

## Energy security and Europe

*Nadia M. Abbasi*<sup>\*</sup>

"Energy Security is emerging as a political and foreign policy issue," Jose Manuel Barroso, President, European Commission, at a seminar at European Policy Centre, Brussels<sup>1</sup>.

In energy terms, power has shifted from the importing to the exporting countries. The world is entering a new energy landscape: energy cut-off incidents (by Russia to Ukraine and Belarus), rising energy demands from new countries, rising world energy demand and declining production from old sources show that Europe can no longer take affordable energy for granted. Europe depends on imported energy to meet its needs and requires a predictable supply from the world energy markets.

Global demand for energy has risen inexorably in the last 150 years in step with industrial development and population growth. Hunger for energy is predicted to continue to rise, by at least 50 per cent by 2030, as developing countries like China and India seek to fuel their rapid economic growth. The lion's share of global energy (about 80 per cent at present) is supplied by coal, oil and gas – fossil fuels that formed long ago from carbon-rich remains of dead plants and animals.<sup>2</sup> Though these non-renewable sources will one day be exhausted and are to be replaced by renewable sources such as solar and wind power, at present, it is the fossil fuels which are at the centre of the debate due to their scarcity and increasing demand worldwide.

Concerns about oil security stem from three related problems: concentrated supply in an unstable or conflict-ridden region; the sustained exercise of market power by key oil exporters; and the continued (although perhaps diminished) vulnerability of the economy to episodic oil supply shocks and price spikes. Global oil reserves are concentrated in a volatile region of the world, with around 60 per cent of reserves in the Persian Gulf region.

In Europe, the major debate focuses on how to manage dependence on imported natural gas and in most countries, aside from France and Finland,

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*Nadia M. Abbasi is a Research Fellow at the Institute of Strategic Studies, Islamabad.* whether to build new nuclear power plants or perhaps to return to (clean) coal. Energy interdependence and the growing scale of energy trade require continuing collaboration among both producers and consumers to ensure the security of the entire supply chain. Long-distance, cross-border pipelines are becoming an ever-larger fixture in the global energy trade.

The challenge of energy security will grow more urgent in the years ahead, because the scale of the global trade in energy will grow substantially as world markets become more integrated. Currently, every day some 40 million barrels of oil cross oceans on tankers; by 2020, that number could jump to 67 million. The amount of natural gas crossing oceans as LNG will triple to 460 million tons by 2020.

Energy has become an increasingly important and defining policy issue as the growing competition for access to limited resources has altered the global economy. Population increases, dynamic economic growth (particularly in China and India), and the spread of prosperity are stimulating a rising demand for energy. However, high energy prices and the lack of spare capacity, particularly in the oil market, have made the global economy sensitive to energy disruption.

Energy security, in terms of supply and stability of price (two key factors for economic strength and growth in industrialised and industrialising countries), is intertwining with geopolitics and international relations. Energy security is based on intangible feelings of comfort and changing perceptions. The West is in a vulnerable position when it comes to energy supply, since an oil or gas shortage which lasts for more than a couple of weeks could pose major problems for Western economies and military forces, and raise serious domestic political questions.<sup>3</sup>

The objective of the present paper is to identify the threats leading to potential energy crises in Europe; and to assess the level of different types of vulnerability, as well as the overall vulnerability of the European region, including threats to physical disruption, political motivations, higher energy prices, etc.

## **Energy Security and its Principles**

Under most strict terms, energy security is defined as the availability of reliable, affordable energy supplies in adequate quantities to satisfy demand and maintain economic growth. An expanded definition also includes notions of geopolitics, sustainability and social acceptability.<sup>4</sup> Perceptions regarding an acceptable level of energy security change over time primarily due to the nature of terms within the definition. There is no such thing as absolute energy security because the word security is itself a subjective term, so too is the concept of energy security.

Policy makers often think of energy security in terms of oil supply disruption and energy price volatility, which can wreak havoc on economic growth, as was the case during the 1970s oil embargoes, and create international tension. Energy security concerns today are still very much driven by the geopolitical dynamics of energy trade. Furthermore, current global energy trends are deriving great concern over the current system's long term stability. These trends include a strong growth in energy

demand from developing economies like China and India, concentration of oil and gas resources in a handful of regions, resource nationalisation and geopolitical tension over the development and consumption of increasingly scarce resources, and failure to invest in and protect energy infrastructure adequately.

According to the World Energy Council, energy security means reduced vulnerability to transient or long-term physical disruptions to import supplies as well as the availability of local and imported resources to meet the growing demand for energy over a period of time and at affordable prices.<sup>6</sup> Energy security is also defined as an uninterrupted supply of energy, in terms of quantities required to meet demand at affordable prices. The subject of energy security initially arose from concerns about the physical security of energy supplies. However, recent concerns have been focused on the economic conditions affecting those supplies. Physical risk will remain as long as energy supply has to rely on transportation and related infrastructure.

According to the International Atomic Energy Agency, energy supply security is defined as the means to having enough energy to meet the basic needs of the population and to make possible a certain level of development aspirations. Depending on national or regional circumstances, supply security concerns might include several, some times even divergent, considerations, for example, import reduction and diversification of energy sources.

At the same time, energy security has a different meaning for different nations. For producers, it would mean consistency and predictability of demand requirements; for consumers it would be the availability, reliability, affordability and securing the sources of supply. But, generally for most governments, it would mean securing supplies at predictable and stable prices to support economic growth, preserve national security interests, and meet consumer needs.

While oil dependence is an issue for oil importers globally, energy security concerns vary from country to country, depending on resource endowment, population distribution, economic makeup, the level of self-sufficiency in terms of energy and other factors. In this scenario, Europeans are increasingly reliant on imported natural gas from Russia; therefore, natural gas is an energy security priority for them.

