

## Short-term trends in the gas industry

In a context of high investment costs and rising energy prices, and recurring unseasonably warm temperatures in recent years, the growth of natural gas demand is slowing. On the supply side, and on the demand side too, new trends are emerging, with potentially powerful impact on the short-and long-term development of the industry.

A scrutiny of the main figures available indicates a number of trends revealing a muddled 2007 gas year. While the American market appears to be reinvigorated, gas demand in the EU-27 seems to have slid for the second year running. As already observed in 2006, LNG tanker trade can be credited with the total increase of international gas flows. According to the tentative estimates released by Cedigaz, natural gas consumption worldwide posted 1.4 to 1.8% growth in 2007 (from 2,888 billion cubic meters, bcm, in 2006).

### Major trends in 2007

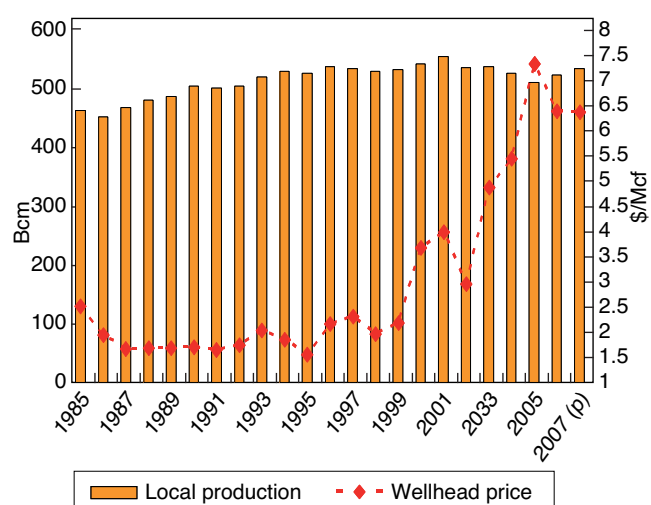
#### Strong recovery in gas demand on the American market

Hurricane damages to production and processing facilities in 2005 having been fully repaired, production capacity climbed back to the normal operating level in 2007. The total volume of gas produced, estimated at about 535 Bcm, provided about 83% of total gas supply.

Stimulated by higher wellhead prices over recent years, exploration helped sustain high gas production and significantly increased proven natural gas reserves. As of 1.1.2007, they amounted to 5,977 bcm, representing 11 years of production at the current rate.

The American gas market also recovered, pushing gas demand steadily upward. Generally lower prices than in 2005-2006, and sustained economic activity, largely motivated the resumption of sales to industrial users. Yet, the residential-commercial and power sectors registered the highest growth rates, on the order of 6 to 8%.

Fig. 1 - Evolution of marketed gas production in the US versus wellhead gas price



(p): Provisional  
Source: Energy Information Administration

#### Slight drop in Russian production

Despite a one per cent drop in Russian extracted volume, total production in the CIS will likely be rather unchanged from the previous year. Surging production in Azerbaijan (build-up to production from Shah Deniz field) and Kazakhstan, as well as larger export sales from Turkmenistan, should offset the drop in Russian sales.

Natural gas consumption in Russia should once again post an increase (+1 to 1.3% over the year), though smaller than observed in the recent period. This

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slowdown in demand growth could at least partly explain the drop in Gazprom's production to 548 bcm in 2007.

### European gas consumption falls for the second consecutive year

A generally very mild climate (in 2007, the number of degree-days again fell significantly) can be blamed for the probable drop in natural gas sales on the European market for the second consecutive year. In most of the countries, the residential sector recorded a fairly sharp drop in the volume of gas used. Despite rather favorable economic activity in a number of countries, sales to the industrial sector likely stagnated at best, or even dropped. The impact of very high gas prices as a result of fluctuations of the price of oil, to which the price of gas is tied with indexing formulas, significantly reduces natural gas competitiveness compared to the other energy sources used in this sector. The power sector was very likely the most favorable outlet for gas in 2007. The good performance stems from the rising price of coal, which dampened the flight from gas particularly in the United Kingdom. While the price of gas imported into Europe under long-term contracts stagnated at 8.5\$/MBtu in 2007 compared to the year before (due to the depreciation of the dollar against the euro, the price of gas fell 7% from 23€/MWh in 2006 to 21.4€/MWh in 2007), the price of imported coal doubled from 65\$/t in the first quarter to about 125\$/t at year end. This increase is largely explained by physical supply limitations for this energy source.

