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Energy in the Mediterranean and the Gulf Opportunities for Synergies

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Abstract

Mediterranean is expected to play an increasingly important role in global energy flows which might result in a greater European dependence on North African supplies and less on the Gulf. At the same time, potential synergies are said to exist in such fields as the development of renewable energy sources, and investment required to meet domestic electricity demand. As far as oil and refined products are concerned, the volume and direction of oil flows to and through the Mediterranean will be important, especially as an expected rise in transport in the near future contains serious security implications. As a result, an increased focus on the development of a pipeline network between the Mediterranean and Europe might open possibilities for Gulf involvement. The same could apply for the supply of natural gas to Europe. In the field of power generation, the improved ability to transmit electricity over longer distances opens the door for establishing a continuum of interconnection from the Gulf to Europe through the Mediterranean and the ability to serve markets along those connections. Finally, the rapidly rising awareness of the need for renewable energy sources suggests an additional field of cooperation.

Keywords: *European Union / Energy Politics / Oil / Natural Gas / Regional Relations / Mediterranean Region / Gulf Countries*

Energy in the Mediterranean and the Gulf
Opportunities for Synergies

by Naji Abi-Aad*

The Mediterranean is expected to play an increasingly important role in global energy flows in the coming decades. European oil imports from Russia, Central Asia and North Africa are expected to increase in the context of an overall stagnation of European oil consumption. This might mean less but still considerable volumes of oil from the Gulf would come into Europe.

For natural gas, Europe's desire to diversify from what is perceived as an excessive dependence on Russia would play in the hands of Gulf exporters of liquefied natural gas (LNG), among others, at a time when supplies from the North African coasts are expected to be stable, if not declining. Prospective pipelines linking the Gulf to Europe would notably strengthen their gas ties.

Important potential synergies between Europe and the Gulf exist in the development of renewable energy sources, especially solar and wind energies, and in investment required to meet domestic electricity demand, which is growing very rapidly in every Gulf country. Several innovative technologies for power generation have been sought by Gulf States, including coal and nuclear energy, with the aim of leaving oil for export and the scarce natural gas for petrochemical feedstock use.

1. Crude Oil & Refined Products

Most projections about oil supplies over the next two decades suggest the role of the Organisation of Petroleum Exporting Countries (OPEC) to increase, and specifically that of the Gulf suppliers, which includes the six member countries of the Gulf Cooperation Council (GCC), namely Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates (UAE).

However, considerable disparities are found in the details, regarding the speed and extent at which increasing supplies from the Gulf will be needed or observed. In fact, future oil supply and export from the region will be shaped not only by global oil demand and the strategies of consuming countries, but will also — and perhaps more significantly — be affected by the future oil supplies from the other sources, including

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Russia, Central Asia, West Africa, and other non-Gulf OPEC countries such as Nigeria, Venezuela, Libya, and Algeria.

Many other key factors should be affecting the prospects for oil supply and export from the Gulf. Those include proven reserves, undiscovered resources, supply costs, oil prices, government policies, industrial development, and especially the level of investment realised not only for expanding production capacity and export infrastructure, but also for maintaining the existing ones.

The huge oil reserve base in the Gulf is a well-known fact of the global petroleum industry. According to the latest issue of the BP Statistical Review of World Energy, the six GCC countries contain huge proven reserves of crude oil, estimated in early 2009 at around 498 billion barrels, representing about 40 per cent of the world's total (while the region's population represents less than 1 per cent of the global one). The average reserves-to-production ratio for Gulf oil, a measure often used as an indication for near-term supply capability, was estimated in the year 2008 at 73 years, compared to a global average of 42 years.

When evaluating the undiscovered petroleum resources in the region, the United States Geological Survey (USGS), the only public source estimating those resources around the world, argued through its latest figures released in the year 2000 that the GCC has an undiscovered crude potential of some 162 billion barrels (mean), or around 17 per cent of the world's total.

Oil development and production is a relatively cheap undertaking in the Gulf, which has the lowest average production cost in the world. Likewise, the investment required to raise oil production capacity in the region is much less than in many other parts of the world, although it has been growing steadily in recent years, necessitating considerable amounts of capital.

Moreover, every GCC country enjoys free and unrestricted access to the open sea, with an extremely well-elaborated export pipeline infrastructure, linking oil and gas fields and reservoirs with petroleum marine export terminals and loading platforms.

In contrast to those positive factors, the GCC share in global oil production (less than 23 per cent in 2008) is much lower than its share in world total reserves. Oil reserves in the Gulf have been underexploited when compared to those in North America, Europe, and Russia. This state of affairs shows no sign of changing, although there is little doubt that the existing reserve base in the Gulf would allow for much higher production levels.