The current energy security system was created in response to the 1973 Arab oil embargo to ensure coordination among the industrialized countries in the event of a disruption in supply, encourage collaboration on energy policies, avoid bruising scrambles for supplies, and deter any future use of “oil weapon” by exporters. Its key elements are the Paris-based International Energy Agency (IEA), whose members are the industrialized countries; strategic stockpiles of oil; continued monitoring and analysis of energy markets and policies; and energy conservation and coordinated

emergency sharing of supplies in the event of a disruption. The emergency system was set up to offset major disruptions that threatened the global economy and stability. It was not established to manage prices and the commodity cycle.

According to David Yergin, an expert on energy security, several principles underpin energy security:

The first is diversification of supply. Multiplying one's supply sources reduces the impact of a disruption in supply from one source by providing alternatives, serving the interests of both consumers and producers, for whom stable markets are a prime concern.

A second principle is resilience; a "security margin" in the energy supply system that provides a buffer against shocks and facilitates recovery after disruptions. Resilience can come from many factors, including sufficient spare production capacity, strategic reserves, backup supplies of equipment, adequate storage capacity along the supply chain, and the stockpiling of critical parts for electric power production and distribution.

The third principle is recognizing the reality of integration. There is only one oil market, a complex and worldwide system that moves and consumes about 86 million barrels of oil every day.

A fourth principle is the importance of information. High-quality information underpins well-functioning markets. On the international level, the International Energy Agency has led the way in improving the flow of information about world markets and energy prospects. That work is being complemented by the new International Energy Forum, which will seek to integrate information from producers and consumers.

The import dependency dilemma of the industrialized West can be gauged from the fact that the leading energy importing countries account for over 60 per cent of world GDP and less than 10 per cent of global energy reserves. The principal energy suppliers, while contributing around only 5 per cent to world GDP, control almost 75 per cent of global oil and approximately 65 per cent of gas

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reserves.

## **World Energy Outlook**

Today, oil supplies about 40 per cent of the world's total energy and 95 per cent of its transportation energy. As a result, those who own the lion's share of the reserves of this precious energy resource are at the driver's seat of world economy and their influence is steadily growing. Since the 1930s, the Middle East has emerged as the world's most important source of energy and the key to the stability of global economy. This tumultuous region today produces 37 per cent of world's oil and 18 per cent of its gas. When it comes to reserves, the Persian Gulf is the king. It is home to 65 per cent of proven global oil reserves and 45 per cent of its natural gas. The Middle East also controls a significant portion of the hydrocarbons that are yet to be

discovered. According to the US Geological Survey, over 50 per cent of the undiscovered reserves of oil and 30 per cent of gas are concentrated in the region, primarily in Saudi Arabia, Iran, Iraq, Kuwait, UAE and Libya.<sup>8</sup>

But, according to international estimates, reserves in non-Middle East countries are being depleted faster than those of Middle East producers. Their reserves-to-production ratio, an indicator of how long proven reserves would last at current production rates, is much lower; about 15 years; for non-Middle East, and 80 years for Middle East producers. If production continues at today's rate, many of the largest producers at the moment, such as Russia, Mexico, the US, Norway, China and Brazil, will in less than two decades cease to be major players in the oil market. At that point, the Middle East will be the only substantial reservoir of crude oil.

Reserves of coal are much more widely spread around the world, and coal is returning to centre-stage because it promises greater diversity of supply, and because technological advances like carbon capture and storage promise to make it a more viable option environmentally. Uranium reserves are also reasonably widespread and are located in more stable countries like Australia and Canada. The International Energy Agency expects global demand for oil to grow by 41 per cent by 2030. How supply will keep up with this demand is unknown: the IEA in its 2006 World Energy Outlook stated that "the ability and willingness of major oil and gas producers to step up investment in order to meet rising global demand are particularly uncertain."<sup>9</sup>

### **Threats to Global Energy Flow**

There are a number of threats to the flow of global energy. These include national instability and civil conflict; terrorism and asymmetric warfare; local and regional conflict; sanctions, embargoes; use of energy and investment as weapons; and attacks on shipping, pipelines, and key facilities<sup>10</sup> as well as the issue of choke points of energy.

There are several risks that could endanger the security of energy supply, e.g., exporting countries might use the threat of disruption to apply political pressure. Another risk is an energy price shock, followed by sustained higher prices and a negative impact on global economy. This situation could create a long-term supply/demand imbalance, with the probability of serious tensions in national and international markets. In addition, these threats can have environmental implications at local, regional and international levels.

The Arab oil embargo of 1973 demonstrated the danger of a conflict between suppliers and consumers, and Russia's withholding of natural gas from Ukraine and

Belarus shows that embargoes remain possible.<sup>11</sup> Apart from security of supply through the pipelines, there are also many chokepoints along the transportation routes of seaborne oil and, in many cases, liquefied natural gas (LNG) that create particular vulnerabilities: the Strait of Hormuz, which lies at the entrance to the Persian Gulf; the Suez Canal, which connects the Red Sea and the Mediterranean; the Bab-el-Mandeb strait, which provides entrance to the Red Sea; the Bosphorus strait, which is a major export channel for Russian and Caspian oil; and the Strait of Malacca, through which passes 80 per cent of Japan's and South Korea's oil and about half of China's. Ships commandeered and scuttled in these strategic waterways could disrupt supply lines for extended periods. Securing pipelines and chokepoints will require augmented monitoring as well as the development of multilateral rapid-response capabilities.

### **Energy Security Predicament for Europe**

EU members possess approximately 0.6 per cent of world's proven oil reserves and two per cent of proven natural gas reserves. The EU holds four per cent of proven coal reserves, and 18 per cent of electric generating capacity. The fossil fuel figures mentioned point out that not only is Europe, which is the hub of economic activity, dependent on imported energy resources, but the ones that it possess are depleting.

