UNESCWA

ECONOMIC AND SOCIAL COMMISSION
FOR WESTERN ASIA

UNITED NATIONS
DEVELOPMENT PROGRAMME

Distr.
GENERAL
E/ESCWA/ENR/1992/WG.1/22
19 June 1992
ORIGINAL: ENGLISH

Interregional Symposium on Gas Development and
Market Prospects by the Year 2000 and Beyond
20-26 June 1992
Damascus

NATURAL GAS RESOURCES IN THE MEDITERRANEAN COUNTRIES: A WAY TO INCREASE INTERNAL CONSUMPTION*

Prepared by
Claudio Simeoni
Ente Nationale Idrocarburi (ENI)
Rome - Italy

The views expressed in this paper do not necessarily reflect those of the United Nations.

* Issued without formal editing.

Ladies and Gentlemen,

It is my great privilege to participate in this important conference and to try to give a contribution to furthering and promoting the use of natural gas in the Mediterranean countries. The North and South shores are linked to each other by a common history, by flows of people and exchange of thoughts and of goods.
Some North Mediterranean have a relatively recent experience of the difficult path of economic development, and of its relations with energy that represents an important element in the cost of producing commodities: therefore the geographical differences in its costs can lead to serious variations in the rate of development especially for industry, whose energy inputs are a significant part of total costs. Energy has a manifold link with the Gross National Product of any country or group of countries, and it is an essential element of economic development and social progress. The only way to increase productivity is to use energy-consuming machinery and equipment; in its turn, economic development causes more energy to be used because higher

incomes induce consumers to acquire more of it to satisfy their demand for comfort and mobility. There is a strict relation between the rate of increase of energy consumption and economic development: the quicker is the growth, the higher is the ratio between energy and G.N.P., i.e. the extra energy consumed per dollar produced.

There is no inherent necessity for the countries to reach the level of energy consumption, for example, of the European Community, as the very different energy consumption per unit of National Income in the EEC shows very well.

In 1950, six European countries associated themselves in the C.E.C.A. -Coal and Steel European Community- with the aim to promote internal coal and steel productions and consumptions. Trade barriers were eliminated and the member states with higher production costs received assistance and incentives by the Community.

The success was immediate: trade among C.E.C.A. members increased after three years by 50 % for coal, 150 % for steel and 450 % for scrap iron; prices diminished from a minimum of 8 % to a maximum of 35 %.

Growing political cohesion and geographic proximity were essential to the success of the C.E.C.A.: the embryo of the future European Economic Community.

1.Natural Gas In Europe

Natural gas provides Europe with the 24 % of the energy it consumes: the Western one with the 19 % and the Central-Eastern one with the 30 % .

In Western Europe the level of consumption is a result of a

fourteen-fold increase from 1960 tO 1990, reached through the action of three main factors.

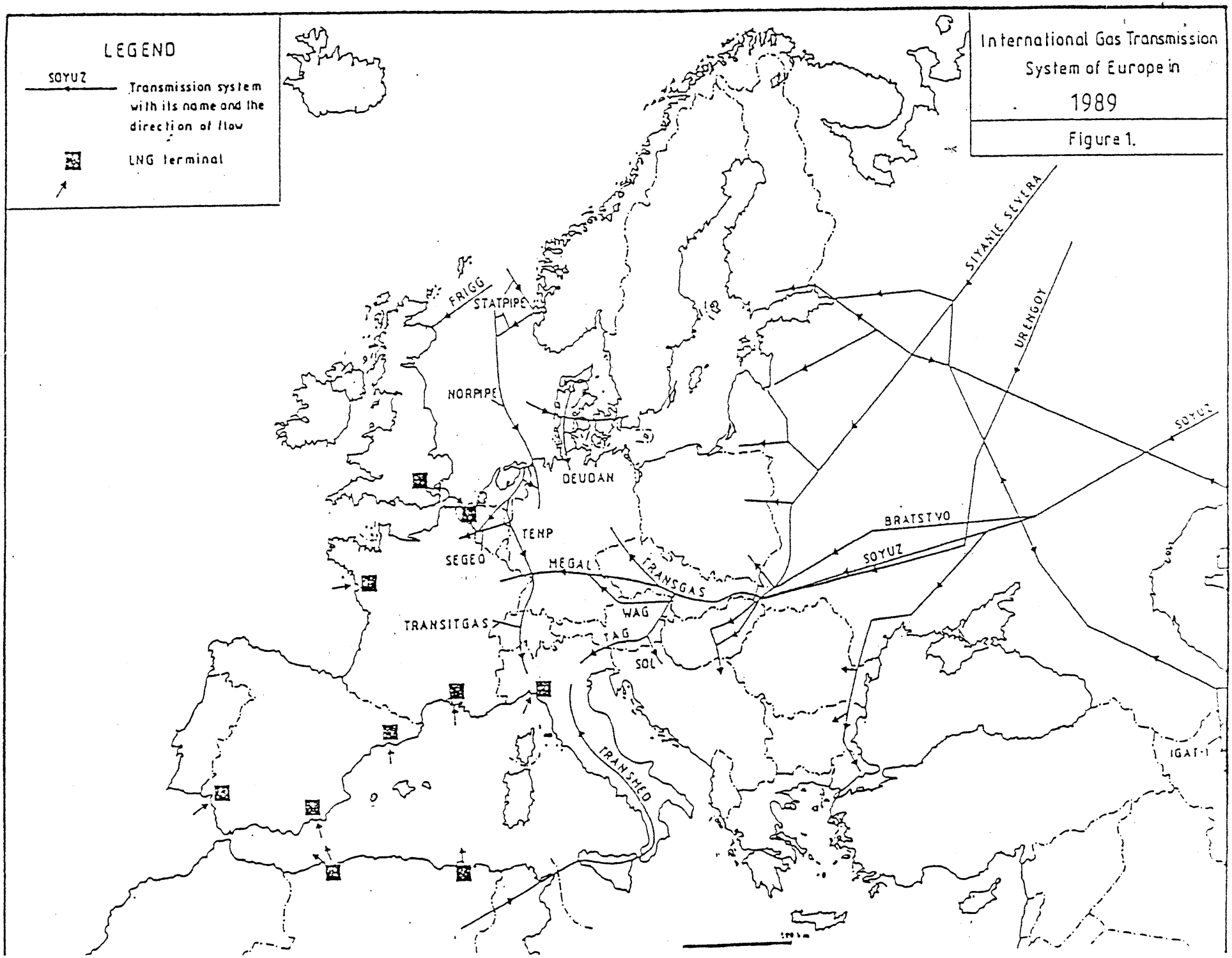
First, natural gas reserves were discovered in Italy and France, then in the Netherlands and North Sea and very rapidly developed. The size of the potential demand for gas prompted to building of very extensive pipelines networks, which eventually give or will give rise to a really unitary infrastructure even when the market is criss-crossed by national boundaries. It is interesting to note that whenever the gas market proved to be very large, its internal supply has been from a very early stage supplemented by imports.

