811
The Netherlands	130,214	138,751	139,246
Turkey	138,683	114,217	138,873
South Africa	118,695	189,613	134,646
Taiwan	167,003	138,518	125,031
Greece	88,781	115,533	105,236
Total	2,056,472	2,080,609	2,030,866

Source: EIA, *Country Analysis Briefs* 2006: 5.

Currently, most of Iran's natural gas is consumed locally. In fact, over the past several years Iran had to import natural gas to meet domestic demands. Iran imported 5.2 bcm from Turkmenistan in 2004 and this amount is projected to reach 14 bcm by the end of 2007. Iran pays a competitive price for the imported gas from Turkmenistan, reported to be around \$ 65 per million cubic meters. This does not mean Iran does not export natural gas at all. An operational gas pipeline exists with Turkey for exports. In 2005, Iran exported 4322 million cubic meters of natural gas to Turkey (World Bank 2007: 25). Additionally, Iran has reached agreement for the construction of an Iran-Pakistan-India pipeline to export 150 million cubic meters of natural gas (Indian Ministry of Petroleum & Natural Gas) . However, given the decline in oil exports and the need for gas re-injection in existing oil fields to boost production, it remains to be seen whether Iran will be able to continue natural gas exports.



4.3.5 The 'Dutch Disease' of the Iranian Economy

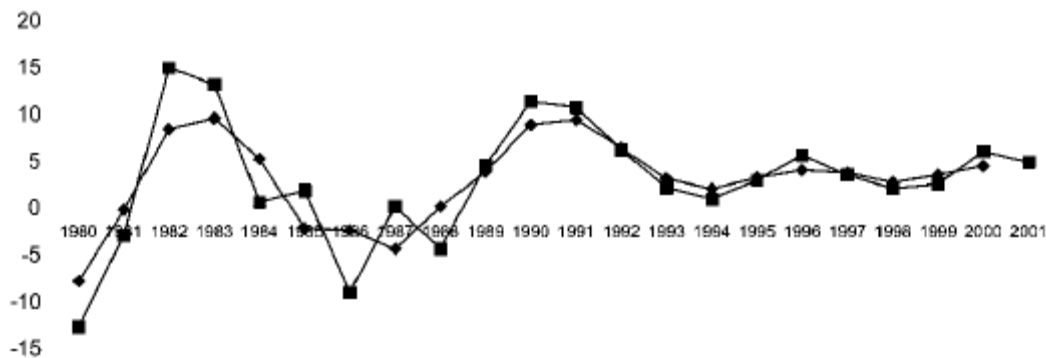
Notwithstanding its long history of industrial development and capital accumulation, Iran's economy leans heavily on its energy industry. High global oil prices over the past few years have increased Iran's economic situation by boosting its oil export revenues. This is well illustrated in the dominance of oil exports in both the balance of payments and the government's fiscal revenues. Lack of diversification of its economy and a continued high oil dependency over the past two decades further highlight Iran's economic difficulties. When comparing GDP development and the income generated by oil exports, one notices the strong correlation. The table below underscores the relationship between the income generated by oil exports and real GDP development over the past two decades.

Table 4.8 Share of Oil Income in Iran's Economy (%)

Year	Share of oil in export income	Share of oil in income in government budget
1974	89.0	86.4
1980	94.8	61.1
1985	96.8	39.7
1990	93.2	53.9
1995	82.4	64.2
1996	86.1	57.2
1998	75.7	30.8
2000	85.5	59.0*

Sources: National Account of Iran, Central Bank Yearly Balance and Economic Trends all published by the Central Bank of Iran.

* This includes oil revenue and income from free market oil dollar sales.

Figure 4.9 Correlation between Oil Exports Income and GDP Development

Source: Karshenas & Hakimian 2005: 73.

As indicated in the above figure, a strong relationship exists between changes in Iran's oil export earnings and real GDP development in periods of both economic boom and recession. The high correlation between these two variables becomes apparent in the relative strong recovery in economic activity after the Islamic Revolution during the period 1982-83 which was helped by a comparable recovery in oil revenues during the same period. Similar trends followed during the initial stages of the First Five-Year Development Plan throughout the period 1989-91 and in 1996. Likewise, strong associations can be observed in times of economic recession when a decline in economic growth was accentuated by a decrease in oil generated income.

Despite being heavily dependent on oil export revenues, Iran has had the objective of stimulating the growth and development of non-oil exports. However, realizing this objective has proven increasingly difficult. The factors that have hindered the growth of non-oil exports are the availability of oil reserves, the posture of Iran's fiscal policy, and the structure of its domestic economy and relative prices. In absolute terms, non-oil exports peaked in 1973 prior to the Iranian Revolution and rose after the termination of hostilities with Iraq until 1994. However, the growth in non-oil exports was halted after a change in the mix of economic policies was adopted in the period that followed (Jalali-Naini 2005: 110-112).



Broadly speaking, one can say that Iran suffers from the so-called ‘Dutch disease’, where the exploitation of natural resources leads to the depreciation of the Iranian Rial. An increase in the level of oil generated revenue has been associated with a declining real exchange rate in Iran. Conversely, higher oil revenues allow the economy to have more investment and intermediate goods at its disposal to increase production. In spite of an increase in saving and investment resources triggered by higher oil revenues, price signals, the macroeconomic policy mix and the domestic economic structure do not allow the initial growth to transform into an export-led growth (Jalali-Naini 2005: 112). In other words, an increase in revenues which are generated from natural resources will reindustrialize a nation’s economy by raising the exchange rate, making the manufacturing sector less competitive. Being dependent on natural resources therefore severely hampers the Iranian economy.

4.3.6 Foreign Investments and Buyback Agreements

As mentioned above, the economy of the Islamic Republic heavily relies on oil and gas generated revenues. Iran’s drive to attract foreign investment is not limited to the energy sector but is part of a larger economic goal that was spelled out in 2004 when Mohammed Khazai, the Deputy Minister of Economy and Finance, acknowledged that the country was in need of an investment of \$ 20 billion over the next five years if its economy was to expand quickly enough to absorb the demands of a rapidly growing population. However, recent calculations by the NIOC estimate that at least \$ 70 billion is needed over the next ten years to modernize the country’s oil infrastructure alone. Such economic targets cannot be reached without massive flows of foreign investment.

The first real step in attracting foreign investment was made in late 1997, when the Iranian parliament announced that foreign companies would in principle be eligible to bid for forthcoming onshore exploration and development projects. Furthermore, in May 2002 the Expediency Council approved of a law on the promotion and protection of foreign investment that would streamline the complex procedure and to give foreign investors more guarantees in securing their funds (Howard 2007: 32).

Most investment in Iran's oil and gas sector is made via buyback agreements in which foreign exploration and development firms provide 60 percent of the funding and the Iranian government provides the remainder (Stern 2007: 378). In most producer countries it is common practice that foreign exploration and development firms provide capital, technology and management expertise in exchange for a certain share of the extracted resource. In Iran such arrangements are considered foreign ownership and this is prohibited by law (Campbell 2007: 3). Instead, the buyback agreement holds that a certain company undertakes to finance, construct and commission all facilities not in return for a direct equity stake in the venture but for a fixed share of oil or gas production. When a company decides to invest in an oil or gas development project, it will recoup its expenditure, together with interest and profit, from the field's output when it starts to produce oil or gas after the contract has been completed. The ownership of that fixed share then reverts back to the NIOC at the end of the contract term (Howard 2007: 33). The investments made by foreign companies in buyback deals in essence become sovereign debt which the Iranian government 'buys back' at a 15 to 17 percent rate of return. Hence, the buyback agreement is a scheme to attract foreign capital while avoiding foreign ownership.

The buyback agreements have been common practice in Iran's energy sector since July 1995, when France's Total and Malaysia's Petronas signed an agreement to develop the Sirri A and Sirri E gas fields to become the first foreign contractors since the Islamic Revolution. By 2004, Total signed four main buyback agreements with the Islamic Republic that gave the company 60 percent of the production share in the Sirri A and Sirri E fields, 40 percent in South Pars, 47 percent in Bahal and 55 percent in Doroud (Howard 2007: 33). From 1997 to 2004, Iran signed a total of 18 buyback deals for the development of the oil and gas sector.



Figure 4.10 Oil and Gas buyback Contracts in Iran

Commitments related to buyback contracts from 1995 to 2004				
No.	Project name	Max. ceiling of commitments (million dollars)	Date of signing	Capital costs
1	2 nd gas supply buyback plan	2358	2002	-
2	South Pars phase 1	1020	1998	730
3	South Pars phases 2, 3	4219	1997	2012
4	South Pars phases 4, 5	3822	2000	1896
5	South Pars phases 6, 7, 8	4783	2000	2650
6	South Pars phases 9, 10	1600	2002	-
7	1 st gas supply buyback	1311	1998	1100
8	Gas and liquefied gas 1200 & 1300	205	1999	150
9	Doroud	998	1999	540
10	Balal	317	1999	169
11	Sorouh & Norouz	1455	1999	799
12	Amak	472	2000	306
13	Nosrat & Farzam	239	2000	160
14	Salman	1228	2000	850
15	Darkhoein	1025	2001	548
16	Forouzan & Esfandiyar	585	2002	359
17	Masjed Soleiman	121	2002	70
18	Azadegan	4456	2004	2000
Sum total (million dollars)				30608

Source: Ministry of Petroleum of the Islamic Republic of Iran.