However, basing an extrapolation of future Gulf production and exports on reserves, geology, and production potential is fundamentally wrong. Basing the same on production trends in recent years is equally incorrect. That was recently shown during the 2003 war in Iraq, when Saudi Arabia alone increased its production by close to 2.5 million barrels per day — equal to the total production level that the Caspian region is now yielding, after 20 years of lengthy negotiations and billions of dollars of investment.

When looking at the oil markets of the European Union (EU), GCC producers face strong competition there from Russia, Central Asia, and Iraq, and especially from Mediterranean riparian producers, notably Libya and Algeria. In fact, the rapid development of North African petroleum resources following the recent political détente with Tripoli has helped alleviating the competitive weakness of Europe in securing adequate imported oil (and gas) supplies.

European oil imports from Russia, Central Asia and North Africa are thus expected to increase in the context of an overall stagnation of European oil consumption. This may mean that less oil from the Gulf would come into Europe. Gulf oil would rather be primarily directed to the emerging economies of Asia, whose demand is to rapidly increase, and to North America.

Thus, the EU-GCC oil exchanges are clearly influenced by three main factors:

- the fact that oil reserves in the GCC are exploited less intensely than in other oil producing countries, as manifested by the fact that the Gulf share in global production is much lower than that of its reserves (23 per cent as opposed to 40 per cent);

- the fact that the EU is the preferred destination for oil from Russia, Central Asia, and North Africa, primarily for logistical considerations, while Gulf oil is mostly directed to Asia and North America; and

- the fact that the EU is diversifying its primary sources of energy, relying relatively less on oil and more on natural gas and coal.

These factors have limited the direct European dependence on Gulf oil exports. But considering that the market for oil is global, the EU will still be reliant on GCC oil production and exports, although indirectly, because the latter are essential to the orderly function of the global oil market, and because the Gulf producers are the marginal suppliers of world oil.
On the scene of refined products, the push by many GCC countries to build new oil refineries in the region has been hit by delays, surging costs and gloomy demand prospects. Gulf States have had to go back to the drawing board on a number of projects, and revamp planned scopes. But so far none of the many new refineries planned for the area has been scrapped. In fact, despite fears that the recent economic and financial crisis and the ensuing recession is eroding demand growth, GCC national oil companies are continuing with most of their downstream expansion plans.

There is a need to better understand which portion of that increase in Gulf refining capacity has been dedicated for export, and to which destinations. The GCC has maybe to synchronize that refining export capacity with the expected needs in consuming countries, including the European markets. This issue may be of significant interest and an area for discussion and coordination between the EU and the GCC.

Trade of crude oil and refined products between the GCC and the EU will continue to play a decisive importance on the volume and direction of oil flows to and through the

Mediterranean. GCC oil flows beyond Europe (especially to North America) are also impacting the transit role of the Mediterranean. Whether it is in the best interest of the riparian countries to see the Mediterranean being used for long-haul oil transit to serve the North American market remains an open question.

In view of the several accidents involving maritime hydrocarbon transportation and the particular vulnerability of the Mediterranean Sea, the already heavy maritime oil transport across the sea and its straits, expected to further increase in the future, is causing serious concerns. Preoccupations are routinely expressed concerning the vulnerability of passage through the so-called “dire straits”, which in turn has led to several proposals for by-passes and alternative logistical arrangements, in particular for reducing the oil flows through the Strait of Hormuz.

An option, if it is shown to be technically, economically and environmentally feasible, would be to consider reducing the maritime oil transportation in the Mediterranean by developing pipelines. In fact, the EU has already expressed the desire to reduce dependence on tanker transport of oil across the Mediterranean, and favour instead more reliance on pipelines.

Nevertheless, all those export outlets and supply and logistic chains remain vulnerable and highly exposed. That fact attracted increasing attention, especially when adding to it the actual or perceived geopolitical factors and security threats. All that could lead to a cooperative EU-Gulf approach towards building strategic stocks.
In the Gulf oil producing countries, the potential for carbon capture and sequestration (CCS) is very significant. CCS is appealing to the GCC hydrocarbon producers where existing petroleum fields offer an excellent opportunity for carbon storage, with the added advantage that the injection of carbon dioxide (CO2) is also a form of enhanced oil recovery (EOR), used in the ageing oil fields in the region.

The impact of CCS on the establishment of energy intensive industries, favouring proximity to fields that facilitate storage, is very important, especially in the process of industrial development. Interest in CCS also means that the GCC countries should have a strong awareness about the market for carbon rights, sponsored by the EU, and in the recognition of CCS as an accepted form of emission reduction, generating tradable Certified Emission Rights (CERs) under the Clean Development Mechanism (CDM) of the United Nations.