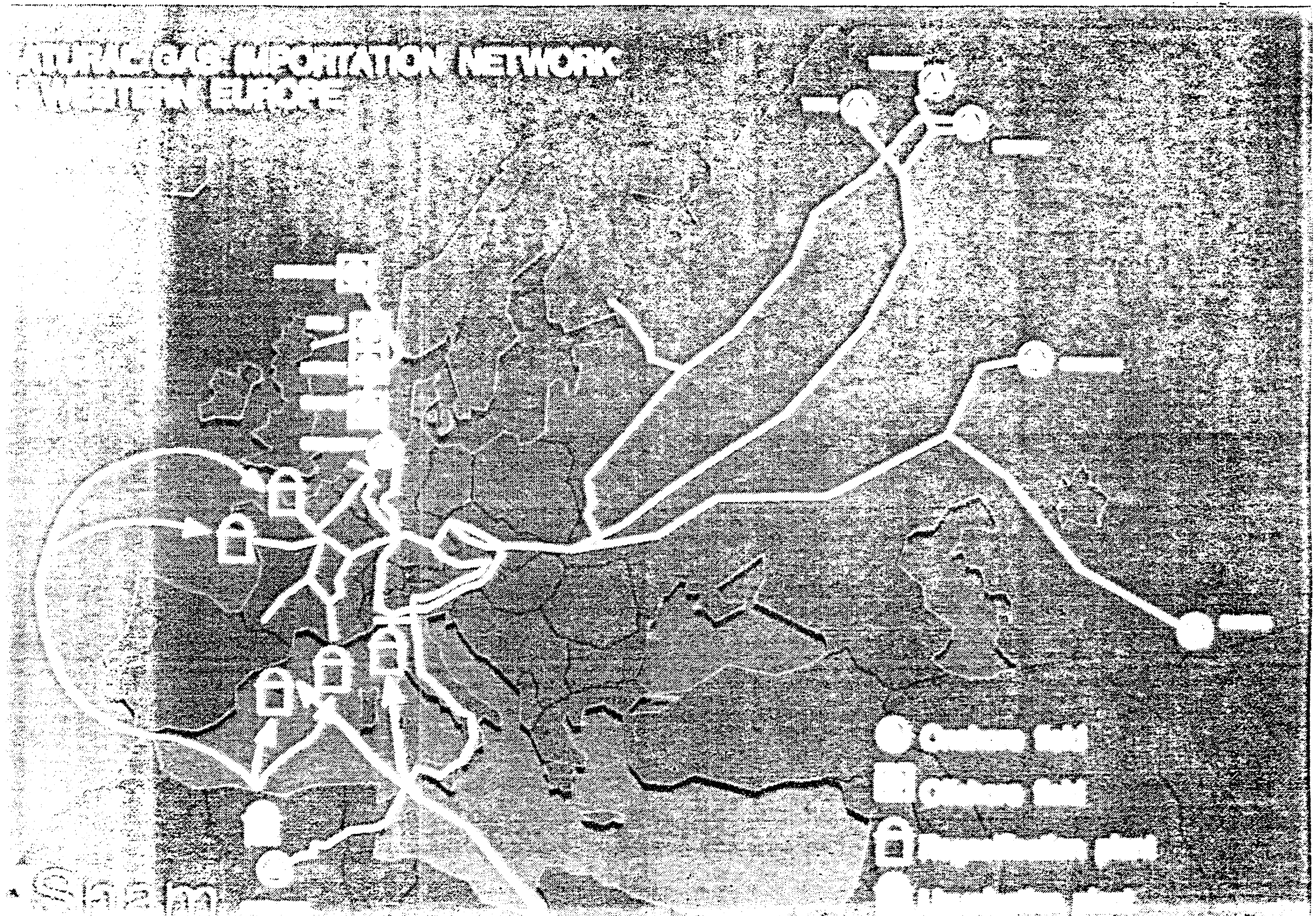
Second, the European Countries adopted from the very start a cooperative attitude: they created a vast network of transport and distribution for natural gas, which allowed both the rational use of internal resources and their integration with imported ones (figures 1 and 2).

The European gas transport system is now about 370,000 km long: the big gas feeders which supply the market from North Sea, USSR and North Africa fields account for 11,000 km. The national pipeline grid systems are interconnected and integrated in a European system, which moved 980 billion cubic metres (cum) of gas in 1989.

Third, the European gas producers and marketers followed a price policy which allowed the gas to enlarge its market first to replace the manifactured gas, then to take a large part of the new energy consumption and finally to substitute petroleum middle distillates.

The form and the relevant economics of the gas are much more similar to the electriciy market than to the oil one


LEGEND
SOYUZ
Transmission system with its name and the direction of flow
LNG terminal
International Gas Transmission System of Europe in 1989
Figure 1.
FRIGG
STATPIPE
NORPIPE
DEUDAN
SIYANIE SEVERA
URENGOY
SOYUZ
BRATSTVO
SOYUZ
TENP
SEGEO
HEGAL
TRANSGAS
WAG
TRANSITGAS
TAG
SOL
TRANSMED
IGAT-1


ATURAL GAS IMPORTATION NETWORK
WESTERN EUROPE

presenting base loads and peaks, tarifs rather than prices, and discrimination among customers according to the various uses of gas. Gas in fact compete with different energy sources in different uses; tarifs and prices are therefore different according to which costumer buys it and to the prices of the competing energy sources. From these basic characteristics of the gas market comes the fact that its distribution, together with electricity, is everywhere considered as a public utility and is, therefore, subject to some regulation.