European gas production continued to drop (by 2 to 2.5% in 2007). Down about 10%, British production now only satisfies about 80% of the country's gas demand. The modest increase (about 2%) in the volume that Norway produced will only partly offset the fall in production observed in most of the producing countries throughout the region.

### Rapid growth of the Chinese gas market

Volumes produced in 2007 by Middle-East, Asia, Latin America and Africa producers should again show significant growth rates, although slightly lower than observed in recent years, which were particularly favorable to gas developments. China undoubtedly ranks first among countries with the fastest growing production, with a growth rate potentially close to 16%, boosting 2007 production to some 68 bcm.

### Globally stable world gas pipeline trade

While pipeline exports from Canada to the United States increased significantly to about 103.5 bcm in

2007, the main outside suppliers to Europe (Russia, Algeria) saw their sales to the continent drop. Algerian gas deliveries to Italy declined sharply (about 10%), via the Enrico Mattei pipeline in particular, and Russian gas exports to many European customers fell significantly. The build-up to capacity of Azeri gas sales to Turkey and the moderate increase in Norwegian gas sales partly offset the drops registered in other producing countries.

### Steady growth of LNG flows

In 2007, LNG tanker trade again registered a significant rise of about 10%, with the US credited with a major share of the increase. Two new exporters started producing: Equatorial Guinea (EGLNG plant) in June, and Norway (Snøhvit LNG) in October. Due to technical difficulties, the Norwegian plant only managed to export two cargoes since it started commercial operation.

### Atlantic Basin

In the United States, LNG imports registered a spectacular increase (+34% more than in 2006). In early August 2007, while gas price at the Henry Hub was rather low at about 5.5\$/MBtu, imported quantities reached record levels. From the end of August, the Asian countries altered the situation, attracting a major share of spot cargoes.

In Europe, the resumption of activities at LNG receiving terminals (Grain LNG in the United Kingdom in particular) in the last four months of the year helped partly offset the import slump in the first half. An Algerian LNG cargo was unloaded on July 22 (the first since mid-March) at Grain LNG, while supply problems, due particularly to the maintenance shutdown of the North Sea CATS transportation network, caused spot prices to rise on the British market.

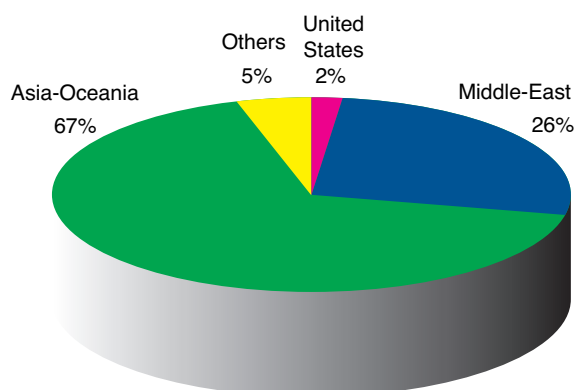
In Spain, despite the start of operations at the new receiving plant at Reganosa (West coast), activity at the terminals was rather slow as the year began. The rainfall in early 2007, much higher than in the previous two years, was a major factor in supplying energy (hydro) to the Spanish market, commensurately limiting demand for gas and LNG.

### Pacific Basin

In Asia, LNG imports posted a major increase, tentatively estimated at about 10% above 2006. LNG sales on the Japanese market rose sharply to almost 90 bcm.

