The Natural Gas Industry in Western Europe: re-regulation, newcomers and sharing the rent

Jean-Marie Martin*

In the years following the second World War, natural gas was attnost unknown in Europe (OECD). Today, it is one of Europe's main sources of energy. Consumption of natural gas is likely to grow faster than that of all other sources of energy (Table 1).

Table 1 - Growth in Consumption of Natural Gas in Western Europe

	$10^9 m^3$	% of total consuption of prymary energy
1950	2	0.3
1970	83	8.0
1995	350	21.0
2010(estimed)	515	25.0

At the heart of this success is a demand sustained by flexibility and cleanness of gas; abundant supply at prices which are very competitive with oi1 products as a result of the exploitation of the North Sea, imports from Russia and Algeria, and the growth of a very efficient transportation and storage infrastructure (Martin, J.M., 1992).

But the industrial structure to which Western Europe owes this growth is being challenged and has already been abandoned in several countries. Why? Is it the price of success, that is, the attraction of a new distribution of gas rent for new entrants?

1 An industrial structure under challenge

The structures of gas industries vary considerably from one European country to another (Percebois J., 1989). But until the 1980's all of them possessed certain common characteristics:

- The pre-eminence of large transportation (and sometimes distribution) companies enjoying territorial monopolies: Gaz de France, British Gas, Ruhrgas (Germany), SNAM (Italy), Distrigaz (Belgium), Gasunie (Holland);
- Extensive co-operation between these companies in the construction and management of the high pressure gas pipeline networks and in negotiations with the producers: Shell, Exxon, Elf-Erap and Statoil in the North Sea; Gazprom (Russia) and Sonatrach (Algeria);
- The adoption of common roles of the game in managing supplies: very long term contracts (20-25 years); the take or pay role and gas prices calculated on the basis of the net back.

From this structure arises the uncompetitive nature of the gas market:

- between transporters and distributors, due to the vertical integration or market power of the transporters ;
- between producers and tran porters due to the monopsonmtic situation of the transporters' oligopoly (FinonD, 1989, 1992).

The challenge to this organisation began in the United Kingdom in 1982 with restriction of the monopoly of British Gas by mandatory third party access and freedom for anybody to build pipelines, followed by the privatisation of British Gas in 1986, accompanied by an effective unbundling (and not just accounting purposes). Initially restricted to industrial customers, the opening up of the network to third parties will be complete in l998.

* Institut d'Economie et de Politique de 1'Energìe (CNRS - Université de Grenoble, France)

Other Europeans countries are committing themselves to going down this road: Holland is implementing partial access to the network; Spain, Italy, Portugal and Austria a remodifying their regulations along the same lines; in Germany, the loose nature of the regulations has already allowed new forms of competition between transporters and distributors.

The European Union is encouraging this development and is even endeavouring to impose it on its most reluctant members (France). Two directives are already taking effect in this area(EEC, 1993):

- to order price transparency regarding gas and electricity for industrial use(29 June 1991);
- to introduce unrestricted transit between gas transporters with in the European Union (31 May 1991).

A third directive, still in the draft stage, goes much further, since it intends to impose:

- network access to third parties (large industrial consumers and distributors), not compulsory but negotiated with the transporters ;
- unbundling between production, transport and distribution in the accounts of the companies;
- tendering procedures or a transparent licensing system for the construction of new installations, including oil pipelines (EEC, 1996).

What is the reason for these structural changes intended to introduce or strengthen competition in the gas industry? Why abandon the traditional reference to the theory of the natural monopoly? The pressure of the economic liberalism and success of gas deregulation in North America (IEA, 1995) are not sufficient to explain them. We must take the activities of new players into account.

2 Newcomers and increased competition

They all have in common the fact that they are being subjected to much stronger international competition than in the past. All of them are trying to confront this competition by developing new technologies and pushing for institutional changes (new rules of the game). Between the two types of change, positive feedbacks are creating new industrial dynamics from which some are gaining more benefit than others.

The oldest candidates for a redistribution of gas rent are the large industrial consumers, in the chemical industry in particular, in the face of fierce competition from countries possessing very cheap hydrocarbon resources and less stringent environmental regulations than in Europe. These consumers are trying to extract lower prices from the gas companies and maintain that they will lose a11 their competitiveness in Europe if they cannot get supplies directly from the producers.