In most of the European countries, some form of concession is used to delegate Governament authority to private or public companies to supply gas. West Germany is the conspicous exception among the matures markets. In a decentralized structure like Spain this authority may be shared between the central and the local authority (autonomous community). This is to be found both upstream, in exploration and production, and downstream, in transport and distribution (tables 1 and 2).

Take-or-pay clauses were developed over a period of years to make possible for gas buyers and sellers to adapt to changes in the economic situation: including flexibility of take and price variation formulae. This is an obbligation on the seller to take delivery of a specific quantity of gas over a specific period or to pay the seller for the quantity of gas equivalent to that which it fails to take. To execute the sales contracts, the European transmission grid was gradually built. Firms take commitments were made over long terms, making it possible for extremely large in-

Table 1 : National transmission companies and supply sources

Country	Transmission companies	Suppliers
Austria	ÖMV and Austria Ferngas	Domestic sources (ÖMV and Shell), Soviet Union, (Troll)
Belgium	Distrigas	Netherlands, Norway, Algeria, (Troll)
Denmark	DONG/DANGAS	Domestic offshore sources (DUC)
Finland	Neste OY	Soviet Union
France	Gaz de France, SNGSO	Domestic sources (Elf/GdF), Netherlands, Norway, Soviet Union, Algeria
West Germany	Ruhrgas, BEB, Thyssengas, SaarFG, GVO Erdgas Süddeutschland, BayerischeFG, GasUnion, WestfälischerFG, SalzgitterFG, FGNordbayern, etc	Domestic sources (BEB, Erdgas Munster, Mobil, Wintershall and others), Netherlands, Norway, Soviet Union, Denmark (Troll)
Greece	DEFA	Algeria, Soviet Union
Italy	Snam	Domestic sources (Agip), Netherlands, Algeria, Soviet Union
Ireland	Bord Gais	Domestic offshore
Luxembourg	SOTEG	Netherlands, Norway (via Belgium)
Netherlands	Gasunie	Domestic sources (NAM) and others, Norway (Troll)
Spain	Enagas	Algeria, Libya, (Troll)
Sweden	Swedegas	Denmark
Switzerland	Swissgas	Netherlands, Soviet Union (via Snam and Ruhrgas)
Turkey	TPAO	Soviet Union
UK	British Gas	Domestic sources (Amoco, Shell, BGC, BP and others), Norway
Yugoslavia	INA-Naftaplin	Soviet Union, other sources via Austria

Table 2 : Transmission and distribution in selected European countries

	Austria	Belgium	Denmark	France	Italy	Netherlands	Spain
Transmission company	ÖMV	Distrigas	DONG/DANGAS	Gaz de France	Snam	Gasunie	Enagas
Owned by	Government/ private	Government/ private Belgian companies	Government	Government	ENI – Government	Government EBN Shell, Esso	INH – Government
Retail distribution	Austria Ferngas and municipal distribution	Distrigas Municipal distribution companies	Municipal distribution companies (5)	GdF Soc Nat. de Gaz du Sud-Ouest	Italgas Siciliana Gas MUNICIPAL DISTRIBUTION COMPANIES	Gasunie Municipal distribution companies	Enagas, Catalana de Gas Municipal distribution companies (9)
	Switzerland	**UK**	**Sweden**	**Greece**	**Ireland**	**Finland**	
Transmission company	Swissgas	British Gas	Swedegas	DEPA	Bord Gais	Neste OY	
Owned by	Fed. of Swiss gas utilities Regional gas federations Banks	Private shareholders	Government Statoil (N) Shell DONG	State	State	State	
Retail distribution	Local gas companies	British Gas	Sydgas Vastgas	Municipalities	Bord Gais/ local gas companies	Neste OY	

vestments to be made, like for example the Norwegian Troll field and the transportation gaslines from Algeria and from Soviet Union. This required the development of the technology to lay pipelines down to more than 600 metres of water and to cross mountain ranges up to 2,440 metres of altitude, and of the creation of purchasing consortia to pool the strenghts of the major European companies and led to cooperation.

Table 3 reports the international gas transmission system in Europe in 1989: interconnections were constructed on the basis of long term agreements between one seller and one or more buyers to transport gas in accordance with previously determined schedules. Some interstates technical problems had to be solved, for example the standards in construction of pipelines were agreed with the help of "ad hoc" technical drafting committees (local standards in distribution were up to individual countries and posed no problems).

The European gasline can be distinguished in:

- lines bringing the gas to markets from domestic on-offshore fields, like the Adriatic and the North Sea;
- lines connecting the various consumption centers;
- intercontinental lines supplying the European market from Soviet Union (length of the USSR lines to the border: 4,600 km the line "Siyanie Severa", 4,500 km the "Urengoy", 2,750 km the "Soyuz") and from Algeria (2,500 km of which 550 km in the Algerian sector, 370 in the Tunisian sector, 156 km in the submarine section across the Sicilian channel, 350 km in Sicily island, 15 km in the submarine section across

International Gas Transmission Systems of Europe in 1989

Table 3

Route	Pipeline System	Country	Diameter [cm]	Length [km]	Flow rate in 1989 [BCM/y]	Remarks
USSR-West Europe	SIYANIE SEVERA	USSR	122	~4500	~120*	to export
USSR-West Europe	URENGOY	USSR	142	~4500	~120*	to export
USSR-West Europe	BRATSTVO	USSR	2x102:81:142		~120*	to export
USSR-West Europe	SOYUZ	USSR	142	2750	~120*	to export
USSR-CSFR-West Europe	TRANSGAS	CSFR	142:3x122	426	65	from USSR
			2x71:91	15	20	to Austria
			142:102:81	435	26	to Germany
			91	449		to Germany
			91	420	7	to Germany
(USSR)-Austria-Italy	TAG	Austria	96:104	225	** 13	
		Austria	91:104	155		
		Italy	91:104	107		
(USSR)-Austria-Yugoslavia	SOL	Austria	51	30	1.6	
(USSR)-Austria-Germany	WAG	Austria	81	250	4	
(USSR)-West Europe	MEGAL	Germany	142	7	** 26.5	from CSFR
			120	30		
			80	173	3.5	from Austria
			120	184		
			110	108		
			100	98		
			90	39.5	** 8.5	to France
			80	171		
Netherlands-Germany-Italy	TENP	Netherlands	107	20	~10	
		Germany	96	420		from Dutch syst
			91	65		
	TRANSITGAS	Switzerland	91	90	7	
			86	90		
		Italy	86	160		
Denmark-Germany	DEUDAN	Germany	60	185	0.5	to Germany
Netherlands-Germany		Neth-Germ	91	39	~15	

International Gas Transmission Systems of Europe in 1989

Table 3 (cont.)

