Global Research Sector

GCC

GCC Natural Gas Outlook

The Fizz on Natural Gas

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The Fizz on Natural Gas

Summary

- Natural gas is combustible colorless and odorless gas. It differs from Liquid Petroleum Gas (LPG) that it has a lower heating value and requires heavy infrastructure investments. Similar to oil, natural gas is described as sweet or sour depending on its hydrogen contents. It is also called wet or dry based on the methane content and described as associated or non-associated depending upon whether or not it is associated with significant oil production. Natural gas can be measured by its volume (cubic feet), or as a source of energy (BTU)

- Recently, the prices for construction of LNG plants, receiving terminals and vessels have significantly decreased due to new technological advancement and more investors. The world's largest LNG exporters are Indonesia and Malaysia, which export to the Asian market. Algeria supplies to Europe and the US, while Qatar exports to Spain and India. Russia and Iran possess the world's largest proved gas reserves, but do not yet have liquefaction capability

- According to BP statistical review and the EIA annual outlook, natural gas contributes to 23.5 % of the total world energy consumption and it is expected to increase to 26.32% in the year 2030. Natural gas uses in the Middle East will more than double between 2003 and 2030. Oil-exporting countries in the region have deliberately sought to expand domestic natural gas use in order to make more oil available for export

- According to EIA, the industrial sector consumes 44% of the total consumption of natural gas worldwide and it is estimated to increase by 2.8% annually till the year 2030. While the electric power sector consumes 31% and it is expected to grow by 2.9% each year during the same period. In the industrial sector, the natural gas will overtake oil as a dominant source of fuel in 2030, but in the electric power sector, natural gas remains second to coal

- A study done by 10-nation Organization of Arab Petroleum Exporting Countries (OAPEC) shows that the Arab region's gas demand growth overtakes oil with an annual growth of 4.4% until 2020. This will expand the share of gas in the Arab energy market from 41.5% in 2005 to 46.2% in 2020

- Natural gas prices are expected to be strongly influenced by the price of crude oil. In a tight gas market, small changes in supply or demand can translate into large changes in the price of natural gas; therefore, high volatility of prices should be expected. We expect natural gas prices to average between $4.5-5.5 per million British thermal unit (mBtu) in the medium term.

- The GCC countries account for almost 25% of world's natural gas proven reserves. Qatar, Saudi Arabia, UAE and Kuwait are among the top 20 countries in terms of natural gas reserves ranked 3rd, 4th, 5th and 20th respectively. In addition, Saudi Arabia, UAE and Qatar are ranked 10th,11th and 19th in terms of production.

Introduction

What is Natural Gas?

Natural gas, in itself, might be considered a very characterless gas - it is colorless, shapeless, and odorless in its pure form. Quite uninteresting - except that natural gas is combustible, and when burned it gives off a huge amount of energy. Unlike other fossil fuels natural gas is clean burning and emits lower levels of potentially harmful byproducts into the air. Energy is constantly required for heating, cooking and electricity generating purposes. It is this need for energy that has elevated natural gas to such a level of importance.

Natural gas is a combustible mixture of hydrocarbon gases. While natural gas is formed primarily of methane, it can also include ethane, propane, butane and pentane. The composition of natural gas can vary widely.

The Difference between LNG & LPG is …

Liquid Petroleum Gas (LPG, and sometimes called propane) is often confused with LNG and vice versa. They are not the same and the differences are significant. Varieties of LPG bought and sold include mixes that are primarily propane, mixes that are primarily butane, and mixes including both propane and butane.

LPG compared to natural gas has significantly higher heating value and it can be stored as a liquid in tanks by applying pressure alone. While the distribution of LNG requires heavy infrastructure investments (pipelines, etc.), LPG is portable. These properties make LPG very interesting for developing countries and rural areas. In fact LPG has been used as fuel in light duty vehicles for many years and an increasing number of petrol stations around the world offer LPG pumps as well. A final example that should not be forgotten is that “bottled gas” can often be found under BBQ grills.

Like oil, natural gas is described as sweet or sour depending on, in the case of gas, its hydrogen sulphide content. Gas is also described as wet or dry depending on the presence of natural gas liquids (NGLs) and other energy gases. If natural gas is greater than 90% methane then it is referred to as dry. Wet gas can be “stripped” of the NGLs (or LPGs) at facilities called gas processing plants. Finally, natural gas is described as associated or non-associated depending upon whether or not it is associated with significant oil production.

LNG and GTL any comparisons?

There is an immense demand for Gas-to-liquids (GTL) all over, especially as many European and Asian mega cities are switching to the cleaner and environment-friendly fuels. Meanwhile, GTL and LNG products are not in competition with each other as some in the energy industry believe. While GTL fuel is primarily suited to the transportation fuels market, LNG is basically suited for utility and major industrial markets. There is, on the contrary, a temptation to attempt integrated development, but this is likely to be a difficult option in the short-term.

Unlike LNG, GTL is not dependent on long-term contracts, though this dependency might be reduced for LNG as spot markets develop. For producer countries, an encumbered GTL project is a faster route to market. The synergies of GTL and LNG can best be realized through a policy of 'separate' but 'together' development.

If GTL fuels are sold at parity with conventionally refined products, they can easily compete with the former as far as fuel properties are concerned since they are extremely environment-friendly. GTL and LNG products between them cover both the transport market and the industrial energy market, which are key areas for any government looking to reduce emissions.

The Usage …

Natural gas has many uses for residential, commercial, and industrial segments. Found in reservoirs underneath the earth, natural gas is commonly associated with oil deposits. Production companies search for evidence of these reservoirs by using sophisticated technology that help to find the location of the natural gas and drill wells in the earth where it is likely to be found.

Once brought from underground, the natural gas is refined to remove impurities like water, other gases, sand and other compounds. Some hydrocarbons are removed and sold separately, including propane and butane. Other impurities are also removed, like hydrogen sulfide (the refining of which can produce sulfur, which is then also sold separately). After refining, the clean natural gas is transmitted through a network of pipelines. From these pipelines, natural gas is delivered to its point of use.

Natural Gas Measurement

Natural gas can be measured in a number of different ways. As a gas, it can be measured by the volume it takes up at normal temperatures and pressures, commonly expressed in cubic feet. Production and distribution companies commonly measure natural gas in thousands of cubic feet (Mcf), millions of cubic feet (MMcf), or trillions of cubic feet (Tcf).

While measuring by volume is useful, natural gas can also be measured as a source of energy. Like other forms of energy, natural gas is commonly measured and expressed in British thermal units (Btu). One Btu is the amount of natural gas that will produce enough energy to heat one pound of water by one degree at normal pressure. To give an idea, one cubic foot of natural gas contains about 1,027 Btus. When natural gas is delivered to a residence, it is measured by the gas utility in 'therms' for billing purposes. A therm is equivalent to 100,000 Btu's, or just over 97cf, of natural gas.

How Natural Gas is Stored and Delivered

The gas companies collect it in huge storage tanks, or underground, in old gas wells. The gas remains there until it is added back into the pipeline when people begin to use more gas, such as in the winter to heat homes.

Natural gas is almost always transported through pipelines from the producing fields to consumers. Since natural gas demand is greater in the winter, gas is stored along the way in large underground storage systems, such as old oil and gas wells or caverns formed in old salt beds. The gas remains there until it is added back into the pipeline when people begin to use more gas, such as in the winter to heat homes.

When chilled to very cold temperatures, approximately -260 degrees Fahrenheit, natural gas changes into a liquid and can be stored in this form which takes up only 1/600th of the space that it would in its gaseous state.

The alternative of transporting natural gas through pipelines has to contend not only with the high cost of construction, which can be covered only when oil is highly priced, but also - and perhaps more importantly - with geopolitical problems.

For example, investment in a project to transport gas by pipeline from the Gulf to Europe is plagued by many geopolitical uncertainties, since it has to cross certain Middle East countries that are prone to local political problems or conflicts (such as Iran, Iraq, Israel, Jordan, Syria and Turkey). In this case, investment in pipeline gas would be justified only in terms of a high premium that would cover the economic and political risks.

World Natural Gas Market

The nature of the natural gas market is similar to other competitive commodity markets: prices reflect the ability of supply to meet demand at any one time. The economics of producing natural gas are relatively straightforward. Like any other commodity, the price of natural gas is largely a function of demand and the supply of the product.

LNG is expected to become an increasingly important source of supply to meet the world's demand for natural gas. Although there were only 12 LNG-exporting countries in 2004 the number is increasing. In 2005, Egypt joined the ranks of LNG-producing countries with the start of two separate liquefaction projects.

Russia also entered the LNG business in 2005, not with the LNG it produced but with LNG for which it traded pipeline natural gas . Not until 2008, when the Sakhalin liquefaction project is expected to start operations, will Russia become an LNG-producing country.

Norway and Equatorial Guinea also have their first liquefaction terminals under construction, and construction on the first liquefaction terminal in South America is scheduled to begin in 2006 in Peru. The number of countries installing the infrastructure necessary to accept LNG imports is also increasing.