The construction of buyback deals in project funding has several drawbacks for international investors. On the one hand, such arrangements give the contractor no incentive to incur extra costs and thus improve total returns for the project, nor to expand the life of the field in question beyond the limited time span of the contract. The rigid formula of the buyback holds that the terms of these contracts are also highly inflexible and cannot be renegotiated even though this is particularly important if all sorts of

unexpected events occur. What is more, the relatively short time lapse of the contracts also imply that foreign companies have little time to build up the spirit of trust and cooperation with the Iranian that their work requires in order to be successful (Howard 2007: 34). This unpopular buyback system of project funding impedes investment by imposing constraints on foreign companies and lengthening the duration of the project negotiations. An article in the state-run *Iran Daily* recognized that “..... foreign companies are not interested in buyback deals. The buyback deals must be reformed to attract foreign investors” (Iran Daily 2005: 2).

4.4 National Energy Policy

4.4.1 National Iranian Oil Company & Subsidiaries

As Article 44 of the new revolutionary constitution states, oil is officially publicly owned and administered by the state. Ownership of Iran’s oil and gas reserves as well as all related industries therefore lies with the national government. The Ministry of Petroleum is responsible for the energy sector and has four autonomous subsidiaries which ultimately report to the ministry. These are the NIOC, the National Iranian Gas Company (NIGC), the National Iranian Petrochemical Company (NIPC) and the National Iranian Oil Refining and Distribution Company (NIORDC). The NIOC is responsible for oil and gas exploitation and production, refining and oil transportation. It manages and exploits an estimated 132.5 billion barrels of oil and 296 trillion cubic meters of proven natural gas reserves. The NIOC generates approximately \$ 46.9 billion in oil export revenue, accounting for 80 to 90 percent of Iran’s total exports and 40 to 50 percent of the government’s budget. The NIGC manages gathering, treatment, processing, transmission, distribution, and exports of gas and gas liquids. The NIPC handles petrochemical production, distribution and exports and the NIORDC has some overlap with the NIOC and deals with oil refining and transportation (EIA 2006, *Country Analysis Briefs*: 19).

Since oil is by far Iran’s most important export commodity, a large part of the public budget stems directly from oil export. The vast majority of government spending, whether military, educational or food subsidies is ultimately derived from revenues



generated by NIOC. As a result, NIOC enjoys limited political autonomy due to its extremely high economic value (Brumberg & Ahram 2007: 17-24). In this light, the NIOC can be regarded as the gold mine for the entire structure of the Iranian welfare state.

4.4.2 Subsidies & Taxation

Iranian energy subsidies are among the highest in the world reaching an estimated \$ 37 billion per year. The bulk of energy subsidies in Iran go to oil. In fact, in 2005 Iran had the highest rate of oil subsidization in the world (IEA 2006: 279). As a result, energy prices are extremely low. The price of one litre of regular unleaded gasoline in 2000 was \$ 4.7 cents based on the free market exchange rate. These prices are a fraction of the prices paid by European consumers. By comparison, prices in the first quarter of the same year in Germany stood at \$ 94.4 cents and \$ 108 cents in the Netherlands. As a result of such high subsidies, energy is sold below its opportunity value and in some cases even below production cost (Moghaddam 2003: 12).

Notwithstanding the fact that Iran exports oil and oil related products at a high price, it must still import gasoline at a premium. According to a recent report published by the *James A. Baker III Institute*, in order for Iran to maintain the price of 0.10 cent per litre for gasoline it has to import \$ 2.5 billion per year of finished products (Brumberg & Ahram 2007: 49-50). Out of the average daily consumption of 70 million litres of oil, 30 million litres have to be imported. This is largely due to Iran's inadequate domestic refinery capacity (Ghezelbash 2005: 23). However, this shortcoming is a real burden for the economy as imported oil is bought at international prices and sold at subsidized prices. In spite of this severe economic burden, subsidy policies by the state have remained largely untouched. Being blessed with large reserves of natural resources, the Iranian people simply consider the provision of cheap fuel a government obligation and due to this policy many people are dependent on these subsidies in making a living. Maintaining high subsidy levels is a political choice because cutting into the lives of many Iranians who are dependent, directly or indirectly, on gasoline subsidies would likely provoke enormous public protest. In fact, this happened last month.

That said, in January 2005 Iran's parliament decided to freeze domestic prices for gasoline and other fuels at 2003 levels. In March of that same year government gasoline subsidy was reduced to \$ 2.5 billion compared with a request of \$ 4 billion and costs of over \$ 4 billion for imports (EIA 2006, *Country Analysis Briefs*: 1). Furthermore, there are currently plans to develop a rationing system whereby a percentage of the gasoline sales would be sold at market conform rates (unsubsidized). When introducing his budget in January 2007, President Ahmadinejad himself stated that some form of reduction in the fuel subsidy cost needs to be found but further mentioned that subsidies cannot immediately be eliminated because "all our economy is tied to this and it would create traumas in people's lives if we were to change our views, lift control over gasoline prices, allowing them to rise by up to 40-50 percent and then have to face all the consequences." Another example of a shift in subsidy policy is the Supreme Leader's official approval of a plan for the implementation of the revisions to Article 44 requiring privatization of considerable state assets in April 2006 (Blumberg & Ahram 2007: 51).

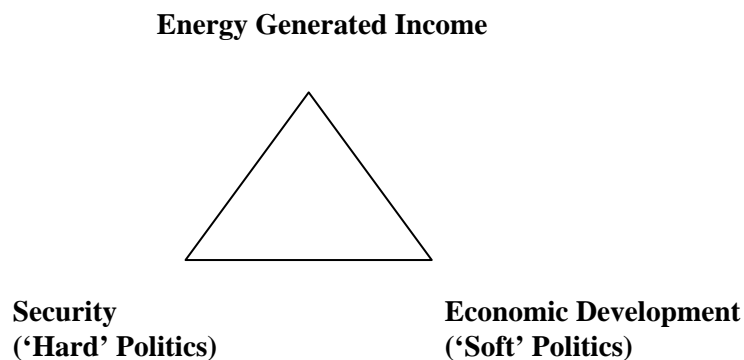
The high level of subsidies in Iran's energy market also has a downturn in that it leads to a distortion of consumer choice and consequently to high environmental damage. In this case, the environmental damage is an example of systemic misuse of resources arising in part from poor price signals. The widespread subsidy of energy prices also negatively affects economic growth and the capacity to create jobs in the medium-term (World Bank 2004: 14).

4.4.3 Energy Generated Income in Soft and Hard Politics

Iran emerged from the 8 year war with Iraq in 1988 with a highly centralized economy. As part of a highly ambitious reconstruction plan, several Five-Year Economic, Social and Cultural Development Plans (FYDPs) were developed. The Third FYDP was a growth orientated macroeconomic management program with the objective of increasing the productivity in key industrial and economic sectors and to promote the non-oil sector (Khajehpour 2000: 6). This Third FYDP finished its course in March 2005 with mixed results. While it approached and achieved some of its objectives such as annual GDP

growth and investment, it wasn't able to fulfil its strategic goals of reducing dependence on oil income, downsizing the government, privatization of state enterprises and increasing overall productivity. As part of this plan, an Oil Stabilization Fund (OSF) was established to escape the so-called "resource curse" otherwise known as the "Dutch disease". The economic rationale for creating the OSF was based on three main considerations. Firstly, to protect the government budget from fluctuations in the international price of oil. Secondly, to maintain fiscal discipline through decoupling public spending from oil price volatility so that government expenditures would be controllable regardless of the behaviour of world oil prices or the size of export revenues. Finally, the OSF was created with the objective to avoid excessive appreciation or depreciation of the national currency resulting from fluctuations in oil exports. Consequently, export generated income from periods of high oil prices would be used when revenues were low. The Third FYDP set a quota on the oil revenues which were allowed to be transferred to the government budget. All revenues above the quota would be transferred to the OSF. In circumstances where revenues were lower than the budget, funds could be borrowed from the Central Bank of Iran (Rivlin 2006: 6-7). Ever since its existence, withdrawals for the OSF have been higher than budgeted. Despite high and increasing oil revenues over the past six years, the Iranian government has been drawing from the OSF rather than making net deposits (Campbell 2007: 3).