Route	Pipeline System	Country	Diameter [cm]	Length [km]	Flow rate in 1989 [BCM/y]
Norway-(Germany)	STATPIPE	North Sea	76/71/91	882	
Norway-Germany	NORPIPE	North Sea	91	440	18
(Norway)-Germany-Netherlands		Germ.-Neth.	91	50	9.9
Norway-United Kingdom	FRIGG	North Sea	2x81	350	** 10.5
Netherlands-France	SEGEO	Belg.-France	91	124	8
		Belgium	91	124	8
Algeria-Tunesia-Italy	TRANSMED	Algeria	2x123	550	** 13
		Tunesia	123	366	
		Sicily Chan.	3x51	160	
		Italy	123	1514	
U.S.S.R.-Finland		Finland	71		2.1
U.S.S.R.-Poland		Poland	100		
		Poland	2x71¦40		** 7.8
U.S.S.R.-Hungary		Hungary	2x81		8.5
(U.S.S.R.)-Hungary-Yugoslavia		Hungary	61		2.5
U.S.S.R.-Romania		Romania	100¦71 2x61		** 5.5
(U.S.S.R.)-Romania-Bulgaria		Romania	100		6.3
(U.S.S.R.)-Turkey		Romania	122		3
		Bulgaria	100		
Iran-U.S.S.R.	IGAT-1	Iran-USSR	107/122	~1500	3

Legend:
- 142¦102¦81 means paralel pipelines with diameter 142, 102 and 81 cm respectively.
- 2x71¦40 is equivalent of 71¦71¦40 .
- 91/75/60 means pipelines in serial connection.
- * estimated flow rates
- ** the sum of flow rates of paralel pipelines

the Messina Straits and 1,060 km on the Italian mainland (figures 3, 4 and 5).

Note that for many years in Italy the debate on imports of Algerian gas was on the preference to be given to a transportation gasline or a LNG carrier. The economic factors which played for choice in 1980 the gasline (after having ascertained that the italian market was potentially able to absorb all the gas arriving from the pipeline operating at full capacity for a very long period of time) were:

-no need of liquefaction, terminal and regasification plants;

- one-way continous flow of gas, while LNG carrier returns empty;

- energy consumed in the compression stations is lower in respect to that consumed to liquefy and regasify and moving the carrier;

- no need of ports, storage tanks, bridges, refrigeration and other facilities;

- lower costs in maintenance;

- no stop of gas flow due to weather and sea conditions;

- ecological aspects because gas is transmitted and distribuited by underground networks that only temporarily and marginally modify the environment; it do not involve open systems with possibility of evaporation;

- a whole territorial planning for development: the transport gasline crosses the country and can supply every place where necessary (a posteriori in Italy we observe the effects: a reduction of the high concentration of industrial activities in some cities of the North and an impul-

