Natural Gas and the Opening of the Single European Market

JACQUES PERCEBOIS

The share of natural gas in the national energy balance varies considerably from country to country in the EEC. The organization of production, imports, transport and distribution also differs greatly. Some countries have a state monopoly, while others allow a certain degree of competition among private or semi-private companies. Despite such differences, cooperation among EEC gas enterprises already exists. The Single European Act could upset the existing equilibrium if it were to lead to the adoption of the "common carrier" principle. While one can envision free transit of natural gas within the EEC and an abolition of the import monopoly where that exists, third party transport is likely to upset the economics of the present system, which is based on two principles: long-term contracts and the general acceptance of the net-back principle.

La part du gaz naturel dans le bilan énérgetique est très différente d'un pays à l'autre au sein de la CEE. L'organization de la production, de l'importation, du transport et de la distribution de ce gaz est également très variable suivant les pays: dans certains cas ce sont des monopoles publics, dans d'autres des entreprises privées ou semi-publiques en situation de relative concurrence. Mais la coopération entre entreprises gazières est déjà une réalité, malgré ces disparités. L'entrée en vigueur de l'Acte Unique en 1993 risque de remettre en cause l'équilibre actuel si le principe du "common carrier" est adopté. On peut concevoir une abolition du monopole d'importation lorsque celui-ci existe et un "libre transit" du gaz au sein de la CEE, mais l'adoption du "transport pour le compte de tiers" risquerait de compromettre l'économie du système actuel, lequel répose sur deux principes: la signature de contrats à long terme, d'une part, la généralisation de la logique du net-back, d'autre part.

Jacques Percebois is Professor of Economics at the University of Montpellier and a Research Associate at IEPE.

How will the Single European Act affect natural gas markets when it comes into force on January 1, 1993? At present the European gas sector is very different from its North American or Far Eastern counterparts. The North American market is highly competitive and a substantial amount of gas (more than 40%) is traded through the spot market. Furthermore, gas consumption in North America amounted to 545 billion cubic metres in 1987, compared with 261 billion m^3 for the whole of Western Europe (including Norway and Austria) and 115 billion m^3 in the Far East (not including China).[1] The Asian market, on the other hand, is characterized by the presence of a small number of buyers and a diversity of actual or potential suppliers. It is a highly "regulated" market in which Japan has a quasi-monopsony. The European market is more of an oligopoly — in inter-country trade a small number of large-scale buyers trade with a small number of suppliers. Within each European country, however, the situation is different; unlike the North American market, the public

1/ Unless otherwise noted, statistical data in this article are drawn from *Cédigaz* (1989) and *Enerdata*. The reader who wishes to find more detail in relation to other descriptive material is directed to the following useful sources: Giraud and Boy de la Tour (1987), Golombek *et al* (1987), Lesourd *et al* (1987), Mabro (1986) and Percebois (1986).

authorities are often directly involved in one area or another of the gas industry. This state presence in markets that are soon to be made more open and the *de facto* pipeline transport monopoly are problematic.

It is important at the outset to review the place of natural gas in the European energy system and to highlight the extent to which the industry in each European country is monopolistic, before going on to attempt an analysis of the likely consequences of the Single Market on the structure of gas trade. Our conclusion will be that, in the present state of affairs, the introduction of a "common carrier system" for natural gas is bound to run into a great many obstacles.

1. The Role of Gas in Europe

The rate of penetration of natural gas in the primary energy balance of the European Community is lower (at 19%) than in the United States (25%). Moreover, it varies substantially from one country to another: although high in the Netherlands, in the UK and even in Italy, it is lower in France, and almost non-existent in Spain (see Table 1). The importance of natural gas at the primary level is usually related to a country's domestic gas resources. Belgium alone is an exception to this rule, although this can be explained by the fact that the Dutch deposits are nearby.

As is evident from Table 1, gas consumed in Europe is in largest part used in the residential and tertiary sector (48% of total gas sales). Industry comes next (with 35% of sales) and a small share (7%) goes to electricity production, except in the Netherlands. The rest (10%) is used for non-energy purposes in the chemicals industry. An instruction from the EEC Council of Ministers in 1975 limits the use of gas in electric power plants, with special dispensations for technical, economic or environmental reasons.

Taken as a whole, the EEC imports 34.6% of the gas it consumes. If we exclude Libya *de facto*,[2] the Soviet Union provides 38.4% of its imports, Norway 32.3% and Algeria 29.3% (quantities are shown in Table 2). If we assume that Norway is a "politically" safe supplier, since it belongs to the Western bloc, then the rate of gas dependency of the twelve EEC countries is relatively low (23.4% of their requirements). This situation should not change much between now and the year 2000, since the fall in imports from the Netherlands should be offset by a rise in Norwegian sales, and this has been confirmed by the latest production and export forecasts elaborated by the Dutch authorities.

The role of intra-community trade in the European natural gas market as a whole is not insignificant (30.4% of trade, which represents 14.7% of the Community's total gas consumption) (see Table 2).

The West European natural gas market brings together a small number of companies which, with the exception of those in Federal Germany and the United Kingdom, are partly or predominantly under public control. On the demand side, five companies play an active role as importers: Ruhrgas, Gaz de France, British Gas, SNAM (in Italy) and Distrigaz (in Belgium). On the export side, four companies share the market between them: Gasunie (Netherlands), Statoil (Norway), Soyuzgazexport (Soviet Union) and Sonatrach (Algeria). On both sides of the market there is a leader: Ruhrgas for the buyers and Gasunie for the sellers. The buyers sometimes deal separately with potential suppliers (this is the case for contracts with Algeria, although the idea that the Europeans could form a common purchasing agency is now beginning to make some headway), and sometimes they present a common front (this has occurred in negotiations with the Soviet Union and especially in the case of a consortium formed for the purchase of Norwegian gas from Troll-Sleipner). The fact that certain operators are state-controlled explains why pressure from the public authorities has always played a determining role in price negotiations, on both the supply and the demand side. Political considerations (in terms of obtaining financial or industrial "compensation") are never totally absent from these discussions, although over the last two or three years closer

2/ Which supplied Spain with a very small amount of LNG (0.8 billion m^3) in 1987 (*Cédigaz*, 1989).