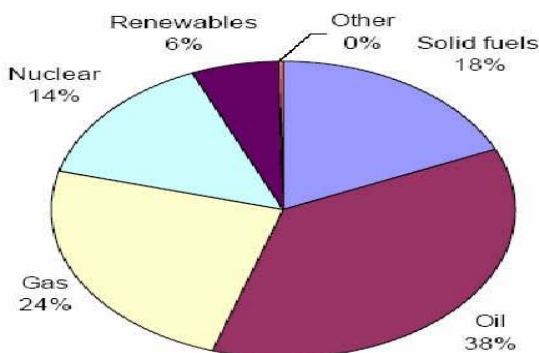
Historically, European countries have regarded energy as a domestic prerogative, but today the EU is involved in a broad-ranging energy debate aimed at building an integrated approach: tackling the EU's dependence on imported energy by diversifying the energy mix, expanding energy sources, and managing shortages more effectively, while also improving the conditions for EU companies' seeking access to global resources.<sup>12</sup>

Today, 80 per cent of the energy consumed by the member states of the European Union is provided by oil, natural gas and coal. The EU imports approximately 50 per cent of its energy needs. That figure is expected to rise to close to 70 per cent by 2030.<sup>13</sup> Europe is currently facing external and internal challenges in relation to energy provisions, ranging from pipeline disruptions to delays in implementing its own energy market. Other energy vulnerabilities faced by Europe include: under-investment (more of a challenge than a political issue); production increases foreseen only in non-OECD countries; high demand in Asia; and continued dependence on fossil fuels. All this will together increase the EU's dependence on oil to 94 per cent and on gas to 81 per cent of requirements.

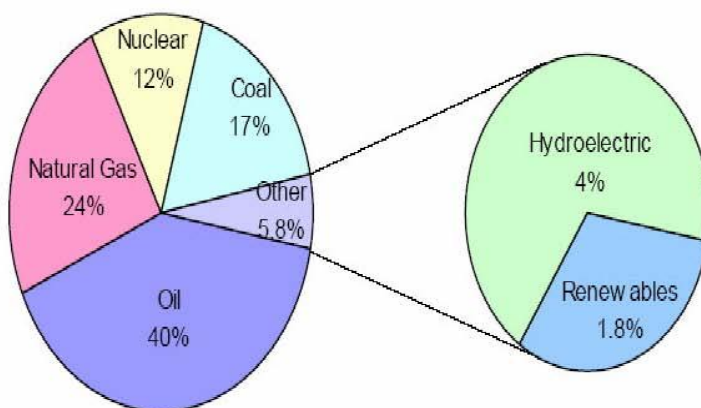
The only legal basis currently available for EU in the field of energy is the single market, as there is no community competence for energy policy. Energy still remains the domain of national competence. There also are limitations on what the European Commission can deliver and enforce. European integration began with energy: at the

time in 1950, it was all about sharing coal and steel in the long-contested region of Western Europe, but this helped trigger the broader process that resulted in the Treaties of Rome which included Euratom. The constitutional treaty (through Article III-256) would establish a better legal basis for a common energy policy, but that is conditional to the EU treaty being approved by all EU members.

### EU-27: Total Energy Supply



### EU Energy Consumption by Source -2005



### Policy Decisions at the EU Level

The external aspects of energy policy remain within the competence of EU member states' foreign ministries and a matter of national sovereignty. However, the Ukraine-Russia gas dispute in January 2006 shed a crude light over Europe's dependency on imports and on the shortcomings of keeping 25 (at that time, there were 25 EU member states) separate policies with external energy suppliers. On March 8, 2006, the Commission issued a Green Paper spelling out options to achieve

"sustainable, competitive and secure" energy supplies for Europe. One key aspect was to build a common external energy policy to co-ordinate relations with external suppliers such as Russia and OPEC countries.

On January 10, 2007, the European Commission adopted a communication which states that "energy must become a central part of all external EU relations". That was followed on March 8-9, 2007, by European Council conclusions featuring a two-year (2007-2009) action plan with recommendations for expanding and strengthening the EU's international energy relations. The key decisions of the EU summit in March 2007 can be summarized as a triple-20 formula. By 2020, the EU member states have committed themselves to:

- a. Reducing greenhouse gas emissions at least by 20 per cent in the framework of the Kyoto Protocol as compared to 1990.
- b. A 20 per cent saving on EU energy consumption compared to projection for 2020.
- c. A binding target of increasing the share of renewable resources in the EU energy mix to 20 per cent. The controversy over the role of nuclear energy, for instance, was solved by acknowledging its contribution in terms of security of supply and low carbon emissions, but without accepting its inclusion in the broader 'renewable'<sup>14</sup>target.

According to the European Commission, "energy supply security must be geared to ensuring the proper functioning of the economy, the uninterrupted physical availability at a price which is affordable, while respecting environment concerns. Security of supply does not seek to maximise energy self-sufficiency or to minimize dependence, but aims to reduce the risks linked to such dependence."

Oil has the highest energy vulnerability in Europe because the EU relies significantly on imports, and a substantial volume of imports comes from those regions considered to have a high geopolitical risk. But, at the same time, it is the security of supply for gas that is of urgent concern to the European continent because somehow or the other, the Middle Eastern region and the highest producers of oil in the region are under US and European influence. Recent history (over the past forty years) suggests that security of oil supply, therefore, may not become an issue for some time for Europe. However, the security of gas supply to the EU creates more insecurity because of its being supplied by Russia.