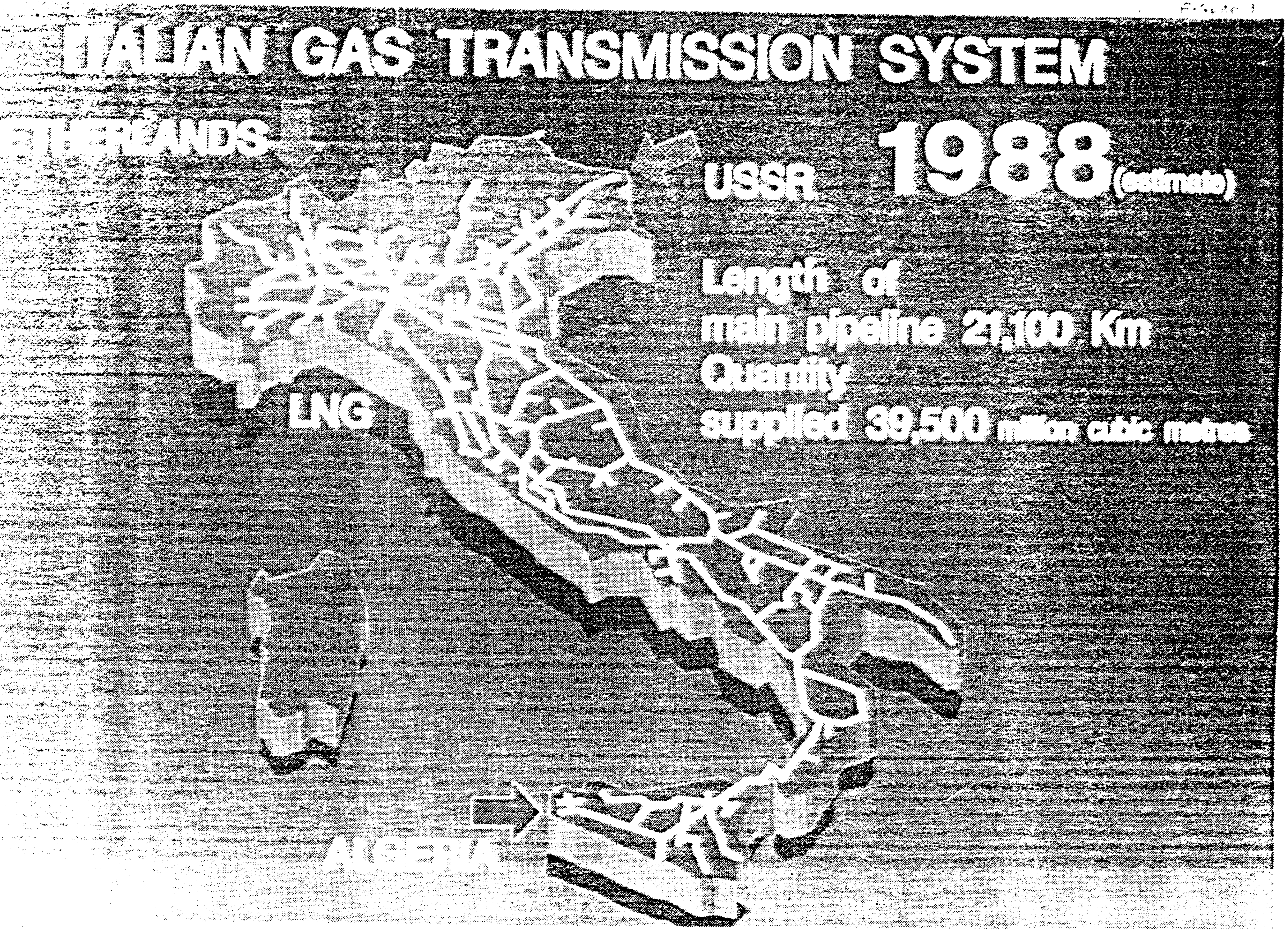
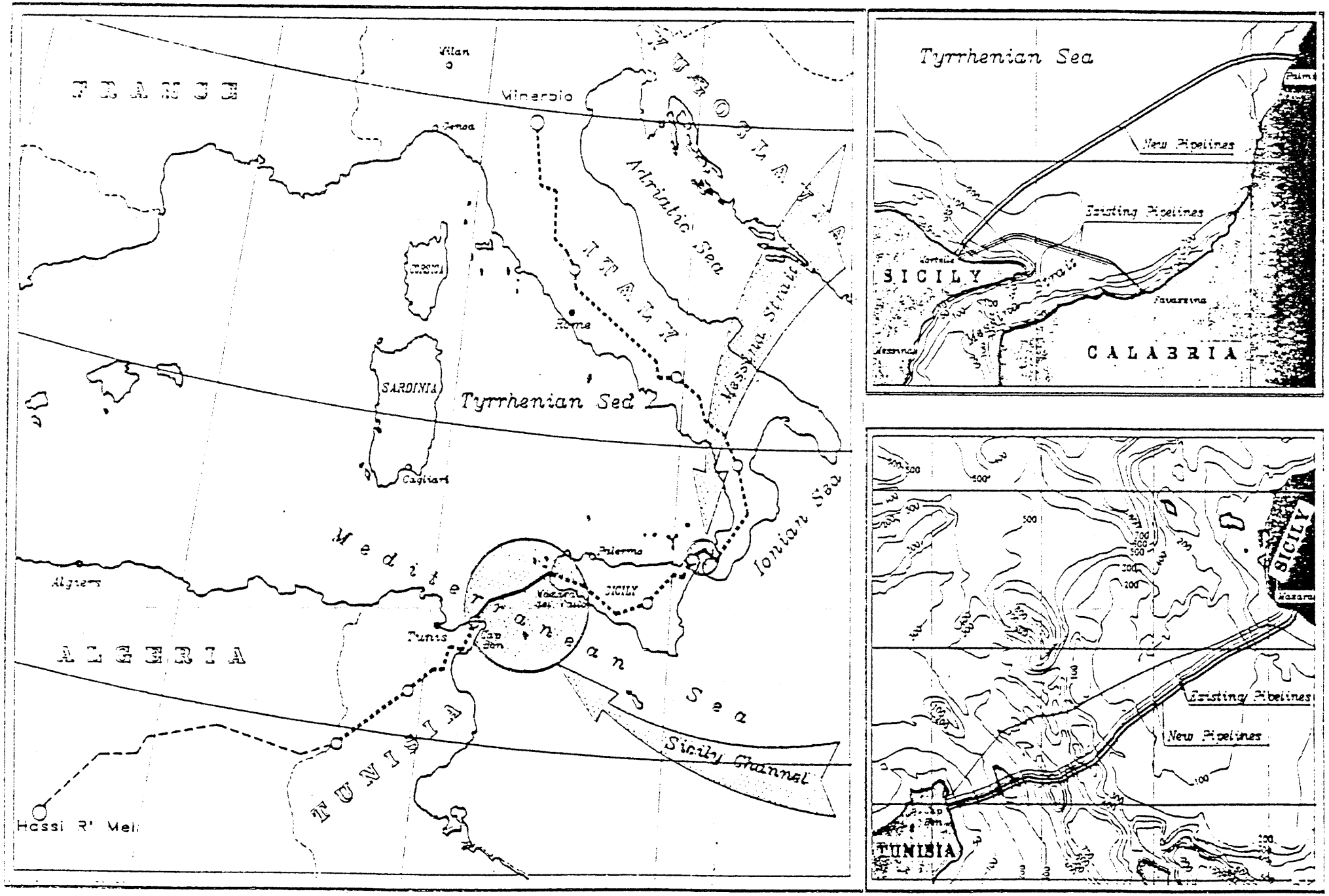
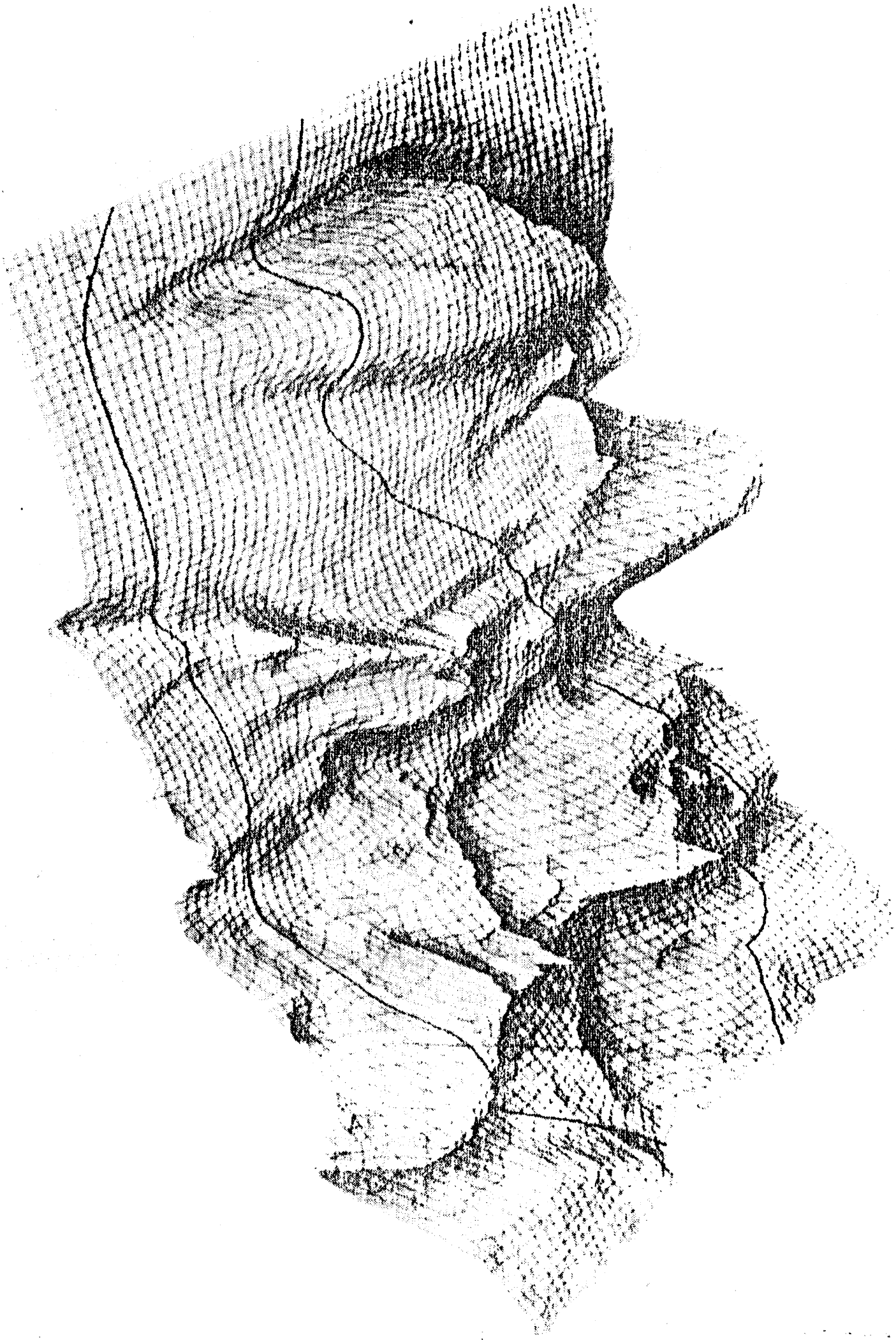