Table 1: Penetration Rates[1] for Natural Gas in Europe (EEC) in 1987 (%)

	Residential & tertiary sector	Industrial sector	Electric power generation	Consumption of primary energy	Share of domestic natural gas production in total natural gas consumption
Federal Germany	22	24	6	17	27
Belgium/Luxemburg	32	17	5	16	0
France	25	22	1	12	13
Italy	33	26	12	22	46
Netherlands	75	44	60	46	95
United Kingdom	48	31	1	24	78
EEC	30	22	7	19	65

Sources: *Cédigaz* (Institut Français du Pétrole, Paris); *Enerdata* data bank (IEPE, Grenoble); Eurostat.
Notes:
1/ The penetration rate represents the share of natural gas in the total energy consumption of the sector.

Table 2: Trade in Natural Gas in the EEC in 1987 (billions of cubic metres)

	Consumption of natural gas	Domestic natural gas production[3]	Trade - exports + imports	Imports from areas outside the EEC				Imports from areas outside the EEC as% of total gas consumption
				Total	Algeria	Norway	Soviet Union	
Federal Germany	61.3	17.7	43.6	24.0	0.1	7.2	16.6	39.1
Belgium/ Luxemburg	9.9	-	9.9	4.6	2.9	1.8	-	46.7
Spain	3.2	0.7	2.5	2.5[4]	1.7	-	-	77.6
France	30.7	3.8	26.9	22.7	9.4	5.0	8.4	74.1
Italy	39.6	16.3	23.3	18.8	10.4	-	8.4	47.4
Netherlands	42.2	75.3	-33.1	1.8	-	1.8	-	4.3
United Kingdom	59.9	47.6	12.3	12.3	-	12.3	-	20.5
EEC[1]	250.1	166.5		86.6	24.4	28.1	33.4	34.6
Western Europe[2]	261.0	196.5						
World	1891.5	1891.5						

Source: *Cédigaz* (IFP, Paris).
Notes:
1/ Including Denmark, Ireland and Greece.
2/ EEC + Austria, Finland, Switzerland, Sweden, Turkey and Norway.
3/ Marketed output.
4/ Including 0.80 from Libya.

economic calculations (more precisely, those involving "net-backs") definitely seem to have taken over.[3]

2. State Involvement in the European Gas Industry

Roughly speaking, we can say that in the 12 EEC countries there are three categories of state intervention in the production, importation, transport and distribution of natural gas: countries in

3/ Consider the recent negotiations between France and Algeria. Aid from the French state is no longer conveyed through payment of a higher purchasing price for Algerian gas.

which control by the state is almost total (France and Italy); countries in which the industry is only partly under state control (the Netherlands and still to a certain extent in the UK); and countries where there is no state control (Federal Germany). When the state plays a significant role its monopoly has been the object of public criticism, in particular from certain oil companies. When the state is absent, the regional and local authorities often exercise a real degree of control, at least in regard to distribution.

2.1 Restrictive State Control

FRANCE

The Act passed by the French parliament on 8 April 1946 stipulated the nationalization of transport, distribution, importation and exportation of gas for fuel use. However, it also stipulated that nationalization did not cover the transport of natural gas produced in France. As a result of this Act, Gaz de France (GDF) took over 615 of the 724 synthesis gas plants which existed at that time in France. The only plants which did not fall under its control were those few owned by Charbonnages de France (the national coal company) and by some local councils. From the very outset GDF's transport monopoly was breached by the oil companies. In 1947 the Régie Autonome des Pétroles (RAP), a state-owned company with legal status and financial autonomy, and engaged in industrial and commercial activities, opposed the transfer of the Toulouse-Bordeaux gas pipeline to GDF. The RAP had been set up in 1939 to exploit the natural gas discovered at Saint Marcet and it had built a pipeline to supply the Toulouse region. The Société Nationale des Pétroles d'Aquitaine (SNPA), which had been created in 1941 by the Vichy government in order to explore the Aquitaine basin, also set out to show that the Nationalization Act did not apply to natural gas. After 1949 the SNPA was controlled by the Bureau de Recherches Pétrolières, a state-owned company whose functions were to establish a national oil research programme and to obtain state shareholdings in various companies. With 51% of the capital the French state had a majority holding in SNPA, whereas the rest was shared out among private interests and with Total CFP, which itself was under partial state control.

It was in order to resolve this conflict that the Armengaud Amendment was passed (on 2 August 1949) confirming the exclusion of natural gas from GDF's monopoly. Although the transport of natural gas was no longer covered by the Nationalization Act, it did not escape state control, since the amendment made it quite clear that this activity should be carried out by a "public enterprise or a national company in which the majority shareholding belonged to the state or to other public enterprises." RAP and SNPA could therefore carry on with their activities.

The discovery of the Lacq gas deposit by SNPA on 18 December 1951 was to modify this situation. Gaz de France took a 30% share of the Société Nationale des Gaz du Sud-Ouest (SNGSO), which was in charge of transporting and distributing the gas from Meillon, Saint Marcet and now Lacq in the Toulouse area.[4] Moreover, under pressure from GDF, it was decided that transport and marketing of the Lacq gas outside the South-West region of France would be handled by the Compagnie Française du Méthane (CEFEM), set up in 1956 with equal holdings by GDF and SNPA.

There were in fact two options open to the public authorities concerning the development of Lacq gas:[5]

(1) they could develop the deposit slowly, keeping the gas for the industrialization of the South-West of France (this was the position defended by the local elected representatives, who believed that Lacq could become a growth centre for the area as a whole); or

(2) they could develop the deposit rapidly, distributing the gas outside the Aquitaine basin, which in practice meant towards Paris (this was the position of the SNPA, GDF and the national authorities).

