

7. Concluding Remarks

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 oil exports from the Middle East in general and from the Persian Gulf in particular. The heavy foreign investment projects in the Persian Gulf together with the desire of international oil companies to invest in the Persian Gulf, where low-cost reserves are available to them, have exacerbated the fragility of Caspian in the long run.

It is usually argued that Caspian oil reserves are similar to the reserves of the North Sea as a point of comparison. It follows from this argument that Caspian region, as a marginal supplier, carries the same degree of importance as North Sea oil in the global security of supply and in reducing the over-dependency on Middle East oil. It should be noted, however, that the

survival of the North Sea as a significant marginal supplier, as mentioned earlier, has been dependant upon production efficiency and on the cost-effectiveness of the development of reserves. With the existence of heavy transit fees, and with the sub-optimal long-distance pipeline routes, which are justifiable only on diplomatic grounds, Caspian oil cannot be regarded as another North Sea marginal producer.

Formulating energy on political consideration will seriously endanger the future prospects of Caspian oil and gas development. In fact, Caspian oil and gas 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 strong supplier.

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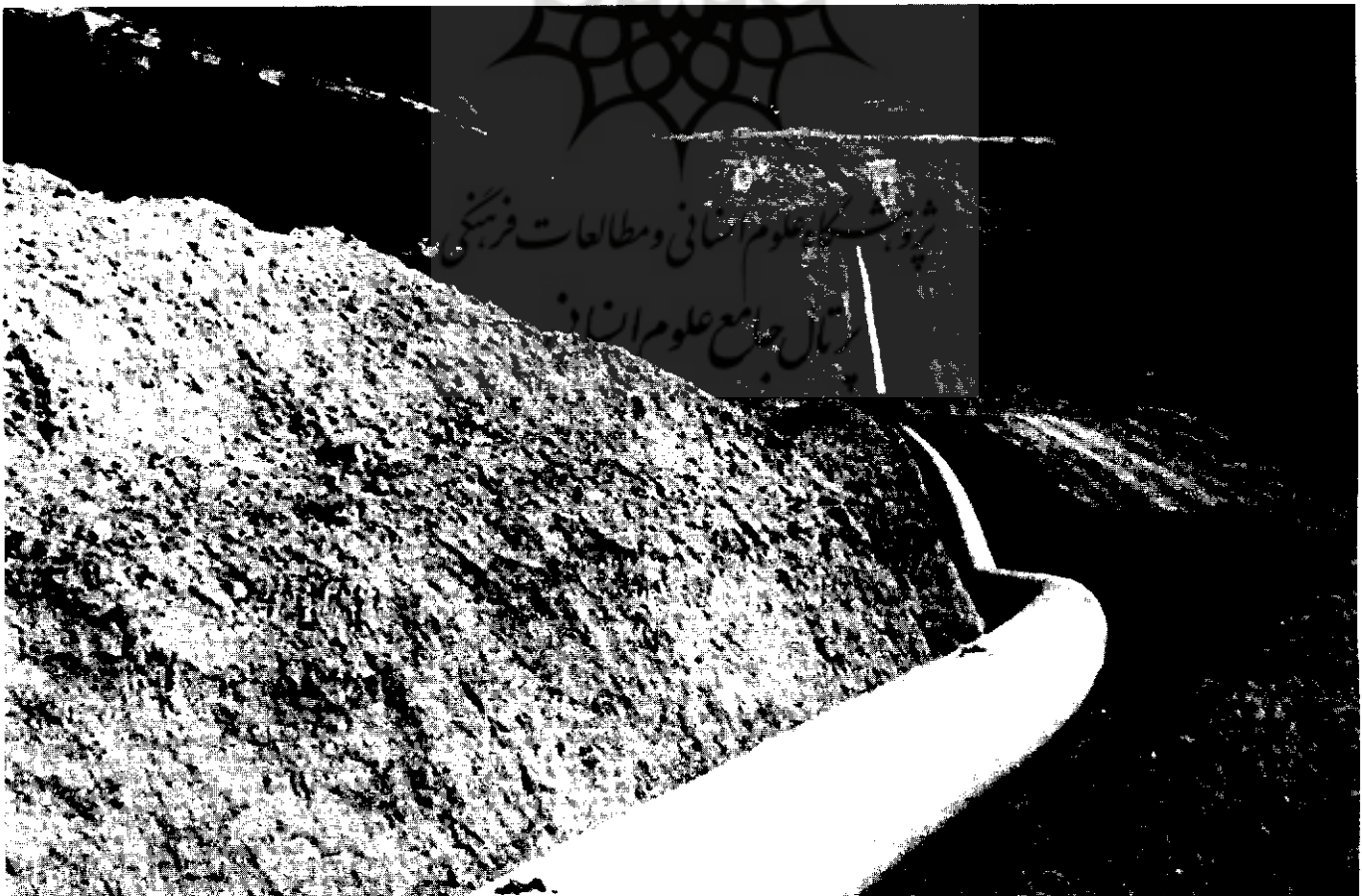
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Footnotes

