

Medium-Term Prospects for the Gas Industry

In the nineties, natural gas was the fastest growing energy source in the world energy mix. However, recent developments on the energy scene, particularly in terms of prices, have strongly impacted the growth of the various energies to the detriment of natural gas. Beyond this inter-energy competition, which could intensify, medium-term prospects for the gas industry evolve in an environment beset with uncertainties.

Over the last ten years, natural gas consumption grew 2.6%/year, reaching 2 841 10⁹ m³ in 2005. In the same period, its share of the world's primary energy needs rose only slightly, from 23.2 to 23.5%.

This increase in gas demand occurred in conjunction with the setting up of huge production and transport infrastructures. Qatar and Iran started producing the world's largest non-associated gas field. International gas trade more than doubled (845 10⁹ m³ in 2005). Apart from the past two years, periods of tensions between supply and demand on the markets have been rather limited.

However, many major developments which have marked the gas industry in the recent period augur for a probably slower and more jerky development of this source of energy in the future.

Worldwide gas supply and demand balance by 2010-2015

By 2010, natural gas consumption will continue to rise steadily, and Cedigaz projects an average annual growth of about 2.5%. The highest growth rates (4%/year or more) should be registered in Latin America, Asia-Oceania, Africa

Table 1
World gas balance – 2015 Outlook

		2005 (10 ⁹ m ³)	2010 (10 ⁹ m ³)	2015 High scen. (10 ⁹ m ³)	Growth rate 2005 - 2015 (%/year)
North America	Supply	741.5	760	766	0.3
	Demand	748.5	805	851	1.3
	Gap	- 7.0	- 45	- 85	
Latin America	Supply	134.0	165	198	4.0
	Demand	119.9	151	177	4.0
	Surplus supply	14.1	14	21	
Europe	Supply	314.5	310	285	- 1
	Demand	565.5	645	721	2.5
	Gap	- 251.0	- 335	- 436	
Former Soviet Union	Supply	808.9	850	900	1.1
	Demand	646.3	680	705	0.9
	Surplus supply	162.6	170	195	
Africa	Supply	171.8	240	323	6.5
	Demand	82.9	105	125	4.2
	Surplus supply	88.9	135	198	
Middle East	Supply	309.1	450	576	6.4
	Demand	268.3	328	385	3.7
	Surplus supply	40.8	122	191	
Asia-Oceania	Supply	360.7	434	487	3.1
	Demand	399.1	494	570	3.6
	Gap	- 38.4	- 60	- 83	
World total	Supply	2 840.5	3 208	3 535	2.2
	Demand	2 840.5	3 208	3 535	2.2

North America includes Mexico.

Europe: EU 27, Norway, Switzerland, Turkey and other Central European countries.

Source: Cedigaz.

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and the Middle East. We can reasonably hypothesize that gas competition with other energy sources should only have a moderate impact in the OECD countries. Power generation continues to be the driver for growth. Planned “clean” coal-fired plants in Europe should not start operating before 2010. In the United-States, recently commissioned new gas-fired plants tend to run at full capacity to meet electricity demand.

On the supply side, gas production and transport infrastructures are already operating or being built to deliver the needed volumes. Yet supplies are very likely to be tight on some markets (Asia).

Beyond 2010, gas growth is expected to slowdown to 2.2%/year at best. A number of latent developments could have a rather strong impact on the medium-term development of the gas industry. In its latest edition of the *WEO 2006*, the International Energy Agency (IEA) forecasts a 2% average annual growth by 2030.

High gas prices favor competing energies

In the world energy mix, natural gas is undeniably the fossil energy whose combustion has the lowest environmental impact. Although its contribution to greenhouse gas emissions (CO₂ in particular) cannot be discounted, it definitely has a minor role in pollutant emissions: about 30% less than oil products and 50% less than coal. In a context of increasingly strict political and fiscal measures over time to reduce the negative environmental impact of the energy industries, the growing use of natural gas can only favor the fulfilment of Kyoto commitments.

Besides, technical and economic performance stemming from efficiencies as high as 58% in the case of combined-cycle power plants, compact facility design reducing construction time and investments, and better space integration, need no further demonstration.

In recent years however, high gas prices have stimulated competition among energies and impacted gas demand in many OECD countries. In the power sector, where substitution of one energy by another can be fairly rapid, power producers in the United Kingdom, for instance, privileged coal, an abundant resource which, despite recent price increases, still remains cheaper entering the plant than natural gas, whose price is often indexed to oil products. This trend towards greater use of coal seems to be spreading over. In Europe, (Germany, the United Kingdom and Norway), several new coal-fired plants with at least partial CO₂ capture are being planned and should become operational after the turn of the decade.

The price of gas is also a serious parameter in potential demand from the industrial sector. In the United States, it is

prompting the largest industrial users to turn to alternative energies, as in the past, when they chose natural gas because it was cheaper.

In the case of petrochemicals, where substituting gas by another energy material is problematic, some US firms preferred to halt production because of a profit squeeze due to the high price of gas in 2005.