## **Geopolitics of Oil and Gas**

Political instability in and around countries considered marginal oil suppliers can cause major price spikes. That instability has created angst among oil importers and given even greater political power to oil suppliers. For example, when Turkey



threatened on October 17, 2007, to take its fight against the terrorist organization, the PKK, into Kurdish Iraq, oil prices jumped from \$87.40 per barrel to \$94.53 by the end of the month. Yet, Turkey is not an oil exporter; and Iraq produces only about three million barrels a day in a world market of 85 million barrels. Understanding the factors driving these fluctuations is at the heart of understanding the geopolitics of energy.<sup>15</sup>

The Arab oil embargo of 1973 demonstrated the danger of a conflict between suppliers and consumers. While the consumers had achieved adjustments at fairly low cost in 1956 and 1967, the situation in 1973 had changed fundamentally. The supply crises in 1956 and 1967 proved manageable because supplies were available from alternative sources, although admittedly at somewhat higher process: Venezuela, Iran and the US could step up their production by using excess capacity and divert some of it to the European countries affected by the supply interruptions.<sup>16</sup> In 1973, no standby capacity was available from alternative sources; nowhere near enough to make up the reduction the Arab oil producers decided upon. The intention to apply the oil weapon in the Arab-Israel context had long figured prominently in Arab thinking, and President Nasser of Egypt had proclaimed oil as one of the three components of Arab power.<sup>17</sup>

## **Energy Security and European Foreign Policy**

Yet, energy security also exists in a larger context. In a world of increasing interdependence, energy security will depend much on how countries manage their relations with one another, whether bilaterally or within multilateral frameworks. That is why energy security will be one of the main challenges for EU foreign policy in the years ahead.<sup>18</sup>

External energy relations are an intrinsic component of the EU's overall energy strategy as well as its own European Neighbourhood Policy (ENP). Europe's neighbours are vital to EU energy security, and the Union and its energy partners are closely linked through commercial relationships as well as bilateral and regional energy dialogues including Russia, Norway, Ukraine, the Caspian Basin, the Mediterranean countries, OPEC, and the Gulf Cooperation Council.

## **EU-Mediterranean Energy Cooperation**

The EU has been engaged with Mediterranean countries to promote regional economic integration and diversify sources and supply routes. In 2003, the EU, Algeria, Morocco, and Tunisia signed an agreement to integrate electricity markets.

Libya, Mauritania, and several sub-Saharan countries may be added in the future to develop new energy resources and the pipeline and infrastructure systems for energy delivery to European markets. The EU is pursuing the creation of a Euro-Mashrek harmonized and integrated energy market that would include the Balkans, Egypt, Jordan, Lebanon, Syria, Iraq, and possibly Israel and the Palestinian Authority.

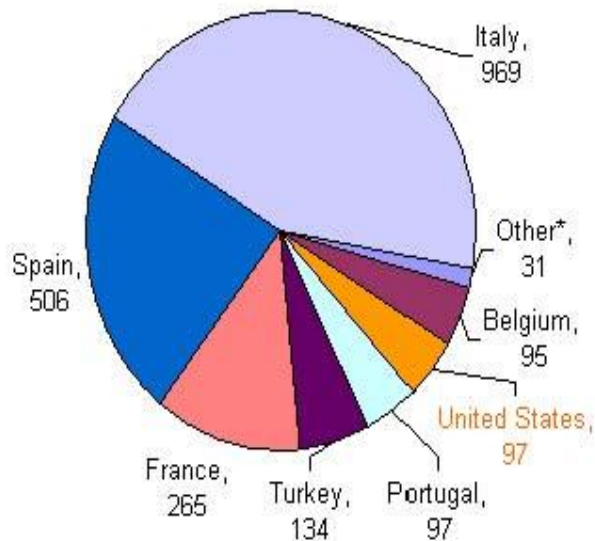
With the Southern Mediterranean neighbours, the EU had launched in 1995 the Euro-Mediterranean Partnership or the Barcelona Process, which draws together the EU-27 and ten countries in the south Mediterranean.<sup>19</sup> The objective is to gradually set up a Euro-Mediterranean free-trade area by 2010.

### *Middle East and Persian Gulf Countries*

The Persian Gulf countries (Bahrain, Iran, Iraq, Kuwait, Qatar, Saudi Arabia, and the United Arab Emirates) hold approximately 715 billion barrels (bb) of proven oil reserves, representing over half (57 per cent) of the world's oil reserves. The region produces about 31 per cent of world's oil. It is estimated that by 2020, the Persian Gulf region will produce about 35 million barrels of oil per day.<sup>20</sup> Also, Libya is estimated to hold 40bb and Algeria 12bb. In addition to its oil capacity, the Persian Gulf region holds an estimated 2,400 trillion cubic feet (tcf) of natural gas reserves, representing 45 per cent of the world total gas. Algeria is estimated to hold (161tcf), and Libya (52tcf).

The EU has the ambition to become a significant actor in the Middle East peace process and a stabilising agent for the region as a whole. Aside from its dialogue with OPEC,<sup>21</sup> the Commission has put bilateral cooperation agreements in place with the six Gulf states represented in the Gulf Cooperation Council (GCC). A free trade agreement with GCC states was put back on the negotiation table in 2001 after it was abandoned in the early nineties. The GCC states hold 45 per cent of world's oil reserves.

## Importers of Algerian Natural Gas – Billion Cubic Feet, 2005



Source: International Energy Agency

\*United Kingdom and Greece

### *South-East European Energy Community*

The treaty establishing the Energy Community of South East Europe (ECSEE) was signed in 2005. The ECSEE is a legally binding treaty covering the electricity and natural gas sectors. It is aimed at putting the signatory countries in line with EU energy legislation in order to establish an integrated market. Its members include Austria, Greece, Hungary, Italy and Slovenia on the EU side; and Albania, Bosnia and Herzegovina, Bulgaria, Croatia, the former Yugoslav Republic of Macedonia, Romania, Serbia and Montenegro, Turkey and Kosovo on the other side. The treaty is designed to satisfy the political and economic goal of stabilisation and development of South East Europe.

### *Baltic Sea Region Energy Cooperation (BASREC)*

BASREC was launched in 1999 by Denmark, Estonia, Finland, Germany, Iceland, Latvia, Lithuania, Norway, Poland, Russia, Sweden and the European Commission. Issues discussed include security of energy supply in the context of growing dependence on Russia, gas transit routes in the region, and progress on electricity and gas interconnections. Environment issues on the agenda include energy efficiency, climate change, and renewable energies such as bio-energy.