Figure 4.11 The Role of Energy in Economic Development and Security



Source: Author's own design

Oil generated income is not only crucial to Iran's economy but furthermore is key to the nation's security policy. According to Amineh, capital accumulation derived from oil is crucial to socio-economic and military projects in the Islamic Republic (Amineh 1998: 240). As such, Iran's economy and security policy are closely linked and run parallel with its energy policy. The income generated from the export of oil and natural gas enables Iranian security chiefs to expand the size of their forces, which helps them keep a grip on dissent and to prepare for any disturbances that could challenge the stability of the regime, whether domestically or internationally driven. An example of such a security measure is the revival of the Basij Resistance Force, a paramilitary organization connected with the Islamic Revolution Guards Corps. Under the administration of President Ahmadinejad, both the number of Basiji and the equipment and training they receive have suddenly increased. The suspected reason why the Basij Resistance Force in particular has benefited from this patronage is their alleged role during the presidential campaign in securing votes for Ahmadinejad. More importantly, the expansion of the Basiji simply helps secure the current regime's grip on power, since these particular types of forces which are being expanded are responsible for quelling riots and public unrest. Iran's petro-earnings are also used to update its aged military apparatus as is apparent in the regime's drive to expand and update its military forces soon after there had been an upswing in the price of oil. From the mid-1990s to 2004, defence expenditure increased significantly which allowed the size of the army to expand from 300,000 to 345,000 troops (Howard 2007: 137).

In sum, oil and gas generated revenues in Iran have an important dual function in economic as well as security considerations. On the one hand side, these revenues generate income that can be allocated for further investments in other sectors of the economy or in funds that stabilize government expenditure. On the other hand, they also provide the financial opportunity to build a security apparatus to protect the regime from internal and external challenges. Without energy generated revenues, the formation and implementation of 'hard' and 'soft' policies in the Islamic Republic would take on a completely different character.



4.4.4 Gasoline Imports

The most important reason for increased spending from the OSF has been the need to import fuel for domestic consumption. Among others, this has been the case in mineral and oil products and their derivatives, including gasoline. Due to high subsidies mentioned above, gasoline prices stand at \$ 0.08 per litre. Since refining gasoline for domestic consumption is unprofitable due to subsidies, imports are favoured over refinery expansion (Stern 2007: 380). Between 2000 and 2001, the total costs attributed to imports amounted \$ 330 million and increased to over \$ 3 billion during 2004-2005. The import of petroleum products can be ascribed to the inadequate refineries both in terms of quality and quantity. The majority of the refineries in Iran are built before the Islamic Revolution of 1979. Moreover, these refineries were badly damaged during the War with Iraq, which brought capacity levels down by more than half. Reconstruction of the refineries took pace after the war but as a result of US sanctions Iran's refinery capacity still struggles to expand. In 2005, Iran's refineries had a combined capacity of 1.684 mb/d. By comparison, European refineries are twice as productive. Due to the weakness of its refining sector, Iran has been importing refined products since 1982 and ever since these imports have increased significantly. Iran imported an estimated 170,000 barrels per day in 2005 at a cost of \$ 3-4 billion. Approximately 60 percent of this share is derived from Europe with another 15 percent stemming from India (Rivlin 2006: 8).

4.4.5 Gas for Oil Substitution Policy

A major change in Iran's domestic energy policy over the last decade has been the replacement of oil products by natural gas. In 1998 an energy policy was adopted which decided to expand the domestic usage of natural gas. For a number of reasons, Iranian energy policy in the future will continue along these lines. First of all, Iran has vast amounts of natural gas resources thus concentrating domestic consumption on natural gas increases the amount of oil available for export. Secondly, power plants based on natural gas are more efficient in their energy use. What is more, natural gas is more energy efficient in refineries when transforming crude oil into petroleum products. Thirdly,

natural gas is more environmentally friendly compared to oil products as it emits less greenhouse gasses. Another reason for the strategic decision to use natural gas for domestic consumption and oil as an export product is that natural gas is more difficult to export. International gas infrastructure is not in place and investing in such projects is extremely costly and faces many political problems. Moreover, LNG requires larger investments than the international oil trade does (Moghaddam 2003: 25).

Nonetheless, the above does not imply that Iran will neglect all possibilities to further exploit the export natural gas. Currently, Iran exports natural gas to Turkey, Pakistan, India, etc. Until the break-up of the USSR, Iran also had a contract with the Soviet Union but this contract was cancelled after its disintegration. Despite Iran holding more than 15 percent of natural gas reserves in the world, competition on the gas market is fierce. Iran's main competitors are Russia, Azerbaijan, Turkmenistan and Qatar, which seeks to export their gas to the same markets as Iran, namely Turkey, Europe, Pakistan and India (Moghaddam 2003: 26).

Increasingly, natural gas in Iran is used for re-injection, a process whereby natural gas is used to pressure old oil wells to ease extraction and stimulate crude production and hence exports (revenue). A clear policy regarding gas re-injection in oil fields is absent as a lack of consensus remains whether re-injection is the best use of gas resources. Some policy makers believe that exporting natural gas in the form of LNG generates additional revenue (Campbell 2007: 3).

4.4.6 An Eastward Shift in Export Policy?

The Iranian regime, heavily influenced by 25 years of political and economic isolation, war and sanctions, seems to focus its attention increasingly towards the East where its security concerns, nuclear ambitions, human rights policy and commercial creativity seem less of a bargaining issue in comparison to Western demands. Iran has found strategic partners in China, Russia and India whom are not as strict in demands on issues mentioned above. These three nations have each developed important domestic, regional and economic links with Iran and have proved to be a valuable ally for Iran both at the



International Atomic Energy Agency (IAEA) and at the UN Security Council where they have opposed sanctions and military actions against Iran. What is more, Iran has recently joined the Shanghai Cooperation Organization (SCO) as an observer nation with the possibility of becoming a full member in time. When asked about this issue Iranian Vice President Muhammad Reza Aref said that “Iran could become a bridge between the SCO and the Persian Gulf states”, to counterbalance regional security and energy interests with US interests in the Caspian and South Asia regions (Vakil 2006: 51-62). This eastward shift in focus has to be understood as part of Iran’s balancing act in safeguarding its regional, commercial and strategic interests and in a sense is a way of escaping the isolation that has been imposed on it by the west. In fact, this turn to the East is arguable not such a bad choice after all, as it has yielded profitable trade relationships with countries like Russia, China and India (see also § 5.3) while developing Teheran’s lagging energy, security and nuclear infrastructure and technology. The lack of unanimity within the UN Security Council can be attributed to Iran’s strategic shift in policy towards the East.

In spite of Iran’s strategic choice to diversify its economic and trade relations, Europe remains the most important trade partner. In 2004, Japan, China and Korea trailed the EU as trade partners of the Islamic Republic but the disparity between the European share (35 percent) and Japan’s (12 percent), China’s (9 percent) and Korea’s (6 percent) of all Iranian trade exchanges is significant. Nevertheless, the current government is determined to reduce imports from Europe. This has resulted in the foundation of a commission which has the task to evaluate the necessity of European imports and investment and to find alternatives (Posch 2006: 121-122). Even though it is too early to measure the effects of this new economic direction, it seems obvious that Iran is determined to change the current dependence on Europe.

4.5 Conclusion

From a geo-strategic perspective, the Islamic Republic of Iran holds a key position in terms of oil and gas resources and its proximity to various energy markets. It can

furthermore exploit possibilities to act as a transit route for Caspian landlocked littoral states. As this chapter has illustrated, Iran's energy potential is not solely characterized by endless opportunities but is most definitely also frustrated by serious constraints.

The most serious problem frustrating Iran's energy potential is its own domestic energy use. Energy consumption in Iran is driven by huge subsidies and over the past decade has increased by approximately 80 percent to take on astonishing proportions. Given Iran's young population and trend to urbanization, consumption is projected to further increase in the near future. Although production of oil and gas has shown a similar upward trend, it still lags behind consumption patterns and is nowhere near the production level prior to the Islamic Revolution. The prospect of Iran becoming a net importer of oil (for natural gas this is already the case) highlights the importance to realize structural change in Iran's energy consumption. Failing to do so will have potential devastating consequences for Iran's overall economic development.

This 'sword of Damocles' hanging over Iran's economic performance is a result of its major dependence on oil generated income. The export of oil plays a vital role in the economy as it is the most important source of income. Natural gas is favoured by Iranian policy makers as the source of fuel for domestic consumption. In this manner, the Iranian government hopes to optimally exploit oil exports. In spite of energy policies focusing on natural gas, consumption of oil has grown to 1.66 million barrels per day in 2005. However, the average annual growth rate of domestic consumption of oil over 1998-2005 was 4.5 percent (BP 2006: 11). This is concerning because this figure is much higher than the average rate of growth of the real gross domestic product, which was only 1.2 percent. Thus, Iranian economy suffers from the 'Dutch disease', the reliance on one commodity which comes at the expense of other sectors. Therefore, a more comprehensive diversification policy is required to 'cure' and improve Iran's economic structure.