Trade in LNG…

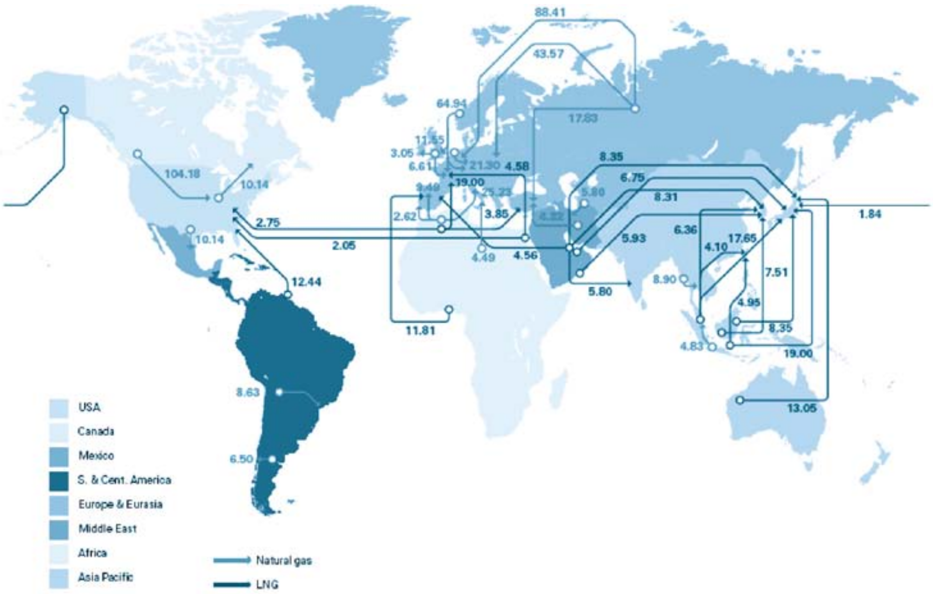
The trade in LNG is conducted via long-term sale and purchase agreements (SPA) between a supplier and receiving terminal, and by signing a gas sale agreement (GSA) between a receiving terminal and end-users which typically extend for over 15 years.

Compared to crude oil, the natural gas market is small but mature. The commercial development of LNG is a style called value chain, which means LNG suppliers first confirm the downstream buyers and then sign 20-25 year contracts with strict terms and structures for gas pricing. Only when the customers were confirmed and the development of a green field project deemed economically feasible could the sponsors of an LNG project invest in their development and operation.

Thus, the LNG business has been regarded as a game of the rich, where only players with strong financial and political resources could get involved. Major international oil companies (IOCs) such as BP, ExxonMobil, Royal Dutch Shell were active players. Japan, South Korea and Taiwan imported large sums of LNG due to their shortage of energy.

In recent years, as more players take part in investment, both in downstream and upstream, and new technologies are adopted, the prices for construction of LNG plants, receiving terminals and vessels have fallen, making LNG a more competitive means of energy distribution.

Chart 1: Major Trade Movements
Trade flows worldwide(billion cubic meters)



Source: BP Statistical Review (2005 Data)

The world's largest LNG exporters are Indonesia and Malaysia, with exports going to Japan, South Korea and Taiwan. Algeria supplies Europe and the US, while Qatar exports to Spain and India in addition to Japan and South Korea. Russia and Iran possess the world's largest proved gas reserves, but do not yet have liquefaction capability, although there are LNG projects currently underway in bsoth countries.

Table 1:Major Exporters and Importers on LNG

Exporters	bcf/d	Share of world total(%)	Importers	bcf/d	Share of world total(%)
Indonesia	3.05	17%	Japan	7.39	40%
Malaysia	2.76	15%	S.Korea	2.95	16%
Qatar	2.62	14%	Spain	2.12	12%
Algeria	2.49	14%	US	1.73	9%
Australia	1.44	8%	France	1.24	7%
Trinidad	1.36	7%	Taiwan	0.93	5%
Nigeria	1.17	6%	India	0.58	3%
Oman	0.89	5%	Turkey	0.47	3%
Brunei	0.89	5%	Belgium	0.29	2%
UAE	0.69	4%	Italy	0.24	1%
Total	**18.28**	**100%**	**Total**	**18.28**	**100%**

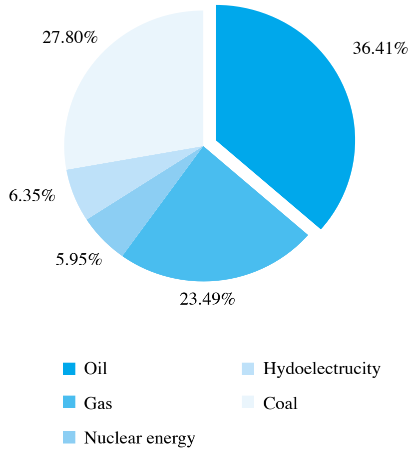
Source: BP Statistical Review 2005 Data

More than 30 years had passed since the United Kingdom imported LNG, but in 2005 it rejoined the ranks of LNG importers, with the startup of its Isle of Grain re-gasification terminal. China, Canada, and Mexico all have their first LNG import terminals under construction; and Germany, Poland, Croatia, Singapore, and Chile are among the other countries considering their first re-gasification terminals.

Natural gas consumption

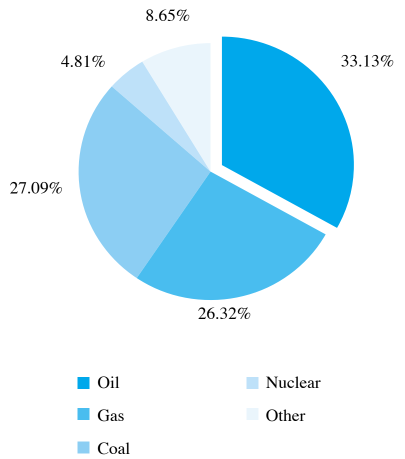
Statistical Review and outlooks by EIA and BP show that natural gas trails coal as the fastest growing primary energy source. The share of natural gas to total world energy consumption is likely to increase from 23.5% in 2005 to 26.32% in 2030.

Chart 2: World Consumption 2005



Source: BP Statistical Review (2005 Data)

Chart 3: World Total Energy Projected Consumption 2030



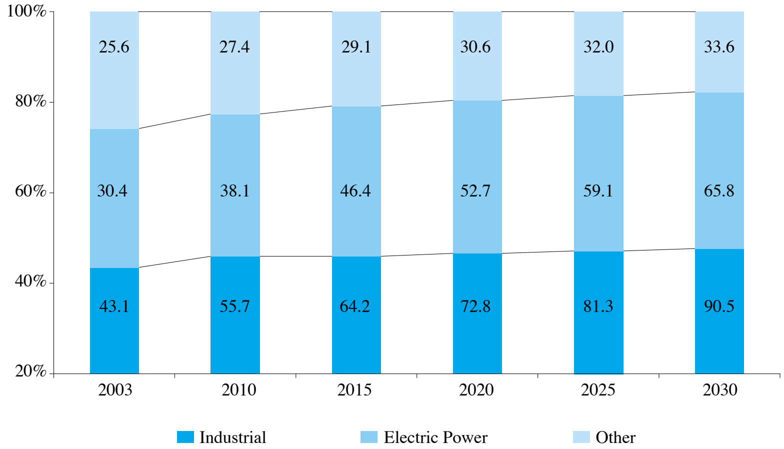
Source: EIA Annual Energy Review

Although natural gas is expected to be an important fuel source in the electric power and industrial sectors, the annual growth rate for natural gas consumption in the projections is slightly lower than the growth rate for coal consumption. Higher oil prices increase the demand for and price of natural gas, making coal a more economical fuel source.

According to EIA, natural gas consumption worldwide is likely to increase at an average rate of 2.4% annually from 2003 to 2030, as compared 2.5% per year for coal and 1.4% per year for oil. Nevertheless, natural gas remains a more environmentally attractive energy source and burns more efficiently than coal, and it still is expected to be the fuel of choice in many regions of the world.

Natural gas use in the Middle East is likely to double between 2003 and 2030. Oil-exporting countries in the region have deliberately sought to expand domestic natural gas use in order to make more oil available for export. In addition, natural-gas-rich countries in the region are developing projects to monetize their natural gas resources, in particular through LNG and, more recently, GTL projects, which have become an active area of interest. As a result, the importance of natural gas as a source of supply for domestic energy demand in the Middle East is likely to increase over the projection period.

Chart 4: World Natural Gas Comsumption by Sector



Source: EIA Annual Energy Review

Worldwide, the industrial and electric power sectors are the largest consumers of natural gas. Industrial sector accounted for 44% and the electric power sector 31% of the world's total natural gas consumption. In the projections, natural gas use is likely to grow by 2.8% per year in the industrial sector and 2.9% per year in the electric power sector from 2003 to 2030. In both sectors, the share of total energy demand met by natural gas grows over the projection period. In the industrial sector, natural gas overtakes oil as the dominant fuel by 2030. In the electric power sector, however, despite its rapid growth, natural gas remains second to coal in terms of share of total energy use for electricity generation.

World Natural Gas Supply

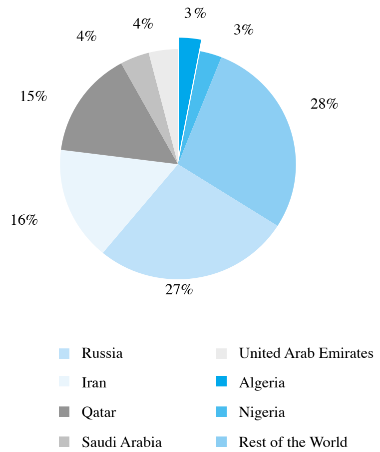
World Natural Gas Reserves

Almost 75% of the world's natural gas reserves are located in the Middle East and Eurasia. Russia, Iran, and Qatar combined accounted for about 58 percent of the world's natural gas reserves as of January 1, 2006. Reserves in the rest of the world are fairly evenly distributed on a regional basis.