GCC producers can well collaborate with the EU for developing CCS related actions, such as promoting projects for CO2 infrastructure development at country level, or building up CO2 storage sites and pipelines for multi-user access. The potential for CDM projects in the GCC countries could well be another item under the umbrella of EU-Gulf synergies.

2. Natural Gas

The Gulf region enjoys a large gas resource base, especially when compared to its current and foreseeable level of demand. While the area historically played a marginal

role in the world gas market (mostly in the South-East Asian markets), its growing potential as a major international gas region has been increasingly recognised.

The GCC holds huge proven natural gas reserves, estimated at the beginning of 2009 by BP Statistical Review of World Energy at an aggregate figure of 43,120 billion cubic metres. This accounts for around 23 per cent of the world's total. A major portion of those reserves is concentrated in a small number of giant fields, a fact making the development of those structures easier and cheaper. Nevertheless, the size of proven gas reserves widely differs from one GCC country to another, from a low of 90 billion cubic metres in Bahrain to a large of 25,460 billion cubic metres in Qatar, mostly located in its North Field, the world's largest non-associated gas field.

In the GCC, the average reserves-to-production ratio for natural gas is extremely high, estimated at around 169 years in 2008, when compared to the global average of 60 years. It is also interesting to note that the total proven reserves of natural gas in the region, as estimated in early 2009, are alone sufficient, even if no further discoveries were made, to satisfy current worldwide gas demand for more than 14 years.

However, most of the proven gas reserves in the GCC — with the exception of those found in Qatar — are in associated form, found and eventually produced together with oil. Natural gas output in these countries is thus closely linked to that of crude oil. That leaves, in the GCC, only Qatar with a huge scope for expanding gas output and export.

When looking at the potential resources in the Gulf, most of the analysts working on the region believe that enormous resources of natural gas are still to be discovered there, considering that the emphasis was historically on oil exploration, and that natural gas reserves in the area have been underestimated to a large extent. According to the USGS in the year 2000, the total undiscovered gas resources in the six GCC countries amount to around 23,309 billion cubic metres (mean), or nearly 16 per cent of the world's total.

Considering the enormous potential of natural gas in the Gulf, little has been done so far to exploit its reserves. Gas production in the GCC is still of minor importance when compared to the region's reserves and output potential. Gas production in the area represented just 8.3 per cent of the world's total in 2008, when the region produced only 0.6 per cent of its gas reserves, compared to the world's average of 1.7 per cent. Therefore, the growth of the gas industry in the Gulf can be considered to be still in its early stages.

The growing domestic gas consumption in the GCC has partly driven the gas development there; only exports to the major consuming zones will allow the region's vast reserves to be fully utilised and valorised. Moreover, growing local gas demand in the area will in no way hinder the capacity of the Gulf to export increasing gas volumes into international markets.

In 2008, the GCC had still a marginal share (around 9.2 per cent) in the international gas trade, mainly comprising LNG exports from Qatar, Oman and Abu Dhabi to European and especially Asian markets, and piped volumes from Qatar to the UAE and Oman (through the Dolphin pipeline). The share of the GCC in the international LNG

trade was around 26 per cent, with Qatar accounting for nearly 68 per cent of the gas exported from the region.

The GCC, and especially Qatar, is keen to play a key and growing role on regional and international gas markets in the near future. Indeed, that country has the strong will, supported by vigorous and dynamic policies aimed at expanding its natural gas exports, while being blessed by a low cost of production and a strategic geographical location in relative proximity to the major markets of Europe and Asia. Consequently, Qatar, already the world's largest LNG exporter, will see its annual LNG exports increasing from around 40 million tons in 2008 to some 77 million tons by late 2010.
In the other GCC LNG producers, namely Abu Dhabi and Oman, the lack of gas feedstock, due to modest non-associated gas reserves and growing domestic demand, has led to the underutilisation of their gas liquefaction plants, a situation that is not likely to change in the future.

Although there is no doubt that the GCC will play a growing and crucial role in regional and international gas markets, many challenges have to be faced by the its gas exporters, especially the medium and long-term impacts of the recent global economic and financial crisis on gas demand and prices.

In addition, natural gas has been suffering from the emergence of competitive energy sources, such as unconventional gas, the development of which is rapidly spreading from its strong base in the United States to Europe (Germany), Asia (China and India) and Australia, and from the development of clean coal technologies that would enhance the exploitation of the huge coal reserves found all around the world.