5 An EU-Iran Strategic Energy Partnership: Real Possibility or Utopia?

“Iran is an enormously important regional player. One only has to look at its neighbourhood to see how important it is and to recognize that we cannot have a credible policy for the wider Middle East that does not embrace and include Iran.”¹²

- Christopher Patten

5.1 Introduction

A global energy overview was given in chapter 2 after which the European energy sector was examined. Iran’s economic, political and domestic energy situation was analyzed in chapter 4. These chapters have taught us that natural gas will become ever more important as projected worldwide consumption of this resource is expected to double by the year 2030. As Europe diversifies its energy mix into one which is environmentally friendlier, cheaper to sustain and more secure in terms of sources of supply, it looks beyond current partnerships and towards possible new alliances. Within this prospect, the Islamic Republic may be a serious option to consider. This chapter considers which, from a European perspective, opportunities and impediments exist with regard to the supply of Iranian natural gas to the European market. The analyses of international and domestic developments in chapters 2, 3 and 4 will provide the necessary materials for extracting the most important strengths and weaknesses which will eventually lead to the formulation of the opportunities and impediments as mentioned above. However, globalization has made the world more interconnected, which means that developments in one part of the world will affect other regions in the world. In this respect, it is important to take note of the actions of competitor states and to consider the role of non-state actors in analyzing what role Iran can play as a future supplier of natural gas to the EU.

¹² Speech at the European Parliament, Strasbourg on 12 February 2004. Christopher Patten is the European Union’s External Relations Commissioner.

The chapter begins by highlighting the role of different actors in energy related projects and discusses which powers compete for the supply of Iranian natural gas. Thereafter, past and current trends in EU-Iran relations are presented before laying out the opportunities and impediments of a possible strategic partnership between the EU and Iran in terms of the security of supply of natural gas.

5.2 The Geopolitics of Security of Supply

5.2.1 The Role of Supplier States

As the previous chapters have illustrated, the demand for natural gas over the coming decades is projected to increase. This increased demand is driven by a growth in the global population and economy, particularly in developing Asia but also due to a shift in energy policy in many countries which have incorporated a more prominent role for natural gas. This increased competition has resulted in the creation of a ‘sellers market’, the direct result of which is the rise in oil prices to unprecedented highs of over \$ 70 dollars per barrel (Financial Times 2007: 1). Consequently, the price of natural gas, which is indexed to oil prices, has also risen steadily.

Critical in understanding security of supply implications is the control of ownership rights of natural resources and related energy infrastructures. Two-thirds of global oil and gas reserves are located in countries which have policies that do not allow foreign investment in the energy sector (Linde, van der 2006: 168). In many cases, energy markets in producer countries have not been liberalized and ownership and control of these resources effectively lay in the hands of national governments. Iran’s energy sector is a well illustrated case where the government owns 99 percent of Iran’s energy producing companies in addition to most of the supply companies (Moghaddam 2003: 89). Nationalistic energy policies are not unique to Iran but are rather common practice rather than exception to the rule. The increase in oil and gas prices could further trigger developments to (re)nationalize the energy industry in several countries and hence have geopolitical implications for the global security of supply of energy.



5.2.2 The Role of Non-State Actors

It is important to note that the security of energy supplies cannot be defined primarily by the actions and activities of nation-states alone. It is clear that nation-states play a crucial role in energy and infrastructural projects but the role of TNOCs, international agencies and multilateral agencies should not be underestimated. That said, the influence of non-state actors in the global game of energy politics should not be exaggerated either. In general, the role of many non-state actors is in fact limited.

Out of the non-state actors, it is the TNOCs that are by far the most powerful and influential. In the West, large multinationals such as Royal Dutch Shell and Exxon Mobile are important for securing energy supplies to Europe and the US and moreover because of the enormous profits they make. The capital they generate is necessary for investments in energy projects, often agreed upon with a consortium of TNOCs. The influence of these TNOCs differs per country but in the end national interests and sovereignty forces TNOCs to comply with legislation of the country they operate in. Such can take on discriminate proportions as is the case of the operations of Royal Dutch Shell in Argentina (NRC Handelsblad 2007: 13). At the same time, TNOCs are limited in their competences since supplier states increasingly re-nationalize energy companies restricting foreign investment. The influence of these National Oil Companies (NOC) in many instances is greater than that of TNOCs as the amount of reserves they hold is much more extensive.

This is certainly true for Iran, where the NIOC controls the overwhelming majority of oil and gas reserves. Nonetheless, in the current age of globalization, the exploitation and export of Iranian oil and natural gas cannot be undertaken without the expertise and know-how of TNOCs. The Islamic Republic does not have the technology nor the financial capability which is necessary to start exploitation and is therefore dependent on foreign TNOCs.

5.2.3 Structural Scarcity

As we have seen in chapter 2, the real challenge for global energy security in the short-term is not necessarily energy scarcity but rather the concentration of oil and natural gas reserves. The uneven distribution of such reserves can lead to a situation of structural scarcity where the supply of these resources is deliberately obstructed by a powerful actor, be it state or non-state. The creation of the Gas Exporting Countries Forum (GECF) has raised awareness around concerns over security of supply as its 11 Member States hold 70 percent of global gas reserves and are responsible for 40 percent of total worldwide production (BP 2006: 6-24). What is more, many members of the GECF national oil companies have monopoly access to reserves in addition to carrying out many functions with respect to the logistical process within the respective country (Hallouche 2006: 18). It is clear that these states and their NOC hold a very powerful position indeed, and if the intention is there, they could induce scarcity for consumer countries.

The concern over structural scarcity of oil and gas reserves can be further highlighted by taking a look at OPEC, which is undisputedly the most important energy export organization that exists today. OPEC can be considered a 'like-minded' grouping as GECF and seven of OPEC's members are also GECF members. As such, the communication lines are short, since ministries and national oil and gas companies within these countries already cooperate with each other. This strengthens their potential for cooperation of gas related issues. More importantly, bearing in mind that gas prices in many markets are connected to the price of oil, OPEC has an influential role in the gas industry through its power over oil prices.

5.3 Competitors in the Race for Iranian Natural Gas

Given the advantages of natural gas over coal and oil, more countries are switching to an energy policy which favours natural gas as a sustainable and reliable source of fuel. As such, natural gas is increasingly becoming more important in the energy mix of a number of countries. The competition for securing the supply of natural gas therefore is expected



to become fiercer. This section will consider the main competitive powers for the security of supply of natural gas.

5.3.1 The United States

It is difficult to assess the role of the United States in the context of the gas market. On the one hand side the US gas market could be seen has a 'blessing' for Europe. On the other hand, it could also be perceived as a potential threat. The growing US gas market could enhance the traded volume and flexibility of gas. This could potentially result in future technological developments (most probably in LNG) which would also benefit Europe. Nonetheless, the US could also act as a magnet to new supplies if its prices and conditions are more favourable compared to the European market.

In any case, considering the fact that the United States is the largest consumer of natural gas globally (at present but also in the coming three decades), it too will have to increase imports to meet domestic demand. Given the historic animosities since the Islamic Revolution and Iran's strive for nuclear energy, cooperation between the US and Iran at first glance seems highly unlikely. In 1992 the Clinton administration passed export sanctions on the Islamic Republic via the Iran Non-Proliferation Act, followed by the Iran-Libya Sanctions Act (ILSA) in 1996, prohibiting investment in the Iranian energy sector. In 2001, the ISLA was extended until 2006 (CIEP 2004: 188). Despite these unilateral sanctions, American allies such as Japan, Italy, and France have found the prospect of investing in Iran's energy sector irresistible, not to mention Russia, China and India. Hence, the geopolitical race for Iranian natural gas is on. If the US wants to obtain its share of Iranian natural gas (by peaceful means at least) a different US foreign policy stand towards Iran is inevitable.

This possibility might not be as unrealistic as some experts have us believe. In October 2002, the Iranian government commissioned several opinion-poll research institutes to conduct a research into strengthening diplomatic ties with the US. The research showed that 70 percent of the respondents answered affirmatively to the question as to what they think about re-establishing relationships with the United States. Moreover, 40 percent of

the respondents said they expressed some understanding of US policy towards Iran and even considered this policy correct and defensible (Posch 2006: 39). It must be mentioned, however, that since the election of President Mahmoud Ahmadinejad in 2005 and his hard line politics towards Israel and the West, public opinion and sympathy for the US and its politics towards Iran might have changed.

Nonetheless, safeguarding energy resources, as laid down in the 'Charter Doctrine', is perceived as a core aspect of protecting US interests. If Iranian natural gas can help achieve that goal then the chances are slim the Islamic regime in Teheran neglect the opportunity to finally be freed from international isolation. Investments in Iran's energy sector are welcome even if these investments take the form of American Dollars.

5.3.2 People's Republic of China

During the last decade it has become clear that China, and to a lesser extent also India, are having an increasingly significant impact on the demand of global energy. At this moment, natural gas provides less than 3 percent of Chinese primary energy demand. However, considering the fact that China has serious urban pollution problems, limited gas resources and that its economy heavily relies on coal supplies, its need to import cleaner energy is projected to increase. Natural gas in Chinese energy policy has been taken to a different level. During the early 2000s China developed plans for very substantial gas imports with LNG as the dominant mode under consideration (Stern 2006: 22).