4/ The rest of the capital was owned by RAP (35%) and SNPA (35%). At present, SNEA owns 70% of this capital.

5/ The production of this gas was particularly problematic because of the high sulphur content. It should however be noted that the subsequent export of this sulphur, via Bayonne, proved to be a profitable operation for the SNPA.

The latter solution was adopted, since, among other factors, GDF wished to replace synthesis gas with natural gas in Paris to avoid having to modernize its old gas plants.

To reduce competition with French coal (in particular from the Loire basin) it was decided to maintain the well-head price of gas at a fairly high level, thus providing substantial profits for the SNPA. The gas was intended for industry and the service sector, though it was also to be used for electricity production. In order to ensure a rapid rise in sales, EDF (the national electricity company) undertook to purchase one-third of available output and to withdraw gradually as demand grew. After a few years, output from Lacq was too low to meet a rapidly increasing demand and it became necessary to look for new sources of supply. The discovery of the Gröningen deposit in the Netherlands in 1959 gave GDF the opportunity to sign a number of substantial import contracts. By 1967 Dutch gas had entered France, to be followed by Algerian gas in the form of LNG in 1973, Soviet gas in 1976 and Norwegian gas in 1977. France in 1987 was the only country in the European Community to be supplied by the Netherlands, Algeria, the Soviet Union and Norway together (leaving aside the peak-shaving contract signed by Federal Germany and Algeria, which involved only a very small quantity (see Table 2)). In 1971 Total CFP obtained a 10% share of the Compagnie Française du Méthane (CEFEM) and the field of action of the latter was extended (in practice part of the GDF network is leased to the CEFEM).

The creation of the Société Nationale Elf Aquitaine (SNEA) in 1976 (the result of a merger between the Entreprise de Recherches et d'Activités Pétrolières (ERAP)[6] and SNPA) now means that this company exploits some 97% of the natural gas produced in France (the rest being associated gas produced by Esso at Parentis) and transports a considerable amount of the gas which is consumed. It does so by means of its direct sales in the Lacq area and its sales through SNGSO or CEFEM in the South-West and Central regions of France. Elf Aquitaine, in which the state has a 56% shareholding (down from 67% before partial privatization in 1986), holds some 70% of the capital of SNGSO and 40% of CEFEM. GDF has a monopoly in public distribution, except in areas where this is under local council control (22 municipal distribution companies exist at the present time). This monopoly also applies to those regions where the gas is transported by SNGSO.

Although the conflict between oil and gas companies concerning transport has diminished, it may well reappear as production from the Lacq deposit runs out. (Lacq produced some 3 billion m^3 in 1987, compared with 4 billion in 1960 and nearly 8 billion in 1967.) This time it is the import monopoly which is the source of trouble. In 1987, SNEA would have preferred to import Norwegian gas directly in order to supply its South-West network, but it ran up against opposition from GDF and, therefore, from the public authorities.

ITALY

ENI (Ente Nazionale Idrocarburi), which is 100% state-owned, controls the exploration for and the production of gas in the Po valley through its subsidiary AGIP. Through its subsidiary SNAM (Societa Nazionale Metanodotti), it controls the transport and distribution of gas in Italy. SNAM directly supplies the major consumers and the local distribution companies (1300 private companies and another forty or so under municipal control, these latter being grouped together in the CISPEL (Confederazione Italiana dei Servizi Publici degli Enti Locali)). SNAM also has a monopoly over the importation of natural gas in Italy. From this point of view, the Italian situation is much simpler than that of the French. The state is omnipresent and roles are clearly defined.

2.2 Partial State Control

THE NETHERLANDS

Production is carried out jointly by a private company, NAM (Nederlandse Aardolie

6/ ERAP was itself the product of the merging of RAP and BRP.

Maatschappij) in which Shell and Esso have equal shares, and the national mining company DSM (Dutch State Mines, formerly the Limburg State Mines). The Dutch government modified the terms of the concession granted to NAM in 1947 after the latter had discovered the deposit in Gröningen in 1959. According to the initial terms of the concession contract, NAM was obliged to sell the gas it discovered to the Dutch National Gas Board, which held the monopoly for the sale of gas in the Netherlands. The government preferred to give more freedom of action to NAM, while preserving the right of inspection through the Staatsmijnen (DSM). In reality, DSM controlled 40% of the capital of this joint company, whereas Shell and Esso both held 30%.

Gas transport and distribution have been assigned to another company, set up in 1963, Nederlandse Gasunie, which has taken over the transport system belonging to the now defunct Gas Board. The ownership structure of Gasunie is as follows: DSM holds 40% of the shares, Shell 25%, Esso 25% and the Dutch state 10%. Thus in reality, with 50% of the shares, the public holds a majority of the company. Gasunie sells directly to major consumers (electric power plants and industrial buyers) as well as to some 130 provincial and municipal distribution companies. The local distribution companies are themselves grouped into an association called VEGIN (Vereniging Van Exploitanten Van Gasbrijven).

For domestic marketing NAM therefore negotiates directly with Gasunie. For foreign sales, NAM has set up two subsidiaries: NAM-GAS-Export which negotiates the contracts; and International Gas Transport Maatschapij, which builds and operates the pipelines that take the gas to the rest of Europe.

The Dutch government gives considerable freedom of action to the NAM as well as to Gasunie, but the fact that it has a majority shareholding in the latter and sufficient shares to block any adverse decision in the former enables it to intervene if necessary. Present legislation requires NAM-GAS-Export to return its profits to the state.

UNITED KINGDOM

The Gas Act of 1948 created a two-tier system in the United Kingdom: Area Boards were in charge of gas production and distribution at a local level and a Gas Council coordinated activities at a national level. Legislation in 1965 extended the jurisdiction of the Gas Council, which could henceforth buy gas throughout the UK and import gas freely in order to supply the Area Boards.

