transportation routes economicaaly feasible in the long run. This can be considered the most promising policy for the initial development of Caspian reserves.

To summarise, Iran's massive oil and gas reserves, her well-developed energy infrastructure, large domestic markets for energy consumption both by industry and households, her vital geo-strategic position and the well-balanced pattern of crude oil exports to Asia and Western Europe have identified Iran as the key supplier which can contribute significantly towards the diversification and future security of supply to international markets.

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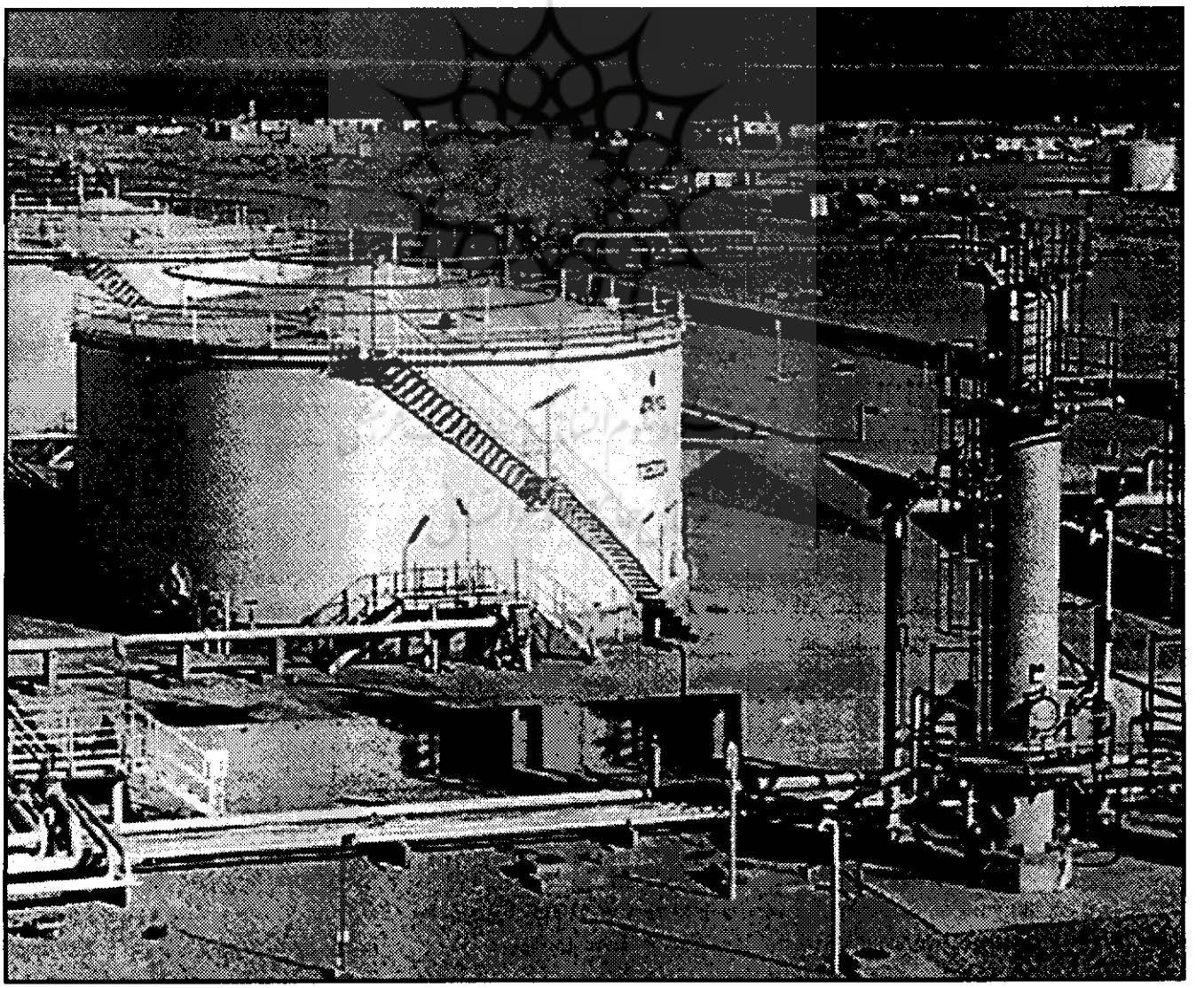

On the other hand, Kuwait's marketing strategy has basically changed in recent years: her exports of crude oil to Western Europe have drastically declined by 66 per cent during the period 1993 to 1997 while her exports to Asia have increased by 24 per cent over the same period. Qatar has essentially exported over 95 per cent of her crude oil to Asia. Similarly, around 92 per cent of the UAE's massive exports of around 2 million barrels per day have been directed to Asia in recent years.