Meanwhile, the Gulf has been facing a growing competition from other LNG developers, especially from within Asia, its main LNG market niche. That rivalry is likely to become intense, with the aim to secure the earliest possible place in the Asian gas market, and with projects trying to avoid being delayed, having also in mind that long distance gas pipelines would eventually compete with LNG.

Facing all those actual and potential problems, the target for Gulf expansion has been oriented into old/new opportunities in Asia, which the Gulf is confident will remain for decades from now its main gas export niche, especially if only part of the energy demand resulted from the growing economic activities in the region was fulfilled by natural gas. Gulf gas producers have also focused on European markets.

There, in the EU, medium and long-term energy outlook show an increase in natural gas demand, although that growth would be much lower than that seen in the region during the past three decades. Some analysts do even believe that the growth in the European gas demand is far from certain. In fact, the increase in the power demand for gas, which is the main driving force for the steep rise in European gas consumption, could well be challenged by the call on coal, especially if an environment-friendly coal technology became widely available, and if the gas prices stayed into their relative high levels, by following those of oil.

Having said that, there is little doubt that the main existing external gas suppliers to the EU countries, namely Russia, Norway and Algeria, will continue to meet most of the

incremental European demand, and to remain the main pillars of natural gas supply to the region. Indeed, those gas exporters are already tied to the European market by transportation infrastructure, notably pipelines, which are currently in the process of being expanded. They therefore enjoy a very significant advantage for satisfying additional European demand. It is in fact much easier to increase the capacity of an existing pipeline than to build one from scratch. And it is much easier for an established supplier that already has sales in a market to decide to build an entirely new pipeline, than it is for a new supplier that has no market share at all to build its first pipeline. New gas suppliers will then have substantial barriers to overcome before acquiring weight in the EU gas market.

While taking those facts into consideration, the EU is well decided to diversify its sources of gas supply. A recent communication by the EC on the security of gas supply underscores the political will that exists to enhance the prospects for gas trade with new suppliers, including the Gulf countries. In that communication, the European Commission clearly declared that the EU has a common interest in continuing and deepening the development of strategic relations with external suppliers and transit countries in order to mitigate both political and technical risks associated with future supplies to the EU and to ensure multiple import pipelines supplying Europe.

In fact, diversifying the LNG supply sources and connecting other producers to the European gas network have to be priority objectives, because if things were left to the market, the outcome is almost certain to be simply an increasing reliance on consolidated suppliers in the short-and even long-term. However, the end result would be a tight oligopoly, and consequently relatively higher prices, diminishing to almost nil the positive impacts of the under-established competitive gas market in the EU. Europe would become even more dependent on barely three countries.

New and prospective gas exporters to Europe particularly include the Gulf producers, especially Qatar, but also the Central Asian countries, from which several pipeline projects (such as Nabucco) have recently been considered. Other suppliers clearly comprise Mediterranean producers, such as Libya and Egypt.

Libya, which is already linked to the European gas network through the Green Stream pipeline to Italy, could see its gas exports growing in the future if additional gas reserves were found and developed in the country. That would also lead to increased LNG exports from its liquefaction plant.

In Egypt, where two liquefaction plants are already supplying European markets with LNG, and from where the Arab Gas Pipeline (AGP) originates to supply the East Mediterranean Arab countries (Jordan, Syria and Lebanon), serious doubts have been raised about the medium- and long-term gas export capabilities of the country.

In fact, Egyptian gas reserves are relatively modest compared to the country's gas export plans and its rapidly growing domestic needs, with the government highly encouraging the use of natural gas in substitution of petroleum products in almost every economic sector. That recently led Cairo to prioritise the allocation of natural gas for domestic use and industry against exports by imposing a moratorium in mid-2008

(for an initial two-year period) on new gas export deals. This situation would only change if major new gas reserves were discovered there.

Back to the Gulf, and while increasing its LNG exports to Europe may well contribute to the diversification of EU gas supplies, a more competitive European gas market requires the establishment of physical pipeline links with the GCC, either directly or through connections with the various existing and planned gas pipelines around the Mediterranean, such as the AGP and Nabucco. Indeed, it is extremely important for the holders of the Gulf large gas reserves to build strong physical links with one of the main markets for natural gas in the world.

A salient feature of all pipeline projects from the Gulf to Europe is that they must first land in Turkey. Turkey is also the essential bridge for many gas export schemes from other countries or regions, which are ultimately aiming at reaching the EU market. Turkey is — in and of itself — a rapidly growing and important gas market.
With respect to LNG transit, it is important to emphasise the central role of Egypt and its Suez Canal, which has to be transited by every Gulf LNG carrier to Europe. If Gulf LNG directed to the United States would also transit the Mediterranean, LNG shipments of 40-60 billion cubic metres/year across the Suez Canal and the Mediterranean could easily be envisaged for 2020. Those volumes could eventually reach 100-150 billion cubic metres/year by 2030.