A significant volume of natural gas remains to be discovered. Worldwide undiscovered natural gas is estimated at 4,221 trillion Of the total natural gas resource base, an estimated 3,000 trillion cubic feet is in "stranded" reserves, usually located too far away from pipeline infrastructure or population centers for its transportation to be economical. Of the new natural gas resources expected to be added through 2025, reserve growth accounts for 2,347 Tcf. More than one-half of the mean undiscovered natural gas estimate is expected to come from Eurasia, the Middle East, and North Africa; and about one-fourth (1,065 TCF) is expected to come from a combination of North, Central, and South America.

Despite high rates of increase in natural gas consumption, particularly over the past decade, most regional reserves-to-production ratios have remained high. Worldwide, the reserves-to-production ratio is estimated at 66.7 years. Central and South America has a reserves-to-production ratio of 55.0 years, Russia 81.5 years, and Africa 96.9 years. The Middle East's reserves-to-production ratio exceeds 100 years.

Chart 5: Proven World Gas Reserves (Jan-2006)



Source: EIA Annual Energy Review

World Natural Gas production

Non-OECD Europe and Eurasia and the Middle East account for almost three-quarters of the world's natural gas reserves, but in 2003 they accounted for only 39 percent of world production. Together, these two regions account for 47 percent of the projected increase in global natural gas production from 2003 to 2030, much of it for export to OECD countries.

Table 2: Top 20 Countries with the Highest Natural Gas Proven Reserves

Country	Reserves(TCF)	Percent of World Total
World	**6,112**	**100**
Top 20 Countries	**5,510**	**90.2**
Russia	1,680	27.5
Iran	971	15.9
Qatar	911	14.9
Saudi	241	3.9
United Arab Emirates	214	3.5
United States	193	3.1
Nigeria.	185	3
Algeria	161	2.6
Venezuela	151	2.5
Iraq	112	1.8
Indonesia.	98	1.6
Norway	84	1.4
Malaysia	75	1.2
Turkmenistan	71	1.2
Uzbekistan	66	1.1
Kazakhstan	65	1.1
Netherlands.	62	1
Egypt	59	1
Canada	57	0.9
Kuwait	56	0.9
Rest of the world	**602**	**9.8**

Source: EIA Annual Energy Review

Russia is already the world's single largest exporter of natural gas, with net exports of 6.3 TCF in 2003, all of it by pipeline. There are also some plans to export natural gas from the Middle East, but much of the region's increase in production is likely to be used domestically—particularly in the electric power sector. The shift from petroleum to natural gas allow the producing countries to monetize more of the oil assets through export. Other non-OECD regions are also expected to increase their natural gas production.

Africa, with its rich and underdeveloped natural gas resources, has the fastest growth rate in natural gas production worldwide, with supply rising by 4.9% per year from 2003 to 2030. A considerable amount of the incremental production in Africa—from Algeria, Nigeria, Libya, and Egypt—is slated for export, both by pipeline and in the form LNG.

Natural gas production in non-OECD Asia also grows substantially over the projected period, but all the growth in supply is required for consumption within the region, and imports are needed to fill the shortfall. In Central and South America, natural gas production outpaces regional demand. As a result, Trinidad and Tobago continues to export LNG outside the region. Peru, and possibly Venezuela, may also begin to export LNG outside the region over the course of the said period. In 2003, the OECD countries accounted for 41% of the world's total natural gas production and 52% of the natural gas consumption.

Table 3: Selected Countries with the highest Natural Gas Gross Production

Country	Gross Production
United States	24,119
Russia	21,768
Canada	7,609
Algeria	5,820
Iran	4,556
Norway	4,177
United Kingdom	3,902
Indonesia	3,155
Netherlands	2,576
Saudi Arabia	2,399
United Arab Emirates	2,305
Malaysia	2,209
Turkmenistan	2,087
Uzbekistan	2,030
Venezuela	1,854
Argentina	1,783
Nigeria	1,554
Mexico	1,509
Qatar	1,414
Australia	1,283
Egypt	1,216
China	1,211
India	1,125
Pakistan	1,017
World Total	**115,994**

Source: EIA Annual Energy Review

World Natural Gas Demand

OECD North America

According to EIA, the United States, North America's largest consumer accounted for more than 80% of the 27.4TCF of natural gas consumed in the region in 2003.North America's natural gas consumption is expected to increase at an average annual rate of 1.1% between 2003 and 2030.The current high levels of natural gas prices in the United States are expected to discourage the construction of new natural-gas-fired electricity generation plants in the mid-term.

Canada, currently the source of almost 90 % of U.S. net natural gas imports, remains the primary source of natural gas imported into the United States until 2010. After 2010, LNG imports replace Canadian imports as the primary source.

Rising natural gas prices make it economical for two major North American pipelines that have long been in the planning stages to come online. The first, a Canadian pipeline to transport natural gas from the Mackenzie Delta, is expected to become operational in 2011. The second, an Alaska pipeline, is expected to begin transporting natural gas from Alaska to the lower 48 States in 2015.

Currently, the United States has five LNG import facilities in operation, with a combined peak annual capacity of 1.6 Tcf. Three additional terminals under construction in the Gulf of Mexico will add a combined peak annual re-gasification capacity of 2.0Tcf, more than doubling U.S. LNG import capacity. The growth of U.S. LNG import capacity is expected to be strong through 2015 and then to slow as high natural gas prices begin to slow the growth of domestic consumption. LNG imports into Canada are also expected to contribute to the supply of Canadian natural gas available for export to the United States.

OECD Europe

Natural gas is expected to be the fastest growing fuel source in OECD Europe, with demand increasing at an annual average rate of 2.0%, from 17.8Tcf in 2003 to 23.9Tcf in 2015 and 30.8TCF in 2030, According to EIA.

OECD Europe received net imports of around 7Tcf of natural gas in 2003, accounting for more than one-third of the region's total natural gas consumption. With domestic production declining in most of the countries of OECD Europe, the region's reliance on imported natural gas grows to more than one-half of demand in 2015 and almost two-thirds in 2030.

Currently, Russia alone provides around two-thirds of Europe's imports, and much of Europe was affected in January 2006 when Russia, in a dispute over contract prices, cut off natural gas supplies to Ukraine.

Security and diversity of natural gas supply are major concerns for OECD Europe now and going forward. Europe is aggressively expanding LNG receiving capacity, and several new pipelines have been proposed that would link Europe to supplies in Egypt, the Middle East, and the Caspian Basin, and would increase capacity from North Africa and add capacity from Russia via routes that bypass traditional transit states.

OECD Asia

Japan has the lowest growth rate for natural gas consumption among the OECD countries outside North America, mainly because its population declines and its economic growth is relatively slow. Even with an average annual growth rate in consumption of only 0.8%, however, natural gas still is the second fastest growing primary energy source in Japan, behind nuclear power. Total natural gas consumption in South Korea is likely to grow at an average annual rate of 1.7 % from 2003 to 2030. In 2003

Table 4: World Natural Gas Consumption by Region (TCF)

Region/Country	2003	2030	% Change 2003-2030
OECD			
OECD North America	27.4	36.6	1.1
United States/a	22.3	26.9	0.7
Canada	3.2	5.3	1.9
Mexico	1.8	4.5	3.4
OECD Europe	17.8	30.8	2.0
OECD Asia	5.0	6.8	1.2
Japan	3.1	3.8	0.8
South Korea	0.9	1.3	1.7
Australia/New Zealand	1.1	1.7	1.7
Total OECD	50.2	74.2	1.5
Non-OECD			
Non-OECD Europe and Eurasia	23.6	40.5	2.0
Russia	15.3	23.6	1.6
Other	8.3	16.9	2.7
Non-OECD Asia	7.5	28.8	5.1
China	1.2	7.0	6.8
India	1.0	4.5	5.9
Other Non-OECD Asia	5.4	17.3	4.4
Middle East	7.9	19.6	3.4
Africa	2.6	8.1	4.4
Central and South America	3.8	10.8	3.9
Brazil	0.5	1.7	4.6
Other Central and South America	3.3	9.1	3.8
Total Non-OECD	45.3	107.8	3.3
Total World	**95.5**	**182.0**	**2.4**

Source: EIA Annual Energy Review

Non-OECD Europe and Eurasia

The non-OECD Europe and Eurasia region is more reliant on natural gas than any other region in the world. Russia is second only to the United States in total natural gas consumption, and it is the only country in the world where natural gas accounts for more than one-half of total primary energy consumption. In 2003, Russia consumed 15.3Tcf of natural gas. The other countries of non-OECD Europe and Eurasia met 44% of their combined total energy needs with natural gas in 2003.Growth in natural gas demand in non-OECD Europe and Eurasia remains strong throughout the projection period, with an average annual growth rate of 2.0% from 2003 to 2030

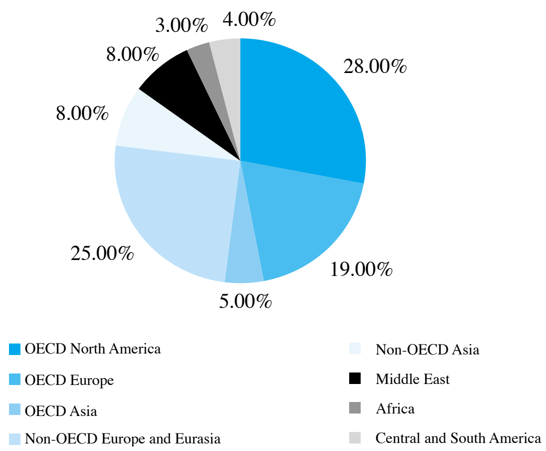
Other Non-OECD

In the rest of the non-OECD countries, significant growth in natural gas use is projected from 2003 to 2030, as strong economic growth and available resources encourage the development of natural gas infrastructure to support demand. In the other non-OECD countries (excluding non-OECD Europe and Eurasia), natural gas demand is likely to triple from 21.7 Tcf in 2003 to 67.3 Tcf in 2030.

