

Short-term trends in the gas industry

After a period of strong expansion that lasted for most of 2008, the gas industry was hard hit by the impact of the economic recession. Although the competitiveness of the gas price was often an advantage in 2009, the natural gas market saw a net decline in consumption that led to a historic decrease in world production and international trade. In addition, the subsequent collapse of market prices gave LNG a competitive edge in the Atlantic Basin, where surplus gas continued to accumulate, heralding a long “gas bubble” period that the industry will have to adjust to permit harmonious, long-term development of the gas markets.

Recent trends in the world gas industry

Market prices collapsed in 2009 after progress in the exploration-production sector led to a sustained increase in the world gas supply and in the spare production capacity available. In 2008, the gas-to-oil ratios for production and reserves went up respectively from 67.8% to 70.2% and from 91.8% to 96.7%, reflecting the rapid development of basins of non-associated gas including unconventional resources such as shale gas in the United States and coalbed methane in Australia. Certain geographic regions, i.e. the Middle East and Asia, have been gradually stepping up their contribution to the world gas supply.

Gas reserves were more plentiful

According to Cedigaz, the proved reserves¹ of natural gas worldwide climbed by 5.1% in 2008 to stand at an estimated 189.1 10¹² m³ (about 170.3 10⁹ toe) on January 1, 2009. The world reserves-to-production ratio (gross production-reinjection) stood at 55 years, compared to 58 years a decade ago.

2008 saw the largest rise in world proved reserves of natural gas in seven years, with additional volumes totaling 9,054 10⁹ m³ (Gm³).

Table 1 shows the ten countries whose reserves went up most significantly in 2008. Evaluations and revised-up

estimates for specific existing fields were partly responsible, such as Yolotan/Osman and Yashlar in Turkmenistan, Abadi and Kambuna in Indonesia, Kish and Fars in Iran, not to mention the development of coalbed methane in Australia, shale gas in the United States and associated gas in the Orenoco Belt in Venezuela. Also contributing to this increase were substantial discoveries of unconventional gas in North America (Louisiana and British Columbia), where drilling campaigns were particularly prolific in first-quarter 2008 as well as natural gas finds in Australia (e.g. Mimia-1, Nimblefoot-1, Lago-2, Julimar-1, Western Australia, Blackwood and Bonaparte Basin), Egypt (Satis 1, North El-Burg, Al-Tawil-1, El Basant-2 and Manzala West), China (Klamelie and Xinjiang) and Peru (Kinteroni XI and North Camisea).

Gas consumption greatly penalized by the economic crisis

The first results made available by Cedigaz indicate that 2009 was a black year in the history of the gas industry: total consumption fell by between 5.5% and 6.5% for the year. It was the first time that it had fallen since World War II.

As shown in Table 2, natural gas sales fell the most in the members of the Commonwealth of Independent States (-11.5%) and OECD countries (-7.5%) especially in Europe (-8%), Canada (-7.5%), South Korea (-11.5%) and Japan (-8.5%). It is thought that gas consumption

(1) Proved reserves correspond to discoveries estimated with reasonable certainty to be commercially recoverable under current economic and technical conditions

Short-term trends in the gas industry

Table 1

Revised-up estimates and gas discoveries - The top ten countries

Country	Increase 2009/2008 (10 ⁹ m ³)	Increase 2009/2008 (%)
Turkmenistan	5,720	213.4
Iran	1,050	3.8
Australia	783	33.1
United States	738	11.0
Saudi Arabia	270	3.7
Venezuela	144	3.0
Egypt	110	5.3
China	90	3.0
Indonesia	90	2.8
Peru	80	23.9

Source: Cedigaz

will edge up slightly in the developing countries, but there should be large variations: strong growth in countries like China and India, but a steep decline in Brazil and Taiwan, among others. The collapse of gas consumption in Brazil in 2009 was partly due to the industrial slump but also to weather conditions, which advantaged hydroelectric production in the early months of the year.