3. Power & Water

Many GCC countries are still at a stage of development where rapid GDP growth translates into large increases in the demand for electricity and desalinated water. As economic development proceeds, increased urbanization and industrial expansion will lead to even higher demand for those vital products, estimated to grow at an annual average rate of 7 per cent over the next 15 years.

As a result, the capacity of power generation and water generation in the region is expected to more than double within the next 12 to 15 years. The additional power generation capacity for the period 2007-2011 alone, some 14 gigawatts (GW) above the current estimated level of 65 GW, translates into a 5-year cumulative investment of about US$25 billion. Over the next decade, Saudi Arabia only would invest around US$80 billion for expanding its power generation and transmission sector. All that would widely open the door for opportunities for EU involvement in the Gulf power investment, in capital terms, as Independent Power Producers (IPPs) or through other forms, or by transferring the latest power technologies, not only for electricity generation but also for power transmission and interconnection.

One of the power generation technologies sought by the countries of the Gulf is the nuclear energy. By looking at ways for establishing a nuclear component to their power generation fleet, GCC countries aim at leaving oil for export and natural gas (which is in deficit in many countries there) for petrochemical feedstock use.

In the field of nuclear energy, Europe is obviously a potential technological partner. The EU has significant competencies in the nuclear field, directly derived from the

EURATOM treaty. Thus, nuclear energy offers an evident and important, if delicate, area for cooperation between the EU and the Gulf, not only for generating power generation, but also for desalinating water.

In fact, according to the World Nuclear Association's website, small and medium sized nuclear reactors are also suitable for water desalination, through the use of low-pressure steam from the turbine and hot sea water feed from the final cooling system.

Clean energy technologies, especially those related to the economic and efficient use of coal in power generation and water desalination would constitute another area of synergy between the Gulf and the EU where many countries have been using coal for centuries and are now developing cleaner coal technologies. In fact, with some countries in the Gulf experiencing constraints in gas supply, there has been a tendency to think of coal as an alternative fuel for firing their new power plants. This is especially true for Oman, and to a lesser extent for Abu Dhabi.

In the field of power transmission and interconnection, the benefits of interconnecting national electricity networks have been well valued in the GCC, and as a result a regional grid is in the process of being established. However, the limited surplus of generation capacity currently available and the coincidence of peaks in member countries will make it difficult to fully exploit the benefits of a GCC power grid.

Nevertheless, power interconnections beyond the GCC itself, with other Middle Eastern and North African countries, are envisaged, thus potentially establishing a continuum of interconnection from the Gulf to Europe through the Mediterranean electricity ring. Together with the improved ability to transmit electricity over longer distances, conditions would be created under which centrally located generation capacities may serve alternative markets situated all-around, exploiting hourly or seasonal differences in peak load demand. In that field of power transmission and interconnection, opportunities for synergies between the GCC and the EU surely exist.

4. Renewable Energy Sources (RES)

There is a fast growing awareness of the potential of renewable energy sources (RES) in the Gulf, especially solar and wind energies, and consequently very considerable prospective exits for technological, industrial and policy cooperation with the EU.

GCC countries have studied and developed interesting activities regarding the development and promotion of RES. Saudi Arabia has been working on a plan to be a main centre for solar energy research and to subsequently become a major megawatt exporter. Masdar City, the US$15-billion future energy initiative in Abu Dhabi, where the headquarters of the UN International Renewable Energy Agency (IRENA) are now located, is to be the world's first carbon-neutral, waste-free, car-free city that will depend completely on renewable energy and re-used water. Other related activities in the Gulf are mostly research or pilot programmes, such as the use of solar energy for desalinating water, the development of advanced photovoltaic systems, the utilisation of wind power for pumping water and generating electricity, and the establishment of RES maps.

The use and development of RES, based on the specific potential of the GCC (in particular solar and wind energies), could make a significant contribution to environmental protection, on regional and global level, and would indirectly help in guaranteeing oil and gas supplies from the region. At the same time, the GCC countries have the opportunity, through RES applications, to support the development of many of their remote towns, villages and settlements.

For those purposes, the GCC could well need to introduce and develop instruments for the growth and expansion of RES in its member countries. The EU has well developed such instruments, which are either price-based mechanisms (feed-in tariff, fiscal incentives and investment grants), or quantity-based mechanisms (quota/time gain compensation (TGC) and tender schemes). Cooperation between the GCC and the EU in that field could therefore be useful and valuable for both regions.

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