### *EU-Norway Energy Dialogue*

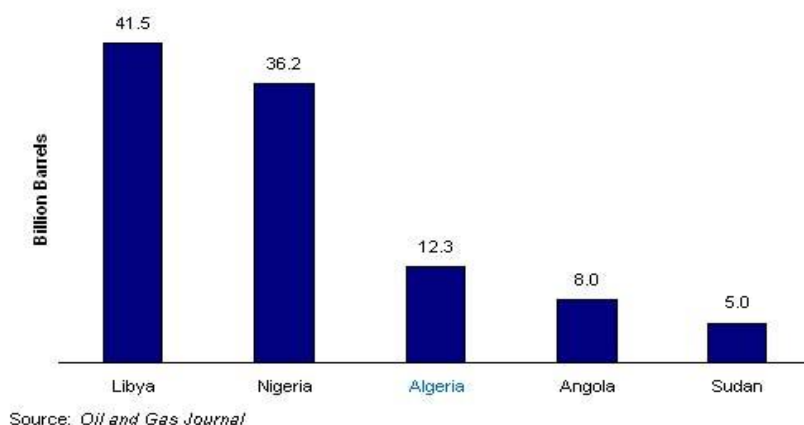
Norway is the world's third largest exporter of natural gas and a major supplier of oil and gas to the EU. A meeting between Energy Commissioner Andris Piebalgs and the Norwegian Minister of Petroleum and Energy on July 6, 2005, confirmed both

sides' interest to cooperate on energy issues. The two sides agreed to strengthen cooperation on energy efficiency, renewable energy, and security of energy supply, including exploration and production activities in the Arctic area. Agreement was reached that the Commission would join an informal forum established by Norway, the UK and Denmark to discuss issues related to the use of carbon dioxide for enhanced oil recovery and storage in the North Sea.

### *Africa*

With countries such as Angola and Nigeria now in the league of major global oil suppliers, other countries in the Gulf of Guinea are seeking to emulate their success. EU relations with the region have been centered on development cooperation with the Economic Community of West African States (ECOWAS), in particular on issues such as peace, security and good governance aspects with a strong emphasis on economic and trade integration. Since January 2007, representatives from both sides have been engaged in an intensive discussion on the possibility of creating an Africa-Europe Energy Partnership.

#### **Top 5 African Proven Oil Reserve Holders, 2007**



### **Geopolitics of Oil for Europe**

As already pointed out, the Persian Gulf countries (Bahrain, Iran, Iraq, Kuwait, Qatar, Saudi Arabia, and the United Arab Emirates) hold approximately 715 billion barrels (bb) of proven oil reserves, representing over half (57) of the world's oil reserves. The region produces about 31 per cent of world's oil. It is estimated that by 2020, the Persian Gulf region will produce about 35 million barrels of oil per day.<sup>22</sup> In addition, Libya is estimated to hold 40bb and Algeria 12bb. In addition to its oil capacity, the Persian Gulf region holds an estimated 2,400 trillion cubic feet (tcf) of natural gas reserves, representing 45 per cent of the world's total gas. Algeria is

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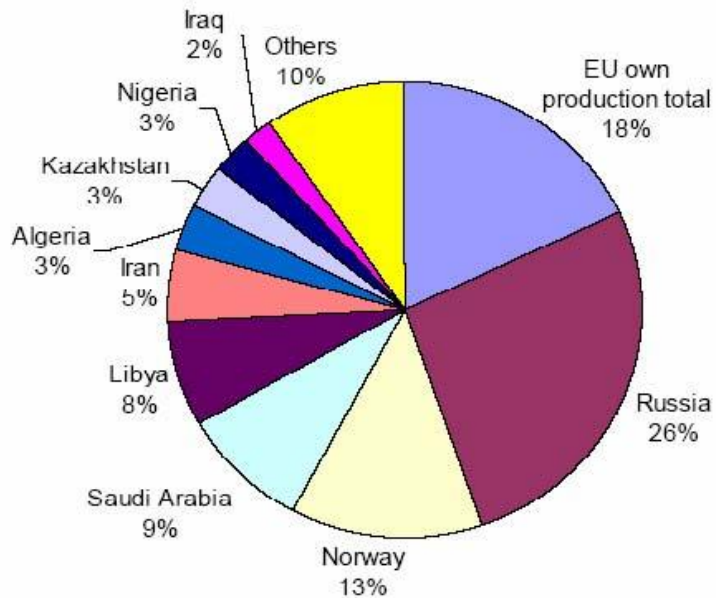
Europe already depends on the Middle East/North Africa region for approximately 30 per cent of its oil imports and 10 per cent of its piped gas. In 2005, Europe imported approximately 3.1 million b/day of oil from the region. The largest portion of that oil comes from Saudi Arabia, followed by Kuwait and Algeria. Europe's tertiary supplier of natural gas has been Algeria via two pipelines that enter Europe through Italy and Spain. A smaller amount comes from Libya via pipelines to Italy. Two additional gas pipelines from Algeria to Spain and Italy are under construction.

Perhaps the most important development for Europe in this region has been the growing availability of liquefied natural gas (LNG). Today, Europe consumes approximately eight per cent of world's total consumption of LNG. Spain and Italy are the primary importers of LNG. Europe's LNG infrastructure of terminals and re-gasification facilities is relatively modern, especially along the Mediterranean coast. Italy is currently engaged in a partnership with British Gas to build a modern facility in the port of Brindisi and has a plan for up to ten additional facilities. The principal suppliers of LNG to Europe include Algeria, Egypt, Oman and Qatar. Algeria is the world's third largest exporter of LNG with almost all of its gas (25b cubic meters) going to Europe. Recently, the Algerian national oil company, Sonatrach, signed a 20-year LNG supply contract with the Spanish power company Endessa.

European relations with the states of the Persian Gulf and North Africa have steadily improved over the years. EU's relations with North Africa were formalized in 1995 with the creation of the Euro-Mediterranean Energy Partnership. The EU has also created the EU-Gulf Cooperation Council (GCC) Dialogue with the states of the Persian Gulf, and has initiated a formal dialogue with the nations of OPEC. European energy companies have also become more involved in the Middle East.