In 2009, world gas production saw a reversal in trend

2008 turned out to be an exceptional year, continuing a decade-long uptrend. The marketed production of natural gas posted the highest growth since 1984, up 4.2% to 3,065 Gm³. Not only did it continue to expand in the Middle East and Asia, whose aggregate share of total produced volume rose from 25.4% to 26%, but production also grew at an atypical rate in the industrialized countries of the OECD, especially Norway (Ormen Lange Field), the Netherlands (Groningue Field) and the United States, where unconventional gas production accounted for more than half of total production for the first time.

According to Cedigaz estimates, the gas supply will see a record decrease (between 4.5% and 5.2%) in 2009. This was due to a significant drop in demand as well as to the unfavorable financial conditions in some producing countries. The members of the CIS are expected to post the largest reductions in produced volumes (down by nearly 100 Gm³ for the year) and Cedigaz has also predicted that output will fall by approximately 30 Gm³ and 15 Gm³, respectively, in Europe and Africa. In Europe, double-digit decreases in production (-12 to -17%) are anticipated in the United Kingdom and the Netherlands. In Africa, production in Nigeria and, to a

Table 2

Gas consumption for the first three quarters of 2009

	Jan.-Sept. 2008 (TWh)	Jan.-Sept. 2009 (TWh)	Variation (%)
The Americas			
Brazil	196.6	150.1	-23.6
Canada	574.6	529.8	-7.8
Mexico	377.9	390.6	+3.4
United States	5,292.5	5,155.5	-2.6
Argentina	317.5	321.8	+1.4
Colombia	73.3	75.6	+3.1
Peru	29.7	27.7	-6.6
Venezuela*	100.4	96.1	-4.3
Europe			
Romania	120.9	95.4	-21.2
Spain	339.1	302.1	-10.9
Italy	663.2	585.1	-11.8
United Kingdom	730.5	649.4	-11.1
Germany	680.4	632.4	-7.1
Poland	107.4	100.1	-6.8
France	339.3	332.9	-1.9
CIS			
Russia	3,571.5	3,207.2	-10.2
Other	2,193.9	1,890.0	-13.8
Asia-Oceania			
Taiwan	95.6	78.1	-18.3
South Korea	274.1	240.1	-12.4
Japan	751.2	689.5	-8.2
China	521.9	589.9	+13.0
Thailand	300.2	299.3	-0.3

* January-June

Source: Cedigaz

lesser extent, Algeria, followed the downtrend in exported volumes.

It is also thought that gas production will decline in Latin America (Brazil, Bolivia and Argentina) whereas the Middle East may post a modest hike in 2009, sustained by Qatar and Iran. Only Asia-Oceania is likely to report a substantial increase in gas production for 2009, with China providing the momentum (+8 to 11%) along with India (+22 to 25%), Australia and Thailand.

This being said, Cedigaz expects world natural gas production to rally in 2010 (+1.8 to 2.4%) as demand starts to rise again in the CIS countries and Europe and the development of major gas projects continues in the Middle East and Asia.

Short-term trends in the gas industry

Russian production fell dramatically

According to preliminary figures provided by the Russian government, gas production dropped in Russia by 16.7% between January and October 2009, i.e. an absolute loss of 92 Gm³. If Russian exports recover at the end of 2009 as anticipated, the decline of national output would be limited to 13-15% for the year.

Shale gas continued to boost U.S. production

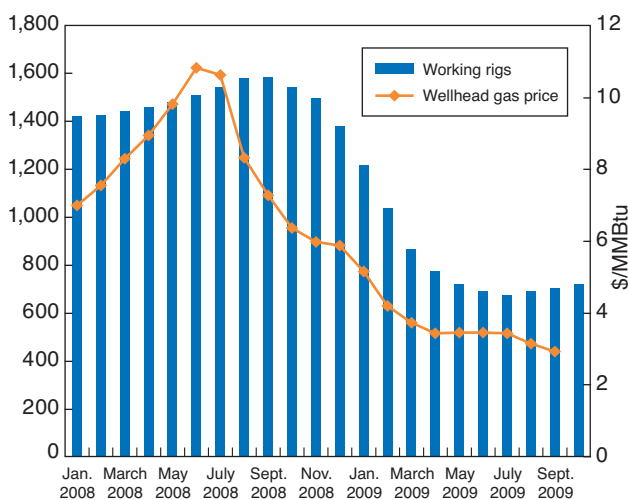
Although the number of active rigs dropped by nearly 60% between September 2008 and July 2009 (Figure 1), U.S. production is expected to grow in 2009, boosted by shale gas which, however, only represented 10% of national output. According to the U.S. Department of Energy, the steep fall-off in drilling of the first half-year 2009 could cause gas production to slip by 3.1% in 2010.