A 1972 Act created the British Gas Corporation, which was given a monopoly over the production, importation, transport and distribution of gas throughout the country. An Act passed in 1976 stipulated that all the gas produced by the oil companies in the British sector of the North Sea should be offered for sale to the BGC at a "reasonable price."

In 1982 another Act put certain limits on the BGC monopoly: major customers can be supplied directly without going through the Corporation and private suppliers can have access to the BGC transport system "within the limits of the availability of the latter." This constitutes a recognition of the common carrier principle. However, in practice, this opportunity does not seem to have been used to any large extent.

The privatization of the BGC in 1986 has not called into question the *de facto* quasi-monopoly that the ex-public corporation holds over gas sales and purchases in the United Kingdom; neither has it affected the application of the common carrier principle. The direct consequence of privatization is likely to be the relative dispersion of share-ownership, since the state, through the "golden share" system, prevents any shareholder from owning more than 15% of total capital. Although the British government no longer has a majority share in the Corporation, it has nonetheless kept enough shares to block any decision, thus enabling it to uphold the national interest whenever this may prove necessary. It should be noted that the British market is special in that it is not interconnected with the rest of Europe.

BELGIUM

Belgium does not produce any natural gas. The state holds 50% of the capital of the Distrigaz company, which has a monopoly over the transport and distribution of imported gas. (Theoretically the Belgian government holds only 15% of the company's shares, but its shareholding is higher because of the 20% held by the National Investment Corporation and the 15% held by the National Transport Corporation.) The rest of the capital is held by Shell (17%) and others in the private sector (33%). The state therefore plays a substantial but not a determining role. A large share of local gas distribution (50%) is carried out directly by local authorities.

2.3 *The Absence of State Control: the Case of Federal Germany*

While the very liberal German system is highly complex, the state is almost completely absent from the production and transport of natural gas. Local authorities are, however, involved at the distribution level.

The domestic production of natural gas satisfied about 28% of home demand in 1987. It is supplied by four big companies, which are in turn controlled by three oil multinationals (Shell, Esso and Mobil). There are 12 companies involved in gas production, but the following four produce more than 90% of domestic output:

- Gewerkschaft Brigitta — owned equally by Shell and Esso and accounting for 44% of domestic gas production;
- Gewerkschaft Elwerath — also owned in equal shares by Shell and Esso, it supplies 13% of domestic production;[7]
- Mobil Oil AG — accounts for 24% of production;
- Wintershall AG — accounts for 10% of production.

The remaining domestic production (9.3%) is shared out among eight much smaller-scale companies (including Texaco AG). These companies sell their production directly to industrial customers or pipeline transport companies.

Transport companies buy the gas either from local firms or from abroad. They play a key role because of the strategic position of Germany in the interconnection of gas networks. All the gas pipelines between East and West, and some of those between North and South, go through Germany because it is in the centre of Europe. These pipeline operators are:

- private firms that have been developed by the big coal or steel corporations (Ruhrgas, Brigitta und Elwerath Betriebsfuhrung (BEB) and Thyssengas);
- commonly-owned firms set up by gas producers wanting to market their own outputs; or,
- companies that have been set up by state-owned distribution services, using regional public or private funds, with a view to obtaining supplies on reasonable terms (Bayerngas, Salzgitter Ferngras).

Among these transport companies, Ruhrgas holds a dominant position, not only because of the size of its transport network and the volume of its sales (74% of total gas sales in 1987), but also because it plays the leading role in gas importation. Ruhrgas negotiates with foreign producers, on behalf of all the German gas importers, in order to obtain the best possible conditions of supply. Some small transport companies do nonetheless act as intermediaries between Ruhrgas, which provides bulk transport, and certain local public distribution services.

Eight companies are involved in gas importing (which covers 72% of consumption), but the relative importance of Ruhrgas, which alone accounts for 58% of the imports, gives it a determining role at this level. Thirty-five percent of the capital of the Ruhrgas company is controlled by Bergeman KG (which itself is controlled by the coal industry, since Ruhrkohle AG holds 52% of its capital). The rest of the capital of Ruhrgas is distributed as follows: 25% is held by Gelsenberg AG (which is owned completely by BP); 25% is held by Gewerkschaft Brigitta (in which Shell and Esso each have a 50% shareholding); and 15% is held by the Schubert group which is dominated by the Veba company.

7/ These companies are sometimes referred to jointly as the "*Brigitta und Elwerath Betriebsfuhrung* (BEB)."

Alongside Ruhrgas there are other smaller companies, which nevertheless have some impact: Thyssengas (which accounts for 11% of imports); Brigitta und Elwerath (12.2% of imports); and Deutsche Erdgas-Transport-Gesellschaft (3.1% of imports). All three companies are controlled by Shell and Esso. Finally, a number of electricity companies are involved in gas importing (Vereinigte Elektrizitätswerke Westfalen (VEW), Energie Vorversorgung Weser-EMS, Rheinisch-Westfälisches Elektrizitätswerke (RWE)).

Gas distribution is carried out by more than 500 local companies, either directly under municipal control or as limited companies in which the local authorities have a shareholding.

Though it does not have a legal monopoly, Ruhrgas plays a determining role in the transport and importation of gas. As in France, there has been some friction between transporters and gas distributors or consumers: thus Ruhrgas undermined direct negotiations between Bayerngas (20% of which is owned by the state of Bavaria and 40% by the city of Munich) and the Algerian Sonatrach in 1988, even though Bayerngas is by far the biggest customer of Ruhrgas (buying 10% of its gas). Similarly, Ruhrgas impeded direct negotiations between Gelsenberg and Soyuzgazexport in 1984. The Federal State generally plays a passive role in regard to gas transport and distribution; the local councils on the other hand are more important in this respect than their French counterparts, since they intervene not only in local gas distribution but also in regional transport.