* The author wishes to express his gratitude to Dr. Abbas Maleki, Mr. Gholam Hossein Hassantash and Dr Davoud Manzour for their comments on a version of this paper.

Source: IEA. International Energy Agency, Caspian Oil and Gas 1998. Data supplied by IEA are based on information provided by governments in the region, petroconsultants and the US government.

BP: British Petroleum Statistical Review of World Energy, June 1998. Data supplied by BP are based on information provided by the oil and Gas Journal.





Europe.

1. On the basis of commercial risks and rewards as well as the political risks concerning pipeline construction, it seems that a rapid development of the huge Caspian gas reserves for export is not likely to happen in the foreseeable future. The supporting arguments are as follows:

- The Europeans and Asia 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.
- Compared to the available and comparatively smaller-size Caspian oil projects, the major gas projects in the Caspian region have a higher commercial risk.
- The interest of the major international financial institutions in financing gas pipeline projects is not as strong as project financing for oil pipelines.
- The complex politics of central Asia and the Caucasus region can be real constraints in Caspian gas pipeline construction. In contrast to an oil export pipeline which carries oil to a terminal from where the rest of the world can be reached,

the success of a gas project pipeline depends on the existence of an effective demand at the other end of the pipeline. The existing uncertainties concerning potential consuming markets for Caspian gas are a key barrier to gas pipeline construction in this region.

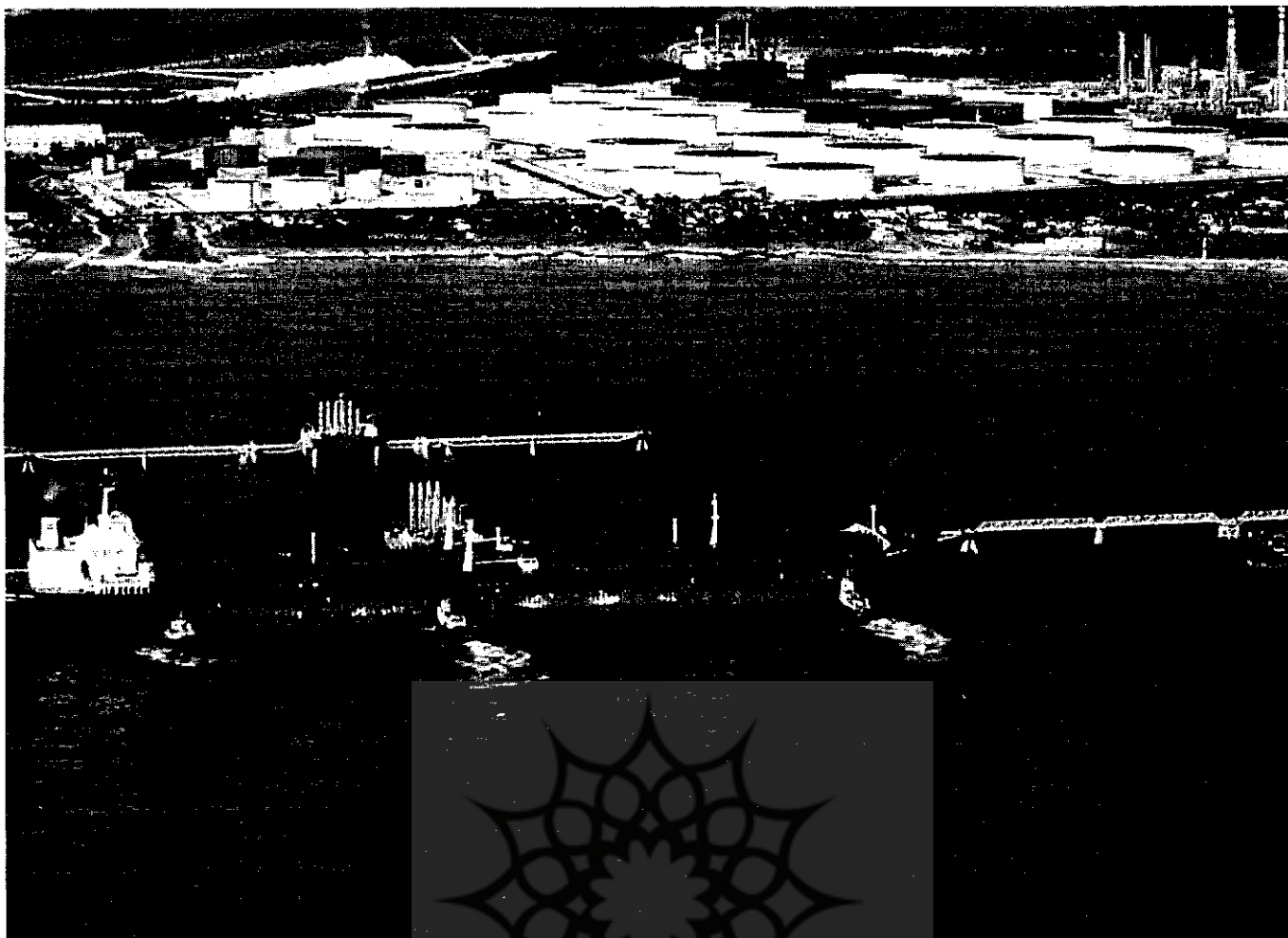
The Caspian region's proven oil reserves constitute only 1.7 percent of total world proven reserves. The similar figure for gas is about 5.2%.