Non-OECD Asia accounts for much of the growth in natural gas demand projected for the non-OECD region. Led by demand in China and India, natural gas consumption in non-OECD Asia expands by 5.1 %per year on average from 2003 to 2030. In both China and India, natural gas is currently a minor fuel in the overall energy mix, representing only 3 % and 7 %, respectively, of total primary energy consumption in 2003; however, both countries are rapidly expanding infrastructure to facilitate natural gas consumption, as well as natural gas imports. In the reference case, natural gas consumption grows at an average annual rate of 6.8 % in China and 5.9 % in India.

Both China and India have limited natural gas reserves and are projected to rely on imports to meet more than 40 % of natural gas demand in 2030. Both countries have been discussing possible import pipelines, but none is imminent. China and India have also been pursuing LNG imports. Both countries are finding it difficult to secure additional long-term LNG supplies for any of their proposed re-gasification terminals at prices that local natural gas consumers would find acceptable.

Chart 6: Natural Gas Consumption by Region



Source: EIA Annual Energy Review

Arab region's gas demand growth overtakes oil

Gas demand in the Arab region has grown faster than oil demand in the past 10 years to peak at 3.34 million barrels of oil equivalent per day in 2005, according to a study by the Organization of Arab Petroleum Exporting Countries (OAPEC).

The demand is projected to rise to 4.08 mn barrels of oil equivalent per day (BOED) in 2010 and to 5.1 mn in 2015 before it climbs to a record 6.4 mn, an annual growth of 4.4 % between 2005 and 2020. The growth is expected to expand the share of gas in the Arab energy market from 41.5 % in 2005 to 46.2 % in 2020.

The expansion will be at the expense of oil products demand, whose share will slide to around 51 % from 55.8 per cent in the same period, projections show that the gas share will continue to grow during that period while the market share of oil products will decline.

This increase is a natural result of economic growth and plans by regional states to rely more on gas in their energy consumption mainly in industries, domestic use and power generation. A key reason for this shift is that GCC countries are focusing on monetizing their oil exports especially with the high prices that have been observed throughout 2006.

In a separate study, OAPEC said that combined Arab gas exports have soared by more than 25 % over the past five years, climbing from 83,043 mn cubic meters in 2000 to a record 104,770 mn cubic meters in 2005.

The bulk of the increase was in Qatar, with its exports of natural and liquefied natural gas jumping from around 14,040 mn cubic meters to 24,060 mn cubic meters.The Gulf producer has embarked on mega projects to tap its mammoth North Field and become the world's number one in LNG exports, which have already exceeded 25 mn tons a year and are projected to climb to 77 mn tons in 2011. Gas exports by the UAE increased slightly and there was sharp growth by Oman, which is not an OAPEC or OPEC member. It showed Saudi Arabia was by far the largest gas consumer in the region, with local demand rising from 635,000 BOED in 2001 to 680,000 BOED in 2005. Gas consumption surged from 419,000 to 530,000 BOED in the UAE, from 443,000 to 515,000 in Egypt, from 375,000 to 415,000 in Qatar and from 380,000 to 415,000 BOED in Algeria. There were also increases in Libya, Bahrain, Syria and Tunisia but declines in Kuwait and Iraq.

A total of 50 oil discoveries and 13 gas findings were reported in 2005 but most of them were relatively small and more than two thirds of them were made in Egypt as a result of intensified exploration programs. As a result, the proven Arab gas reserves remained almost unchanged at around 53,353 bn cubic meters at the end of 2005 compared with 53,263 bn cubic meters at the end of 2004 and nearly 52,240 bn cubic meters at the end of 2000.

Natural Gas Prices

Sustained high prices of alternative fuel oils (because of higher crude oil prices) and a limited availability of clean fuel options are likely to mean increased gas demand, and continued upward pressure and volatility in future natural gas prices. Looking forward, natural gas prices are expected to continue to be strongly influenced by the price of crude oil and are likely to be in the price range set by 1% sulphur RFO and NO2. heating oil, which are the primary oil-based fuels that compete in the same major markets as natural gas. Please refer to our earlier report on “GCC Oil Sector” dated August 8th 2006, where we had estimated the price of crude oil in the range of US$55-60 for 2006.

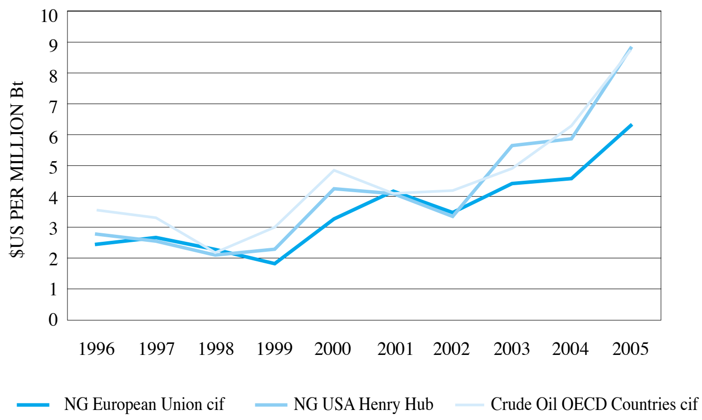
The North American natural gas market is expected to remain supply constrained throughout the projection period, and demand is expected to show some continued resilience to higher gas prices in light of its attribute as a cleaner burning fuel.

High natural gas prices encourage continued high drilling activity and investments necessary to develop gas supply from new regions in North America. High prices also help support the expected growth of LNG imports required to meet North American demand. Nonetheless, there is a cost consequence of high natural gas prices to consumers and energy-intensive industries in North America.

Since the early 1980s, the available supply of natural gas exceeded the market demand. This was referred to as the “gas bubble.” As a result, gas prices remained artificially low and stable. In fact, the price at the wellhead for natural gas in 2002 was 22 % less in real terms than it was in 1985.

Natural gas prices have increased dramatically recently because the “gas bubble” had two effects. First, more customers in all markets – including residential, commercial, industrial, and power generation – had an economic incentive to use more. Second, gas producers did not have an economic incentive to find more. The net impact of these two trends is that, today, the gas bubble is gone and natural gas supply and demand are roughly in balance. Like all such balanced situations under a market-driven system, an unexpected change in supply or demand will cause a rapid shift in price. That is what has occurred in the natural gas market.

Chart 7: Prices of Oil and Natural Gas



Source: BP Statistical Review (2005 Data), Note: cif = cost + insurance + freight (average prices)

There are several causes of the current natural gas price shift. First, the past two winters were especially cold. As a result, the amount of natural gas used increased sharply. More importantly, the amount of natural gas drawn out of the storage systems of the nation's natural gas utilities was far more than anticipated.

Second, natural gas utilities are winter-peaking, i.e., the demand for gas from utilities is greatest during the winter season. Historically, gas utility regulation encouraged utilities to maintain relatively high levels of storage to serve their winter peak. That has changed. In general, gas utilities today have an economic incentive to keep storage levels as low as possible, i.e., just adequate enough to serve their forecasted winter demand. The combination of relatively low 2002 storage levels and the cold winter left gas utility storage at historically low levels. In the spring and early summer of 2003, utilities were competing in the market to buy gas to replenish their reserves for the 2003-2004 winter heating season. That aggressive purchasing contributed to upward pressure on gas prices.

Third, natural gas has become the fuel of choice for electricity generation due to its low cost and significant environmental benefits. There also have been regulatory and other obstacles to building electricity plants operating on other, often dirtier, fuels. As a result, natural gas use for electricity generation has grown dramatically. Electricity plants tend to be summer peaking to serve the growing air conditioning market. In the past, the price of gas in the summer was much lower than in the winter. However, as a result of this growing summer demand, seasonal pricing has changed. Electricity plant operators are now competing with gas utilities for the same gas supply during the summer -- thereby putting even more upward pressure on gas prices.

Long term contract prices are likely to average between $4.5-5.5 per million British thermal units (mBtu). Currently negotiation are active between Iran and India for a pipeline project, which delivers Iranian gas to India via Pakistan. The project called (IPI) pipeline has been canceled because Tehran is demanding $7.20 per mBtu, linked to global crude-oil prices.

The Iranian position is considerably higher than India's offer of $4.25 per mBtu at its border with Pakistan. Though Pakistan has been voicing plans of going alone in case India decides to drop out. Iran has rejected India's demand for a price equivalent to international long-term gas-supply contracts, saying that New Delhi should forget about buying Iranian gas at a low price.