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The above account indicates that the European gas industry, taken as a whole, is heterogeneous, though there are some similarities between countries.

The companies which transport or distribute domestic or imported gas are absent from production. Gasunie is not the same sort of company as NAM in the Netherlands, even though both of these companies are partly controlled (40%) by the national mining company DSM; SNAM differs from AGIP, even though both are entirely controlled by ENI; Ruhrgas is not involved in gas production in Germany, but that does not prevent Esso and Shell from holding shares in the company as well as in the main production companies, in particular in Brigitta und Elwerath (BEB); Gaz de France is not involved in French gas production, although the French state has a share in SNEA; the British Gas Corporation is not involved in British gas production in the North Sea; and so on.

Oil companies play a determining part in gas production, whether it be in Germany, France, Italy, the Netherlands or the UK. They intervene in the transport and even the distribution of gas in Germany and the Netherlands, but only on a very modest scale in Belgium and the Netherlands (with the exception of the SNGSO network and the CEFEM network in France). It must also be added that, in the French case, a state corporation is involved, whereas in the three other countries it is the subsidiaries of multinational companies (mainly Shell and Esso).[8] In certain countries the relative weight of the coal companies is quite substantial: DSM in the Netherlands and Ruhrkohle in Federal Germany.

With the exception of the UK and, to a large extent, France (where a single company is in charge of imports, transport and distribution) the European countries have a two-tier structure:

- transport companies buy the gas from domestic or foreign producers and then sell it to industrial customers and state-owned distribution companies;
- publicly-owned distribution companies are in charge of selling the gas to final industrial, commercial or domestic users.

Undoubtedly it is in gas transport that there is the greatest likelihood of real or potential conflict between the various actors on the gas scene. In regard to the selling of imported or domestic gas, the transport companies have opposed attempts by certain local distributors or consumers to conclude direct purchase agreements with the producers (in France and Germany, in particular). This has been the case even when the transport

8/ Of course, account should be taken of the presence of Esso in the Parentis deposit in France.

companies do not enjoy a legal monopoly (in Germany). Several factors may help to explain why these transport companies are reluctant to see their customers bypassing them and negotiating directly, but it may be that the application of the Single European Act in 1993 will modify this situation, all the more so since European cooperation in this field is already a reality.

3. European Cooperation Already Under Way

The European natural gas market is a "club" made up of a few companies whose managers know each other well as they have been in contact for years, either on opposite sides of the negotiating table (the Dutch against the others, for example) or on the same side (the Europeans against the Norwegians or the Soviets). Together they have managed to ensure overall security of supply by means of a network of largely interconnected transnational gas pipelines, and they have succeeded in introducing the logic of the "net-back" in long-term purchase contracts.

3.1 A Largely Interconnected Network[9]

The development of international gas transport in Europe dates back to the exploitation of the Gröningen deposit in the Netherlands. Gasunie extended its network to the borders with Belgium and Germany; Distrigaz transported the gas intended for French consumption as far as Taisnières on the French border and was remunerated for doing so. An international transport network was set up in order to supply Italy with Dutch gas through Germany and Switzerland. The German part of this pipeline is run by the Trans-Europa Natural Gas Pipeline Company (TENP), a subsidiary of Ruhrgas (51%) and SNAM (49%), and the Swiss part by Transitgas, which is a subsidiary of Swissgas (51%), SNAM (46%) and Ruhrgas (3%). It takes Dutch gas as far as Milan.

Soviet gas, on the other hand, is transported into Western Germany by means of the East-West Waidhaus-Gernsheim pipeline, which is run by Ruhrgas; it is also sold to Austria and Italy by way of the Trans Austria Gasleitung (TAG), which crosses Southern Austria from Baumgarten to the Italian border town of Tarvisio and links up with the Netherlands-Italy pipeline in the Milan area. A new gas pipeline network has been set up in order to bring Soviet gas from Urengoy into Western Europe. This consists of two parts: (1) the Baumgarten-Oberkappel pipeline, which was built by the West Austrian Gasleitung company (WAG), a joint subsidiary of the Austrian company OMV (51%), Gaz de France (44%) and Ruhrgas (5%), and is run by OMV; and (2) the network built by the MEGAL company (Mittel Europaische Gasleitungesellschaft), a subsidiary of Ruhrgas (50%), Gas de France (43%), OMV (5%) and Stiching Megal (2%), and operated by Ruhrgas.

The Transmed pipeline links the Algerian deposit of Hassi R'Mel with Italy through Tunisia and Sicily. It was jointly constructed by Sonatrach and SNAM.

The exploitation of gas deposits in Norway has also led to the development of a set of pipelines: the Frigg System, made up of Norwegian and British pipes which link the Frigg field to the Scottish mainland; and the Norpipe, built by a subsidiary of North Sea producers and which links the Ekofisk field to Emden in Federal Germany. This pipeline carries gas for Federal Germany, the Netherlands and Belgium as well as France: in Belgium the gas is transported by the Société Européenne de Gazoduc Est-Ouest (SEGEO), a subsidiary of Distrigaz (75%) and Gaz de France (25%). There is a third network, the Statpipe, which collects gas from the deposits at Statfjord, Heimdal and Gulfaks and takes it to an interconnection platform where it is fed into the Norpipe. This pipeline is also run by a subsidiary of the North Sea producers, and the gas is sold to various European buyers.

The development of the Troll and Sleipner fields is likely to involve the construction of another network of pipelines: to Zeebrugge, via the Zeepipe for the gas intended for the French and Belgian markets; and to Emden, via a main pipe

9/ Sources on this subject include *La Technique Moderne* (1987) and Davis (1984).