- 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.
- According to IEA, the costs of supplying Turkmen gas to Western

Europe would range from \$127 per 1000 cubic meters via Iran and Turkey to \$152 per 1000 cubic meters via Russia and Ukraine, while Algeria can supply at \$64 per 1000 cubic meters and Russia at \$113 to \$131 per 1000 cubic meters.

2. On the other hand, there are reasons for supporting Caspian gas development for export. Some of the supporting points are as follows:

- Developed countries with higher rates of dependency on gas consumption may regard Caspian gas a potential source of import diversification.
- The recent interest of Turkmenistan and Uzbekistan in attracting foreign investment in gas exploration and development may change the perceptions of foreign investors towards Caspian gas resources.
- Turkmenistan has the potential of becoming a producer and exporter of gas-based petrochemicals and electricity. This may attract the interest of foreign investors on a large scale.
- Exporting both Turkmen and Uzbek gas to Europe, China and Japan is economically feasible albeit in the long-term.



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 the time when the Caspian "late oil" appears on the market.

iv) Marginal Exports

Caspian oil exports will remain marginal in the future even when production and exports reach their peak. According to the IEA's "high" case scenario projections, annual oil exports from the Caspian states of Azerbaijan, Kazakhstan and Turkmenistan, plus Uzbekistan, are 0.671 mb/d by 2000, 1.14 mb/d by 2005 and 2.36 mb/d by 2010. The "low" case

Unfortunately, the general expectation is that oil and gas export revenues can, in principle, solve most of the domestic economic and social bottlenecks.

scenario projections for annual oil exports are as follows: 0.580 mb/d by 2000, 0.886 mb/d by 2005 and 1.52 mb/d in 2010. Table 5 summarizes these data.

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 quite negligible compared to what a single major exporter in the Persian Gulf can achieve by increasing her export levels. For instance, the Kuwait oil company is aiming to

boost its oil exports, in the same period, to a level higher than the whole Caspian region has optimistically planned to increase hers. In fact, cheap Persian Gulf oil and its direct access to sea transport will present a major challenge to the future development of Caspian oil.