The gas distributors, when they are juridically independent of the transporters but powerful enough to challenge the market power of the latter (in Germany, in particular), are demanding the right to buy directly from the producers. Several projects along these lines have failed in thepast, including Gelsenberg-Statoil (1984), Bayerngas -Sonatrach (1988).

The producers also claim to be victims of the market power enjoyed by the coalition of transporters. The low prices imposed on them would dissuade them from investing in exploration and renewing reserves sufficiently quickly. They have only managed until now by dint of industrial reorganisations and technological change[1]. Cost reductions of 20 to 30% are essential to maintain the profitability of new LNG projects. Hence the interest shown by the gas producers in downstream vertical integration in order to:

- retain a higher proportion of the rent;
- increase their profits by eliminating a number of middlemen;
- gain access to new activities enhancing the value of the gas(electricity production, for example) ;
- give themselves greater strategic flexibility through contact with end consumers (Quast O and Locatelli C, 1996).

This downstream integration is practised by Elf-Aquitaine through its subsidiary Agas, which sells more than 1,000 million m^3 on the British market. It is also done by Statoil with Ruhrgas and BEB Erdgas

[1] Shell, for example, says that it has reduced the cost of operating Troll by 50% thanks to design optimisation of its marine platforms and reducing their weight.

Erdsl in Germany, and by BP with Alliance Gas in the United Kingdom. It is done on larger scale by Gasprom in Germany with Wintershall (Wingas), and soon in Italy with Edison.

But with the success of combined cycle gas turbines (CCGT) in electricity production, other candidates in a new distribution of gas rent have appeared:

- older electricity companies or those recently emerging from the privatisation of the public monopolies (United Kingdom) are balking at depending on a gas transporter and want to get supplies directly from the producers;

- industrial self-producers, especially those wanting to take advantage of co-generation, are also interested in direct supply;[2]

- new energy companies, who are seeking to benefit from scope economics through horizontal integration (gas, electricity, heating networks, waste treatment, co-generation).

Threatened on their own ground by all these newcomers, the gas transporters in turn are attempting new forms of vertical integration: downstream (electricity production) and upstream (gas production). Thus Ruhrgas is participating in the exploitation of two off-shore fields in the United Kingdom; British Gas is itself a large producer; Gas de France is beginning to invest in outside production. This upstream integration not only gives them control over reserves but also provides confidence regarding any new distribution of gas rent.

3 What redistribution of gas rent?

Very simply, but practically, gas rent may be defined as the difference between the valuation price of the gas and the actual cost of the gas delivered to the end consumer (Table 2)

The valuation price at the end consumer level represents the competitiveness limit of gas compared with its main competitors. They are of the order of 3 to 5 US$ per Mbtu[3] in industry and the production of electricity where natural gas must compete with the heavy fuels and steam coal; lO to 15 US$ in the tertiary residential sector where light fuels are the main competitors. That is, an average estimated at 5.6 US$/mbtu.

The end costs of natural gas vary with the size and location of the consumers servedbutalso with the origin of the natural gas. These costs can vary from 1 to 10 between:

- gas extracted from Lacq(France) or Groningen(Holland) at more or less 0,2 US$/Mbtu, almost on the doorstep of a large number of consumers;
- gas from the new off-shore fields in the North Sea and a fortiori at Yamburg and Yamal in the far north of Siberia which can reach 2 US$/Mbtu.

Again, an average price over the whole of Western Europe including the costs of distribution and a normal return on capital (10%) should give a figure in the region of 3 US$/Mbtu.

The difference between 5,6 and 3 represents a rent of about 2,6 US$/Mbtu, hitherto going mainly to the transporters (60%) thanks to the pricing system in force. The remainder benefits the producers (35%) more than the consumers (5%).

The new rules of the game implemented by various countries and by the European Union are currently altering this rent distribution. How?

For some, imitation of the North American model (complete unbundling; wide third party access to the network; the setting up of hubs and widespread use of spot sales) should lead to a redistribution of rent, particularly to the detriment of transporters and to the benefit of consumers. Manufacturers using gas on a large scale (nitrogen manufacturers, in particular) and distribution companies would contract freely with the North Sea producers on the basis of prices provided by spot markets organised round the Zeebruge interconnector (Belgium), for example.