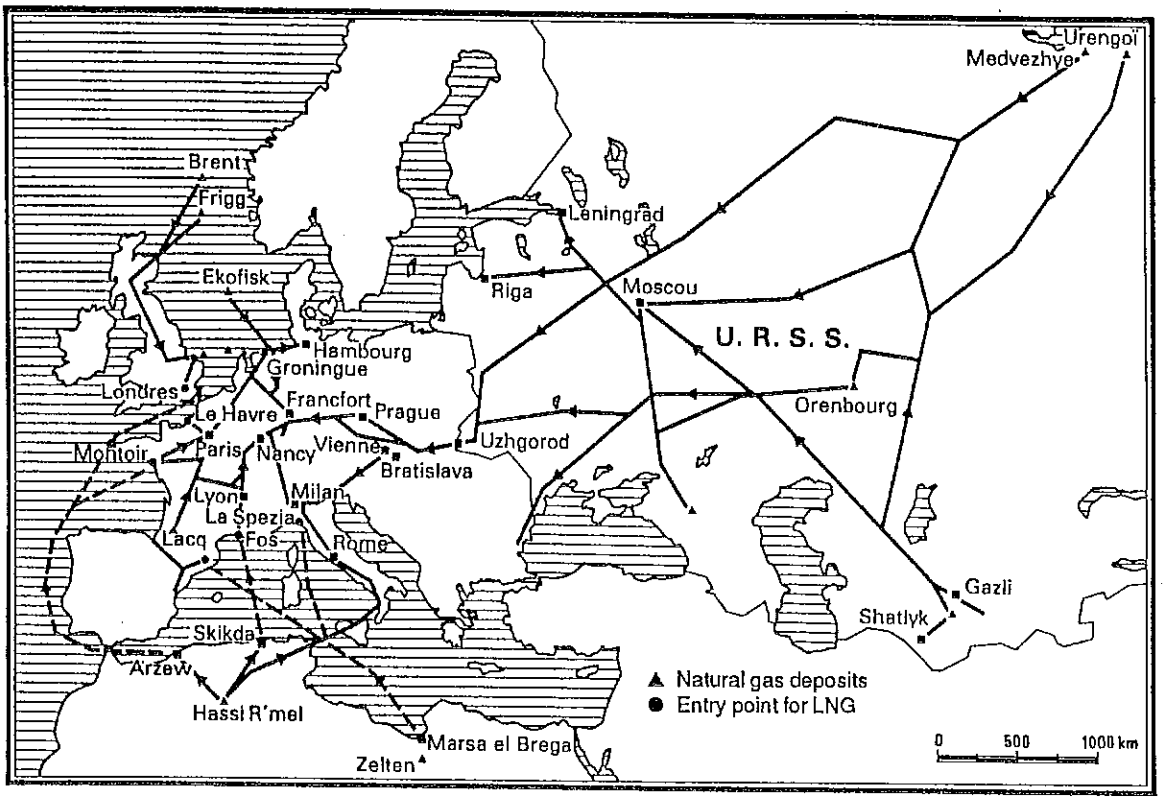

Fig. 1: Natural Gas Pipelines in Europe. (Source: Giraud and Boy de la Tour (1987).)

linked to the Statpipe-Norpipe network for the gas intended for the German and Dutch markets.

This relatively dense network has not, however, resulted in the interconnection of all the European markets — the United Kingdom, Ireland, Spain, Portugal and Greece are not yet linked to the rest of continental Europe. Moreover, there is no direct gas link between Belgium and Federal Germany. A link across the Channel is being studied, which would eventually allow the UK to buy Soviet gas. The interconnection of the French and Spanish networks is also being examined. This would be carried out by means of a pipeline linking the Lacq and Serrablo deposits. This should allow Spain to import Norwegian and/or Soviet gas after it has been transported through Belgium and France in the first case, and Germany and France in the second. The interconnection should also allow Portugal to be connected to the European network. Negotiations have been undertaken to persuade Portugal to participate in the funding of the Franco-Spanish project. In the longer term it is possible that the Union of Arab nations of the Maghreb will decide to construct a trans-Maghreb gas pipeline, serving Morocco and suitable for extension into Spain and Portugal. Nigerian gas, in the even longer term, could be brought to Europe by means of a pipeline through Morocco and Spain or in the form of LNG.

As we can see, Europe is already a reality in regard to gas and the existing network already enables certain gas companies to compensate one another through barter. From the viewpoint of these companies this is the best way to obtain secure supplies. In the future, France and Germany are likely to become the centrepins of this vast network.

3.2 *The Consensus Over Net-back*[10]

The companies involved in the transport, importation and distribution of gas have together managed to impose a net-back logic on the setting of the price of gas purchased from the producer. This was a long-term battle, but it remains the best guarantee that gas will be able to compete in the future with its substitutes.

Since gas has no captive uses, it must be able to compete with the cheapest of the energies for which it is a substitute. These are low-sulphur heavy fuel oil in industry and coal in thermal power plants. Producers, on the other hand, tend to believe that gas enjoys a "quality bonus" (since it is easy to use and less polluting) and therefore warrants high selling prices. Ultimately, from this point of view, the FOB price of gas should be brought into line, on a calorific basis, with the FOB price of crude oil; all the more so since upstream investment in the gas industry is particularly costly for the exporter. According to the exporters, if the selling prices are too low to be worthwhile, they are likely to hold up the development of new deposits, which would be detrimental to the consumer in the long run.

This approach represents the underlying logic of a producer looking downstream. It is opposed by the importers, who look upstream and prefer to work back from the final market price. They argue that natural gas is not a substitute for crude petroleum, but rather for certain petroleum products (heavy fuel oil, light heating oil) as well as coal and even electricity. If it is to hold on to or increase its market share, gas must be sold at a price comparable to that of its rivals, especially in the manufacturing sector. All the more so since the natural gas market needs the industrial sector if it wishes to expand. Industrial demand is much more stable than demand from the domestic sector; the latter involves peaks which generate storage or modulation costs. From this standpoint, parity between gas and oil prices should be sought at the level of the final user. It is, therefore, up to the producer to cover all the extra costs of transporting gas to the consumer market in comparison with the reference case (petroleum).