In the period January-September 2009, net marketed production rose by 3.8% compared to the same period of the previous year, driven by onshore production and in spite of a 45% reduction in the number of active rigs during the first five months of the year. Among the different types of gas, the exploitation of shale gas was the least penalized by the poor economic conditions and it allowed domestic production to keep growing. The reasons were as follows:

- some shale gas reservoirs continued to obtain positive rates of return at prices of \$3.5/MMBtu,
- some leases stipulate that new wells must be drilled to retain the licenses to operate and develop the gas.

In the short term, the delay in the development of wells drilled in 2009, improved well productivity, progress in

Fig 1 - Number of working rigs on gas target versus wellhead gas price in the United States



Source: Baker Hughes – Energy Information Administration

the area of multiple zone completions and the recovery of the drilling sector (especially horizontal wells) since July should help keep the flows of produced shale gas at high levels.

Unprecedented decrease in international piped gas transactions

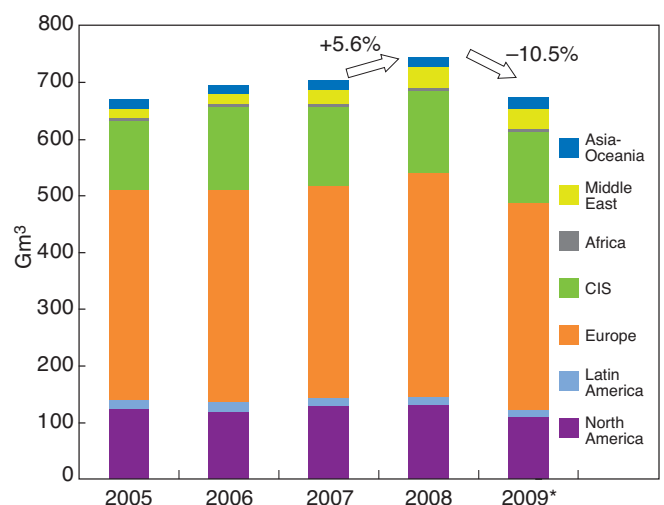
After a significant increase of 5.6% in 2008, bringing the total for volumes traded to 744 Gm³, Cedigaz predicted that the international piped gas trade would see an unprecedented contraction in 2009, especially following the downturn in gas consumption in the CIS countries and Europe, where more than 70% of all international piped gas transactions take place.

Cedigaz anticipates that traded volumes of piped gas will fall by an average of 10-13% in 2009. Besides the strong decline in intra-CIS trade (-15%) and in European imports (-8.5%), piped gas flows between Canada and the United States, Bolivia and Brazil and Myanmar and Thailand also fell substantially. The two main outside suppliers to Europe (Russia, Algeria) saw their sales to the continent drop strongly.

Trade via LNG carriers remained stable overall

The massive arrival of a plentiful supply of LNG in the Atlantic Basin encouraged the purchase and storage of large quantities of LNG in this zone at competitive prices. LNG cargos headed for the most liquid markets offering efficient instruments ensuring flexibility and covering financial risks. According to the official statistics, LNG imports to the United Kingdom surged from 0.4 Gm³ (for the first three quarters of 2008) to 5.7 Gm³

Fig 2 - Trend in the international piped gas trade, by importing region



* Estimates
Source: Cedigaz

Short-term trends in the gas industry

(same period of 2009). In parallel, the South Hook and Dragon LNG regasification plants came onstream in March and September 2009, respectively, inaugurating the first long-term deliveries between Qatar (Qatargas II) and the United Kingdom. This positioned Qatar (Qatargas, Rasgas) as a major gas supplier to the United Kingdom, furnishing more than 45% of the LNG deliveries during the first three quarters of 2009. In the United States, LNG imports were up by 29% to 10.4 Gm³ for the period between January and October 2009. Trinidad and Tobago supplied nearly 54%, followed by Egypt (35%), Norway (8%) and Nigeria (3%). The short-term LNG trade should see its market share increase significantly in 2009.