But this is forgetting that Western Europe gas supplies do not depend, as in North America, on a very large number of producers and transporters on whom the roles of a competitive market can be imposed. European natural gas is controlled by a small number of producers whose operational gas fields are increasingly distant from the centres of consumption (Fig. 1)

[2] Which is what ICI is doing in association with BP in the UK, or Rh™ ne Poulenc in France. which already has 200 MWe of installed capacity.
[3] Million of British Thermal Units. 40 Mbtu = 1 Tonne Oil Equivalent (TOE).

Another hypothesis regarding the distribution of gas rent is thus appearing on the horizon. This would consist of trimming the transporters' income (but less than in the North American model) and redistributing in favour of producers more than consumers. The instrument of this rent redistribution would be the vertical integration of the producers downstream (creation of Wingas by Gasprom) and of the transporters upstream (Ruhrgas and Statoil). In the view of several observers[4], this hypothesis is far better suited than the preceding one to the strength rations between the players on the European gas scene. It would also allow, more easily than total competiton, the construction and financing of the immense network of gas pipelines and liquefaction (LNG) facilities which Western Europe will need during the comming decades.

Table 2 – Example of gas rent evaluation and its distribution (US$/Mbtu)

A - Valuation price of natural gas in various uses (based on oil products and coal)

	- Residential - tertiary	13.8		
	- Industry and raw material	3.5	**5.5**	1
	- Electricity production	4.4		

B - Cost of natural gas to the end consumer[2]

	- Cost of production	0.5	
	- International transportation if gas imported	0.7	
	- Internal transportation and storage	0.7	**3.0**
	- Average cost of distribution	1.1	

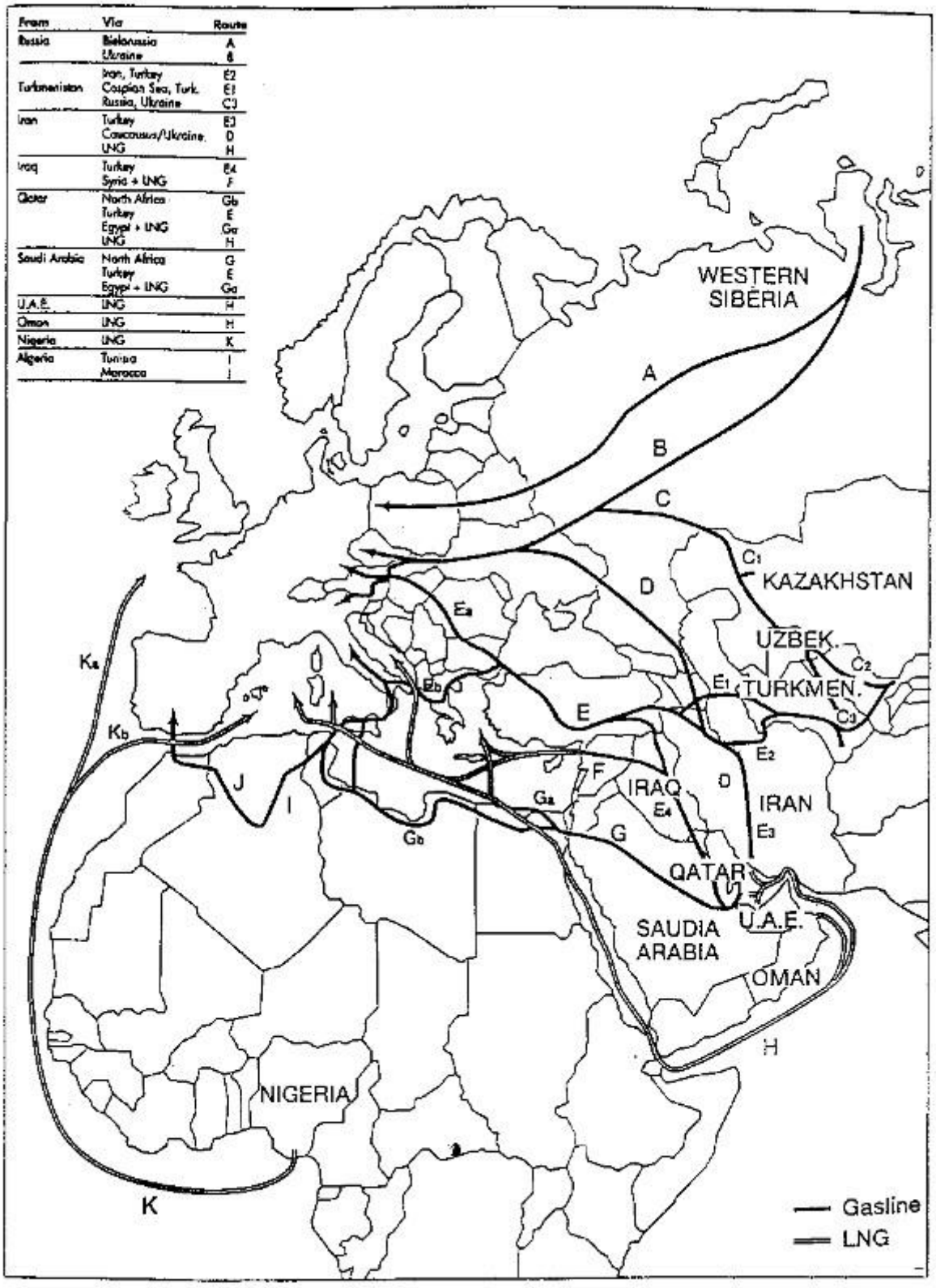
C - Distribution of rent **A - B = 2.5**