6. Caspian Potential for Gas Export

Let us briefly examine a few points concerning the Caspian potential for gas export. In previous sections, we did not discuss gas production, consumption and exports in the Caspian region. This is because the Caspian region is now of intense interest to the major oil companies for its oil resources. However, this region is seriously constrained by the lack of direct access to international markets for the export of its gas. The following points may shed some light on the barriers to Caspian gas export to the main consuming markets in Asia and

**Table 2 Share of Caspian oil and Gas Reserves as a Percentage of the World Total
(at the end of 1997)**

	Proven Oil Reserves	Proven Gas Reserves
Azerbaijan	0.7%	0.6%
Kazakhstan	0.8%	1.3%
Turkmenistan	<0.1%	2.0%
Uzbekistan	0.1%	1.3%
Percentage of the World Total	1.7%	5.2%

Source: BP Statistical Review of World Energy, June 1998.

Table 3 Oil and Gas Proven Reserves in the Persian Gulf

	Proven Oil (Bb)	% Of World Total	Proven Gas (Tbc)	% Of World Total
Iran	93.0	9.0%	810.0	15.8%
Iraq	112.5	10.8	109.8	2.2%
Kuwait	96.5	9.3%	52.9	1.0%
Saudi Arabia	261.5	25.2%	190.5	3.7%
UAE	97.8	9.4%	284.9	4.0%
Qatar	3.7	0.4%	300.0	5.9%

Source: BP Statistical Review of World Energy, June 1998.

Table 4 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: Based on IEA, 1998, Caspian Oil and Gas.

Table 5 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, 1998.

countries to adopt a policy of diversification in pipeline routes.

The Russian oil industry is more inclined to actively participate in western joint ventures in the development of Caspian oil. This will not only provide industry with secure access to advanced technology but will help Russia to assume more of a leading role in world oil markets and hence to share out the spoils. In summary, the success of Russia in Caspian oil development depends critically on the degree of her participation in joint ventures in the areas as well as on the direction of export pipeline routes.

The two straightforward objectives of the US in the Caspian region are first, to keep out the Islamic Republic of Iran from Caspian oil and gas developments including the pipeline routes, and secondly, to protect the interests of US companies. From a purely geographical perspective, Iran provides the best opportunity for the southern export pipelines as an alternative to the northern pipeline, which is under Russian control.

However, the concerns of external lobbies may have forced the US to adopt a non-optimal solution to the geo-strategy of pipeline in the region. This is in sharp contrast to the US's other aim of protecting the commercial interests of US companies. Indeed, US companies, by and large, consider the US policy of dual containment as detrimental to their long-term commercial interests. By the same token, they strongly support those pipeline strategies which are not only politically motivated, but are based on economically sound foundations.

While the US policy on Caspian oil and gas is constrained mainly by diplomatic considerations, China's strategic policies in the Caspian region are primarily motivated by her domestic energy policy objectives. In sharp contrast to Russia and the US, for whom the development of oil and gas in the Caspian region is not a crucial issue per se since they are not dependant on oil and gas imports from this region- China's prime concern is to secure a new source of oil and gas for her growing future

consumption.

In summary, those external forces which play the energy game on political considerations are likely to disturb the optimum pattern of pipeline networks in the region. By subordinating economic fundamentals, these politically motivated games will substantially reduce the oil revenues of the Caspian states. In addition, the sustained flow of oil exports from the Caspian region will be at risk as a result of the decline in its competitiveness in international markets in general and the Mediterranean in particular.

5. Sub-Optimality of Pipeline Routes and the Vulnerability of Caspian Oil Production

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

The first point regarding Caspian oil and gas resources which strikes an energy analyst is the serious discrepancy between the available estimates of oil and gas reserves in the region.

and gas in the future. Being a supplier at the margins, Caspian oil as a medium to long-term competitor in the international markets, can survive if and only if its production and distribution becomes cost-effective. Constructing several oil transportation routes to feed the dispersed European oil and gas consumption markets is sensible, but adopting excessively expensive pipeline options for Caspian oil and gas will put the future of Caspian exports at risk. Let us briefly explore this point.

i) Marginal Reserves

Caspian oil reserves constitute a small fraction of total world reserves, that is, about 2 to 3 per cent of the world total proven reserves of oil as discussed earlier.

ii) Expensive oil

Compared with the low-cost Middle East reserves, the cost of development, operation and pipeline construction 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.