In addition, three new countries appeared on the list of LNG importers to the Atlantic Basin:

- in Brazil, the Pecem and Guanabara Bay receiving terminals were commissioned in the first quarter of the year and received more than 110 Mm³ of natural gas during the period January-September 2009, according to the National Agency of Petroleum (Brazil),
- Canada saw its first regasification terminal, Canaport (7.7 Mt/yr), come onstream in June 2009,
- Chili inaugurated Quintero, the first onshore regasification terminal (2.5 Mt/yr) in the Southern Hemisphere, in July 2009.

The rise in LNG imports to the Atlantic Basin may reach nearly 15 Gm³ in 2009, compensating for the strong drop-off in the volumes imported by the three largest LNG markets in the Pacific Basin: Japan, South Korea as well as Taiwan, which depend on LNG for more than 95% of their supply. For January-September 2009, LNG imports to these three countries fell by 8.2%, 13.9% and 12.5%, respectively, compared to the same period of 2008, due to a decline in industrial consumption.

The short-term outlook for the gas industry

The existence of a surplus supply of LNG at a time when total gas demand is expected to grow only slightly, indicates that the markets are in for a long "gas bubble" period. According to Cedigaz forecasts, the bubble will get worse in the very short term, with a potential LNG surplus of about 90 Gm³/yr during 2010–2011 (i.e. about one-quarter of total LNG supply capacity) before being progressively absorbed over several years. Although excess LNG capacity will steadily decrease after 2011, it is not expected to become marginal (lower than 30 Gm³/yr) until after the end of 2016. The market surplus of LNG will exert downward pressure on natural

gas prices and call into question the continuation of gas-to-oil-price indexation in long-term contracts in Europe and Asia.

The LNG industry is taking off

Cedigaz anticipates that 85.5 Mt (113.7 Gm³) of additional liquefaction capacity will come onto the market between January 2009 and January 2013, with the Middle East accounting for two-thirds of it. In 2009, it is estimated that nearly 69 Gm³ in new liquefaction capacity came onstream, 60% of it in Qatar.

It should be stressed however, that only six projects in the last three years received the green light for investment. This will limit the growth of liquefaction capacity after 2012. Anticipating the development of two new LNG projects in Australia, in addition to the Gorgon LNG project and a project in Venezuela, Cedigaz foresees the installation of 46 Mt (61 Gm³) in supplementary liquefaction capacity between January 2013 and December 2016, 65% of it in Asia.

Regasification is also developing quickly. In the next five years, total regasification capacity could increase from 748 Gm³ in January 2010 to 1,064 Gm³ in December 2015. The Atlantic Basin would generate nearly 80% of additional capacity. 2009 confirmed the expansion of offshore regasification technologies with the commissioning of a gravity-based terminal in Italy (Rovigo), floating storage and regasification units or FSRUs in Brazil (Pecem and Guanabara Bay) as well as regasification vessels that offload at unloading buoys or port installations suitable for that purpose (e.g. Mina Al-Ahmadi in Kuwait and Neptune LNG in the United States).

The fleet of LNG carriers currently finds itself in a situation of excess capacity. Many orders for new vessels were placed in 2004–2006, which is why 51 ships were commissioned in 2008 and about 40 in 2009. By year-end 2009, the fleet totaled more than 340 ships. New orders have plummeted since 2006, so only a few new ships (less than 35) should be commissioned during the period 2010–2013.

Short-term gas demand to grow slightly

According to Cedigaz, the gas market in OECD countries will grow slightly in 2010, thanks to a limited rally in economic growth and the competitiveness of the gas price, which is sometimes an advantage in the electricity sector. The price of coal, which recently jumped to over \$80/ton, may continue to rise in the short run to meet increasing demand for base-load electricity production in Asia.