It is also interesting to note the distribution of the Persian Gulf's exports of crude oil to Asia. With the exception of Iran and Saudi Arabia, the other major producers in the Persian Gulf have directed more than half of their oil exports to Japan only. This point is illustrated in Table 11.

Table 11

Distribution of Persian Gulf Crude Oil Exports to Asia (%)

		1993	1994	1995	1996	1997
Iran	Japan	37.3	38.4	37.5	42.0	40.0
	Others	62.7	61.6	62.5	58.0	60.0
Iraq	Japan	--	--	--	100	15.8
	Others	--	--	--	--	84.2
Kuwait	Japan	51.2	50.9	50.1	48.2	58.6
	Others	48.8	49.1	49.9	51.8	41.4
Qatar	Japan	84.0	95.0	92.7	84.9	71.9
	Others	16.0	5.0	7.3	15.1	28.1
Saudi Arabia	Japan	37.3	36.7	35.7	34.8	36.4
	Others	62.7	63.3	64.3	65.2	63.6
UAE	Japan	65.5	70.0	66.4	64.8	65.7
	Others	34.5	30.0	33.6	35.2	34.3

Source: Calculations based on *OPEC Annual Statistical Bulletin*, 1997.

Table 11 does not suggest an optimal distribution of exports of Persian Gulf crude oil to Asia especially from the point of view of those countries which will experience the highest rates of consumption growth in future, i.e. China and India. Assuming that the key crude oil producers in the Persian Gulf maintain their current pattern of Asian exports intact, Iran and Saudi Arabia will be the most promising stabilising producers which can provide security of supply to the fast growing Asian economies.

Concluding Remarks

With:

- **geo-strategic significance of reserves;**
- **outstanding oil and gas resources;**
- **the unique characteristic of being geologically a bridge between the Caspian region and the Persian Gulf;**
- **a long history of balanced supply to Asia and Western Europe;**

Iran can

- ☐ **provide the best solution to the dilemma of transportation of oil and gas from the Caspian region, and hence enhance the supply to the Black Sea and Mediterranean regions;**
- ☐ **make the alternative high cost transportation options economically feasible in due course;**
- ☐ **secure a well-balanced supply to Europe and the Asian fast-growing economies in the foreseeable future.**

Western Europe and Asia will remain energy dependent in the foreseeable future. The Persian Gulf with its massive resources will remain the only viable supplier of crude oil to the dynamic economies of Asia and the matured industrial economies of Europe. Diversification of sources of supply has remained a policy imperative for the major consuming markets. In this regard, the Caspian region has emerged as a promising source of supply.

The geo-strategic significance of Iran, together with her outstanding oil and gas resources, reinforced by a long history of balanced supply to Asia and Western Europe, has singled out Iran as a key producer which is able to secure the future flow of oil to international markets.

Iran is geologically a bridge between the Caspian region and the Persian Gulf. Being the only contry in the Middle East which borders the Persian Gulf in the south and the Caspian Sea in the north, Iran can provide the best solution to the dilemma of transportation of energy from Central Asia to the growing energy markets in Asia, and hence enhancing the supply to the Black Sea and Mediterranean regions. The low cost of transportation routes through Iran and the feasibility of swap arrangements with Iran can make the more expensive alternative

pipeline networks. This is the most promising option by which the likelihood of exporting Caspian oil and gas to Asia and the Mediterranean and Black Sea regions will considerably increase.

It should be mentioned, however, that the outcome of the influx of Caspian crude oil into the Mediterranean is of considrable importance. Caspian oil should be able to compete efficiently with the local crude oil producers, such as Libya, Egypt and Algeria, as well as with the crude oil from Russia through the Black Sea, from the Middle East via the Sumed pipeline and the Suez Canal, and from Iraq via the pipeline to Ceyhan, ofcourse under normal political circumstances.

The problem of surplus refining capacity in the Mediterranean will add a new dimension to the problems associated with additional crude oil imported from the Caspian region. Similarly, the emergence of Caspian Sea crude oil in the Black Sea will certainly have serious impacts on refining surplus capacities especially in Ukraine, Romania and Bulgaria, and may increase the flow of finished products to the Mediterranean hinterland due to the policy of minimising shipment of crude oil through the Bosphorus.

The development of the Caspian resources through an optimum mix of outflow of oil and gas, which can only become feasible with full utilisation of the Iranian link, can also contribute significantly towards securing the supply sources to the Asian market. To give an example, recall that the successful development of Caspian resources by means of the swap deals with Iran will be conducive towards investment in the construction of long-distance pipelines to Asia. This will, in turn, enhance the security of supply to Asia and particularly to China, and in addition, will critically increase the likelihood of development of China's own reserves especially in the Tarim region, which implies a contribution to further diversification of supply sources.

