

reconfirmed also once more in a Supplementary Act concerning the creation of the petroleum Ministry.

To date the Legislature has not revised the statutes of the said companies and thus continue to be in control.

However the Petroleum Act of 1366 (the Act) has imposed sever limitations on the authority and freedom of the companies operating under the Ministry of Petroleum. The Act broadly defines the term "Petroleum" to cover all hydrocarbons except coal. Thus all matters concerning the natural gas production, processing, transportation, sales and export of gas products together with all commercial activities and plannings and performance of projects and services related thereto are governed by the Act.

Article 6 of the Act embodies two almost distinct rulings which are both important and call for the special attention. First, all projected investments must be placed in the budget of the relevant "Operating Unit" (i.e NIOC or NIGC) and then through the Ministry of Petroleum be incorporated in the national budget to be finally approved by the Legislature. Secondly the Act states that "No foreign investment in these operations is permitted in any way."

As mentioned earlier the Act treats both oil and natural gas identically. It was in the implementation of the first requirement of Article 6 of the Act that 12 production projects were identified in the Five- year Plan as well as the National Budget of the year 1374 (1995) and received the necessary approvals. The capital expenditures advanced by contractors in carrying out of these projects shall be paid back out of the income derived from the export of the Oil or gas produced by the said projects. The term "buy-back" (in Farsi "beiae Motagabel" or reciprocal sale) used by the Legislature in its authorization of the said projects is understood to mean the arrangement for the pay-back as mentioned above. A foreign company that is willing to sign a contract for any one of those projects should be prepared to advance money which shall be paid back through a buy-back arrangements as described above.

As for the confusion created out of the very broad definition ascribed to the term "petroleum operations" under the Act, the approach of the authorities in the Ministry of Petroleum, as far as I have understood, is to divide the said operations into two phases. The first phase which includes the

exploration and production activities are to be carried out by NIOC. Once the crude oil or natural gas is produced and sold, the NIOC's responsibility is considered as satisfactorily fulfilled and thereafter it is the duty of the buyer to make it's own arrangements necessary for taking delivery of crude oil or natural gas purchased, and for the transportation of the same to its destination of export. The buy-back arrangements are devised to meet the requirements of the first phase of operations. As to the second phase, the buyer is free to avail himself of privileges afforded by the provisions of the Attraction and Protection of the Foreign Investment Law. This point of view has, to the best of my knowledge, been communicated by NIOC and NIGC to the foreign companies interested in the development of the Iranian Gas export Whatever comment could be made on this matter from the stand point of an independant lawyer there is no doubt in that an interpretation put on petroleum law of Iran by the appropriate authorities entrusted with the execution of the said law shall be binding on the Government and the foreign investors are well advised to rely upon and follow the direction pointed out by the said authorities.

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A BRIEF LOOK AT THE IRANIAN LEGISLATION EFFECTING ITS GAS INDUSTRY



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The organizers of this conference have requested me to present an outline of the Legal Regime governing the exploration, development and production of natural gas in Iran.

When Iran decided to nationalize its oil industry in 1951, there was very little prospect for an expanding gas industry in the world. The producers in the Middle East usually viewed the gas as an unwanted guest produced together with the crude oil to be ridden off by flaring away and burning it up. The time was still needed so that the appropriate technology could be developed for processing and transporting of gas into the world market. As the unique importance of natural gas in a global

energy picture was gradually recognized and also the magnitude of the Iranian huge gas reserves became known, the National Iranian Gas Company (NIGC) was formed as a fully owned subsidiary of National Iranian Oil Company (NIOC) with a duty to develop the necessary requirements of this new industry in Iran. NIGC under its Statutes, which was approved and ratified by the legislature as an Act of Parliament, was permitted to enter into association agreements with the prospective investors under the provisions of The Law Concerning the Attraction and Protection of Foreign Investment.

The differences arising out of the Agreements were allowed to be

submitted to a neutral body of arbitration under the NIGC's Statutes and the investment made was protected under the relevant law as referred to above.

This, briefly said represents the position of Iranian Gas industry prior to the Islamic Revolution of 1979. Following the Revolution the Ministry of Petroleum was founded. The National Iranian Oil Company (NIOC) and National Iranian Gas Company (NIGC) both came under the new Ministry's supervision and control.