Currently, the European region relies on two big pipeline projects which will reduce the region's dependence on Russia. The Caspian Pipeline Consortium (CPC) project connects Kazakhstan's Caspian Sea area oil deposits with Russia's Black Sea port of Novorossiysk. Oil loaded at Novorossiysk is then taken by tanker to world markets via the congested Bosphorus Straits. The Baku-Tbilisi-Ceyhan oil pipeline (BTC), which opened in July 2006, exports oil from Azerbaijan and up to 600,000 bl/d from Kazakhstan along a 1,040-mile route from Baku, Azerbaijan via Georgia to the Turkish Mediterranean port of Ceyhan. This will allow oil to bypass the Bosphorus Straits. There also are a few additional projects in which Europe could be involved.

#### **EU-27: Origin of Oil (2004)**



## European Dependence on Natural Gas

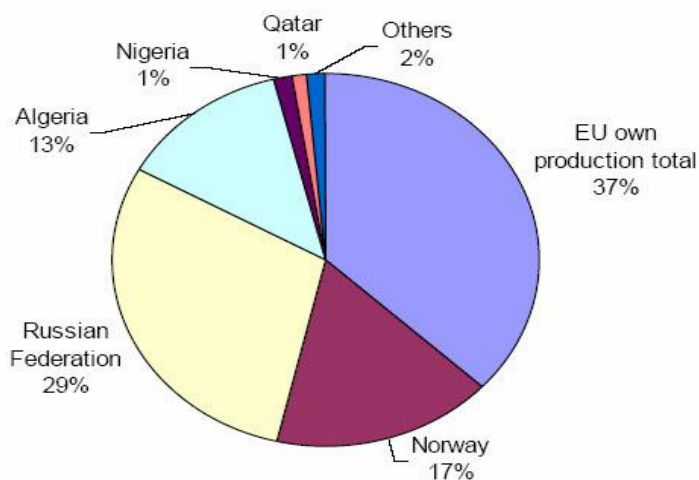
A significant energy development over the past several years has been the rapid growth in the global demand for natural gas. Natural gas has become an important source of energy in the EU, and virtually all scenarios foresee its share of the energy mix increasing in the coming decades. But, unlike oil, gas is extremely difficult and costly to ship via tankers; pipelines are the preferred method of transportation. Thus, if a supplier refuses to provide gas or charges an unreasonable price, the consumer cannot quickly or easily turn to another source. The consumer state would have no choice but to accept the supplier's conditions or go without natural gas, an option that is all but unacceptable for most.

Nevertheless, the relatively cheap cost, until recently, of natural gas has allowed the EU to reduce its oil dependency and limit CO<sub>2</sub> emissions, preventing an otherwise inevitable increase in greenhouse gases. In some cases, most notably in the UK, switching from coal to natural gas has also offered big economic advantages. However, recent increases in natural gas prices and the 'Ukraine incident' in January 2006 have raised questions about the virtues of natural gas and, in particular, concerns over the EU's relatively high dependence on imports of natural gas from Russia. In order to properly assess the natural gas supply situation and the necessary policy initiatives, a few facts are helpful:

Global natural gas reserves are relatively larger than oil reserves (proven gas reserves are 65 times' annual consumption versus 40 times' for oil).

Natural gas reserves are concentrated in a few countries (Russia, Iran and Qatar

account for 65 per cent), but many gas fields around the world remain untapped.<sup>23</sup>



*Source: European Commission DG TREN, Eurostat*

Europe's main indigenous sources of natural gas are in North Western Europe, onshore in the Netherlands and Germany and offshore in the UK and the Norwegian continental shelf. Most of these reserves have heavily been exploited and production is in decline in most areas. Norway is the only significant gas exporter of gas to Europe and the UK. The consumption of natural gas is expected to double over the next 25 years. Gas has rapidly become Europe's fuel of choice for power generation. The consumption of gas in Europe represents 17 per cent of the total world consumption. The EU as a whole currently receives slightly less than half of its natural gas from the UK, the Netherlands and other EU member states. Around 50 per cent of the gas consumed by the member states of the EU is imported.

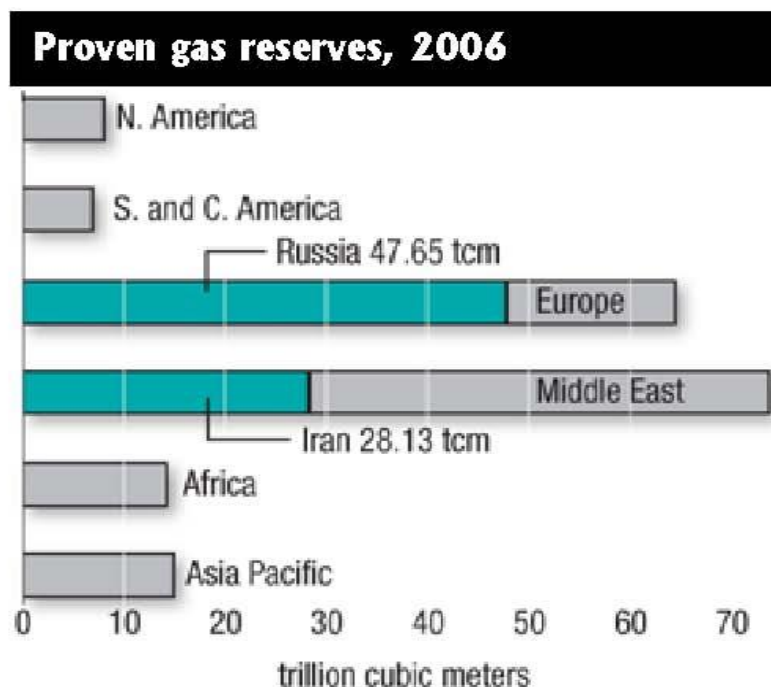
EU gas imports are expected to reach 80 per cent by 2030. Three countries; Russia, Norway and Algeria; provide Europe with the bulk of its gas imports. Russia currently provides 25 per cent of that imported gas, and that is expected to rise to over 30 per cent by 2015. Several EU member states are totally dependent on Russian natural gas for their domestic energy consumption. The following chart illustrates the levels of dependency on Russian natural gas in selected nations of the EU. Many new members are highly reliant on Russian energy imports and have a complex set of non-energy relationships and histories with Russia. This gives a new colour to the discourse on questions of gas trade, energy security and ownership of gas assets.