The Significance of Iranian Oil in Persian Gulf Exports for Balancing the Future Supply to Asia and Europe

- **The balanced marketing strategy of Iranian crude oil together with her massive reserves has secured a steady flow of crude oil to Western Europe and Asia, which is unparalledled in the Persian Gulf.**
- **Only Iran and Saudi Arabia have balanced export strategies to Asia. More than half the exports of other key producers in the Persian Gulf are directed to Japan.**

The massive Iranian proven reserves of crude oil coupled with her stable marketing strategy has identified Iran as one of the key suppliers in the Persian Gulf with a historically balanced supply to Asia and Europe. This is an important characteristic which the main consuming markets in Asia, especially China and India, should seriously take into account when planning for the security of their long-term imports. The following table shows the Asian and European shares in the Persian Gulf's key producers' export of crude oil.

The above table indicates that the balanced marketing strategy of Iranian crude oil has secured a steady flow of crude oil to Western Europe and Asia. In fact, Western Europe and Asia have each received around 40 per cent of Iran's total exports of crude oil in recent years. Although Saudi Arabia's exports of crude oil to Western Europe and Asia have shown a steady trend in recent years, their shares of the total exports have been distributed around an average of 26 per cent to Western Europe and 45 per cent to Asia.

Table 10

Distribution of Persian Gulf Crude Oil Exports to Western Europe and Asia (%)

		1993	1994	1995	1996	1997
Iran	W. Europe	51.5	43.9	47.6	43.5	41.1
	Asia	37.8	43.4	38.6	38.8	41.9
Iraq	W. Europe	–	–	–	12.5	48.4
	Asia	–	–	–	3.7	12.9
Kuwait	W. Europe	31.6	21.6	13.2	16.6	13.6
	Asia	38.3	45.7	59.5	58.8	60.3
Qatar	W. Europe	–	–	0.004	0.004	–
	Asia	97.0	94.8	95.6	94.0	97.4
Saudi Arabia	W. Europe	27.3	26.4	26.1	23.7	26.1
	Asia	42.9	42.1	43.8	46.1	47.7
UAE	W. Europe	0.04	0.03	–	–	–
	Asia	83.9	89.5	95.0	94.8	94.7

Source: Calculation based on *OPEC Annual Statistical Bulletin*, 1997.

1997 with the aim of increasing the volume of exports to 120,000 b/d through this arrangement.

Turkmenistan has followed suit in supplying crude oil to the Iranian refineries in the north. Monument Oil and Gas of UK and Dragon Oil of Ireland signed long-term swap agreements with NIOC last year and delivered their first cargoes of Caspian crude oil under swap deals in late July and early August. Monument is ecpected to increase its delivery of crude oil to a potential 70,000 b/d in the 2000-2008 period while Dragon will increase its delivery to some 32,000 b/d in 2005. The crude oil is delivered to Neka in the north of Iran from where it is transported through an existing pipeline to the Tehran and Tabriz refineries. These companies will lift an equivalent volume of Iranian light crude from NIOC's Kharg island export terminal in the Persian Gulf. Taking into account the freight costs from Turkmenistan to Neka, the total cost of the swap arrangement is far lower than the other options for taking Turkmen oil to international markets. The existing Neka-Tehran pipeline can only transport up to 40,000 b/d. However, a new 32-inch, 392 km pipeline from Neka to Rey terminal in the south of Tehran tendered by NIOC in June last year at an estimated $280 million, can transport some 320,000 b/d of Caspian crude oil to the Tehran and Tabriz refineries.

The same argument holds for the export of natural gas from the Caspian region. The fact that Iran's gas reserves are mainly in the south and in the Persian Gulf (onshore and offshore), far from the northern population centres makes investment in gas pipeline projects in the Caspian region in the north attractive and significant. A 190 km gas pipeline from western Turkmenistan to Kurd-Kuy in the north of Iran near the Caspian Sea, was completed in just over a year and inaugurated in December 1997. Iran financed $150 million of the total cost of $190 million. The initial estimate for gas imports was 2 billion cubic meters per year (bcm/y) in late 1998, which has now doubled, and will further increase to 8 bcm/y by the end of 1999. Turkey has agredd to buy 8 bcm/y from Turkmenistan by the year 2000, which can be accomplished if Turkmen's exports to Iran are swapped for Iranian supplies to Turkey. Iran has agreed to export 10 bdm/y gas to Turkey by the year 2005 via another pipeline.