The piece of law creating the Ministry endorsed and provided for the continuous application of the existing Statutes of the said two companies. This order has been

TABLE 4
COMPOSITION OF GAS
IMPORTS TO EUROPE
%

	1992	2010
EUROPE		
- RUSSIA	73.0	61.1
- ALGERIA	27.0	25.4
- IRAN TURKEMENISTAN	8.9	
- LIBIA	-	3.3
- OTHERS	-	3.9
TOTAL	100.0	100.0
E.E.C.		
- RUSSIA	61.3	47.3
- ALGERIA	22.6	19.7
- NORWAY	16.1	22.5
- IRAN TURKEMENISTAN	4.9	
- LIBIA	-	2.6
- OTHERS	-	3.0
TOTAL	100.0	100.0

Source: OME

NATURAL GAS -
RESERVES FOUND AND TO BE FOUND

billion cubic meters

AREAS	Proven reserves 1-1-1996	commercialized production 1995	Reserves to be found
World	150,241		155,500
Middle East	45,261	144.9	24,000
Iran	20,963	35.1	10,000
Qatar	7,070	13.6	2,000
Abu Dhabi	5,380	20.5	1,400
Saudi Arabia	5,341	40.3	6,500
West Europe	6,831	241.3	4,600
Norway	3,000	30.4	2,800
Netherlands	1,815	78.4	400
U.K.	700	75.4	500
Italy	305	20.4	230
East Europe	59,190	733.6	50,000
CIS	58,500	704.2	46,000
Romania	407	19.2	210
Africa	10,041	84.4	7,600
Algeria	3,690	58.1	500
Nigeria	3,474	4.5	3,700
Libya	1,313	6.3	480
Source	Cedigas	Cedigas	Colitti-Simeoni

**TABLE 3
GAS BALANCE FOR E.E.C. AND EUROPE**

billion cubic meters

	1991	2000	2010	AV.I.
PRODUCTION:				
- for local consumption	179	173	172	
- for export to other European countries:				
from Denmark	2	4	4	
from Netherlands:				
contracted	40	40	23	
extension	-	-	17	
from UK:				
contracted	-	0.6	0.6	
interconnector	-	10	20	
TOTAL E.E.C. PRODUCTION	221	227.6	236.6	0.4
From Norway	25	62	87	7.2
contracted	25	57	53	
extension	-	-	4	
new contracts	-	5	30	
TOTAL EUROPEAN PRODUCTION	246	289.6	323.6	1.5
IMPORTS				
From Russia:	95	103	185	3.7
contracted	95	84	6	
extensions	-	31	89	
new contracts	-	8	90	
Algeria:	35	68	78	4.4
contracted	35	61	45	
extensions	-	-	18	
new contracts	-	5	15	
Others:				
Qatar	-	2.8	2.8	
Nigeria LNG	-	-	6.5	
Trinidad LNG	-	-	2.4	
Libia	-	-	10	
Iran/Turkmenistan	-	-	19	
TOTAL IMPORTS TO EUROPE	130	171.8	299.7	4.7
TOTAL IMPORTS TO E.E.C.	155	233.8	286.7	5.2
TOTAL EUROPEAN SUPPLY	378	461.4	621.3	2.8

AV.I.: Average Annual Rate of Increase 1992-2010

Source: OME

discussed.

The LPG price for simple thermal use (e.g. steam raising) would normally be aligned with a positive differential for easiness of use with that of other competing fuels, basically low-sulphur fuel oil and heavy gasoil. The price of LPG for the petrochemical industry is instead related to that of Virgin Naphtha, which is in turn related to gasoline. LPG market as a feedstock should therefore bring higher prices, and the volumes are not that small: in 1996 Europe has cracked 53.3 million tons of feedstock, of which 80.4% (43.3 Mtons) Virgin Naphtha; 9.0% LPG (4.8 Mt); 8.4% gasoil (4.5 million

tons), 2.2% ethane (1.2 Mt).

The European petrochemical industry is today trying to improve its competitiveness by substituting new feedstocks for the now predominant Virgin Naphtha, which is in any case getting short; and by interconnecting its plants by a system of pipelines to create a real market for intermediates. This will open opportunities for feedstock producers. If the various European petrochemical plants will eventually be interconnected, those with the cheapest feedstock will sell their ethylene to others; and their feedstock supplier will as a consequence enlarge their market.

LPG and Condensate supply to Europe comes from the North, that is the North Sea; from the South, that is, Northern Africa; from south-east, the Middle East; and potentially, from Russia, which is not a supplier now. These sources will compete with each other, and perhaps some of them will be able to pre-empt the others by establishing within short time some long-term agreement.