ITALIAN GAS TRANSMISSION SYSTEM
1988 (estimate)
ETHERLANDS
USSR
Length of
main pipeline 21,100 Km
Quantity
supplied 39,500 million cubic metres
LNG
ALGERIA

FIG.4


FRANCE
Milan
Genoa
Minerbio
ITALY
Adriatic Sea
Messina Straits
Rome
SARDINIA
Tyrrhenian Sea
Cagliari
Ionian Sea
Western Mediterranean Sea
Algiers
Palermo
SICILY
Tunis
ALGERIA
TUNISIA
Sicily Channel
Hassi R' Mel
Tyrrhenian Sea
New Pipelines
Existing Pipelines
SICILY
CALABRIA
Existing Pipelines
New Pipelines
TUNISIA



se of new activities in the Center and South with a stop to the strong emigration from these areas).

The gas transport system is run by choosing at every moment the cheapest source of gas available, and therefore minimizes the cost of producing and transporting the gas. Through growing gas stocks and appropriate market policies it also reduces the differences between peak and baseload.

In Italy the first utilization of natural gas began on an industrial scale in the years immediately after the second world war with the discovery of the Po valley fields in the late 40's. A gas transport system was rapidly built to convey the gas first to the industrial sector, the only one capable of utilizing the new resource immediately (thermoelectrical production immediately took an importance of note because constituted an immediate consumption outlet) and than to the domestic consumers.

This policy has been a common constant in all the countries that have developed a market for gas: only in a second instance, in fact, do the thermoelectric stations become included among the uses that guarantee a consumption level necessary for the levelling of the load diagram.

The history of the utilization of gas in Italy still remains a typical example of natural gas' capacity as a "lever of development". In fact, the development of gas sales to the industrial poles of the Northen side fostered a rapid expansion of productive activity, especially in the sectors of ceramics, fine metallurgy, nonferrous metal industries, cooked foods, and others, which drew considerable technical and economic advantage from the utilization of

this energy source.

The problem therefore of the better utilization of the energy available in an economy devoid of its own resources was already then, long before the energy crisis, a common preoccupation among the technicians of the gas sector. In any case, the massive utilization of methane as a source of industrial energy made it possible for Italy to develop an experience that was among the first of its kind in Europe. Near Venice at Murano, for example, where glass is processed, the use of methane goes back to 1954, the year in which the first glass-works were connected to the network. In 1955 there were thirty-one glassworks. In that area today there are around one hundred in operation.

Around Brescia,again in 1955, five steel mills were utilizing methane: today over fifty.

The most noteworth consequences were seen in the expansion of the ceramics industry in Emilia, where the use of natural gas made an industrial development possible: the factories fueled by natural gas, six at the end of 1955, are now more than 350.

The availability of methane thus costituted a factor that cannot be overlooked in the country's industial development process, inasmuch as:

- in areas where industry already existed and was already consolidated, methane fostered its modernization and transformation to more qualified and more valuable processes;
in areas in which industry was beginning to find a place, the availability on a wide scale of methane has been the determinant element for a rationalization of the production

processes and for significant progress in terms of product quality, of economy, and hence of competitivity.

The expansion in Italy of the use of gas has been constant and progressive in certain industrial processes: between 1970 to 1980 it has been noted that in the food sector the use of methane has passed from 8 % to 37 %, in the glass sector from 32 % to 67 % and in ceramics from 55 % to 89 %. The best results have been obtained for processes whose plants have a thermal potential of small or medium dimensions. In these plants, in fact, thermal yields prove to be higher when utilizing gas than the other fuels.

In the domestic uses the expansion of utilization of natural gas is linked in all cases to factors of a technical, economic and social nature:

- the distribution of methane makes it possible to transport greater quantities of energy in terms of calories (approximately 75 % more) in networks of equal dimensions;
- such greater concentration of energy has permitted the enlargement of the area of utilization to new applications (the heating of homes and of sanitary hot water, instead of only the cooking of food);
- methane is nonpoisonous and has thus been an imporant safety factor in its domestic use:
- methane for civil uses has represented an important opportunity for the modernization of the production structures of the industries manufacturing equipment for domestic heating;
- it has represented an irreplaceable source of high ecological content, especially in the large urban centres and in

those having a special historic and artistic content (a special law for Venice which makes the use of methane compulsory);

- it rationalizes the city's energy distribution system by supplanting the LPG-in-bottles system;
- in terms of commerce and economics, there is also the activation of a local market for use equipment as well as activities connected with installation and maintenance of internal plant.