The gas export pipeline to Turkey involves construction of a 250 km pipeline from Tabriz to the Turkish border town of Teba. Iran's 1,100 km IGAT-1 pipeline together with the IGAT-2 pipeline will be used to flow gas to Tabriz mainly from the fields in the Kangan and Ahwaz areas. The gas obtained from phase I of South Pars, being developed by PetroPars, will also be used. The IGAT-1 pipeline was constructed to transport 318 bcf/y (9 bcm/y) to the former Soviet Union's Trans-Caucasus region - that is Azerbaijan, Armenia and Georgia- and was functional from 1970 to 1979 when the Iranian government asked for an adjustment in the price of its exported gas. However, resuming gas exports to Armenia and increasing the volumes of exported gas to Azerbaijan are under consideration.

The rapid growth in oil and gas consumption in Iran especially in the populated northern provinces makes the oil swap arrangements and the construction of gas pipelines a matter of great mutual benefit to both the Caspian States and Iran. Iran's population is now estimated at around 65 million. About 55 per cent of the population are under the age of 20. The rapid rate of urbanisation resulting from such a young population has brought greater pressure on government not only to create employment opportunities but also to accommodate the residential and commercial demand for enrgy, especially that of the urban transportation sector. On the basis of a conservative rate of annual growth in consumption of 4 per cent, the estimated future levels of consumption are given in Table 9.

Table 9 shows that the Caspian region can make a significant contribution to meeting the growing levels of Iranian domestic demand for crude oil.

To summarise this section, let us note that an effective Iranian oil and gas link will enable the Caspian region to successfully carry out further pipeline construction by cost optimisation of the

Table 9 Domestic Consumption mb/bd

2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
1.574	1.637	1.703	1.771	1.842	1.915	1.992	2.072	2.155	2.241	2.331

● **Iran's gas reserves are mainly in the south and in the Persian Gulf, far from the northern population centres. This makes investment in gas pipeline projects in the north attractive.**

□ **Using Iranian export terminals in the Persian Gulf, an equivalent volume of imported oil can be swapped out.**

□ **Without full-scale swap arrangements with Iran, it is unlikely that Caspian oil can penetrate the Mediterranean market.**

Table 8 Caspian Oil Exports Million b/d

	2000	2005	2010
High Case Scenario	0.671	1.14	2.36
Low Case Scenario	0.580	0.886	1.52

Source: IEA, *Caspian Oil and Gas*, 1998.

□ **The Persian Gulf's upward shift in production when Caspian "late oil" appears on the market**

transport will present a major challenge to the future development of Caspian oil.

Regarding the huge Caspian gas reserves, there are reasons to believe that the rapid development of these reserves for export is not likely to happen in the foreseeable future especially under the structurally weak price of crude oil. In fact, European and Asian gas markets are the only two major markets for Caspian gas exports. Exporting to the European gas market in particular is a real challenge since it involves competing with established and experienced suppliers. On the other hand, a successful policy of gas exports to Asia depends critically on the cost-effectiveness of pipeline construction. In this regard, the complex politics of Central Asia and the Caucasus regions can be real constraints in Caspian gas pipeline construction. The existing uncertainties concerning the potential consuming markets for Caspian gas are a key barrier to gas pipeline construction in this region.

Nevertheless, given the difficulty of penetrating the European gas market, the Central and Eastern European countries may appear a target for Caspian gas. However, competing with Gasprom on price in this region seems a tough battle. ironically, Russia constitutes one of the best markets for Caspian gas.

Let us summarise the above points by mentioning that expensive and often economically unfounded long-distance pipeline construction coupled with very high transit fees on pipeline routes and relatively high production costs have made Caspian oil rather costly. Caspian oil, has, therefore become quite vulnerable to any serious upward shifts in westbound and eastbound oil exports from the Persian Gulf. The desire of international oil companies to invest in the Persian Gulf, where low-cost reserves are available to them, has exacerbated the fragility of Caspian oil exports in the long run.

Formulating energy policies on political considrations and supporting the suboptimal long-distance pipeline routes, which are justifiable only on diplomatic grounds, will seriously endanger the future prospects of Caspian oil and gas development. In fact, this region should compete in a highly competitive and transparent international market where the Persian Gulf, with its massive and cheap oil and gas reserves has traditionally been a strong supplier.