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Fig. 2 - LNG imports in Japan by origin in 2007



Others: Spot purchases from Trinidad & Tobago, Algeria Egypt and Nigeria  
Source : Cedigaz

The shutdown of some of the country's largest nuclear plants (especially Kashiwasaki-Kariwa operated by Tepco) is responsible for the sharp rise in LNG imports in Japan. Under long-term contracts and "spot" cargo purchases, nearly all LNG producers now participate in supplying Japanese buyers.

While volumes of low price (about 3.17\$/MBtu) LNG imported into China from Australia are building, supplies were supplemented with the purchase of some "spot" cargoes (between 8 and 9\$/MBtu) from Algeria and Nigeria.

### Short-term prospects in the gas industry

New developments currently under consideration will have a major impact on gas expansion in the short-and longer-term.

#### The rise of LNG

Despite many difficulties (delays in the startup of some projects, technical problems, cost increases) and challenges faced, the LNG industry is experiencing very rapid growth today. Thus, world liquefaction capacity is expected to increase almost 50% by 2012 to reach some 383 bcm/year (288 Mt/year).

New plants being built and planned in Qatar are nevertheless responsible for 50% of this additional capacity. Despite high investment costs (700 to 900 million\$/t of LNG produced for the new projects compared to 380 to 400 million\$/t for the plants decided in 2004), some project promoters are risking the construction of new plants. In 2007, investment decisions were finalized for the project at Skikda in Algeria, Pluto LNG in Australia and Angola LNG.

Table 1  
Additional liquefaction capacities 2012 Outlook (Mt)

	End 2007	2008	2009	2010	2011	End 2012
Atlantic Basin	74.1	78.2	78.2	78.2	85.0	90.0
Algeria	20.3	-	-	-	4.5	24.8
Angola	-	-	-	-	-	5.0
Egypt	12.0	-	-	-	-	12.0
Equatoriale Guinea	3.7	-	-	-	-	3.7
Libya	0.7	-	-	-	3.0	3.0
Nigeria	17.8	4.1	-	-	-	21.9
Norway	4.2	-	-	-	-	4.2
Trinidad & Tobago/ Venezuela	15.4	-	-	-	-	15.4
Middle-East	46.8	54.4	73.35	84.3	99.9	99.9
Abu Dhabi	5.8	-	-	-	-	5.8
Oman	10.6	-	-	-	-	10.6
Qatar	30.4	+ 7.6	+ 15.6	+ 7.6	+ 15.6	76.8
Yemen	-	-	+ 3.35	+ 3.35	-	6.7
Pacific Basin	71.5	75.7	88.9	93.7	98.5	98.5
Australia	14.7	-	+4.2	-	5.0	23.9
Brunei	7.2	-	-	-	-	7.2
United States	1.5	-	-	-	-	1.5
Indonesia**	25.0	+ 3.8	+ 3.8	-	- 4.6	28.0
Malaysia	23.1	+ 0.4	+ 0.4	-	-	23.9
Peru	-	-	-	-	4.4	4.4
Russia	-	-	+ 4.8	+ 4.8	-	9.6
WORLD TOTAL	192.4	+ 15.9	+ 32.15	+ 15.75	+ 27.9	288.4

These new capacities do not include debottlenecking operations with the exception of Malaysia (2 x 0.4 Mt/year on MLNG Dua)

\*\* The total for Indonesia takes into account the drop of the volumes produced on Bontang and Arun