It seems that Europe is now offering a double opportunity, that is, a market both for methane and for LPG, the first for combustion and the second for feedstocks for crackers.

TABLE 1 NATURAL GAS IN EUROPE

billion cubic meters

	1992	2000	2010	AV.I.
PRODUCTION:				
- E.E.C.	221	227.6	236.6	0.4
- NORWAY	25	62.0	87.0	7.2
TOTAL EUROPE	246	289.6	323.6	1.5
IMPORTS	130	171.8	299.7	4.7
TOTAL SUPPLY	376	461.4	621.3	2.8
IMPORTS ON SUPPLY				
- EUROPE	34.6	37.2	48.2	-
- E.E.C.	41.2	58.7	62.2	-

AV.I.: Average Annual Rate of Increase 1992-2010

Source: Observatoire Méditerranéen de l'Energie

TABLE 2 COMPARATIVE COSTS OF FLECTRICITY PRODUCTION

In US cents per kWh

Power station		Gas turbine		Combined	Steam	Steam
Fuel		Natural Gas		cycle	twinfuel	threefuel
		/GPL		Natural	Gas/Fuel	Coal/Gas/
				Gas/GPL	Oil	Fuel oil
Investment (US cents per kWh)		0.64		1.35	1.87	2.39
Operating costs- excluding fuel (US cents per kWh)		0.21		0.43	0.61	0.78
Price of fuel at the station						
\$GJ	Natural Gas \$/MTBU	Fuel Oil/GPL \$/TOE	Coal \$/TC E	Total cost of electricity production (US cents/kWh)		
0.5	0.53	21	14	1.4	2.2	3.0
2	2.11	84	56	3.2	3.3	4.4
3	3.17	125	83	4.3	4.0	5.4
4	4.22	167	112	5.5	4.8	6.4
5	5.28	209	140	6.7	5.5	7.4
						8.0

Actualization rate: 10% - Load factor: 75%

Source: Observation Méditerranéen de l'Energie

change: shares of Russia and Algeria will decline while that of Norway will increase; new producers will enter the European market.

At present we are observing the jockeying for position of old and new suppliers, and in particular the strong activity of the North Sea ones. Very recently, the Northernmost big gas producer in Europe has concluded with the Southernmost big importer an important long-term contract, the result of a strong marketing policy of a producer which until now had kept relatively quiet. A flurry of contracts, not yet ended, are being agreed upon for the gas being supplied to Central Europe through the Interconnector, the UK-Belgium pipeline.

This does not mean that Russia has in any way accepted a loss of market. Gazprom- the largest and better run corporation of the whole Russia- has adopted a very aggressive strategy, which seems primarily aimed to keep its market share in Europe, and possibly to enlarge it, by capturing new peripheral markets, for example in South-Eastern Europe.

New producers are also well poised to enter. Nigeria- one of the oldest LNG projects- has an important contract to supply Europe with Liquefied Natural Gas (LNG), which however seems to meet with some difficulties at the receiving end. A potential new suppliers is Libya, which is near Italy, and has a large surplus of Gas.

The bigger new potential suppliers, however, are the Middle East producers, like Qatar and Iran, both with very large reserves. Saudi Arabia could be in a similar position, but up to now it seems to concentrate its interest on liquids rather than on gas.

The tables attached show the numerical basis for this argument. The

one with forecasts up to the years 2010 is of course subject to extreme uncertainty, especially for the last year. To reduce that uncertainty, I have distinguished the existing contracts from their extensions, to show the new contracts expected to be concluded by the various producers interested in the European market.

In the next few years, decisions will have to be taken on how and when to take the Middle East gas into Europe. To that effect, some elements will have to be evaluated, namely:

- there is today in local populations a growing sense of fear related to large LNG projects, and in particular to large rigassification plants to be located near built-up areas;

- costs of LNG train have decrease but not as much as expected, and would-be importers risk to find themselves squeezed between well-head prices and gas prices to the final consumer in Europe;

- the institutional framework of the gas industry in Europe is under strong pressure to change. Such a pressure comes at the institutional level from the EEC, which envisages to apply to Europe some concepts (third party access, "unbundling", price transparency etc.) experimented and generalized in the USA, an area with very different structure of gas production and consumption. At the market level, such a pressure comes from the oil companies with gas reserves in the North Sea, which are muscling in what used to be a State monopoly of transport and distribution;

- new competitive opportunities seem to be opening up, and as a consequence, European delivered prices of gas are being diversified by areas, with consumers of North Sea gas (e.g. UK) taking advantage of a strong decrease mainly due to competition among producers;

- it is possible that the pressures of potential exporters, and the effects of institutional change, will produce a tendency of prices to decline at Europe's border, which would in its turn very probably accelerate the rate of increase of gas demand, and its expansion on thermal energy uses;

- recent political difficulties in South-Eastern Europe have for the moment spread uncertainty over the projects to connect Middle East gas reserves with European markets through that area, which is in any case actively courted by Russia.