The Regional Significance of Iran in Facilitating Caspian Development

□ **Iran can be the major importer of the Caspian oil and gas output**

● **Iran's population centres are mainly in the northern part, which is close to the Caspian region.**

● **The total capacity of Iranian refineries in the north is over 800000 barrels a day.**

● **The young and growing population guarantees stable and growing demand for Azeri, Kazakh and Turkemen oil.**

Diversification of transportation routes for the Caspian resources has been a policy imperative for both the Caspian states and international oil companies. However, the cost optimisation of the transportation routes is the key factor in successful development of these resources. The point is that the low cost of the Iranian route will make it economically feasible at macro level to consider the relatively more expensive routes through Turkey and Russia in penetrating the Mediterranean and East European markets.

The Iranian population centres are found mainly in the northern part of Iran and are close to the Caspian region. This unique economic and geographical feature has made the swap deals the key policy instrument to promote Caspian exports. iran can import considerable volumes of crude oil from Caspian producers for use in the northern Iranian provinces while by utilising Iranian export terminals in the Persian Gulf an equivalent volume of crude oil can be swapped out.

It is intersting to note that the total capacity of Iranian refineries in Tehran, Tabriz, Isfahan and Arak is over 800000 barrels a day. With very little investment, these refineries can accommodate up to 400,000 b/d of Caspian oil (Azeri, Kazakh and Turkmen oil) which can increase to over 800,000 b/d with some additional investment. Using Iranian export terminals in the south, an equivalent volume of crude oil can be swapped out. Kazakhstan was the first Caspian State to sign a swap contract with Iran in early

cannot compete with the Persian Gulf

As explained earlier, diversification of sources of supply has been a policy of critical importance for the major international consuming markets. The development of Caspian oil and gas resources will be a significant effort towards the realisation of this prime objectve. However, the development of these resources depends entirely on an optimal solution to the challenging problem of transportation routes, in which Iranian oil and gas can play a key role.

The fundamental fact is that any sub-optimal solution to pipeline export routes for Caspian oil and gas will prove to have serious side effects on the development and production of oil and gas in this region. Being a supplier at the margin, Caspian oil as a medium to long-term competitor in international markets, can survive if and only if its production and distribution of oil and gas become cost-effective.

It should be noted, however, that those external forces operating in the Caspian region which play the enrgy game on political grounds are likely to disturb the optimum pattern of pipeline networks in the region. By subordinating economic fundamentals, pattern of pipeline networks in the region. By subordinating economic fundamentals, these politically motivated games will substantially constrain the oil revenues of the Caspian states. In addition, a secured flow of oil exports from the Caspian region will be at risk as a result of the decline in its competitiveness in international markets and particularly in the Mediterranean and Asian regions. The geo-strategic significance of Iranian reserves can effectively contribute towards the development of the Caspian resources.

With about 2 per cent of the world total reserves of oil, the Caspian oil reserves do not constitute a major potential supplier of crude oil like the Persian Gulf-5. Moreover, compared with the low-cost Middle East reserves, the cost of development, operation and pipeline constructions is high in the Caspian region. This together with the transit fees for the current and proposed pipeline routes will make Caspian oil less competitive from the cost-effectiveness point of view.

On the other hand, from a global perspective, Caspian oil production is at the margin and will stay marginal in the foreseeable future. According to IEA "high" and "low" case scenario projections, the annual oil production in the Caspian states of Azerbaijan, Kazakhstan and Turkmenistan, plus Uzbekistan, will be 3.9 million barrels per day and 2.8 mb/d by the year 2010, equivalent to 4.1 per cent and 2.9 per cent of the total world production, respectively. the high case scenario is based on the assumption that the proposed investment programmes materialise and sufficient export outlets are developed.

unconstrained Iraq can produce additional oil during a period of about 3 to 4 years, which will be equivalent to the incremental oil that the whole Caspian region can produce in 10 years' time.

The vulnerability of the Caspian supply with respect to an incremental supply of cheap Persian Gulf oil is of vital practical importance for the Caspian states. This problem will become more serious when the heavy foreign investment in exploration and development in the Persian Gulf yields a considerable upward shift in oil production at a time when the Caspian "late oil" appears on the market.

Caspian oil exports will remain marginal in the future even when production and exports reach their peak. Again, according to the IEA's "high" and "low" case scenario projections, annual oil exports from the region will reach 2.36 mb/d and 1/52 mb/d in the year 2010, respectively.

According to the "high" case scenario, the Caspian states can increase their exports by 1.69 million barrels daily after about 10 years (2000-2010). This is

Table 7 Caspian Oil Production Million b/d

	2000	2005	2010
High Case	1.6	2.47	3.9
% of the World Total	2 %	2.8 %	4.1 %
Low Case	1.4	1.95	2.8
% of the World Total	1.7 %	2.2 %	2.9 %

Source: Calculation based on IEA, *Caspian Oil and Gas*, 1998.