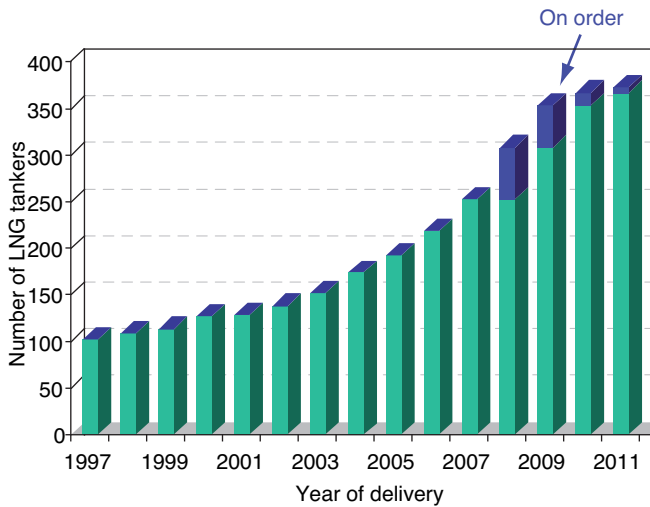
Source: Cedigaz

The growth of the LNG tanker fleet is also accelerating to accompany the growth of trade flows associated with these new capacities. More than 120 new LNG tankers are currently on order for delivery by the end of 2011. Due to probable delays anticipated on some of the plants and the forecast decrease of Indonesian LNG exports to customers in Asia, transport overcapacity should become recurrent and favor "spot" transactions over the period.

As for regasification, promoters of receiving terminals demonstrate a similar dynamism. In the next five years, regasification capacity worldwide could jump from almost 500 bcm/year in 2007 to about 700 bcm/year in 2012. New concepts in regasification terminals (regasifying ships, floating terminals) offer more flexibility and much faster construction, arousing the interest of emerging countries like Pakistan for instance, in LNG.

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Fig. 3 - Evolution of the LNG tanker fleet



Source: Cedigaz

These developments are occurring while new companies, active in oil trading and finance (Vitol, Goldman Sachs, Merrill Lynch) have recently entered into LNG trading, re-purchasing "spot" cargoes from importing companies.

New factors will be decisive in the development of varying pressures on the LNG market. Sales to the residential sector, contingent on climatic conditions in the Atlantic Basin and, to a lesser extent, in Asia (mainly South Korea), and even to the power sector (shutdown of nuclear plants in Japan), will continue to play an important role. The impact of high LNG prices and competition from other energy sources on gas demand stand as the major parameters of the balance. Insofar as new plants are built on the basis of long-term contracts, any lag between contract start-up date and commercial production on the plants will likely generate pressures on world supplies and favor price arbitrage between basins.

### Producers change strategies

Over the recent period, several producers have developed a protectionist strategy aimed to preserve their gas resources for their local market and for future generations. Following Qatar, which since 2005 set a moratorium on any new gas export project, and Indonesia, which decided to only partially renew its LNG export contracts with its Asian customers, due to expire in the short-term, Nigeria is adopting a similar move, aiming to limit the development of new liquefaction infrastructures.

Access to supply will clearly become a key element in the gas expansion in the medium to long term.

### Producers revise their gas tariffs on local markets

In many producing countries (Oman, Trinidad & Tobago, Egypt) the recent growth of gas consumption was very rapid. Stimulated by low prices granted by governments to promote the economic development of their country, industrial companies built large petrochemical capacities (methanol in Trinidad & Tobago) and other industries. In some cases, as gas production capacities failed to grow at a sufficient pace to anticipate growth in consumption, the volumes produced today are not available in sufficient quantities to supply the needs of local industries and liquefaction facilities.

In the coming years, a substantial price rise, may be observed on some of these markets, counteracting the increase in local gas demand. For instance, the Egyptian government is considering tripling the price of gas (currently at 0.75\$/MBtu) supplied to petrochemicals in the short term. In Russia, although the political context as the elections approach weighs on the nationwide implementation of such measures, the Energy Commission for the Moscow region published a decree aimed at raising the price of gas to residential customers from January 2008.

In China, the price of gas sold to industry and petrochemicals (with the exception of fertilizer producers) was recently increased.