Thus the net-back approach abandons upstream parity and imposes it at the downstream level. If the constraint of downstream parity is ignored, gas prices will soar, preventing substitution, and the market will collapse.

Despite their current opposition to it, there is an advantage for the producer-exporters in net-back pricing. When the price of crude oil rises, they will obtain rents from their gas and it is indeed quite justifiable that those who take the risks should be rewarded when profits are available. European importers have argued along these lines and have obtained agreement that the ex-border price should differ from one contract to another depending on differences in transport costs, so that the price of gas remains more or less identical for the final user. The farther the supplier is from the place of consumption the lower the field price will be.

Such an argument is valid for a fuel whose price is not the "marker price," but it was accepted only because a buyers' market prevailed. It is now a view widely shared by all the operators on the European gas market. This approach may, however, be called into question if certain measures advocated by the Brussels Commission are actually implemented.

4. The Consequences of the Single Act in 1993

When the Single European Act comes into force on 1 January 1993, consumers should theoretically have free access to the suppliers of their choice. In practice, this will certainly not affect the consumer in the domestic sector, but it will concern the large industrial consumer, the local gas distributor or the electricity company which supplies kWh by burning gas.

This freedom will immediately come up against a legal obstacle — the import and/or transport monopoly enjoyed by certain gas companies. Moreover, it will have two important consequences:

(1) Openness concerning tariffs: In Europe the conditions of sale or purchase of natural gas, at

10/ See Percebois (1989), Chapter 7.

least in international contracts, are theoretically confidential. The establishment of an authentically single market will involve these conditions being made public; the same applies to the tariffs granted to industrial users.

(2) Recognition of the common carrier principle: In practice this will mean that transporters will be obliged to make their extra capacity available to any gas buyer, including former customers who prefer to negotiate their gas purchases directly with a domestic or foreign producer with whom the transporter has no arrangements. The common carrier system involves *a fortiori* the "free transit" of gas through national territories linking producers to importers.

Major gas users are generally in favour of such a system which, in their view, has the advantage of introducing real competition, perhaps leading to lower prices and moreover making it possible to share out the risks. The gas transporters, on the other hand, are not generally attracted by such a system, which would call into question their relative or absolute monopoly position. Measures taken over the last few years in France and Federal Germany, in order to prevent direct agreements between foreign suppliers and local distribution companies, indicate clearly their opposition. Their argument against the common carrier system is developed around two main ideas.

First, it is very difficult, if not impossible, to liberalize trans-border purchases of gas completely (meaning, in practice, that a local gas distribution company could buy gas directly from the foreign producer of its choice) in a context in which security of supply is a major constraint. This is all the more so in regard to international gas contracts in which the transport companies importing the gas are bound by long-term contracts with particularly tight take-or-pay clauses. Rigidities within the gas purchase-and-delivery system lead to precise requirements from both the buyer and the seller: for instance, from the seller's standpoint, the high cost of a liquefaction plant is ample justification of the need to guarantee regular sales of their gas; for the purchasers, the cost of setting up a transnational network of gas pipelines is a sufficient reason for gas supplies not to be interrupted. This explains why in the gas market, unlike the oil market, contracts are long-term (20-25 years), with take-or-pay clauses and relatively rigid prices.

Secondly, obliging gas transporters to open up their networks to outsiders in fact amounts to penalizing farsighted investors who, in order to avoid future shortcomings, have developed their transport capacity beyond what is strictly necessary under present market conditions. They would then be forced to market products in competition with their own through their own networks. This may be acceptable if the contract is freely entered into by both parties, but it would seem difficult to impose it, even if the outsider pays for the service. One can well imagine that transporters would not make any great effort to inform potential users of available capacity, and would only very reluctantly provide assistance to users who are not among their regular customers. What guarantees would the user in question then have?

For the most part, the argument that the system already exists in the United States, and that it could therefore be transposed into Europe, is hardly relevant here. The structure of the American gas market is very different. In the US 85% of demand is covered by domestic production, whereas in Europe half of the gas consumed has to cross a border. There are many gas producers in the United States, including small-scale producers, so that the large number of transport companies (operating both within state boundaries and between states) act as intermediaries in balancing supply and demand. The American gas industry is not vertically integrated. Production is spread across several hundred companies. Transport is controlled by powerful independent firms operating mainly with long-term contracts (although, of late, they are no longer bound by take-or-pay commitments). These companies are willing to transport gas for a third party and they supply numerous distributors of various sizes. The pipelines are, moreover, bound by a statutory obligation to serve the distribution companies, in particular in the case of interstate supplies.

Unlike the American situation, where the large number of operators and the juxtaposition of local and federal regulations have created a vast and decentralized market, the fact that only a small number of companies operate in the European market has led to a certain uniformity in contract conditions. At present the standard arrangement for an importer-transporter is a supply contract which stipulates an annual take-or-pay obligation within a margin of 80-110% of the annual contracted quantity, over a long period and at a price which reflects market conditions, not only at the time of the negotiation but also throughout the contract period (via an index of the prices of gas substitutes). In Norwegian contracts prices are only partially indexed to oil product prices in order to take into account the growing competition from electricity in certain segments of the market (in particular in the residential-tertiary sectors).

The aim of the Single Europe Act is to suppress the physical, technical and economic (especially fiscal)[11] obstacles to competition in order to improve competitiveness at all levels of industrial activity. If transporters were to be obliged to open up their networks, then this would in fact give a right of access to an infrastructure which had been built and financed by somebody else, thus raising three types of relevant objections.