The rate of growth of Caspian production is very low, that is, an incremental output of 2.3 mb/d over a period of 10 years according to the "high" case scenario, and only 1.4 mb/d over 10 years, in accordance with the "low" case scenario. This makes the flow of Caspian oil production extremely vulnerable to the growth of oil supplies from the Middle East. For instance, an quite negligible compared to what a single major exporter in the Persian Gulf can achieve by increasing its export levels. For instance, the Kuwait Oil Company is aiming to boost its oil exports, in the same period, to a level higher than that which has been optimistically planned by the whole Caspian region. In fact, cheap Persian Gulf oil and its direct access to sea

decline in the UAE's exports to this market as well as the very low profile of Iraq's exports.

The above analysis implies the stabilising character of the Iranian Westbound and Eastbound flow of crude oil. This crucial role will become more pronounced in the next decade when China and India enter economic maturity and accelerate along the welfare economy to attain higher standards of living. The same argument holds for Iran's key role in supplying crude oil to Western Europe. With regard to the fact that Europe's total oil reserves are only 20 billion barrels, Iran, with over 90 billion barrels of proven crude oil, is a prime source of future supply to Europe.

The above argument holds equally for the historical trend in Iran's gas production. Possessing the second largest gas reserves in the world, Iran was the major gas producer in the Middle East as well as among OPEC member countries before the Islamic Revolution in 1979. In 1971, Iran produced over 14 billion cubic meters of marketed natural gas, which then reached 20.6 billion cubic meters in 1974, far above the Libyan production of 4 billion cubic meters as the second largest producer of natural gas in the Middle East at the time. However, as a resuld of wide-scale strikes prior to the Islamic Revolution of 1979, production declined to 7.1 billion cubic meters in 1980. Due to a sharp decrease in exports to the Former Soviet Union, production declined further to almost 6 billion cubic meters in 1981. Nevertheless, increasing domestic consumption of natural gas encouraged an upward trend in production, reaching 50 billion cubic meters in 1998. Table 5 illustrates the historical trend in Iranian production of natural gas.

The sharp variations in the historical trend of gas production together with the profound under-utilisation of gas resources signify the critical role of external disturbances to the Iranian gas industry. Iran's massive reserves of natural gas coupled with the past experience of being the major gas producer in the Middle East clearly shows the outstanding potential for an upward trend in Iran's gas production. Ironically, Iran, being the number one producer of natural gas in the Middle East, is currently importing gas from Turkmenistan for domestic use.

Table 5 Marketed Natural Gas Production **Billion cubic meters**

1971	1975	1979	1980	1981	1985	1990	1995	1997	1998
14.2	20.2	17.9	7.1	5.9	14.6	24.2	38.0	47.0	50.0

Source: *OPEC Annual Statistical Bulletin, 1997*, and *BP Amoco Statistical Review of World Energy*, June 1999.

The current share of production and consumption of natural gas in the persian Gulf and the Caspian region is illustrated in Table 6, which indicates the importance of the development of the Iranian gas industry for further diversification of sources of future supply.

Table 6 shows that Iran's natural gas reserves are the most under-developed resources in the Persian Gulf and the Caspian region.

The Regional Geo-strategic Importance of Iranian Reserves for the Caspian Region

- ☐ **The Caspian contribution towards diversification and stability of global supply depends entirely on the optimal solution to the problem of transportation routes in which Iran can play the key role.**
- ☐ **The vulnerability of Caspian oil and gas development:**
- ● **The energy game in the Caspian region is being played on political grounds**
- ● **With marginal reserves, production and exports, the Caspian region**

Table 6 Natural Gas

	Proven Reserves (% of World Total)	Production (% of World Total)	Consumption (% of World Total)
Iran	15.7	2.2	2.3
Iraq	2.1	n.a	n.a
Kuwait	1.0	0.4	0.4
Oman	0.5	0.2	n.a
Qatar	5.8	0.9	n.a
Saudi Arabia	4.0	2.0	2.1
UAE	0.3	1.6	1.3
Azerbijian	0.6	0.2	0.2
Kazakhstan	1.3	0.3	0.3
Turkmenistan	1.9	0.5	0.4
Uzbekstan	1.3	2.3	2.1

Source: *BP Amoco Statistical Review of World Energy*, June 1999.

and the Caspian region confirms Iran's potential to deliver an adequate supply of oil and gas to international markets. As the first producer of crude oil in the Middle East, Iranian production of crude oil dates back to 86 years ago when Iran produced only 5 thousand barrels per day. The historical trend in Iranian oil production has shown three turning points following three major events, i.e. the nationalisation of the oil industry in 1951, the Islamic Revolution in 1979 and the eight years of war between Iraq and Iran, which erupted in 1982.