	- Gas producer	0.90	(35%)
	- Transporter - distributor	1.50	(60%)
	- Consumer	0.10	(5%)
	• residential tertiary 0.15 • industry 0.05 • electricity generator 2.00		

1 Average from distribution of sales
2 Very approximate estimate
3 Based on sale prics and contracts. Approximate estimate by Quast (IEPE, 1996)

[4] Verticalintegtationwithanegotiatedthirdpartyaccessmaybeareasonableoutcomcfor continental Europe, adding flexibility and some competition to the present system and gradually reducing transportation costs, but at the same time maintaining a gas industry able and willing to finance new long disfance pinelines" (O. Norenq. 1995, p. 234).

Figura 1 - Long Distance and Long Term Supply of Natural Gas of Europe



Font: IEA, 1995

Bibliography

- EEC. Proposal of decision 94009 (COD) and 940010 (SYN) COM (93) 685 final.
- EEC. Proposal of the European Parliament and the Council... relating to trans-European networks in the energy sector. COM (96) 390 final.
- EEC. Modified directive proposals concerning common mlcs rn~ the internal gas market. COM (93) final COD 385.
- Finon Dominique. L'ouverture de l'accés des gazoducs européerls aux tiers [Opening the European gas pipelines to third parties]. IEPE, June 1989, various pages.
- _____. Maturité des industries gaziéres et viabilité du regime concurrentiel. In: Economies et Sociétés, série Economie de 1'energie [Maturity of the gas industries and viability of the competitive system, Economies and Societies, Energy economics series], n. 1, 2, 1992 p 189-222.
- International Energy Agency (IEA). The IEA natural gas security study. OECD, 1995, 564 p.
- Martin Jean-Marie. Economie et politique de l'energie [Energy economics andpolicy]. Paris : A. Colin 1992, 1 92p.
- Norenq Oystein. Structural change in the European gas market : implications for industry and the security of supply. In: IEA national gas security study.
- Percebois Jacques.Economie de l'r~r!r raie [Enerev econoroi esl. Paris : Economica, 1989, 689 p.
- _____. Le marché européen du gaz naturel à l'aube du marché unique [The Europe na natural gas market at the dawn of the single market]. Energie Internationale 1989-I990, Paris : Economica, 1989. 345 p.
- Quast Oliver and Lamort Fabien azl,es pressions concurrentielles .sur l'industrie gaziére: intemationalisation et emergence de nouveaux entrants [Competitive pressures on the gas industry: internationalisation and the emergence of newcomers]. IEPE, 1995, 6p.
- Quast Oliver and Locatelli Catherine. Russian natural gas policy and its possible effects on European gas markets. IEPE, pre-print 1 996. 1 3 p.