Of the gas imported from outside the European region, two thirds come from the Russian gas giant, Gazprom – the world's largest producer of natural gas. Some 80 per cent of it is carried by the Ukrainian pipeline network, the rest of it through a smaller pipeline crossing into Poland and Germany via Belarus. Most of the rest of the gas

imported by Europe comes from Algeria.<sup>24</sup> A number of countries, including Belgium, Ireland, Portugal, Spain, Sweden and the UK, import no gas from Russia. Norway and Denmark are entirely self-sufficient and do not import gas from anywhere.

Some of the biggest importers of Russian gas include Germany, Ukraine, Italy, Turkey and France. The countries of Central and Eastern Europe are among the most dependent on Russian gas. The countries that are most dependent on Russian gas in Europe due to geographical reasons as well as the availability of network of pipelines<sup>25</sup> available include Slovakia, Finland, Bulgaria, Lithuania, Greece and Austria.

Country	Dependence on Imported Gas, 2005	Total Gas Consumed, Imported from Russia
Austria	88%	74%
Czech Republic	98%	70%
Estonia	100%	100%
France	98%	26%
Finland	100%	100%
Germany	81%	39%
Italy	85%	30%
Poland	70%	50%



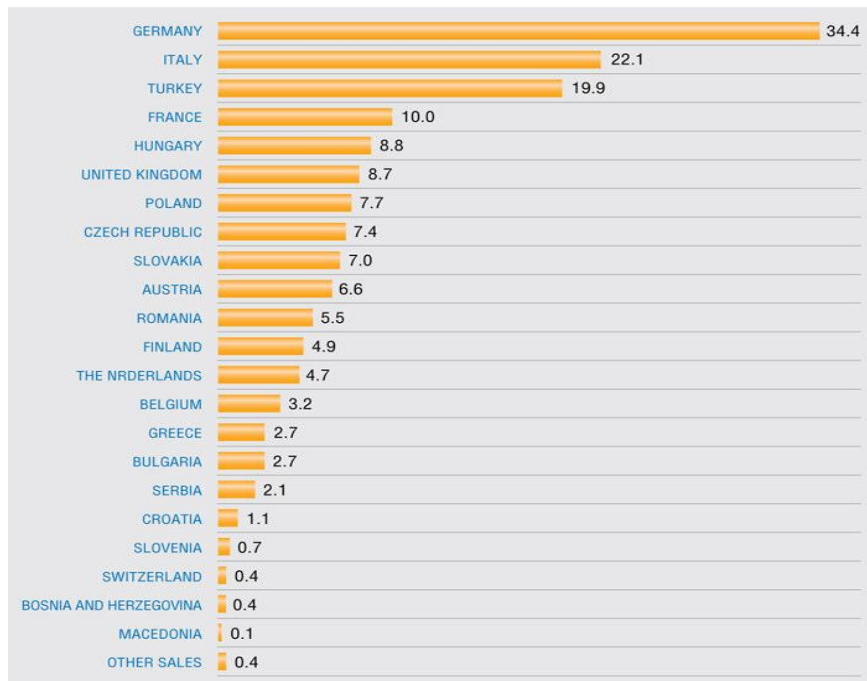
Source: Energy tribune



## GAZPROM and European Gas Market

Owing to its geographical proximity to Russia and the dominant position of Russian gas, the European gas market continues playing an important role in the export policy of Gazprom. In 2006, Gazprom's natural gas sales to European countries accounted for RUR (Russian Rubbles) 161.5 billion, marking an increase of 3.5 per cent as compared to 2005.<sup>26</sup> Gazprom supplies approximately one-third of Western Europe's total gas imports. The major consumers of Russian gas are Germany, Italy, Turkey and France.

### Gazprom Group Sales to Europe



### Diversification of Natural Gas Routes to Europe

The major gas pipeline routes from West Siberian gas fields to West European export markets run across Ukraine (over 80 per cent of overall gas exports to Europe from Russia). Russia wants alternative routes for the gas it sells to Europe to reduce its reliance on routes through Ukraine and Belarus, where pricing disputes and concerns over inadequate infrastructure risk interrupting supplies. At present, the Yamal-Europe gas pipeline has been completed (the pipeline's annual capacity exceeds 30 billion cubic metres).

- **Blue Stream** commissioned in late 2002 and intended for direct gas supplies to

Turkey across the Black Sea (annual capacity – up to 16 bcm) has become another important export through-passage of Gazprom.

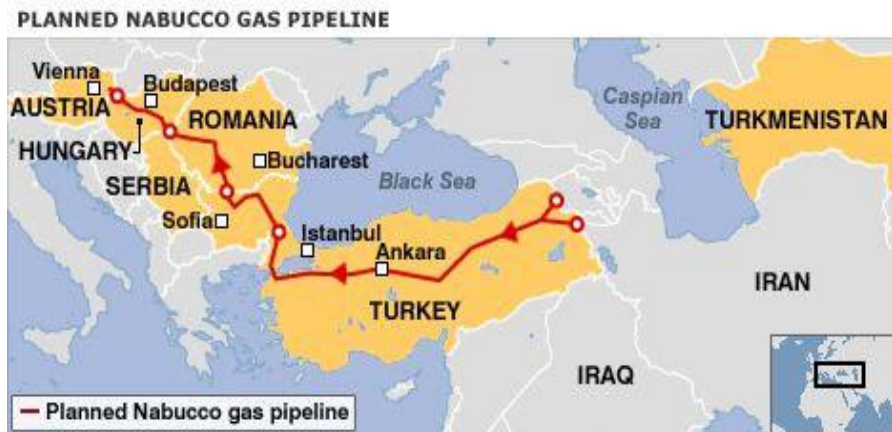
### Blue Stream/Russia-Turkey Gas Pipeline



**Nord Stream** gas pipeline will be a fundamentally new export route for Russian gas to Europe (the annual design capacity of two lines will account for 55 bcm). The gas trunkline will cross the Baltic Sea with no transit country's involvement, thus enabling to reduce transportation fees and to ruling out possible political risks. The target markets for gas supply via Nord Stream are Germany, the UK, the Netherlands, France, Denmark and other countries.