The peak of crude oil production in Iranina oil history was reached in 1974 when about 6 million barrels of oil were produced. Despite additions to the proven reserves of crude oil, the actual production of crude oil in Iran shows a downward trend, which, in recent years, has stabilised around an average of 3.5 billion barrels a day. As explained above, this has been mainly due to political factors affecting the performance of the Iranian oil industry. However, this is a clear indication of the fact that the Iranina oil reserves are considerably under-utilised. The following table demonstrates the historical trend in Iranian oil production.

Table 3. Crude Oil Production Thousand barrels a day

1913	1950	1952	1965	1974	1979	1980	1986	1990	1998
5	664	27	1,908	6,021	3,167	1,816	2,037	3,134	3,616

Source: *OPEC Annual Statistical Bulletin*, and *MEES*.

In order to examine the relative importance of the Iranian oil industry in the Persian Gulf and the Caspian region, it is useful to consider the current shares of production and consumption in these regions. Table 4 provides the relevant information.

As table 4 shows, Iran is the second largest producer and consumer of crude oil in the Persian Gulf and the Caspian region after Saudi Arabia. However, as will be discussed later, a population of around 65 million, a well-developed industrial base, and populated cities in the north make Iran an attractive market for consumption of the Caspian region's crude oil. This can be regarded as one of the key factor for the initial development of the Caspian resources.

Iran's exports of crude oil were reported at 2,600 million barrels per day in 1998. This implies that Iran supplied over 8.16 per cent of the total global exports of crude oil, which was reported at around 31.82 million barrels daily in 1998. Iranian exports of crude oil in 1998 were equivalent to 59 per cent of Japan's total imports crude oil or 31 per cent of the total import of crude oil by Western Europe in the same year. Iran's exports of crude oil played even a more significant role in the past. About 25 years ago, with an average of 5.3 million barrels daily of crude oil exports, Iran accounted for over 19 per cent of OPEC's total exports and 17.2 per cent of the total global export of crude oil.

Table 4. Crude Oil, 1998 (%)

	Proven Reserves (% of World Total)	Production (% of World Total)	Consumption (% of World Total)
I. R.Iran	8.5	5.3	1.7
Iraq	10.7	3.0	n.a.
Kuwait	9.2	3.1	0.2
Oman	0.5	1.3	<0.05
Qatar	0.4	1.0	<0.05
Saudi Arabia	24.8	12.1	1.8
UAE	9.3	3.4	0.5
Azerbaijan	0.7	0.3	0.2
Kazakhstan	0.8	0.7	0.4
Turkmenistan	<0.05	0.2	0.1
Uzbekistan	0.1	0.2	0.2

Source: *BP Amoco Statistical Review of World Energy*, June 1999.

The preceding discussion clearly shows the importance of the proven reserves as well as the production and exports of the Persian Gulf-5, i.e. Iran, Iraq, Kuwait, Saudi Arabia and the UAE. The percentage of Iranian oil in the total exports from the Persian Gulf signifies the critical role which Iran can play in the security of the future supply of oil to developed and developing countries.

Iran's current share in the Persian Gulf-5 exports of crude oil to Asia and aminly to the Far East is around the significant level of 16 per cent, which shows a substantial decline from 47 per cent in 1970. Similarly, the current share of Iran in the Persian Gulf-5 exports of crude oil to Western Europe is about 40 per cent, which has increased from 35 per cent in 1990. However, this increase has been mainly due to the sharp

The Regional Significance of Iranian Oil and Gas Reserves

According to the BP Amoco Statistical Review of World Energy, the Iranian proven reserves of crude oil are estimated at around 90 billion barrels by the end of 1998, which is equivalent to 8.5 per cent of the world total proven reserves of crude oil. In other words, Iran's proven reserves of crude oil are equivalent to the combined proven reserves of crude oil in the United States of America, the Russian Federation and Norway. Despite the fact that the Persian Gulf region has the largest proven reserves of crude oil in the world, Iran's proven reserves in the Persian Gulf and the Caspian region are estimated at an outstanding level of 13.2 per cent. The following table gives the estimated proven reserves of crude oil in these areas.

Table 1. Proven Reserves of Crude Oil at the End of 1998

	Billion Barrels	% of World Total	R/P Ratio
I. R. Iran	90	8.5%	65.3
Iraq	112.5	10.7%	>100
Kuwait	96.5	9.2%	>100
Oman	5.3	0.5%	16
Qatar	3.7	0.4%	13.3
Saudi Arabia	261.5	24.8%	80.7
UAE	97.8	9.3%	>100
Azerbaijan	7.0	0.7%	84.1
Kazakhstan	8.0	0.8%	42.3
Turkmenistan	0.5	-	13.6
Uzbekistan	0.6	0.1%	10.0

Source: *BP Amoco Statistical Review of World Energy*, June 1999.