The price that Tehran is seeking would be the costliest long-term LNG deal in the world. Currently, India imports 5 mn tons of LNG from Qatar at $2.53 per mBtu. This price will rise to $3.50 per mBtu in 2008.Qatar sells LNG to the US at $4.5-4.8 per mBtu, and other long-term LNG contracts around the world cost not more than $4.75 per mBtu. India started importing gas from Qatar in 2004 and has been promoting LNG imports since then.

In January 06, Russia temporarily cut natural gas supplies to Ukraine over a pricing dispute. The move effectively cuts natural gas exports to Europe, since most Russian exports travel via Ukraine.

Major Players

Russia

Russia resumed natural gas shipments within a few days and reached a compromise agreement with Ukraine. However, the incident prompted a discussion in Europe over its future energy security, with many countries calling for concerted action by the European Union (EU) to reduce reliance upon Russian natural gas. Russia provides about one-quarter of total EU natural gas imports, with over 80% of this natural gas flowing through Ukraine.

Moscow denies political motive for cancelling gas permit

Russia insisted that attempts to cancel a key permit for the Royal Dutch Shell-led Sakhalin-2 natural gas project was motivated entirely by serious environmental violations and had no underlying political motive. But the environmental pressure may be wrapped up with the Kremlin's attempts to increase the role of the state in Russian energy projects.

The tough stance of Russia's natural resources ministry on Sakhalin-2 and two other production-sharing agreements (PSAs) had previously been criticized by more liberal arms of government such as the economic ministry. PSAs, signed during Russia's transition to capitalism in the 1990s, are outside the country's usual tax regime, with the government getting a share of the oil and gas production once investors have recouped their costs.

Iran

Iran is likely to face stiff competition for LNG customers, given the fact that many other LNG suppliers (Oman, Qatar, the UAE) are already players, having locked up much of the Far East market. U.S. sanctions also mean that Iran is limited to non-U.S. liquefaction technology, which is significant as most LNG plants use processes developed by U.S. companies. Currently, Iran has no LNG facilities.

With the rising global demand for energy, gas is increasingly playing a strategic role for meeting that demand. With its enormous natural gas reserves, Iran is looking to export large volumes of natural gas. Besides Turkey, potential customers for Iranian natural gas exports include: Ukraine, Europe, India, Pakistan, Armenia, Azerbaijan, Georgia, Taiwan, South Korea, and China. Exports could be via pipeline and/or LNG tanker, with possible LNG export terminals at Asaluyeh or Kish Island.

Iran is also looking to export natural gas to Kuwait, most likely via pipeline from South Pars. In March 2005, Iran and Kuwait signed a preliminary MOU for natural gas sales, possibly 300 Mmcf/d for 25 years starting in 2007.

Egypt

Egypt has become a major player in the international gas exporters' club. It was only in 2003 that Egypt joined the gas exporters' club. It now ranks sixth largest member, thanks to significant natural gas discoveries made in recent years. These have attracted an influx of foreign investments into Egypt's gas sector and made what had once appeared an ambitious dream come true.

Possessing some 58.5 Tcf of proven natural gas reserves, Egypt now accounts for approximately 1% of the world's total production and is becoming an increasingly important player in the gas market. Production is expected to rise to roughly 5.0 bncf/d by 2007, with much of the increased volume being exported as LNG.

The export of natural gas to Israel, which has been under discussion since the mid-1990s, was finally agreed upon in June 2005. The deal calls for the East Mediterranean Gas Company (a consortium of EGPC, Merhav of Israel, and Egyptian businessman Hussein Salem) to supply $2.5bn worth of natural gas to Israel. The natural gas will travel via a new pipeline to be operational by late 2007.

Egypt's other option for exports is LNG, for which it already has three operating trains. With LNG exports having already risen to 1.55 Bcf/d by 2005, Egypt has jumped into sixth position in global LNG production, with further expansions expected when reserves are located. Currently the largest LNG train is the SEGAS Plant in Egypt with a capacity of 5mtpa. Exxon Mobil operating Qatar gas stage 2, of which one train has a production ability of 5 million ton per annum.

Gcc Natural Gas Sector

The GCC countries have almost one quarter of the world's natural gas proven reserves. Qatar is one of the world's top producers of natural gas. Qatar is ranked third on the world and posses 14.9 % of the world's reserves. Saudi Arabia is the highest producer of natural gas among GCC countries and is ranked fourth in terms of natural gas reserves with 3.9%. Kuwait produces a relatively modest volume of natural gas. Kuwait is ranked twentieth in world natural gas reserves, with an estimated reserve of 0.9 % of the world's total reserves. The UAE is ranked fifth with 3.5% of world's total reserves while Oman has made natural gas the chief focus of its diversification and economic growth strategy.

Qatar

With proven reserves of 911 Tcf, Qatar's natural gas resources rank third in size behind Russia's and Iran's. Most of Qatar's natural gas is located in the offshore North Field, which is the largest known non-associated natural gas field in the world. In addition, the onshore Dukhan field contains an estimated 5 Tcf of associated and 0.5 Tcf of non-associated gas. Smaller associated gas reserves also are contained in the Id al-Shargi, Maydan Mahzam, Bul Hanine and al-Rayyan offhore oil fields.

The Qatari government believes that the country's economic future lies in developing this vast natural gas potential. Currently, Qatar has two LNG exporters: Qatar LNG Company (Qatargas); and Ras Laffan LNG Company (Rasgas).

The Qatargas downstream consortium comprises Qatar Petroleum 65%, Total 10%, ExxonMobil 10%, Mitsui 7.5% and Marubeni 7.5%. In December 1996, the Qatargas venture delivered its first shipment of LNG to Japan. The Qatargas LNG plant consists of three trains, with a total capacity of 446 Bcf. Qatargas signed an agreement in July 2004 with Gas Natural of Spain for the sale of the incremental volume over a period of 20 years, to commence when the capacity expansion is completed.

Rasgas is Qatar's second LNG project. The two major shareholders in the project are Qatar Petroleum and ExxonMobil. Rasgas consists of four 163 Bcf trains. The first train was completed in early 1999, and loaded its first cargo in August 1999 for South Korea's Kogas, which has a long-term supply contract. The second train came on-stream in April 2000. Rasgas contracted with Chiyoda, Mitsui and Snamprogetti in April 2001 for the construction of the third 228-Bcf train, which was completed in 2004. A fourth train was completed in late 2005 and the fifth scheduled for 2007.

Qatar Petroleum and ExxonMobil signed an agreement in October 2003 for the construction of Rasgas II, adding 756 Bcf of liquefaction capacity. The facility will comprise two liquefaction trains, with a capacity of 378 Bcf each -- the largest liquefaction trains ever built. The first of the two trains is expected to commence commercial operation in 2008 or 2009. Much of the LNG produced at Qatargas II will be imported into the United States, through import terminals to be built on the Gulf of Mexico, under the 25-year agreement. Reserves of 26 Tcf from the North Field have been earmarked for export through the Rasgas II terminal. Qatar Petroleum will hold a 70% stake in the export terminal, with ExxonMobil holding the remaining 30%.

Qatargas II reached financial close in December 2004. The project, which also is a joint venture between ExxonMobil and Qatar Petroleum, will involve two 7.8-Mmt/y (378-Bcf) liquefaction trains, with the first to be completed in 2007 and the second in 2008. The project will supply an import terminal to be built in the United Kingdom.

A preliminary agreement also has been signed with ConocoPhillips for Qatargas III, which would involve 7.5 Mmt/y of liquefaction capacity, aimed at the U.S. market, to begin operation in 2009. Shell concluded a preliminary agreement with Qatar Petroleum for the Qatargas IV project in February 2005, which is to start production in 2009 or 2010, and will likely export mainly to the North American market through El Paso Energy's terminal at Elba Island.

Qatar's original markets for its LNG exports were Japan and South Korea, the world's two largest LNG importers. India has joined them as a significant market for Qatari LNG. RasGas signed an agreement in July 1999 to supply 7.5 Mmt/y (365 Bcf/y) of LNG to Petronet, an Indian LNG import and gas distribution project. Deliveries under the Petronet contract began in January 2004. Spain's Enagas also has signed a purchase agreement with Italy's Edison, its first term-contract customer in Europe. Deliveries of 3.5 Mmt/y (170 Bcf) began in 2005.

Another significant proposed project will tie Qatar into the United Arab Emirates (UAE) Dolphin Project, an integrated natural gas pipeline grid for Qatar, UAE and Oman, with a possible subsea connection linking Oman to Pakistan. The United Offsets Group (UOG), a UAE state-owned corporation backing the project, signed preliminary memorandums of understanding with Qatar, Oman and Pakistan in June 1999.

ExxonMobil also signed a preliminary agreement in June 1999 for the natural gas supply from ExxonMobil's production capacity in the North Field. The total project is expected to cost around $10 billion, including costs associated with the development of more extensive gas distribution networks in the UAE and Oman. Qatar initially will sell around 730 Bcf per year of North Field natural gas, starting in 2006, transported through a subsea pipeline linking the North Field to Abu Dhabi in the UAE. Links between Abu Dhabi, Dubai and Oman will be added afterwards.

The Dolphin Project has been driven in part by the desire of UAE and Oman to use more natural gas for power generation and industrial uses, and the decline in their own production of associated natural gas. Pakistan's participation is highly doubtful, due to its financial condition and the possibility of imports from Iran.