Currently, China holds one operating LNG terminal, another under construction and an estimated nine others in various stages of planning. The recent increase in oil prices consequently stirring up gas prices have seriously hampered progress and undermined the Chinese programme. Moreover, the rise in oil prices has weakened the competitive edge of natural gas over coal as the fuel used in Chinese power plants. In spite of the advantages of transporting natural gas via LNG, pipeline transportation is also a serious option for Chinese policy makers. Recently, China and Iran signed a 25-year LNG contract worth \$ 100 billion, on top of the 150,000 barrels of crude oil to be sold daily to



China at market prices. A future phase of the Iranian-Chinese strategic energy cooperation agreement involves the construction of a 1000 km pipeline from Iran to the Caspian Sea to connect with the planned pipeline between China and Kazakhstan. In 2004 trade between China and India totalled \$ 7 billion, of which non-oil trade was \$ 1 billion. This figure doubled in 2005 and by 2008 Chinese-Iranian trade is projected to reach a record high of \$ 10 billion (Vakil 2006: 54).

Aside from investments in Iran, China also looks at diversifying its supply mix. The location and magnitude of Russian natural gas resources in Eastern Siberia and the Far East means that China has the potential to import vast amounts of natural gas from these regions and to a lesser extent from Central Asia. Given trends in demand and geographical location, it would be likely that the natural market for Siberian natural gas will be China as there will only be limited competition for these resources from other importers. In March 2006, an agreement was signed between Gazprom and CNPC for deliveries of natural gas via pipeline from Russia to China. The agreement encompasses the construction of two pipelines supplying China with gas from Western and Eastern Siberia (Stern 2006: 23). Furthermore, China is in advanced talks with Turkmenistan and Kazakhstan for the import of natural gas via pipeline. The Turkmen and Chinese delegations agreed that 30 bcm per year of natural gas for a period of 30 year starting in 2009 will be exported to China. Yet, in order to reach such demand a pipeline of approximately 2000 km through Uzbekistan and Kazakhstan to the Chinese border will need to be constructed. At the border, transportation to the market predominantly located in the East of the country also needs to be realized. It is thought that the above mentioned agreement is a strategic decision by the Chinese to try to create price competition between Central Asian suppliers and Gazprom. However, given the problems concerning the economic viability of such projects, the possibility of success remains to be seen.

Though Iran might increasingly be looking to the East for alternative investors in order to decrease its dependence on the West, it remains to be seen to what extent China will emerge as a potential large-scale partner. While China can certainly provide capital for investment, its state-owned energy companies are not much more technically capable

than that of Iran. One thing seems obvious: it will take some time before China will be able to fill all of Iran's technical gaps.

5.3.3 Russia

Where China lacks the technical capabilities, Russia potentially could prove to be a strategic partner to fill some of these gaps. Russian energy companies, despite not being able to offer quite the same level of expertise as Western firms in the complexities of managing Iran's older reservoirs, could assist Iran in developing newer oil and gas fields and perhaps more importantly, in realizing Iran's huge export potential for these resources. As a matter of fact, Russia and Iran have already held talks of possible coordination of Iranian gas exports with Gazprom, Russia's state-owned gas and oil company.

From a Russian perspective, collaboration with the Iranians in this regard poses many benefits. A common heard assumption is that within a few years, the amount of gas that Gazprom is contracted to provide may possibly exceed what it could bring to the market on its own. As such, Gasprom has been trying to fill the gap by purchasing extra gas from states in Central Asia that rely on Russian pipelines to export their oil and gas (New York Times 2005: 2). Not only would the involvement of Russian energy companies in Iran support Moscow's external energy strategy, it would also serve to counter-balance US attempts to undermine Russia's influence in Central Asia.

Despite Iran's nuclear ambitions, President Putin has remained resolute in his decision not to endanger Moscow's strategic relationship with Teheran. Their mutual interests are further tied in the Beijing-Moscow alliance that has been formed under the SCO, of which Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan are also members. Iran has more recently become an observer member together with India and Pakistan, with the possibility of eventually becoming full members (Vakil 2006: 62). In this context, there are opportunities for Chinese-Russian cooperation in developing Iranian resources not in the least to undermine what both Moscow and Beijing see as excessive US unilateralism



in world (energy) affairs. By working together, Russia and China could enhance their position in the Persian Gulf and consequently in the global energy market.

Iran and Russia together control almost half of the world's proven natural gas reserves and as such are already important players. However, if they coordinated their production and marketing decisions, these two countries could strengthen their position and become even more dominant in the international gas market. Collaborating with the People's Republic of China or with India and Pakistan could turn the geopolitical table of energy even further.

5.3.4 India & Pakistan

Due to a fast growing demand for energy, India has forged relations with countries that can assist it in its quest to secure adequate resources. In fact, it has gone so far that it has even incorporated and strategically worked together with its old enemy Pakistan in terms of energy politics. However, Indian-Iranian ties go beyond a proposed gas pipeline for New Delhi seeks both commercial and military cooperation. The two biggest political parties in India, the Congress Party and the Bharatiya Janata Party (BJP), have encouraged closer ties with Iran and used this relationship to ingratiate itself with its Shi'a constituency. This because India has the second largest Shi'a population in the world and strengthening ties with the Islamic Republic could send encouraging signals to the approximately 20 million Shi'a in the country. What is more, left-wing Indian politicians see cooperation with Iran as an opportunity to challenge US imperialism (Vakil 2006: 58) and of course such political ambitions are received well in Iran.

More importantly, India and Iran concluded a \$ 22 billion agreement regarding the yearly supply of 5 million tons of Iranian gas to India over a 20 year period. This agreement is part of a joint conclusion for the construction of an Indo-Pakistani-Iran gas pipeline, which was initiated in 1989 but finalized recently in 2006. A feasibility study was conducted concerning the prospects for a pipeline that would cut across southern Pakistan to supply India with Iranian natural gas. This in turn would provide Pakistan with lucrative transit fees in addition to gas supplies of its own (Howard 2007: 9). This

pipeline is projected to transport as much as 90 million cubic meters daily from Iran's South Pars field to India and 60 million cubic meters to Pakistan by 2009-2010. This strategic cooperation has accelerated the nature of Indo-Iranian relations with regard to energy politics. Moreover, India helps Iran in its quest of becoming a transportation hub which links the Persian Gulf to Central Asia. As part of this transport corridor, India will assist Iran in modernizing the south eastern Chahbahar port on the Strait of Hormuz (Vakil 2006: 60).

Aside from the above mentioned strategic agreement with Iran, India is also involved in the long discussed TAP pipeline project from Turkmenistan to India via Afghanistan and Pakistan and is evaluating the possibility of importing gas from the East, with both Bangladesh and Myanmar as possible sources of supply (Stern 2006: 23). Additionally, Indian policy-makers are also looking at the possibility of LNG imports. Notwithstanding the fact that Indian LNG importers are better located geographically in terms of proximity to reserves, they are in a similar position as their Chinese counterparts. They too, are unable to compete on price with the much richer competitors in the Pacific and as a result struggle to obtain either long term LNG supplier or spot cargoes. The two existing LNG terminals in India are consequently being underutilized.

5.4 Past and Future EU-Iran Relations

5.4.1 Comprehensive Dialogue

Relations between the EU and Iran are like the swing of the pendulum, moving from crisis towards positive initiatives to improve relations. Since the landslide victory of Mohammad Reza Khatami in the 1997 presidential elections, the EU and Iran have engaged in what was termed the *Comprehensive Dialogue*. Prior to this period, relations were far less warm hearted and meetings between the two were hence coined the *Critical Dialogue*. By the means of the former dialogue, the EU's aim was to support the president's reform agenda and the general policy of cultural, economic and political liberalization in Iran. Twice a year, meetings with the Iranians at the level of Under-Secretary of State or Deputy Minister are held and covers, among other, issues such as



the conflict in the Middle East, non-proliferation of weapons of mass destruction, human rights and terrorism, drugs control, refugees but also a possible strategic cooperation in the energy sector. The Iranian parliamentary elections in 2000 and Khatami's re-election in 2001 further encouraged the EU to strengthen ties with the Islamic Republic and for the first time the possibility was opted to for a Trade and Cooperation Agreement (TCA). The political concessions that followed lead the Iranians to change their negative policies in areas that were of concern to the EU and in return the EU would agree on a generous TCA (Posch 2006: 100).

5.4.2 The Consequences of Iran's Hard Line Politics

More recently European-Iranian relations have been highly strained. The *Comprehensive Dialogue* was suspended by Iran in 2003 and the negotiations for the TCA stalled from June 2003 due to the pending nuclear issues with Iran. The EU-3 (France, Germany and the UK) made attempts to convince Iran to suspend uranium enrichment and allow intrusive inspections of the IAEA and in return would receive a package of economic incentives. An agreement was reached and laid down in the *Paris Agreement* in 2004, reaffirming the commitment to the Non-Proliferation Treaty (NPT). The breakthrough did not last long, as shortly thereafter Iran resumed uranium conversion at the Esfahan plant in 2005 (EC 2007: 2)

Matters were further worsened when President Ahmadinejad made inflammatory remarks regarding the Holocaust, describing it as a 'fairy tale' and calling for the reallocation of Israel to Europe (The Guardian 2006: 2). In response, the European Commission as well as the General Affairs and External Relations Council of the EU issued statements condemning in the strongest terms the comments made by President Ahmadinejad (CEU 2005: 13). The outrageous remarks made by President Ahmadinejad have seriously damaged the goodwill and diplomatic intentions that have been built up over the past two decades. Avoiding further deterioration between Iran and Europe will primarily depend on Iran's intent to address the EU's main areas of concern and change its aggressive and discriminatory political language.