**South Stream** South Stream's route or routes into Europe, once it crosses the Black Sea into Bulgaria, have not been finally agreed. Hungary, Greece and the Balkans are all possibilities, as well as Italy. The South Stream is projected to carry 33bn cubic meters of gas a year to south and central Europe.

**Nabucco Pipeline** The EU-endorsed Nabucco pipeline (to be started in 2009 and completed in 2012) will ship natural gas from the Caspian region, via Turkey and Bulgaria, to Austria for sale in Europe. A look at projections for future gas supplies demonstrates the predicament. By 2030, Europe will depend on foreign producers for 85 per cent of its gas, a big jump from the current 57 per cent. Further, many European countries are uncomfortable with their reliance on Russian gas giant Gazprom, and are eager to find other suppliers.



## Renewable Resources and Europe

As a solution to being an energy import region, renewable energy technologies (solar, wind, tidal, biomass, geothermal and hydro) are in the process of being developed in Europe. But, these will meet only some of the extra demand. Nuclear

energy is another part of the answer. In the countries of the EU, 35 per cent of electricity was generated by nuclear energy in 2005. France holds the top position with a share of 78.5 per cent, followed by Lithuania with 70 per cent, Belgium and Slovakian Republic with 56 per cent, and Sweden with 46.7 per cent.

The ITER project on nuclear energy is an example of the important long-term energy partnership between EU and Russia. In the past, nuclear energy based on fission appeared to be the way forward; now, however, controlled fusion seems to be a major promising development. ITER is an international project to design and build a fusion reactor involving the EU, China, India, Japan, Russia, South Korea, Switzerland and the United States, under the auspices of the International Atomic Energy Agency (IAEA). The project, which is based in southern France, is expected to cost 10 billion US dollars. Controlled nuclear fusion promises to be environmentally benign, widely applicable and inexhaustible, and it is hoped that it will result in centralised, inexhaustible nuclear energy generation in the latter half of this century.<sup>27</sup>

The fact that nuclear power generation does not produce carbon dioxide is increasingly relevant to its role in the European energy mix. The European Commission also recognises that Europe cannot make any significant impact on carbon dioxide emissions without relying on nuclear energy.

## **Conclusion**

Russia is clearly more dependant on gas exports to the EU (which account for close to 100 per cent of its income from such exports) than the EU is dependant on imports from Russia. Concerns that Russia might decide to reorient its gas exports towards China or Japan are unjustified. East Siberian gas will find markets in the Far East, but West Siberian gas (the source of current exports to EU) will become a commercially attractive alternative only when East Siberian gas has been fully exploited. Exporting West Siberian gas to China would require huge investments in new pipelines.

Natural gas still faces strong medium-to long-term competition from other energy sources (coal, nuclear, wind and biomass), particularly for electricity generation. The current price of EU gas imports (over €200 per 1,000m<sup>3</sup>) is already making natural gas uncompetitive for future base-load electricity generation, probably even compared to coal with CO<sub>2</sub> capture and storage. The EU is geographically well-situated as a natural gas importer. There is no other attractive market for the big gas deposits in Russia, Middle East, and North Africa. Gas imports (LNG) from West Africa (Nigeria) might go to the EU as well as to North America. Against this backdrop, it is justified to conclude that when European natural gas production slows down over the next 20 years and consumption rises from the current 500 bcm to 650 bcm, the gas

required will be available within a reasonable distance of the EU's main centres of consumption.<sup>28</sup>

The other problem that Europe faces in terms of energy is the issue of unbundling and the introduction of internal energy market reform. The internal market report and sector enquiry shows that certain companies control energy networks as well as production or sales, protecting national markets and preventing competition. Such a situation also creates a disincentive on vertically integrated companies from investing adequately in their networks, since the more they increase network capacity, the greater the competition that exists on their "home market" and the lower the market price.

At the same times, most of the large companies like Eon and RWE of Germany, Gaz de France, Eni of Italy and OMV of Austria are part of the Gazprom network or are shareholders in supply of gas to Europe, and in most cases do tend to bypass the Central European and Baltic members of Europe, putting them at a disadvantage. For example, the EU's two largest importers of gas are Germany's Eon and Italy's Eni. They have also signed up to build the Nord Stream and South Stream pipelines to carry this gas more directly to their markets, thereby making the EU's central European members (most of whom are wholly dependent on Russia for gas) nervous about being bypassed. According to the Energy Policy for Europe, ownership unbundling (where network companies are wholly separate from the supply and generation companies) is to be introduced.<sup>29</sup> But, of course, that is not an easy task. How successful the implementation of this policy would be, has yet to be seen.

But, as far as Western European companies are partners with Gazprom to bringing gas to Europe, there does not seem to be any substantial threat to gas supplies. Unfortunately, however, the Baltic states and other Eastern European countries may have to face Russian gas cuts from time to time. In addition, the mechanisms to ensure solidarity between member states in the event of an energy crisis are not yet in place, and several of them are largely or completely dependent on one single gas supplier. That puts the new EU member at risk of energy insecurity. As with EU's foreign policy, good relations with the neighbouring regions are already transforming into better energy access for Europe in the future.

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