### The price of gas in long-term contracts: towards parity with oil...

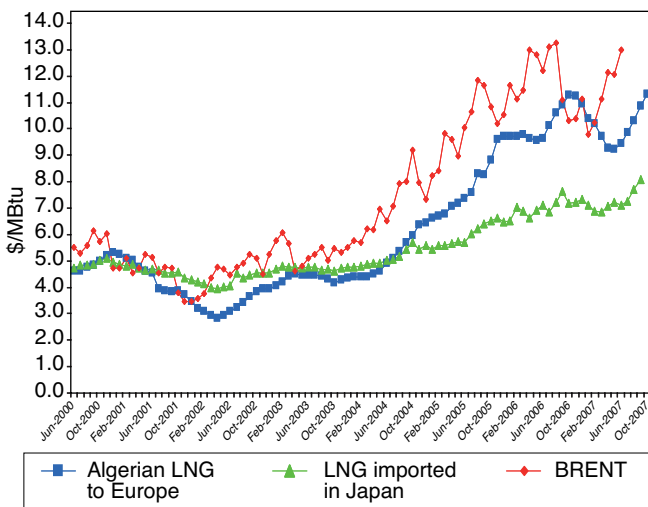
In the United States, the Henry Hub "spot" price weakened slightly in 2007 compared with the previous year, to 6.88 \$/MBtu on average (7\$/MBtu in 2006). Today, this "spot" price serves not only as a leading price on the US market, but also as a benchmark price in many "spot" transactions in the Atlantic basin and more particularly in Spain, a market which is far distant from Northern Europe's major transport pipelines.

This downward trend of the "spot" price could also largely be observed on the European market. The development of new transport infrastructures between the continent and the United Kingdom tends to drive prices down. Some price harmonization also developed among "spot" prices on the various hubs (Zeebrugge, TTF) in relation to the price at the NBP in the United Kingdom, today serving as a benchmark price in some long-term import contracts between Norway and the United Kingdom, and the Netherlands and the United Kingdom, and even in some signed LNG contracts.

The price of Algerian LNG purchased under long-term contracts, unloaded at Montoir de Bretagne in France or

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Fig 4. - Price of imported LNG in Asia and Europe



Source: World Gas Intelligence, METI

in Zeebrugge in Belgium, has evolved in a range between 9 and 12\$/MBtu. As shown on the graph above, since the indexing of the gas price to the oil price is not instantaneous (time lag over several months, smoothing mechanism), the price of Algerian LNG has risen, while the price of oil had already dropped repeatedly in the last two years.

In Asia, the price of LNG imports to Japan continued to rise, although more moderately than in 2006, to 7.25\$/MBtu on average over the first nine months of the year. In a context of very high oil prices, Asian importers continued to benefit from the indexing formula negotiated with their suppliers, i.e. the "S-Curve".

However, on a "sellers' market" this indexing formula, which shelters Asian importers from very high oil price

increases, may well disappear. Recent contract renegotiations with Middle Eastern and Asian suppliers' show the willingness of the producing countries to obtain a gas price in parity (or nearly) with oil in the future.

### Gas demand in the short-term

By 2012, world natural gas demand could grow at an annual average of 2 to 2.2% to reach some 3,290 bcm. Due to their indexing to the price of oil, gas prices on international markets will very likely retain their high levels. At present, despite the recent rise, the price of imported coal in Europe remains low compared to gas, at 190\$/toe compared to 355\$/toe. However, by 2012, competition from other energy sources, coal in particular, is unlikely to have a very unfavorable impact on gas demand growth. Indeed, besides the fact that coal power plants with CO<sub>2</sub> capture are unconceivable on a large scale by that horizon, the significant rise in the price of coal observed in 2007 could continue in the short-term, particularly as a result of growing Chinese demand.

In its Five-Year Plan (2006 – 2010), China plans to add 87,380 MW of electric capacity from coal (13,640 MW for gas-fired power plants). Besides, as a result of the huge tonnage of marketed coal worldwide, transport infrastructures are a major bottleneck, further pushing up the supply costs of this energy source.

Although they can also partner with gas (solar-gas installations for instance), renewable energies will probably emerge in the short and long-term as major competitors to gas in the industrialized countries.

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