As far the social aspects are concerned,it is to be noted that:

- methane has made it possible to reach an extremely high number of families (10 million, equivalent to 50 % of the total;
- it has reached small and medium seize and even suburban centres;
- it has substantially improved the way of life and family housekeeping by semplifying a series of activities in the house related to the handling of other sources.
-it has employment effect: estimates were made in 1988 by the Agency for promoting development in Sothern Italy that the implementation of the general program would involve the direct employment of 60,000 people and another 25,000 indirectly employed.

Snam is a major distributor of gas through pipes and it supplies gas directly to custumers having a significant consumption. It also supplies gas to distributors at the local and regional level.In addition to Snam/Italgas group, there are about 700 local and regional distribution compa-

nies. A breakdown of ownership and control shows that small municipalities manage 7 % of the distribution companies directly, a further 37 % are managed by groups of municipalities, 32 % are part of Italgas group and 24 % are private companies of various sorts.

2. The Advantages of Natural Gas as a Fuel for Development

The characteristics of natural gas make it the energy source best suited for economic development.

Natural gas is a very good energy source. It is flexible: it can produce directly both thermal and mechanical energy, i.e. it can supply not only heat but also movement without passing through the costly stage of electricity. It is very clean, and does not leave nasty black fumes in the air. Its purity is an important economic asset: its flame can be put directly into contact with whatever you are heating or cooking, and can be pinpointed almost at will. Finally, natural gas can be used in large or small quantities without serious economic differences; it does not require any kind of consumer's storage; and its utilization process can be made completely automatic.

These advantages are of great importance. Natural gas will give its users not only an economic advantage but also a strong incentive to technological progress, especially to those that can fully profit from its special properties by manufacturing high value-added product. The use of gas as an industrial fuel brings with it a simplier and cheaper technology of utilization, a better product and quicker

production than practically any other source of energy. In a word, natural gas seems the ideal fuel to use in order to obtain a strong acceleration of economic development.

3. Reserves and Production of Natural Gas in the Mediterranean Countries.

On 31 December 1990 proven reserves of natural gas in the Mediterranean countries were evaluated to be 5,644 billion cubic metres (bln cum), 4.3% of total world (table 4).

Two countries, Algeria and Libya, account for 80% of proven reserves.

In 1990 126.50 bln cum were produced; excluding the amounts of natural gas flared or lost and transformed, the marketed production was equal to 93.42 bln cum: 68.31 bln cum were produced by the South Mediterranean countries and 25.11 bln cum by the Northener ones (tables 5 and 6).

The South Mediterranean countries consumed domestically 40.45 bln cum, i.e. 59% of their production, while the North Mediterranean countries consumed 94.29 bln cum, having imported more than 69 bln cum from Algeria, Libya, Commonwealth of Indipendent Republics and other countries.

It is obvious that the contribution to the domestic consumption of gas in the South Mediterranean countries is very small compared with its overall potential; in fact the ratio between proven reserves and production is 52, i.e.

TABLE 4

MEDITERRANEAN COUNTRIES : NATURAL GAS

PROVEN AND TO BE DISCOVERED RESERVES

($10^9 m^3$)

NATURAL GAS	RESERVES		
	PROVEN END 1990	TO BE DISCOVERED UP TO YEAR 2010 AND REVALUATION OF OLD FIELDS	TOTAL TO 2010
NORTH MEDITERRANEAN COUNTRIES	511	880	1,391
SOUTH MEDITERRANEAN COUNTRIES	5,133	2,719	7,852
MEDITERRANEAN COUNTRIES TOTAL	5,644	3,599	9,243
WORLD TOTAL	131,822	125,127	256,949
% ON WORLD	4.3	2.9	3.6

SOURCE: SURVEY OF ENERGY RESOURCES; THE WORLD GAS INDUSTRY; LE PETROLE ET LE GAZ EN AFRIQUE EDIAFR; M. COLITTI - SIZE AND DISTRIBUTION OF KNOWN AND UNDISCOVERED PETROLEUM RESOURCES IN THE WORLD; OPEC REWIEW.

TABLE 5

MEDITERRANEAN COUNTRIES : NATURAL GAS

PRODUCTION IN 1990

(10^9 m^3)

SOURCE / REGION	NATURAL GAS	
	PRODUCTION IN 1990 (*)	CUMULATIVE PRODUCTION END 1990
NORTH MEDITERRANEAN COUNTRIES	26.06	718.04
SOUTH MEDITERRANEAN COUNTRIES	99.94	1,475.09
TOTAL MEDITERRANEAN COUNTRIES	126.50	2,193.13
TOTAL WORLD	2,287.14	46,984.16
% ON WORLD	5.5	4.7

* (GROSS PRODUCTION - REINJECTION).

SOURCE: OIL & GAS JOURNAL; WORLD ENERGY INDUSTRY; CEDIGAS.

TABLE 6

MEDITERRANEAN COUNTRIES : NATURAL GAS

MARKETED PRODUCTION AND CONSUMPTION

($10^9 m^3$)

NATURAL GAS	MARKETED PRODUCTION IN 1990	CONSUMPTION IN 1990	PROVEN RESERVES ON	
			PRODUCTION (*)	CONSUMP-TION
NORTH MEDITERRANEAN COUNTRIES	25.11	94.29	19	5
SOUTH MEDITERRANEAN COUNTRIES	68.31	40.45	52	127
TOTAL	93.42	134.74	45	42
WORLD TOTAL	2,064.40	2,064.40	48	64
% ON WORLD	4.5 %	6.5 %		

* (GROSS PRODUCTION LESS REINJECTED).

SOURCE: OIL & GAS JOURNAL; WORLD ENERGY INDUSTRY; CEDIGAS.

hydrocarbon that only sovereign states may take over their own resources?

The first option should be related to their economic development. So considerable is the wealth in natural gas that the obvious choice for the South Mediterranean countries would be to rely heavily on it for the satisfaction of their additional energy demand. Such a wealth looks even more important if we add to the proven reserves the ones which could be found in the future.