5.4.3 Opportunities for Cooperation

As a possible strategic partner for natural gas supplies to Europe, Iran comes into the picture for a number of reasons. Iran's unique geo-economic features distinguish it from many other resource-rich countries in the region. Henceforth, Iran has several comparative advantages which provide numerous opportunities for the development of its export capacity to Europe.

- I. First of all, the Islamic Republic has the second largest reserves of both oil and natural gas in the world, 138 billion barrels of oil and 28 trillion cubic meters of natural gas. Under current production levels, these reserves are expected to last approximately 93 years for oil and 160 years for natural gas. Due to these relatively low production levels, the Islamic Republic has the potential to greatly improve its exports of both oil and natural gas over the next two decades.
- II. The potential of Iran's vast resources is further underscored by its strategic geographic position among the major oil and gas producers and consumers in the world. Iran shares land and sea borders with 15 countries and therefore not only has the potential to become an important exporter of oil and natural gas but also to act as a transit country for the export of oil and gas from neighbouring countries. The current oil swaps with several Caspian littoral states is a case in point.
- III. The Islamic Republic has an extensive domestic gas pipeline network and several links to Turkey, Azerbaijan, Iraq and Turkmenistan. Even though many of these pipelines are ageing, these pipelines can connect to such transit countries for the export of natural gas. Upgrading of the current infrastructure gives ample opportunity for exports to the European market. Moreover, the current infrastructure leaves room for LNG exports.
- IV. A major advantage if Iran were to choose to engage in an energy partnership with the EU is the technical know-how European experts can provide in managing the complexities of Iran's older reserves. This technical expertise is often absent with their Chinese and



Russian counterparts. Thus, in this regard Europe has a comparative advantage over some of its competitors.

- V. The liberalization of the European energy market creates numerous opportunities as this process will push buyers and sellers in the same direction since they will both be looking for new ways of sharing and absorbing risks. In order to attract new suppliers at competitive terms and ahead of competing markets it will be essential for the EU to create a business climate that stimulates such development. A European market in which suppliers and buyers face a regulatory environment subject to uncertainty and change, with induced high production costs and risks will compare less favourable with competing markets elsewhere. In order to secure the supply of natural gas in a global gas environment in which a number of markets compete for the same resource, the EU must ensure that policies and market players cooperate to create the best environment in which this is possible. In gaining a competitive edge, recognition of the long term community of interest of both the demand and supply side of the market is necessary.
- VI. The EU maintains a completely different diplomatic strategy with Iran than the US. It seeks to strengthen relations with Iran as it sees the isolation of that country by the US as a threat to its own security and energy interests (Amineh 2003: 5). This different political approach and continued attempt by the EU in maintaining a dialogue with Iran is an important element for possible future cooperation.

5.4.4 Impediments for Cooperation

The future might not be as bright as the above opportunities have us believe. The impediments for an EU-Iran energy partnership outnumber the possibilities. A quick glance therefore tempers such expectations but in the end does this mean the balance is negative?

- I. By now it has become clear that the global competition for natural gas will become fiercer in the near future. The increased demand is complicated by the fact that reserves

are geographically highly concentrated. Therefore, more countries compete for the same resources in approximately the same region. This competition for energy causes what is termed *demand induced scarcity*. This fiercer competition could lead to higher prices, though it must be noted that the price for natural gas is heavily influenced by other than market factors alone, such as energy subsidies and taxes.

- II. Iran's fast growing population growth has resulted in a significant increase in direct and indirect domestic energy demand. Despite the Islamic Republic's slow down in population growth, it still remains relatively high at 3 percent per year (UN Population Division 2007). The size of the population in 2007 was almost 70 million inhabitants, of which 51.2 was younger than 19. This demographic composition will result in many new families and a steady increase in the use of energy appliances and new dwellings, leading to a strong increase in domestic energy demand. As a result of an increase in domestic energy consumption, export of Iranian oil is projected to decrease in the future. According to the *World Energy Outlook*, primary energy demand in Iran is expected to increase annually by 2.6 percent, doubling by 2030. By the same year, oil and gas are expected to be responsible for 41 and 55 percent of Iran's primary energy demand respectively (IEA 2005: 1). This is due to the promotion of gas consumption by the national government, partly through the means of extensive subsidies, in order to free up oil for exports.
- III. A serious problem of Iran's energy sector is the lack of an effective energy pricing mechanism. For a long time Iran has maintained energy prices at a fixed level, while as a result of inflation real energy prices have diminished over time. The government's high subsidy policy has resulted in serious misallocations of resources and resulted in an increase in energy intensity. Rather, it would be much more effective and economically viable to base energy prices on the opportunity cost of energy.
- IV. Another obstacle for cooperation is the lack of technology and technical expertise, which is likely to delay gas developmental projects (as it has done in the past). In March 1995, the US, via an executive order, banned foreign investment in the Iranian energy sector.



One month later, a ban on all US exports to Iran was imposed. In 1996 the ban was replaced by the ILSA, which was passed by the US to prevent European and Japanese countries benefiting from the US export ban. The effect of these sanctions is that most of Iran's economic sectors use obsolete and depreciated machinery and facilities which are far below the standards used in other parts of the world. Iran's energy sector is no different: only four out of ten refineries have a remaining lifetime of more than six years, the others are obsolete (Moghaddam 2003: 87-88). The technology which is being used in Iran's energy sector needs to be upgraded and updated if it wants to boost the lifespan of its reserves and improve the efficiency of its energy sector.

- V. The lack of financial assistance certainly does not contribute to the development of the energy industry in Iran. A policy of nationalization and protectionism of Iran's energy sector prohibit foreign ownership and constrains the financing of energy projects. The unattractive buyback agreements impede investment by imposing constraints on foreign companies and lengthening the duration of the project.

- VI. The Iranian political structure is formed in such a way that the government is overly involved in the economy in general and in the energy sector in particular. Decision-making with regard to energy policy is complex, centralized and requires too much government approval. This results in inefficiency and inflexibility of the political system but also of the entire energy sector. Efficient decision-making is therefore constantly constrained. What is more, an incentive for good energy management is virtually absent. There is insufficient regulation and enforcement. This environment leads to a repetition in decision-making and does not put an end to inefficient practices. The current structure does not make it clear who is responsible for certain activities and, perhaps more importantly, who is responsible when things go wrong. There are numerous government bodies that take decisions on energy issues, among others the Ministry of Energy, the Ministry of Petroleum, the Ministry of Industry and Mining, Iran's Atomic Organization, the Ministry of Agriculture and the Energy Commission of the Iranian Parliament (Moghaddam 2003: 91). It comes as a surprise that in a country which is so highly dependent on its energy sector, there exist no efficient structure to coordinate activities

between these institutions. Restructuring the organization of the energy sector in Iran is therefore required if the EU and Iran were to effectively cooperate in energy projects.

- VII. The government of President Ahmadinejad has had regular verbal confrontations with OECD countries on wide ranging issues such as the existence of the state of Israel to the development of nuclear power. On the 26th October 2005 he publicly stated that he would be happy if Israel was wiped from the map and the US be destroyed (Posch 2006: 23). This aggressive stand of Iran in foreign diplomacy and its continued policy of nuclear development in spite of international pressure have led to international sanctions being imposed on it and have certainly not helped improve EU-Iran relations. The imposed sanctions by the international community and the United Nations have placed Iran in a political isolation and have made international investments in Iranian gas projects near to impossible.
- VIII. The regional political stability also has an impact on the possibility of a strategic energy partnership with Iran. The Israel-Palestinian conflict, the war in neighbouring Iraq and Afghanistan are expected to be persistent and can possibly destabilize the region even further. Destabilization of the region heavily influences the investment climate in Iran. Considering the huge costs associated with energy projects, TNOCs and other TNCs are reluctant to make large investments, especially in a region with such political uncertainty. The vulnerability of pipelines in a political unstable region such as the Middle East for terrorist attacks, sabotage and illegal drainage is high and most TNOCs are not willing to take such risks.

5.5 Conclusion

The past has shown numerous attempts have been made between the EU and Iran to strengthen political and economic ties so while would this not be realistic for the future? Competition over Iranian natural gas is already ongoing and several trends are noticeable. In search of large volumes of natural gas to supply its energy needs, China will focus on Eastern Siberia and the Russian Far East. India on the other hand, will presumably centre



its attention of the Gulf States and Central Asian countries in meeting its energy demand. LNG is much less economically viable than transportation via pipeline which makes competition for LNG with richer OECD importers less attractive. It seems likely, therefore, that both India and China will focus on the import of natural gas via pipeline as fewer competitors exist. Should both countries decide to compete with OECD countries for LNG, then most likely this would be for Middle East supplier principally from Qatar. This implies that neither China nor India is likely to become a serious competitor for Europe over supplies of natural gas, at least not up to the year 2020. The only exception to this statement is with respect to Western Siberian gas where Gazprom and CNPC are negotiating the construction of a pipeline to China. Despite this project being economically unattractive for both parties, it should not be ruled out altogether. Thus China and India in the near future may become more attractive markets for Russian and Middle Eastern suppliers.