Short-term trends in the gas industry

Nonetheless, growth is not expected to exceed 1% per year because of the slow pace of economic recovery, especially in Europe (the most recent OECD forecasts say that the economy will grow by only 0.9% in the euro zone in 2010). Natural gas is also in close competition with coal for base-load electricity production on key markets like Japan and the United States, where the price of coal is competitive at \$2.5/MMBtu for a natural gas price of \$4/MMBtu. Even in northern Europe, where natural gas has strong prospects for growth in the electricity sector, various considerations reduce the potential of the natural gas market for short-term expansion:

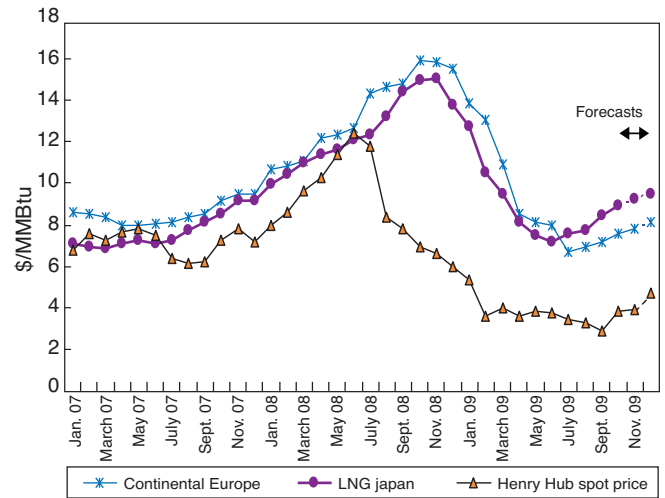
- the carbon penalty is low,
- coal stocks are high,
- under environmental pressure, several coal-fired power plants will close in the United Kingdom by 2015, an incentive to make greater use of these units in the short term.

That's why, according to the Cedigaz forecast, the gas market will grow by 1-1.5% in 2010 and by 1.5-2% a year during the period 2010-2012, sustained mostly by the developing countries. These growth rates are lower than those observed during the period 1998-2008 (+2.9%/yr on average).

Downward pressure on natural gas prices

The gas development projects and the economic conditions prevailing since 2008 have given rise to new gas price trends whose main consequence is a pronounced "disconnect" between spot prices and oil-indexed prices. This can be attributed to the growing role of unconventional gas production in the United States and to the overplentiful LNG supply, which caused a collapse in market prices dictated by the fundamentals. From August 2008 to November 2009 (Figure 3), these prices remained about 50% lower on average than oil-indexed gas prices set in long-term contracts in Europe and Asia. This price gap should persist after the winter 2009-2010 is over, considering that a plentiful, flexible supply of LNG is available on European and Asian markets and that demand is only making a timid recovery. This new situation cannot be sustained over time. It furnishes additional reasons for questioning the continued existence of the gas-to-oil indexation mechanism in

Fig 3 - Import prices indexed on long-term contracts versus Henry Hub spot prices



Source: World Gas Intelligence, Cedigaz

"take or pay" contracts as well as whether a "gas OPEC" should be established in the medium or long term to regulate the natural gas and LNG supply so that exporting countries can keep gas prices at a high level. One can expect this debate to become more heated over the hypothesis of future probable increases in the oil price. Other factors — pressure from producing countries, the lack of liquidity and depth at gas hubs in Europe, the limited role of spot trading in Asia and the advantages associated with the current gas-to-oil price indexation (less price volatility and substantial feedback) — are inhibiting the rapid emergence of a reference market price for long-term contracts in Europe and Asia.

Although the new fundamentals characterizing the gas industry in 2009 will impact medium-term gas markets, it is imperative to resume gas investments during this period of economic crisis to avoid further long-term market disequilibria. It is up to key industry players and public authorities to adopt appropriate pricing and regulatory policies that will prevent the current turbulence on the gas market from undermining the expansion of the gas industry.

Armelle Lecarpentier – armelle.lecarpentier@cedigaz.org
Final draft submitted in December 2009