Emerging production constraints

Whereas natural gas resources are globally abundant and in adequate quantities to supply a fair share of the world's energy requirements over this century, the industry will have to contend with tight supply periods due to:

- the lack of investments earmarked to exploration-production in Russia. Possessing huge gas potential, the country extracts 50% of its production from fields brought into operation in the seventies – eighties (Medvezhe, Urengoy, Yamburg) where decline is already well advanced. Recently developed gas fields (Zapolyarnoye) are smaller and unable to compensate for declining production from older fields. Independent companies (Novatek, Itera) and oil companies must sharply increase their production (from 93.7 10⁹ m³ in 2005 to about 114 10⁹ m³ in 2010) to meet the needs of a fast expanding local market (power sector in particular). Several large fields (Bovanenko, Kharasavey, Kruzenshtern, Tambey) will also be developed, but are unlikely to start producing before 2012-2013. As a consequence, despite the significant contribution of neighbouring countries (Turkmenistan, Kazakhstan), a gas shortage is anticipated in Russia in the short-term, with potential repercussions on exports to Europe.
- difficulties associated with the volumes of gas available today for production in some countries. Liquefaction facilities in Oman and Trinidad & Tobago cannot run at full capacity because of insufficient gas supplies. In Indonesia, technical problems encountered on some fields limit gas production, making it difficult to supply liquefaction plants as well as the local market whose needs are growing fast.

Political decisions of producing countries and the world gas balance

In recent years, many producing countries have reviewed their national resources allocation process (local market against exports), the participation of international companies in the development of their resources, and the role of their national firms. Several emerging trends could jeopardize the future regional/world supply equilibrium due to the scale of investments necessary to set up gas projects:

- Bolivia nationalized its gas assets leaving little room for international companies;

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- in Russia, the Duma granted Gazprom a monopoly on gas exports and restricted international participation in new developments.

Trends on major markets

North America

In North America (including Mexico), gas production (including non-conventional gas) should continue to grow around 0.3%/year until 2015. In the United States, the gas produced from non-conventional sources (coal-bed methane in particular) is slated to offset the declining production of conventional gas, which already reached its plateau early this decade. The relocating of processing facilities towards areas well endowed with non-conventional gas resources demonstrate the determination to produce this resource. According to the Energy Information Administration (EIA), non-conventional gas could account for up to half the US gas output by 2030. In Canada, while volumes produced by 2010 should only be around 2% less than in 2005 (185.5 10⁹ m³), the drop should be more significant after the turn of the decade, by when the country will turn to external sources to supplement its supplies with LNG imports.

By 2010, gas demand on the US market should grow around 1% per year on average, with a major draw from the power sector to fuel recently commissioned gas-fired plants. In Canada, more than 60% of additional gas demand should be dedicated to meet oil industry needs as a result of increasing production from tar sands (steam production from gas).

In the short-term, Canadian gas exports to the US market should continue at a similar rate as observed over the past few years (100 to 102 10⁹ m³/year), leaving LNG less leeway than anticipated. Besides, rather abundant supply should continue to drive prices to globally lower levels than registered in 2005-2006. Beyond 2010, the rapid decline of Canadian production, combined with increasing local gas needs, should generate a massive call to LNG suppliers to restore the North American market balance.

Europe

In Europe (EU 27, Norway, Switzerland, Turkey and other central European countries), three countries (Norway, the Netherlands and the United Kingdom) which currently produce 80% of the volume extracted every year in the region, will continue to provide a major share of supplies. European production could slide from 314 10⁹ m³ in 2005 to some 310 10⁹ m³ in 2010 and 285 10⁹ m³ in 2015. In Norway, the Norwegian Petroleum Directorate projects a production plateau of around 125 10⁹ m³/year from 2012, the bulk being available for the European market. In the Netherlands, the

production capacity regeneration program carried out by the operator, NAM, makes Groningen a key producer for up to another 25 years and a smaller-scale producer for the years thereafter. In the United Kingdom, prospects are less favorable and the decline of production, underway for some years already, is ineluctable due to the rather low level of reserves. By 2015, the country could provide around 50 10⁹ m³/year.

European gas demand should continue to grow at a rather rapid pace by 2015 (2 to 2.5%/year), but with disparities between countries. Driven by strong gas demand from the power sector, the highest growth rates (around 3 to 4%/year) should occur in countries bordering the Mediterranean (Spain, Portugal, Italy, Turkey), much more than in northern or Central Europe (1.6 to 1.8%/year). With a 4.5%/year increase on average, gas demand in Spain should post the fastest growth rate throughout Europe.

Table 2
Existing and planned combined-cycle power plants in Spain

Power plants	Number	Planned installed capacity (MW)
Operating	28	13 252
Test period underway	3	2 420
Projects with preliminary administrative authorisation	10	7 485
Projects with positive environmental impact statement	4	3 600
Projects with negative environmental impact statement	1	-
Projects having filed public information request	8	4 770
Environmental impact study under way	47	33 755
Cancelled projects	6	2 810
Total	107	68 092

Source: Industry Ministry, September 2006.