Such figures need obviously to be taken with caution: they are the result of a desk study (a full account of the study is in M. Colitti "Size and Distribution of Known and Undiscovered Petroleum Resources in the World, with an Estimate of the Future Exploration",Opec Review, 1981. The study has been yearly up-dated; the results are obviously more significant for the areas than for any single country).

In the South Mediterranean Countries natural gas reserves to be discovered from now to the year 2010 and reevaluations of old fields could amount to 2,719 bln cum; adding to the proven reserves amounting to 5,133 bln cum, the total natural gas reserves could amount to 7,852 bln cum (table 4).

4. South Mediterranean Countries: Increasing Internal Consumption of Natural Gas

The data on the preceding paragraph seems to conclude that the abundance of natural gas in the South Mediterranean countries will last well into the future. We could, therefore, imagine a development plan which would push natural

gas consumption to a maximum. This would bring an important advantage: it would free crude and oil products for exports or reduce their imports.

According to such a plan, natural gas might increase its share of energy internal demand from about 34% (40.5 bln cum) in 1990 to 46% (62 bln cum) in the year 2000 and to 56% (92 bln cum) in the year 2010, i.e. with an average annual growth rate of 4.4% from 1990 to the year 2000 and of 4.1% up to the year 2010 (tab. 7).

In a comparable length of time, between 1965 and 1986, European gas consumption increased on average by 12.3% per year.

This would bring the total volume of natural gas marketed in the South Mediterranean countries (consumed and exported) to 108 bln cum in the year 2000 and to 158 bln cum in the year 2010.

This trend would result in a cumulated production of natural gas for internal market between 1991 to 2010 equal to 1,306 bln cum and for exports to 904 bln cum.

At the end of the period under examination South Mediterranean countries would therefore have produced 2,250 bln cum, 44% of the proven reserves, but would be left with a lot of those discovered between 1991 to 2010.

In order to calculate the contribution these new reserves would give to consumption after 2010, it is necessary to elaborate an hypothesis on the distribution in time of possible discoveries expected from 1991 to 2010. Let's choose one of the worst possible time distributions and suppose that only 27% of the total expected is found before

Table 7 - South Mediterranean Countries

Natural Gas - A Possible Long-Term Target

(billion cubic metres)

Years	Domestic Demand (a)	Exports (b)	Marketed Production (c=a+b)	New Reserves to be Discovered (d)	Proven Residual Reserves (e=e -c+d)
1990					5,133
91	41	28	69	29	5,093
92	44	31	75	40	5,058
93	47	34	81	46	5,023
94	49	35	84	62	5,001
95	51	36	87	75	4,989
96	53	38	91	88	4,986
97	56	40	96	100	4,990
98	58	42	100	138	5,028
99	60	44	104	175	5,099
2000	62	46	108	216	5,207
01	65	48	113	255	5,349
02	68	50	118	265	5,496
03	71	52	123	258	5,631
04	74	54	128	226	5,729
05	77	56	133	185	5,781
06	80	58	138	177	5,820
07	83	60	143	130	5,801
08	86	62	148	105	5,758
09	89	64	153	95	5,700
2010	92	66	158	54	5,602
	1,306	944	2,250	2,719	5602

Static Lifetime of Nat. Gas Proven Reserves in 1990 = 52 years
Static Lifetime of Nat. Gas Proven Reserves in 2010 = 35 years

year 2000 and the difference in the next 10 years.

Even according to this pessimistic hypothesis, the natural gas reserves producible from the fields would steadily increase well into the last decade of the century; exports of natural gas from South Mediterranean countries could raise from 28 of 1991 to a maximum of 66 bln cum in the year 2010.

According to this highest hypothesis, the natural gas reserves would still amount to 5,602 bln cum by the year 2010; the reserves/production ratio would be 35 years, higher than the same ratio for the North America gas industry which in 1990 was equal to 11 years.

A complete numerical calculation of this set of hypotheses and assumptions is shown in table 4, which presents year per year to 2010 a possible long term development of natural gas in the South Mediterranean countries, and can therefore be used to check the internal consistency of the methodology applied.

5. South Mediterranean Countries - A Possibile Outline of a Natural Gas Development Program.

In order to implement an increase of natural gas consumption as big as the one above envisaged it seems necessary that a large transportation system be built, in order first to collect natural gas from all potential gasfields, second to bring the gas to the parts of the area which have no reserves; third, to allow a capillary distribution.

It is my opinion that the South Mediterranean countries, in the energy sector, should aimed to develop a very large

project concerning the rational use of their internal energy resources, that is, the development of gas, which can replace very well -at first for the production of electricity and for the large industrial uses, and than for civil uses- the liquid fuels consumed today, which will therefore be available for export.

The South Mediterranean countries have different energy economies and the creation of a large structure, that is, a system of gas pipelines would have specif consequences and the large project for the delopment of the consumption of natural gas could be prepared through these fundamental steps:

An estimate of the production capacities of the various fields (large,medium and small size) in 20 years, both developed and to be developed, has to be prepared. The figures given in tables 4 and 7 on the possible amount of gas available in the future could be used as a first guess.

A gas transportation and distribution network should be then designed, including:

- offshore gas gathering systems and pipelines to bring the gas onshores;
- pipeline connecting gas fields with areas of the Maghreb without natural gas reserves. These lines are those corresponding to the European intercontinental pipelines;
- transportation and distribution pipelines within the consumption areas.

The configuration of such network could be kept as simple as possible: for example a single feeder could run along the territories linking their gas fields, than secondary

lines could be built linking the natural gas to the consumption centers. In this way it will work as a gas gathering system for the whole area.

It would obviously be a gigantic plan to be realized in steps, and with the utmost attention to overall economics.

A very rough evaluation , based on a table-top map of the area, would indicate that the total length of such big feeder would be about 8000 km. Such a figure for the total length of a big feeder need not to astonish anybody. It is only something higher to the great pipelines linking the CIS with Italy, and less than three times the Algerian-North Italy one. The only difference would be no presence of the longer stretches to be covered under the sea.

Finally the investment costs will have to be estimated, the financing scheme defined and the way of participation of other Countries and Institutions in the capital and technology in the project be arranged.

The South Mediterranean countries are well aware of the necessity of exploiting their great wealth of natural gas: proof of this is the number of projects for the conveyance and marketing of gas in these countries. With respect to them, the gas pipeline is in substance a "master plan" for the development of the area, and therefore has the advantage of being able to incorporate the local initiatives in a single framework.