As I have just said, it is not easy, and probably not even useful, to foresee the outcome of the interaction of so many factors. What is interesting is to keep in mind the complexity of the situation, and the need for producers, actual and potential, to adopt a clear-cut strategy. As usual, time is not abundant, and the fabulous year 2000 is now just outside the door.

LPG AS A CHEMICAL FEEDSTOCK

Up to now we have dealt with methane, or at least with a gas made up predominantly of methane to be used as fuel. We should not, however, ignore that gas from oil, and even gas, wells, is often a mixture, in which the so-called Liquefied Petroleum Gas (LPG), and the products usually called "Condensate" have a relevant part. LPG and Condensate can be used as a source of heat; in this capacity, LPG are exchanged in large volumes around the world: witness the million tons per year imported by Japan, predominantly from Saudi Arabia, but also from nearer countries. LPG and condensates are also a very good chemical feedstock, an aspect rarely

"The Gas Industry in the 21st Century"

INTERNATIONAL GAS CONFERENCE AND EXHIBITION KISH ISLAND-IRAN

Michael Colliti
Honorary Chairman

NATURAL GAS: A GENERAL OUTLOOK

Natural Gas is an energy source which has not yet expressed all its importance for the world economy; odds are that it will do it in the next ten years.

In that period, demand for gas is going to develop faster than that of crude oil. This is due to a combination of different factors. First of all, gas has a strong environmental advantage, which is pushing gas to increase its share of the thermal uses of hydrocarbons, until liquids will be dedicated to transport and petrochemicals only, leaving gas all thermal uses, large and small. The second large factor in this picture is technical progress. For example in producing electricity, the efficiency of a gas-based combined cycle power plant is much higher than any other comparable technology.

We have to consider that technology does not stop, actually it progresses every day. Methods for transporting gas will certainly improve in the next decade or so, and the production of highly ecological liquid fuels from methane will come of age. Important improvements will also be introduced to the production of methanol, a gas-obtained product

which is bound to become a useful energy vector.

These factors plus the abundance of gas in various areas of the world are going to impress a long-term dynamism to gas production and demand. In the next 25 years gas consumption will very probably double world-wide, which means an average yearly rate of increase of 2.8%.

Gas reserves are abundant. Envisaging, because of what we have just said, a growth of consumption faster than that of crude oil, the present reserves of gas and those which we could be found in next years will last at least as much as those of crude oil, that is, well into the next hundred years.

NATURAL GAS: A LOOK AT EUROPE

Europe is one of the areas of the world where demand of natural gas will increase, taking the share of gas on the energy consumption of the old continent well beyond the present 20-25%. Gas supply is expected to increase up to 2010 at an average rate of 2.8%, which is of course faster than total energy consumption.

Europe's internal production of gas is large but it is not enough to satisfy demand, so that the role of imports is going to increase. If we

consider the geographical Europe, that is, in gas matters, EEC plus Norway, production is going to increase 1.5% per year on average from 1992 to 2010, to reach 289.6 billion cubic meters in the year 2000, and 232.6 bmc in the year 2010. If we take the EEC only, production is actually expected to decline slightly from 1992.

Imports of natural gas to EEC are therefore going to increase at an average rate of 5.2% up to the year 2010, while the geographical Europe will increase its imports by 4.7% only. In 1992, imports accounted for 34.6% of supply for Europe and 41.2% for EEC, and they are going to increase in the year 2010 up to 48.2% for Europe and 62.2% for the EEC.

Today, EEC has three outside suppliers: Russia (61.3% of the total), Algeria (22.6%) and Norway (16.1%), all of them supplying it through pipeline, plus some gas (16.6 bmc in 1995) from Algeria through the LNG train.

The situation is however quite fluid. Europe is now, and will continue to be in the future, an area of competition among the producers-exporters, actual and potential. Forecasts are therefore difficult to make. To my opinion, it is highly probable that the increase of demand will bring a diversification of sources of supply. In the near future the simple structure of today will