In the first place, the common carrier principle is incompatible with the logic of existing long-term contracts. One cannot oblige the transporter to buy stipulated quantities of gas and to supply the public distribution companies without fail over a period of 20 years, and at the same time allow certain operators to use the same transport network on a short-term contract basis (2 or 3 years), the network owner being only "marginally" remunerated for the service so supplied. The transport of Soviet gas across German territory led Gaz de France to participate in the company which was set up for that purpose — buyers must be in a position to commit themselves over a long period and participate with a degree of certainty in the funding of installations. As the Director of Supply in GDF has pointed out (Cousin, 1987), "our job is to sell to customers, who are not obliged to buy from us, gas which we buy from suppliers who are not obliged to sell to us." Obliging the pipeline companies to transport gas for third parties who have arranged direct purchases calls into question the type of long-term supply contracts that have been used in the European system. Who is likely to embark on the development of costly delivery systems associated with new gas deposits if there is no secure outlet for the gas so procured?

Secondly, the companies which transport the gas they import (Ruhrgas, Gaz de France, SNAM and Distrigaz, i.e., almost all of the European gas companies, with the exception of Gasunie and, to a lesser extent, British Gas) are sure to be able to market it under the net-back system. Introduction of the common carrier principle would undermine the economics of the system, since the formation of the price of gas would tend to change. The inevitable scrapping of long-term contracts and the inevitable development of spot sales would lead to the emergence of a single FOB price on the European market. The ex-field prices of all imported gas would tend towards uniformity because of the greater competition between sellers and this would result in the importers who are far from production sites being penalized, as would be the buyers with the highest transport costs. France, which has the disadvantage of being farther away than most of its partners from the main production sites (Norway, Netherlands and the Soviet Union) would be particularly badly hit. To preserve its share of the market, Gaz de France would have to cut its transport costs so as to guarantee competitive

11/ It should be noted that at present (1989 data) VAT rates applied to gas sales (as a percentage of the pre-tax price) vary greatly from one country to another: 14% in West Germany, 18.6% in France, 9% in the domestic sector but 18% in the industrial sector in Italy, 20% in the Netherlands (with the exception of the horticultural sector, which enjoys a preferential rate of 6%), 17% in Belgium, 6% in Luxemburg, 10% in Ireland, 22% in Denmark, 12% in Spain and 8% in Portugal. There is no VAT on gas sales in the United Kingdom. Moreover, France has been using, since 1 January 1986, an internal tax on the consumption of natural gas (TICGN) which is applied to the industrial sales of fuel gas when these are in excess of 5 million kWh (the rate is 0.56 centime/kWh).

final delivered prices to its industrial customers. If not, GDF would be likely to lose customers to rival forms of energy.

Finally, a distinction must be made between freedom to import, free transit and the common carrier principle. These are three separate principles and not all of the European natural gas companies will be concerned by all three of them. Moreover, the third principle implies the two others, but this is not reciprocal. It is feasible to put an end to an import monopoly and to accept free transit without necessarily accepting the common carrier principle.

The principle of free importation can be envisaged in isolation, though its effect is constrained by the availability of transport arrangements. If SNEA wishes to import Norwegian gas, it can do so; but nothing can make GDF transport the gas. Thus the importing company will either have to develop its own transport network or else make an agreement with an existing transporter. All things considered, however, when the net-back system is the rule and common purchasing agencies are current practice, a statutory import monopoly is no longer justifiable. It is no longer necessary to put pressure on the sellers, who will adapt to the final market by themselves; and security of supply is no longer threatened, since contracts are signed for long periods of time.

Following the same logic, one may also accept the principle of free transit: any country that wishes to buy gas from abroad, involving transport across another national territory, should be able to do so without necessarily having to set up a joint subsidiary, as is the case at present. With the free transit principle in effect, it would be sufficient to sign a contract with a foreign transporter, who for a given price will transport the gas through his network. Free transit can be characterized as a common carrier system restricted to gas pipeline companies. Some see this as the first step towards a generalized common carrier system; others view it as a substitute for a fully open system.

The question of common carriage is far from being resolved; all the more so since it concerns not only natural gas but also other products using networks or grids (electricity, communications, etc.). The maintenance of an import monopoly and the refusal of free transit are much weaker lines of defence than the refusal to introduce common carriage. In theory, it is possible to envisage a common carrier system which is restricted to certain operators (electricity companies using gas or the nitrogen industry), but in such a case certain users would undoubtedly turn to the European courts to contest what could be construed as unequal treatment. The negotiations between ENEL and SNAM — in order to allow ENEL to use part of the SNAM network to import Norwegian gas — constitute the first example of this type of agreement (*Pétrostratégies*, 1989). One can reasonably argue that the relatively united opposition of all the European gas transport companies to the common carrier principle is in itself sufficient to make the system unworkable. On the other hand, they will have to yield ground on other issues, such as the openness of contract conditions, free importation and perhaps even free transit.

The development of a community energy policy is no easy thing when the UK is an oil-producer, Holland a gas-producer, Germany a coal-producer and France a producer of nuclear power, while Italy is dependent on its energy imports. On the other hand, natural gas is more of a common factor encouraging cooperation than a cause of dissension within Europe.[12] No doubt the introduction of common carriage would call into question the fragile equilibrium that has been achieved and would undermine the two pillars that hold up the European gas edifice: the acceptance of long-term contracts and the logic of net-back. The abolition of the import monopoly and the freedom of transit (statutorily restricted to gas companies) would doubtless constitute another step towards a European gas system, since such changes would not affect these two pillars. Attention is likely to be focused on these issues in the coming months. Other concerns should also have high priority:

12/ On the history of gas in Europe and the political dimensions of gas negotiations, see the excellent book by J. Estrada *et al* (1988).

the abolition of certain privileges in regard to prices, more public information about the conditions contained in industrial contracts and the development of the gas network in Southern Europe. Is not the introduction of the common carriage system merely a threat brandished by the Brussels Commission in order to achieve easier victory on these less ambitious but more realistic issues?

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