Qatar announced a preliminary agreement with Bahrain to supply it with natural gas from the North Field, beginning in 2008. Negotiations on pricing and volumes continue, and no binding contract has yet been concluded.

Kuwait has also held discussions with Qatar about the purchase of Qatari gas. A preliminary agreement was signed for gas sales in July 2000, which would source the gas from ExxonMobil's North Field holdings. Details of the project and volumes are still being discussed, and a final agreement has not been reached. Qatar also has held discussions with Bahrain on the possible supply of North Field natural gas, which could be accomplished with a "spur" from the proposed North Field-Kuwait pipeline. The pipeline would have to be built through Saudi Arabia's territorial waters, and political tension between the Saudi and Qatari governments reportedly have inhibited progress on the project. As an alternative, Kuwait may consider importing LNG sourced from Qatar .

ORYX GTL starts up

The Middle East's first and the world's largest GTL started and was officially inaugurated in the beginning of June. Oryx GTL is a 51:49 joint venture between Qatar Petroleum and South Africa's Sasol. It was built at a cost of US$950mn. The plant has a capacity of 34,000b/d and will produce 24,000 b/d of high quality diesel, 9,000 b/d of naphtha and 1,000b/d of LPG.

The partners have also signed a deal to increase the project's capacity to 100,000b/d by adding another train of 70,000b/d capacity, by 2010. Chevron Texaco of the US has also tied up with Sasol to join the expansion. Oryx GTL is a very important event that will shape and influence the future of the GTL technology and industry as a whole.

Qatar Petroleum, ExxonMobil launch Al Khaleej Gas Phase-2

ExxonMobil Middle East Gas Marketing Limited, a wholly owned subsidiary of Exxon Mobil Corporation, the State of Qatar and Qatar Petroleum have announced the signing of a development plan and the launch of the Al Khaleej Gas-Phase Two (AKG-2) project. This follows the completion of the initial stage of the project, AKG-1, which started up in November 2005.

When operational in 2009, AKG-2 is estimated to produce 1,580 million cubic feet per day (mcfd) of North Field natural gas for processing to sales gas for domestic markets in Qatar, while recovering associated condensate and natural-gasliquids. AKG-2 is expected to produce annually about 1,250 mcfd of sales gas, about 15 million barrels of field condensate, about 1 million tons of natural gas liquids (propane, butane and plant condensate) and an estimated 870,000 tons a year of ethane for use as petrochemical feedstock.

Al-Khaleej Gas is being developed concurrent with the Ras Laffan LNG Expansion Project to maximize synergies between the Ras Laffan Liquefied Natural Gas Company Limited (3) and AKG-2 projects. Total investment for AKG-2 is expected to be more than US$3bn.

Qatar and Shell Launch Integrated Pearl GTL Project

In July 27th 06, Qatar Petroleum and Royal Dutch Shell have announced the launch of the world scale integrated Pearl GTL project in Qatar.

The Pearl GTL project includes the development of offshore natural gas resources in Qatar's North Field, transporting and processing the gas to extract natural gas liquids and ethane, and the conversion of the remaining gas into clean liquid hydrocarbon products through the construction of the world's largest integrated GTL complex in Ras Laffan Industrial City.

The fully integrated Pearl GTL project is being developed under a Development and Production Sharing Agreement with the government of the State of Qatar, covering offshore and onshore costs, with Shell providing 100 % of project funding. Production from the first Pearl GTL train is anticipated to begin around the end of the decade, with the start up of the second train following
within a year.

GTL opens a new global market for Qatari natural gas and allows Qatar to contribute constructively to improving the local environment by supplying a cleaner alternative transport fuel.

Saudi Arabia

Saudi Arabia's proven natural gas reserves are estimated at 241Tcf, ranked number four in the world (after Russia, Iran, and Qatar), and up about 5 Tcf from 2002. Around 60% of Saudi Arabia's currently proven natural gas reserves consist of associated gas, mainly from the onshore Ghawar field and the offshore Safaniya and Zuluf fields. The Ghawar oil field alone accounts for one-third of the country's proven natural gas reserves. However, it is important to note that only 15% of Saudi Arabia has been «adequately explored for gas,» according to Aramco.

Most new associated natural gas reserves discovered in the 1990s have been in fields which contain light crude oil, especially in the Najd region south of Riyadh. Most of Saudi Arabia's non-associated gas reserves (Mazalij, Al-Manjoura, Shaden, Niban, Tinat, Al-Waar, etc.) are located in the deep Khuff reservoir, which underlies the Ghawar oil field. Natural gas is located in the countries extreme northwest, at Midyan, and in the Empty Quarter (Rub al Khali) in the country's southeastern desert. The Rub al Khali alone is believed to contain natural gas reserves as high as 300 Tcf. In June 2004, gas was discovered at the Fazran 23 well, located near Dhahran.

Another large natural gas field, called Durra, is located offshore near the Khafji oil field in the Saudi-Kuwaiti Divided Zone and may be developed by Japan's AOC. Durra development is controversial, however, because part of it is also claimed by Iran (which calls the field Arash). The maritime border between Kuwait and Iran remains un-demarcated, but Saudi Arabia reached an agreement with Kuwait in July 2000 to share Durra equally. Currently, Iran is resisting any moves by Kuwait and Saudi Arabia to develop the field on their own.

Saudi Gas Initiative

In June 2003, Saudi Oil Minister officially announced termination of negotiations with foreign energy companies on the $15-$20 billion «Saudi Gas Initiative» (SGI), which promised to be the first major step towards reopening of Saudi Arabia's upstream hydrocarbons sector to foreign investment since nationalization in the 1970s.

The SGI aimed to increase foreign investment and natural gas development in the country, while integrating upstream gas development with downstream petrochemicals, power generation, and water desalination. SGI had been seen as the key to Saudi Arabia's entire foreign investment strategy. However, negotiations broke down over two major stumbling blocks:

1. The extent of gas reserves to be opened to upstream development and whether or not this should include gas from the Saudi Aramco Reserve Area (SARA)

2. The rates of return to participating companies (the companies wanted a significantly higher rate than the Saudis were offering)

Following cancellation of the SGI, Saudi Arabia repackaged the project as a series of smaller, more focused contracts, with better rates of return than previously offered.

At the same time, the Saudis moved away from the integrated upstream/downstream gas, water, power and petrochemical nature of the SGI. Downstream and «midstream» elements of the SGI will now be handled separately, in large part by SABIC and Aramco.

In July 2003, Saudi Arabia reached a tentative deal (officially signed on November 15) with Royal Dutch/Shell and Total on Blocks 5-9 and 82-85 in the Shaybah and Kidan areas of the Empty Quarter region. Besides the major European companies, Saudi Aramco -- replacing ConocoPhillips -- will have a 30% share in the $2 bn project. Shell will maintain a 40% share and Total the remaining 30%, in a consortium known as the South Rub al-Khali Company (SRAK). The deal covers an area of 81,000 square miles. In October 2002, construction was completed on a $4 billion, 1.4-billion-cubic-feet (Bcf)-per-day, non-associated gas processing plant at Hawiyah, located south of Dhahran and east of Riyadh near the giant Ghawar oil field. Hawiyah represents the largest Saudi natural gas project in more than 10 years, and the first to process only non-associated gas (from the deep Khuff and Jauf reservoirs). Hawiyah was officially inaugurated in October 2002, and reportedly is producing enough natural gas to free up around 260,000 bbl/d of Arabian Light crude oil for export.

Aramco has also invited bids to expand Hawiyah to recover «hundreds of thousands of barrels daily of additional petrochemical feedstock,» primarily NGLs from the treatment of 4 billion cubic feet (Bcf) per day of natural gas. In March 2005, Japan's JGC was awarded a contract for Hawiyah that involves building the world's largest NGL processing plant.

Besides Hawiyah, Foster Wheeler has been managing a $2 billion project to build a new natural gas processing plant at Haradh, 120 miles southwest of Dhahran at the southern tip of Ghawar. The Haradh plant was completed in the summer of 2004, increasing total Saudi natural gas processing capability by 1.6 Bcf/day, to around 9.5 Bcf/day. Haradh processes non-associated natural gas (both sweet and sour) from four fields in the Khuff formation.

In addition, a $1.2 billion, 3,800-Mmcf/d «straddle plant» -- a natural gas reprocessing plant located adjacent to a gas transmission line for the purpose of extracting light hydrocarbon liquids newly formed due to recurring compression and decompression of gas during transmission -- is slated to be built. When complete, the straddle plant will service both Haradh and Hawiyah and increase Saudi NGL production.

Another gas find is reported

According to the Saudi Oil minister, Saudi Aramco has discovered a new gas field in Eastern Province the well, known as Zamlah-1, located 50 km south of the giant Ghawar field and 250 km south of the capital, Riyadh. It had produced at a rate of 20MMcf (570,000 cu meters) of gas and 1,400 barrels of condensates per day when tested on June 29th.

Initial reports indicate that the Karan-6 well may be capable of producing 80Mmcf (2.27mn cu meters) per day. Further tests are now being carried out in the area to determine the feasibility of a gas plant. To guide future exploration work, Aramco is currently conducting seismic and other geophysical survey work in several parts of the country, including the Red Sea, according to the Middle East Economic Survey.

Although the Kingdom has balked at International Oil Company (IOC) involvement in its upstream oil sector, the possibility that further gas exploration work could be carried out by IOCs has not been ruled out. Lukoil (Russia), Sinopec (China) and Eni/Repsol (Italy/Spain) are already looking for gas in the Empty Quarter under exploration deals signed in 2004.