With 45% dependence on external suppliers, Europe currently has a total import capacity of around 455 10⁹ m³/year (including 86 10⁹ m³/year of LNG receiving capacity). By 2015, the dependency rate could reach 60%. To cover part of the supply gap, traditional operators and new entrants are actively developing and planning new import capacities. By 2010, an additional 13 10⁹ m³/year should be available to increase pipeline deliveries of Algerian gas. By 2015, one or two large capacity export projects for Russian (Nord Stream) or Central Asian gas (Nabucco) to Europe, as well as an additional link between Algeria and southern Europe, could materialize.

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Many LNG receiving terminal projects are also being built or under study. Altogether, these LNG capacities amount to an estimated 215 to 230 10⁹ m³/year.

Asia-Oceania

Asia-Oceania is certainly a region likely to witness a very steep rise in gas production (+2.7 to 3.1%/year) over the next ten years. Output growth should be very fast in China where 80 to 85 10⁹ m³/year could be extracted from the fields by 2010 (48 10⁹ m³ in 2005), rising to some 110 10⁹ m³/year by 2015. Gas developments are also numerous in Australia, stimulated by the dynamism of the LNG market in the area, although it faces significant supply constraints (falling Indonesian LNG exports). A substantial rise in production, although more moderate compared to what can be anticipated for China or Australia, is also assumed in India, where large natural gas reserves have been discovered on the east coast (Krishna-Godavari Basin). This new producing area will gradually take over declining output from the Bombay High field.

Demand should also grow strongly (+3 to 3.6%/year) by 2015. Gas use should grow most spectacularly in China (about 120 10⁹ m³/year by 2015 compared to 48 10⁹ m³/year in 2005), largely covered by domestic resources. Sustained though more moderate growth rates, are expected in many countries including South Korea (3 to 4%/year), Indonesia (3%/year) and Japan (1.8 to 2%/year).

Despite the significant rise in production capacities throughout the region, the call for supplies from outside the region will intensify.

International gas trade

The growing imbalances between producing areas with surplus supplies and the OECD countries, where production can no longer satisfy demand for gas, will be further accentuated. Besides the huge volumes which will have to be transported from one area to the other, the management of flows will certainly win top prize complexity, exacerbated by the proliferation of LNG routes. The share of LNG in total gas trade is indeed due to rise sharply, going from 22.3% in 2005 to 30% in 2015. Flexibility, diversification of sources and improvement of supply security are only some of the drivers of this dynamism.

By 2010, additional liquefaction capacity in the range of 116 10⁹ m³/year (including 58 10⁹ m³/year in Qatar) should be operational. In the short-term, producing countries will have to take the final investment decisions for the new capacities to be built just after the turn of the next decade. However, many uncertainties weigh on their setting-up and the potential start-up date. While Qatar has set a moratorium on any new export gas project, the Iranian government has to

give a decision on the willingness to export part of its gas resources. In Nigeria, investment decisions concerning the construction of additional trains on the existing NLNG plant or the construction of new greenfield projects (Brass LNG, Olokola LNG) are very unlikely before the end of the year, and in any case not before the political situation has been clarified.

To continue the development and the smooth running of this industry, the construction of large additional liquefaction capacities will be indispensable.

Table 3
LNG supply and demand - 2015 Outlook

(10⁹ m³)

Liquefaction capacity	End 2006	End 2010	End 2015	Demand 2005	2010	2015
Atlantic Basin	88	113	169	66.4	126	185
Middle East	56	123	186	–	–	
Pacific Basin	100	124	158	122.4	165	205
World total	244	360	513	188.8	291	390

Source: Cedigaz.

By 2010, LNG demand should grow at a sustained pace of around 9%/year. Despite the better covered North American gas balance than anticipated and the less attractive price environment, LNG demand prospects in the Atlantic Basin are still high. The European market, which, by this horizon, will have large available import capacities, should be eager for LNG. Pipeline gas supplies from Norway and Algeria in particular will help secure a share of additional demand. However, uncertainties as to Gazprom's ability to deliver more gas to Europe is widening the field of opportunities for LNG suppliers. In the Pacific Basin, Japan and South Korea will continue to stand among the most dynamic markets, both to guarantee their development and, in the case of Japan, to cover needs during maintenance shutdown of nuclear reactors.

Beyond 2010, LNG development prospects remain favorable both east and west of Suez. Many countries (the Netherlands, Chile, Pakistan, Thailand) will likely join the ranks of importers. However, the industry is likely to see a global re-routing of part of the volumes initially intended for Atlantic Basin markets towards Asia, which will maintain its leading position.

Investment constraints and significant budget cost overruns for new plants tend to imply a slide between initial and actual

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facility start-up dates. Besides, plant stoppages due to technical problems, outside of scheduled maintenance periods, as well as the seasonality of market supplies, are some of the many factors which could spark periods of strong tension on supply in the short- to- medium-term.

New developments, particularly concerning investments in a restructured gas industry, more open to competition will

gradually lead to a new market functioning model to which the industry will have to adapt to avoid jeopardizing the world gas balance.

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