There are certainly opportunities for cooperation in energy related issues between the EU and Iran. As we have seen in chapter 3, the European energy market is in a vulnerable position. The demand for energy in the EU is growing while indigenous supplies are beginning to run out. One of the most effective ways for the EU to decrease this vulnerability is by diversification of type and origin of resource. For instance, the EU is increasingly focusing on different types of resources such as natural gas and renewable energy sources in meeting domestic demand. Less concrete steps have been taken to diversify the origin of resources.

In the case of natural gas, this vulnerability is underlined by the dependence on a limited number of non-EU suppliers. More than half of all gas consumed in the EU has to be imported and a quarter of this imported gas is derived from Russia, 15 percent comes from Norway and 11 percent from Algeria. Further diversifying supplies is necessary to diminish import dependency. The European Commission cannot neglect this potential threat to European natural gas supplies and it is inevitable, therefore, to seek alternative energy partners. The threat of insecurity of natural gas supplies to Europe

could possibly open the door and provide an opportunity for cooperation with the Islamic Republic of Iran.

Ironically, it is Iran itself, with its long lasting policy of high energy subsidies which forms a major constraint for future cooperation. These subsidies encourage domestic consumption and limit the amount available due for export. Moreover, the energy infrastructure in the Islamic Republic is old and desperately in need of new investments. As a result of Iran's nationalistic energy policy and unattractive buyback deals, in addition to Iran's hard line politics towards the West, foreign TNOCs are wary to invest in Iran. Iran's putative status as a future hydrocarbon superpower lay in its own hands. The major impediments for engaging in a strategic partnership with the EU over security of supply of natural gas are domestic issues. Much depends on the ability of the regime to push to policy measures to restructure the domestic energy industry and to cure it from the 'Dutch disease'.



6 Conclusion

*“In the Europeans’ long-term [energy] calculation, Iran has too much potential to ignore”.*¹³

- Frank Harris

6.1 Final Conclusion

The objective of this research was to provide insight in the European energy security of supply situation and to analyze the potential role of the Islamic Republic of Iran with respect to becoming a possible strategic partner for supplying natural gas to the EU.

In so doing, a global energy outlook was laid down in chapter two, sketching the current situation in terms of reserves, production and consumption of natural resources and where necessary providing forecasts up to the year 2030. Chapter two has made it clear that fossil fuels will remain the dominant source of energy for the coming decades throughout the world. Oil will remain the most widely consumed resource but as a result of changes in energy policy in different countries and the geo-economic advantages, the role of natural gas in the global economy is expected to become more important in the decades to come. The global energy situation is characterized by a division of production and consumption. Production is highly concentrated in the Persian Gulf and Caspian region while consumption is mainly concentrated in the Western hemisphere but recently has shifted eastwards to also include China and India. The equation is simple yet worrisome: increased worldwide consumption driven by population growth and an increase in GDP levels will mean that the main resources to fuel this consumption will run out shortly. The ‘conventional’ energy mix in many countries will have to diversify in order to safeguard global energy security.

The area of focus in the chapter thereafter was on the energy security situation in the European Union and policy measures taken in order to guarantee security of supply.

¹³ Quoted in Financial Times 2007: 3. Frank Harris is head of the natural gas division of the Scotland-based Wood Mackenzie consulting group.

While there is currently no immediate crisis in Europe's energy supplies, a number of pressures are building up that are reason for concern. One such concern is the decline of indigenous production and the projected rise in import dependency. By the year 2030, 88 percent of oil and 81 percent of natural gas will have to be imported. In total, 67 percent of total primary energy in the EU by this date is projected to come from non-EU suppliers. Yet, import dependency in itself does not automatically imply insecurity of supply. However, dependence on a limited number of suppliers, as is the case of natural gas, increases the vulnerability of European energy security and has consequently been a topic of heated debate. Although the European Commission is aware of this vulnerability and has taken policy measures as formulated in the *Green Paper* on sustainable, competitive and secure energy, the main internal threat poses the Member States themselves. Consensus among all Member States is needed for formulating and implementing a long term common coherent energy policy. Despite this objective, this goal is far from accomplished. Securing Europe's energy supplies is an integrated part of the wider foreign and security policy of the Union. Agreement on energy policies cannot be reached without an integrated approach to foreign, security and energy issues. One thing seems clear: alternative opportunities for increasing energy supplies from other regions is seriously to be considered.

A reorientation of diversifying energy imports cannot neglect the potential role of the Islamic Republic of Iran. Holding the second largest proven reserves of both oil and gas in the world, Iran is considered by many to be a 'sleeping giant'. In order to fully assess Iran's potential as a future supplier of natural gas, an analysis was given in chapter four of the Islamic Republic's oil and gas sector as well as the political and economic situation of the country. Several developments have come to the forefront. One of which is the fact that production since the Islamic Revolution has stagnated significantly while domestic demand has shown a steady upward trend. This has had a negative impact on export levels. In fact, Iran became a net importer of natural gas since 2000, an unthinkable position for a country holding such vast reserves. Given Iran's demographic composition, it is likely that consumption patterns will further increase in the nearby future. If the Iranian regime has ambitions to develop the country's energy potential then growth and



development of non-oil exports are a prerequisite. While attempts have been made in the past, until now all have proven unfruitful.

Considering trends in the international energy market and domestic developments both in the EU and Iran, numerous opportunities exist which could bring both sides closer together. Europe's increasing import dependency and its reliance namely on Russian, Norwegian and Algerian natural gas for imports make it necessary for the EU to consider alternative suppliers. With relative proximity to Europe and holding the world's second largest reserves of oil and gas, the Islamic Republic is a worthwhile option to consider. It is strategically located and its relative proximity makes it economically feasible to export natural gas by pipeline to Europe. In spite of ageing infrastructure, current pipelines and export routes provide opportunities to transport natural gas to the European market, though investments will be needed. The liberalization of the European energy market furthermore enhances competition as buyers and sellers seek new ways of absorbing risks. A competitive European energy environment will stimulate TNOC to seek new suppliers and possibly push them in the (Middle Eastern) directions, such as of exploring opportunities with the state owned NIOC and NIGC.

However, there are numerous problems frustrating a strategic energy cooperation. Demand induced scarcity will mean the competition for natural resources in the nearby future will be fiercer. Hence, more countries will be competing for fewer resources. Additionally, these resources are highly concentrated resulting in power projections and coalition forming to safeguard energy supplies. Not only the rise in global demand poses a threat for cooperation. Growing domestic energy needs in Iran is among the most serious impediments. Driven by popular vote, President Ahmadinejad is hesitant to drastically lower energy subsidies as this will lead to civil unrest. A recent attempt in June 2007 illustrates this concern. The subsidies have driven domestic energy consumption to exorbitant high levels and threaten future energy exports. The lack of political will to reform the country's energy subsidies is a major reason for concern. The current legal and regulatory framework does not enhance cooperation either. The government holds an iron grip over the economy in general and the energy industry in

particular. The structure of energy sector is rigid and requires too much government approval. Furthermore, foreign investments in Iran's energy sector are discouraged by the nationalistic energy policy, Iran's aggressive attitude toward the international community and by the political instability of the region.

Whether the European Union and the Islamic Republic of Iran will engage in a strategic energy partnership will for the most part depend on their own political will. The potential is there but many obstacles will nevertheless have to be eased away. In the end, an equation will be made. If the long term economic opportunities outweigh the political impediments, then the mutual benefits will lay the foundation for a strategic energy agreement.

6.2 Policy Recommendations

It seems evident that the major impediments for cooperation are internal struggles both in the European Union and in the Islamic Republic of Iran. As part of this research, some policy recommendations will be suggested that could bring the making of an energy partnership closer to reality.

6.2.1 European Union

- I. Characteristic of a supranational institution such as the European Union, competing interests often act as barriers and constrain cooperation among Member States. Examples are the struggle in formulating a coherent foreign and security policy but also in developing a common security of supply policy. However, an EU-wide security and foreign policy does not stand in itself but runs parallel with concerns over energy security. Instead of treating these issues as separate entities, it would be wiser to formulate a wider common external policy.
- II. As many other independent countries, Member States view the energy industry as strategically important and although the policy agenda has widened, issues such as security of supply remain the domain of national governments. Therefore, it is important



in addition to formulating a common external policy with an incorporated role for energy security, that EU legislation provides a regulatory framework that obliges individual Member States to cooperate more collectively on central issues such as energy security. The main obstacle for the EU's effectiveness is its multi-level politics and competing national interests. A EU energy minister is needed to coordinate a common policy on energy supply security. A collective approach, more so than it is now, would prove to be much more effective.