Foster Wheeler-led JV wins Saudi Aramco Khurais EPC contract

A joint venture between Foster Wheeler Energy Limited and Korea's Hyundai Engineering and Construction Co., has been awarded a lump-sum turnkey engineering, procurement and construction contract by Saudi Aramco for the Khurais gas facility, part of the Khurais Central Processing Facility in the Kingdom of Saudi Arabia.

The Khurais gas Facility is one of the main contract packages that make up the Khurais Crude Increment Program, which aims to deliver 1.2 mn b/d of Arabian light crude by 2009. This program is the largest project to be developed under Saudi Aramco's expansion program aimed at increasing oil production by the end of the decade and is one of the most important oil projects in the world today.

The Khurais Crude Increment Program covers three oil fields: Khurais, Abu Jifan and Mazlij. The Khurais gas Facility will be designed to process the sour associated gas produced from the three oilfields into a natural gas liquid product and a dry, single-phase sour shipping gas. The plant will process a total of 563 mn standard cu ft per day of sour associated gas and 70,000 b/d of hydrocarbon condensate.

United Arab Emirates

According to Oil and Gas Journal (1/1/06), the UAE's natural gas reserves of 214.4 Tcf are the world's fifth largest after Russia, Iran, Qatar, and Saudi Arabia. The largest reserves of 198.5 Tcf are located in Abu Dhabi. Whereas Sharjah, Dubai and Ras al-Khaimah contain smaller reserves of 10.7 Tcf, 4.0 Tcf, and 1.2 Tcf, respectively. In Abu Dhabi, the non-associated Khuff natural gas reservoirs beneath the Umm Shaif and Abu al-Bukhush oil fields rank among the worlds largest.

Elevated domestic consumption of electricity and increasing demand from the petrochemical industry has provided incentives for the UAE to boost its use of natural gas. Over the last decade, natural gas consumption in Abu Dhabi has doubled, and it currently stands at around 4 Bcf/d. The development of natural gas fields also results in increased production and exports of condensates, which are not subject to OPEC production quotas.

The past few years have seen the UAE embark on a massive, multi-billion dollar program of investment in its natural gas sector including a shift toward natural gas-fired power plants and the transformation of the Taweelah commercial district into a natural gas-based industrial zone. An ambitious plan, the Dolphin Project, to interconnect the natural gas grids of Qatar, the UAE, and Oman, is underway. Most of the UAE's increased natural gas needs in the next decade are to be satisfied with imported natural gas from Qatar. Much of the natural gas development in the UAE itself involves the extraction of NGLs and re-injection of the gas to maintain pressure in oilfields.

The second phase of the UAE's $1 billion onshore natural gas development program (OGD-2) at the Habshan complex located directly over the Bab oil and natural gas field was completed in early 2001. This second phase included the construction of four trains to process 1 bcf/d of natural gas, 300-500 tons per day (t/d) of NGLs, 35,000-55,000 t/d of condensate and up to 2,100 t/d of sulphur. Additional capacity expansion is underway in the third phase, OGD-3, and will involve the construction of two additional natural gas processing plants.OGD-3 is scheduled for completion in early 2008.

Dubai's natural gas consumption has been growing by nearly 10% annually due to expansion of the emirate's industrial sector, a switch to natural gas by its power plants, and the need for an enhanced oil recovery (EOR) system based on natural gas injections for its mature oilfields. Dubai natural gas demand will average 810 Mmcf/d in 2005, with major swings between summer and winter consumption patterns. Until mid-2001, Dubai's entire natural gas supply came entirely from fellow UAE member Sharjah.

The Dolphin Project aims to develop links between the natural gas infrastructures of Qatar, the UAE and Oman. It will allow the export of non-associated natural gas from Qatar's massive offshore North Dome field. A Statement of Principles for the project was signed in March 1999 between the UAE Offsets Group (UOG) and Qatar Petroleum. The two firms signed a natural gas sales agreement in March 2001, with natural gas supplies expected to start in late 2006. Estimated to cost $8-$10 billion over the next decade, the project will begin as a sub sea pipeline from Ras Laffan in Qatar to a landfall in Abu Dhabi, which will then be extended to Dubai and northern Oman.

In October 1999, UOG and Abu Dhabi National Oil Company (ADNOC) issued a joint declaration dividing up natural gas distribution between them. Natural gas from the Dolphin Project will be the exclusive supply for natural gas-fired power plants, except in the Western Region of Abu Dhabi, and will also supply natural gas for ADNOC contracts with Dubai. Natural gas from the Dolphin Project will use the ADNOC distribution network until the project develops its own network.

Upstream development in Qatar began in 2003, financing for the subsea pipeline was concluded in late 2004, and initial deliveries of natural gas to the UAE are expected to begin in the first quarter of 2007. After several years of delays, Dubai signed a binding natural gas sales contract with Dolphin Energy in May 2005.

Oman already has a natural gas pipeline to Fujairah in the UAE, and until supplies from Qatar become available, Fujairah is importing natural gas from Oman, under a contract held by Dolphin Energy. Supplies of 135 Mmcf/d of Omani natural gas commenced in January 2004 -- the first natural gas transmission across national borders on the Arabian Peninsula. Eventually, Qatari natural gas will be supplied to Fujairah, and the direction of the pipeline will be reversed by 2008, allowing for Omani imports of Qatari natural gas.

Kuwait

Kuwait produces a relatively modest volume of natural gas around 396 Bcf in 2003 the vast majority of which is "associated gas" (i.e., found and produced in conjunction with oil). Kuwait is ranked twentieth in world natural gas reserves, with an estimated reserve of 56 Tcf which contributes to 0.9 % of the world's total reserves, as reported by EIA.

Kuwait hopes to significantly increase its use of natural gas, both domestic and imported, especially in electricity generation, water desalination, and petrochemicals. A switch to natural gas would free up a substantial amount of oil -- possibly as much as 100,000 bbl/d -- for export. The country continuously seeks supply of both associated and non-associated gas, while reducing natural gas flaring to a minimum.

In July 2000, Kuwait and Qatar signed a memorandum of understanding (MOU) for possible import of Qatari gas from the offshore North Field -- the largest non-associated natural gas field in the world -- into Kuwait. In February 2003, MOU were signed for a $2 bn pipeline project from Qatar's port of Ras Laffan to Al-Zour South in southern Kuwait.

Qatar Petroleum and ExxonMobil (operator of Qatar's North Field) have signed an agreement on supplying gas. A territorial dispute between Qatar and Bahrain had held up the pipeline, but this was resolved in 2001. In addition, Saudi Arabia has expressed opposition to the pipeline, which is to pass through Saudi territorial waters, and has not granted approval yet.

Besides Qatar, Kuwait is also looking at importing natural gas from Iran, most likely from its huge South Pars gas field, via pipeline. Iran and Kuwait signed a preliminary memorandum of understanding for natural gas sales in March 2005. The gas is to be used for power generation and water desalination.

It remains unclear whether Kuwaiti gas demand could support Iranian, Qatari and Iraqi export projects simultaneously. In any event, a natural gas deal with Iran is being held up by the need to resolve maritime border issues in the region, specifically on the Dorra offshore gas field.

Prior to the 1990/1991 Gulf War, Kuwait received significant volumes of natural gas from Iraq. The gas which came from Iraq's southern Rumaila field, was used in Kuwaiti electric power stations and LPG plants. Currently, Kuwait and Iraq are making plans to restart the pipeline. The two governments concluded a MOU in December 2004.

The first phase of the project is modest, involving only 35 MMcf/d, which would be transported through the existing pipeline. The second phase would involve an $800 mn investment in refurbishment of the pipeline and associated pumping stations, which would allow the volume to increase to 200 MMcf/d. For the time being, though, the security situation in Iraq has prevented even the first phase of the plan from being implemented. Apart from imports, Kuwait hopes to increase its domestic natural gas production, both through reduced flaring of associated gas and through new drilling. Exploratory drilling

is currently being undertaken at the Raudhatain oilfield, reaching geological formations much deeper than the oil deposits, which are believed to be gas rich.
Gas development comes a step closer

The under-secretary at the Kuwaiti Ministry of Energy, confirmed on June 7th, 2006 that Kuwait and Saudi Arabia are to forge ahead with seismic studies in the offshore Durra gas field, which they share. He expressed the hope that gas production could start within three years, eventually rising to 17m cu meters/day.

Meanwhile, in June, more non-associated gas was reportedly discovered onshore—an estimated 140bn cu meters in fields of Umm Niqa, Sabriyah and Northwest Rawdatain which according to studies is 60-70% is recoverable. The deputy managing director of Kuwait Oil Company indicated that the discovery raises proven gas reserves to 1,140bn cu meters, and the new field could be producing 5.1mn cu meters/day by the end of 2007.

Oman

Although oil remains the single most important source of revenue, Oman has made natural gas the chief focus of its diversification and economic growth strategy through export of LNG and implementation of several gas based projects. Intense exploration has raised proven natural gas reserves from only 12.3 Tcf in 1992 to its current level of 29 Tcf, according to the Oil and Gas Journal.

The government is continuing its aggressive exploration campaign. Most of Oman's reserves are in areas owned by the petroleum development Oman (PDO), which is Oman's biggest natural gas producer. Most natural gas in Oman is associated with oil, but even that which is non-associated is often located close to the country's oil fields. More than 10 Tcf of Oman's non-associated natural gas is located in deep geological structures, many of which are beneath active oil fields. In 2003, Oman produced 583 Bcf of natural gas.