- ☐ **8.5 per cent of the world total proven reserves of crude oil**
- ☐ **Equivalent to the combined reserves of the United States of America, Russian Federation and Norway**
- ☐ **13.2 per cent of the total proven oil reserves in the Persian Gulf and Caspian region**

Let us now review briefly the Iranian gas reserves and their regional importance. With over 812 trillion cubic feet of proven natural gas reserves, equivalent to around 16 per cent of the world total proven reserves, Iran's reserves are the second largest in the world after the Russian Federation. Despite the massive reserves of natural gas in the Persian Gulf and the Caspian region, Iran's proven reserves of natural gas are estimated at 41 per cent of the total combined reserves in Persian Gulf and Caspian region. In other words, the Iranian proven gas reserves are greater than the combined reserves of natural gas in the United States of America, the whole of Central and South America, the whole of Europe and Saudi Arabia. Table 2 provides more information about the significance of Iranian proven gas reserves in the Persian Gulf and the Caspian region.

Table 2. Proven Gas Reserves at the End of 1998

	Trillion Cubic Feet	% of World Total	R/P Ratio
I. R. Iran	812.3	15.7%	>100
Iraq	109.8	2.1%	>100
Kuwait	52.7	1.0%	>100
Oman	28.4	0.5%	>100
Qatar	300.0	5.8%	>100
Saudi Arabia	204.5	4.0%	>100
UAE	212.0	4.1%	>100
Azerbaijan	30.0	1.3%	>100
Kazakhstan	65.0	1.3%	>100
Turkmenistan	101.0	1.9%	>100
Uzbekistan	66.2	1.3%	34.7

Source: *BP Amoco Statistical Review of World Energy*, June 1999.

- ☐ **16 per cent of the world total proven gas reserves**
- ☐ **Second largest reserves in the world**
- ☐ **41 per cent of the proven gas reserves in the Persian Gulf and Caspian region**
- ☐ **Greater than the combined proven gas reserves of the United States of America, whole of Central and South America, and the whole of Europe and Saudi Arabia.**

The Regional Significance of Iranian Production, Consumption and Exports of Crude Oil and Natural Gas

The outstanding significance of Iranian oil and gas in the Persian Gulf

Regional Significance of Iranian Oil and Gas in Diversification and Stability of Supply

Dr Masoud Derakhshan, Senior Economist

2nd Annual Event
The Iranian Petroleum Summit

Introduction

There are reasons to believe that the problem of securing an adequate future supply of crude oil is a practical concern both for producing and consuming nations. The following are a few examples: the current structurally volatile price of crude oil, the inability of non-OPEC to maintain its incremental growth in supply to meet the future upward trend in demand particularly in Asia, and the uncertainty in the expected return on investment in exploration and development in geologically high cost regions. This paper attempts to explain that the geo-strategy can play a significant role in the diversification of supply sources towards securing the future supply to international oil and gas markets. The regions which are studied in this paper are the Persian Gulf in the south and the Caspian basin in the north.

Section 2 provides the analytical framework by examining the Iranian supply potential as compared with the key producers in the region. A brief review of Iranian production and export of crude oil and natural gas and their historical shares in regional production and export are the subject matter of Section 3. Despite the Persian Gulfs massive reserves and their geologically low cost of development, the diversification of supply sources has been one of the main concerns of the international oil market. In this regard, the Caspian region offers one of the most promising recent additions to oil and gas supplies.

Section 4 is concerned with the regional geo-strategic importance of Iranian reserves. Being a land-bridge for transporting Caspian oil and gas to world markets, Iran is the only country in the Middle East which has direct access to the energy-rich regions of the Persian Gulf and the Caspian Sea. By brief reference to the production and export outlook for Caspian oil, it is shown that without full utilisation of the Iranian geo-strategic position, the Caspian resources cannot successfully compete with the Persian Gulf suppliers.

Section 5 deals with the regional significance of Iran in facilitating Caspian oil and gas development. It is argued in this section that the Iranian link will make it possible for the Caspian producers to optimise the cost of their pipeline network by utilising the cheap Iranian route to compensate for the alternative higher cost options. Credit should be given to the geo-strategy of Iranian export outlets in the Persian Gulf which makes swap deals possible. This is again a signifier of Iranian importance in diversifying the sources of supply to the Mediterranean as well as to the Asian consuming markets.

In Section 6, the significance of Iranian oil in Persian Gulf exports in balancing the future supply to Asia and Europe is briefly examined; and finally Section 7 offers some concluding remarks.