- III. The liberalization process of the European energy market is still incomplete and in some cases vague constraining further investments. The European Commission should formulate a more comprehensive and clear regulatory framework and stimulate/pressure Member States with the development of the liberalization of the European energy market.
- IV. In order to improve diplomatic relations and understanding, advances should be sought with the Islamic Republic in the form of a comprehensive dialogue for energy matters. Since Europe is in search for alternative suppliers and given the fact that the gas market is a 'sellers market', a pragmatic approach is necessary and the European Commission should take the first step in realizing such a dialogue. It should act as a platform for improving political relations and highlight the mutual benefits of a strategic energy partnership. Moreover, it could take away any mistrust and sceptical feeling among both parties.

6.2.2 Islamic Republic of Iran

- I. Iran's energy policy is in need of drastic reform. The incredibly high energy subsidies are the main issue threatening Iran's export potential. Not only do high levels of subsidies give the wrong incentive, it also reduces government income and eventually it will be harder to induce non-oil economic activities. It would be much more effective and economically viable to base energy prices on the opportunity cost of energy. Without a change in Iran's energy pricing policy, conservation projects are doomed to fail and Iran's energy intensity will remain disproportionately high. The more energy Iran consumes domestically, the less will be available for export.

- II. Reforms are also necessary in the structure of the energy industry in Iran. Too many government bodies are involved in decision-making processes making it rigid for pragmatic changes and unclear who is responsible when things go wrong.
- III. If Iran truly has the ambition to take advantage of its energy potential then it must rethink its current energy policy with respect to foreign investments. Under the current legal framework, TNOCs and other large foreign investors of energy projects are used to generate (foreign) capital while avoiding foreign ownership. This policy has not yielded much success. By giving foreign exploration and development firms a certain share of the extracted resource, Iran will become more attractive to foreign investors. Such investments are desperately needed to upgrade ageing refineries and replace the country's obsolete and depreciated facilities and machineries.

6.3 Two Possible Geopolitical Scenarios

The following scenarios are purposely abstract and oversimplified, the intent of which is to illustrate to the reader the effect of geopolitics on energy supplies. It poses two scenarios that the Islamic Republic might consider in an attempt to 'optimize' its energy potential.

6.3.1 The Russian Connection

The Islamic Republic of Iran is in a paradoxical situation. On the one hand, it has continuously been isolated by the West since the Islamic Revolution and has suffered from numerous sanctions imposed upon it by the international community. Henceforth, Iran has been struggling economically as well as politically to become the major regional power it has so long aspired to be. On the other hand, Iran's position is at a crossroads now that global demand for energy is steadily rising. This offers multiple opportunities to enhance its energy potential and realize the country's mentioned aspirations.



Energy geopolitics and power projections between competing powers over Iranian natural gas therefore puts the Islamic Republic in a renowned position. Fed up with the unilateral international system, Western dominated institutions and continuous interferences in domestic politics, the Iranian government will embark on a political course orientated towards cooperation with Russia and the Former Soviet States of Turkmenistan, Uzbekistan and Kazakhstan. Such an alliance will hold 46 percent of total proven natural gas reserves in the world and be responsible for almost 30 percent of worldwide production.

This scenario will have serious geopolitical implications for consumer countries and producer countries alike. It shifts the geopolitical chessboard and implies that consumer countries will be vulnerable to structural scarcity induced to it by this consortium. This concern is further rooted in the fact that Russia and Iran are also both 'heavy weights' in terms of oil reserves and global oil production. Due to the vast infrastructure of existing pipelines, export markets all over the world can be reached. Certainly, Halford Mackinder's perception of controlling the Eurasian landmass will help the Islamic Republic realize its regional if not global aspirations.

6.3.2 A Bridge to Qatar

Instead of focusing Eastward for cooperation with Russia, the Islamic Republic could also look to neighbouring Qatar for an alliance. Cooperation between Iran and Qatar, together holding approximately nearly 30 percent of total natural gas reserves and responsible for 6 percent of worldwide production, could enhance the export levels of natural gas of both countries.

Already sharing one of the largest proven reserves of natural gas in the world, Iran and Qatar will both benefit from strengthening economic and political ties. In exchange for technical expertise and development of LNG facilities, Qatar can make use of Iran's pipeline infrastructure to export natural gas via Turkey to Europe. The development of LNG terminals will improve Iran's competitive position as it will be able to export natural gas more easily to long distance markets.

6.4 Limitations of this Research

Notice must be taken of the fact that this research is primarily based on political considerations and much less on an economic analysis. Nonetheless the author has tried to combine these two multidisciplinary fields in order at best answer the research questions as outlined in the first chapter. Qualitative research has been the cornerstone of this thesis though some attention was given to a more quantitative approach in chapter two. However, a serious limitation throughout this thesis has been the reliance on secondary data that at times, as in the case with projection scenarios, does not always prove to be consistent. Estimates or predictions often vary according to the institution of organization to which this data belong. Consequently, any analyses made as part of this research greatly depend on the accuracy of such data.

A second limitation is the focus on the European Union as a whole with less emphasis on individual Member States. Though this was a deliberate choice in order to illustrate the wider picture of European energy policy and security in general, the reader must be aware that differences exist between individual Member States which remain autonomous on energy issues. As part of a follow-up on this research, it would be interesting to take a closer look at differences between Member States in the equation of energy security and how they differ in their related policies. Perhaps this would shine a different light on the possibility to develop a common security and foreign policy with an integrated role for energy and create other opportunities and impediments for a possible future energy partnership between the European Union and the Islamic Republic of Iran.



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Appendices

Appendix 1

OECD Nations					
Australia	Austria	Belgium	Canada	Czech Rep.	Denmark
Finland	France	Germany	Greece	Hungary	Iceland
Ireland	Italy	Japan	Korea	Luxembourg	Mexico
Netherlands	New Zealand	Norway	Poland	Portugal	Slovak Rep.
Spain	Sweden	Switzerland	Turkey	U.K	U.S

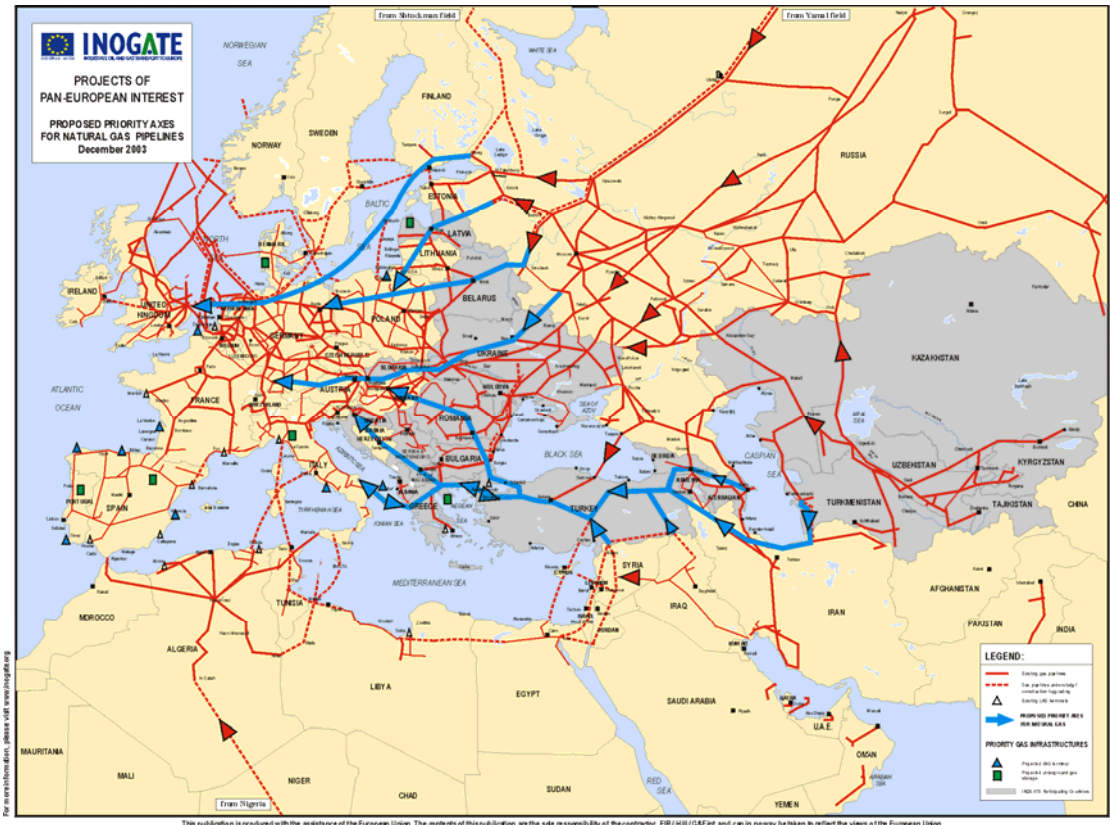
Appendix 2

Division of the World by Region



Source: BP Statistical Review of World Energy 2006

Appendix 3 Pan-European Natural Gas Pipeline Infrastructure





Appendix 4 Iranian Oil and Gas Infrastructure





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