In 2005, the total production of natural gas was at 917.7Bcf, an increase of 7.6% from 2004 levels (270.5Bcf associated and 647.2Bcf non-associated), vis-à-vis as 852.9 Bcf (287.7 Bcf associated and 565.2 Bcf non-associated) in 2004. The number of producing non-associated gas fields during 2005 was 10, out of which 4 fields belonged to PDO, 1 to Novus company and 5 to Occidental company.

Currently, gas is largely utilized for Re-injection into oil reservoirs to sustain oil production in addition to its usage as LNG. It is also used as a fuel for power generation activities in desalination units, cement, textiles and other industrial projects in the country. Going forward, the utilization of gas will increase in gas-based industrial projects such as fertilizer, cement, aluminum and petrochemicals.

LNG exports

LNG constitutes a large part of Oman's plan to develop its natural gas sector, and the country is investing heavily in it. Oman's LNG program is being coordinated by OLNGC. During 2005 LNG exports reached 7.06mn tons as compared to 6.9mn tons in 2004.

Production has been evenly split between two liquefaction plants (commonly referred to as "trains") located at Qalhat, each with a capacity of around 170 Bcf per year. A third train with the same capacity began commercial operation in January 2006. It is a joint-venture between the Omani government (56%), ONGC (37 %), and Union Fenosa (7 %). There have been preliminary discussions with India over the possibility of that country taking an equity stake in a possible fourth train. The viability of the project depends on the number of future customers for the country's gas.

The major destination of LNG exports was to countries such as South Korea, USA, Japan, Spain and France. Oman also exported 198 thousand metric tons of by-product LNG to UAE in 2005. Gas revenues showed an improvement in Oman with a reported revenue contribution of RO397mn or 8.6% of the total revenues generated in 2005, up from 6% in 2004. This was as a result of continued exploration and better exploitation of existing wells.

Natural gas output soars

The start of operations at Oman's LNG train, Qalhat LNG, has boosted demand for natural gas. Gas output for the first six months of 2006 was up by 28% compared with the first half of 2005, with the production growth of non-associated gas far outpacing that of associated gas.

Overall usage of natural gas for LNG production increased by one-third, with almost all of the new demand coming from the third train at Qalhat LNG. The government gas system also remains an important consumer, with usage increasing by a substantial 19.7%. To some extent, this increased demand may reflect the start of operations at the Sohar Power Company.

Substantial growth of nearly 50% was also seen in the amount of gas used for re-injection in the country's oilfields, probably giving an indication of recent activity as oil companies in general (and PDO in particular) try to maintain former production levels.

Oman takes delivery of two more LNG carriers

Oman took formal delivery of two LNG carriers in June during an official visit to several Asian countries by the national economy minister. The carriers were the Ibri, built by Mitsubishi Corporation of Japan, and the Ibra, constructed by Samsung Heavy Industries of South Korea. The new ships bring the total number of carriers wholly or partly owned by Oman to six, boosting the work of the Oman Shipping Company (OSC).

The country's ambitions to build a shipping industry do not, however, stop with the Ibri and the Ibra. In June, the official Oman News Agency reported that Oman and Mitsui OSK Lines of Japan agreed to jointly purchase 83,000 cubic meter liquefied petroleum gas carrier and an 110,000 ton product carrier. Following the signing of the agreement, the minister announced that OSC plans to own at least ten ship
s by 2009.

Sohar project moves forward

The Omani government's plan to establish various gas-based industries in Sohar, on the northern Batinah coast, as part of its efforts to diversify the economy, took a step forward in July with the signing of an engineering, procurement and construction contract for the Aromatics Oman petrochemical plant. A consortium of two South Korean companies, LG International Corporation and GS Engineering and Construction, will be responsible for work on the plant.

Bahrain

Bahrain has natural gas reserves of about 3.25 Tcf, much of it associated gas from the Awali oil field. The output of natural gas and associated grew by almost 10 %, from 428,375 Mmcf in 2004 to 470,413 Mmcf in 2005.

The country produced 341 Bcf of natural gas in 2003, all of which was consumed locally. Natural gas production and processing are the responsibility of Bapco Upstream. The largest domestic consumer was Aluminium Bahrain (Alba), which uses it in its power plant. In September 2003, the government signed an agreement with Alcoa allowing the American company to take up to a 26 % equity stake in the company. Bapco Upstream awarded a contract in June 2004 to the U.S. engineering firm Foster Wheeler for upgrades to their main natural gas processing facility at Awali.

Bahrain's growing demand for electric power generation is likely to cause it to become a net natural gas importer in coming years. In January 2002, Qatar and Bahrain signed a Memorandum of Agreement indicating Bahrain's intentions to purchase natural gas from Qatar's North Field Enhanced Gas Utilization Project. After repeated delays, it now appears that it may be 2008 before Bahrain receives the 0.5 - 1 Bcf/d that it is seeking. Bahrain also opened negotiations with Iran on possible purchases of natural gas in early 2004.

Bapco has also pursued investment in LNG projects. In 2002, the country set up a joint venture with the American firm Dynegy to invest in related opportunities in the Middle East and North Africa.

Bahrain Plans New Upstream Drive To Boost Gas Reserves

Bahrain is planning a fresh upstream initiative in 2007 based on restructured offshore blocks as part of efforts to boost the Kingdom's natural gas reserves. The initiative is one of the first to emerge from the recently-formed National Oil and Gas Authority (NOGA). By the end of 2006, NOGA will have drawn up a new map of its offshore acreage, with the six current blocks combined to form either two or three larger ones.

While Bahrain hopes to make new oil discoveries to stem its declining production, exploring for new sources of natural gas to ensure the Kingdom's security of supply has now become a priority. NOGA is now working out a strategy that takes into account the delay in supplies from Qatar, This is becoming all the more necessary because of the rise in gas demand, notably for power and desalination, as new ventures are established in the Kingdom. NOGA has made a study of gas demand over the coming 10-15 years.

Natural Gas Outlook

Natural gas which was once ignored has suddenly attracted oil majors that are pouring billions into projects to meet a booming demand for the environmental friendly fuel. Oil will continue to reign supreme because of its dominance in the transport sector, but gas will find a home at power stations, overtaking dirty coal.

Demand for natural gas is increasing. It comes second after coal as the fastest growing primary energy source. The natural gas share of total world energy is expected to be 28% in 2030 from 23.5% in 20005. That is an increase of 4.5% which can be justified by environmental constraints as well as high oil prices which encourages consumers to rely more on natural gas. Also technological developments, especially in the area of transportation can be a main factor in driving the world to demand more natural gas.

Looking forward, natural gas use in the Middle East is expected to more than double between 2003 and 2030, where oil-exporting countries in the region have deliberately sought to expand domestic natural gas use in order to make more oil available for export.

The future of this clean, efficient and environmentally friendly fossil fuel should be much brighter than that of oil. Yet many uncertainties surround future gas demand. Gas being in direct competition with oil, future price trends of the latter will have a bearing on natural gas consumption. Declining oil prices do not favor natural gas, but environmental considerations do, at the expense of oil, while tax policies in consumer countries penalize oil in favor of natural gas.

Unpredictable geopolitical developments in the two natural-gas-producing regions, namely the Middle East and the Former Soviet Union (FSU), could affect long-term investment in pipelines, whereas technological progress, which can reduce the cost of transporting liquefied natural gas, could definitely be a plus in encouraging consumers to rely more and more, on a more benign source of energy, namely, natural gas.

Currently Qatar, Oman and UAE are among the major LNG exporters contributing together 23% of world's total LNG exports, which has a positive affect on their economies. However we believe that opening up the energy sector to foreign investments and expertise could increase the production. GCC governments are considering permitting foreign participation in their hydrocarbon sector. They are also constructing several expansion plans that are expected to finish within the next 5 years.

The GCC countries have almost 25% of the world's natural gas proven reserves. A significant volume of natural gas remains to be discovered. Worldwide undiscovered natural gas is estimated at 4,221 trillion of the total natural gas resource base, an estimated 3,000 Tcf is in "stranded" reserves, usually located too far away from pipeline infrastructure or population centers for its transportation to be economical. Of the new natural gas resources expected to be added through 2025, reserve growth accounts for 2,347 Tcf. More than one-half of the mean undiscovered natural gas estimate is expected to come from Eurasia, the Middle East and North Africa.

We believe that private sector in GCC region is large enough and has shown resilience to handle mega-projects in other sectors. We expect that the energy sector too will be benefited by the entry of the private local players who have local knowledge and skills and can definitely add value while working side by side with the public sector.

Returns across economic sectors can be highly variable, therefore, GCC countries are looking for ways to diversify their economies. Bahrain has led the way, privatizing non-essential services and instituting labor market reform. Oman has invested heavily in tourism and encouraged the revival of traditional industries such as fishing. Other GCC states have looked to banking and financial services, with Qatar, Kuwait, the UAE and Bahrain vying to be the region’s financial hub.

Natural gas intra GCC trading is expected to increase especially with major projects being constructed in the region. Examples of these projects could be the Dolphin project which aims to develop links between Qatar, the UAE and Oman. Qatar also has held discussions regarding supplying gas to Bahrain and Kuwait through pipelines.

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