iii) Marginal Production

From a global perspective, Caspian oil production is at the margins and will stay marginal in the foreseeable future. According to the IEA "high" case scenario projection, the annual oil production in the Caspian states of Azerbaijan, Kazakhstan and Turkmenistan, plus Uzbekistan, will be 1.6 million barrels per day by the year 2000, 2.47 mb/d by the year 2005 and 3.9 mb/d by the year 2010. These projections are based on the assumption that the proposed investment materialises and sufficient export outlets are developed. On the basis of the world oil supply estimates at 78.3 mb/d, 87.5 mb/d, and 94.5 mb/d in 2000, 2005 and 2010 respectively, the share of Caspian oil in total world production will be 2%, 2.8%, and 4.1% respectively.

Oil Production in the "low" case scenario, where some projects are assumed to suffer delays, is estimated at 1.4 mb/d by 2000, 1.95 mb/d by 2005 and 2.8 mb/d by 2010. Thus the share of Caspian oil production in global oil production will be 1.7% in 2000, 2.2% in 2005 and 2.9% in 2010. These figures are summarized in the following table.

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 unconstrained Iraq can produce additional oil during a period of about 3 to 4 years, which will be

Table 1 Caspian oil and Gas Reserves, at the end of 1997

Azerbaijan				
Source	Proven oil Reserves	Estimated oil Reserves	Proven Gas Reserves	Estimated Gas Reserves
IEA	3-11 Bb		0.3-0.8 Tcm (10.6-28.2 Tcf)	
BP	7 Bb		0.85 Tcm (30 Tcf)	
Kazakhstan				
IEA	8-22 Bb	95-117 Bb	1.5-2.4 Tcm (52.9-84.7 Tcf)	4 Tcm (141.2 Tcf)
BP	8 Bb		1.84 Tcm (65 Tcf)	
Turkmenistan				
IEA		1.5-47 Bb		2.7-21 Tcm (95.3-741.3)
BP			2.86 Tcm (101 Tcf)	
Uzbekistan				
IEA				
BP	0.6 Bb		1.88 Tcm (66.3 Tcf)	

BP: Billion Barrels

Tcm: Trillion Cubic Meters

Tcf: Trillion Cubic Feet

Source: IEA, International Energy Agency, Caspian Oil and Gas, 1998. Data supplied by IEA are based on information provided by governments in the region, Petrocosultants and the US government.

BP: British Petroleum Statistical Review of world Energy, June 1998. Data supplied by BP are partly based on information provided by the Oil and Gas Journal.

Turkmenistan with strong reliance on gas revenue.

There are a number of lessons for the Caspian states to learn from the recent economic history of oil-based developing economies, as to how the injection of oil and gas export revenues can produce economic and social dislocation. Adopting more cautious and prudent financial programming regarding petrodollar injections would be the optimal solution for the Caspian states. Ironically, the pipeline game, which permits only a slow and gradual increase in the outflow of oil and gas from the region, may be a blessing in disguise.

Regional Factors

The pipeline network, as the only way of exporting oil and gas to the rest of the world, has, despite increasing transportation costs, made the export success of a country conditional upon the co-operation of its neighbours in whose territories the pipeline crosses. This economic fact will considerably enhance the likelihood of sustained mutual co-operation among Caspian states by fostering an atmosphere of stability and trust in the region. The recent effort to break the diplomatic stalemate in the ten-year-old conflict between Azerbaijan and Armenia may be explained in this context. In fact, stability in that particular region is a necessary condition for the implementation of any major pipeline construction, especially at a time when the Euro-Asia corridor is a topical issue.

In summary, the strong dependency of oil and gas-producing countries in the Caspian region on pipelines for the transportation of their oil and gas resources to international markets has produced a serious tendency towards mutual co-operation among the Caspian states. In this regard, the demarcation of the Caspian Sea is a clear example, in which mutual effort has been put into resolving the legal dispute even when Russia and Iran's potential sectors of the Caspian sea are not considered rich in oil and gas resources. Nevertheless the role of the major external players in

hampering this fundamental tendency should not be overlooked. This is a problem to which I now return.

External Factors

The basic fact is that there is not a power vacuum within the region to allow an easy game for external players. The Caspian states have been very quick in proving their robustness and in formulating their own independent economic and foreign policies. More importantly, they have done this in an environment of rivalry between the US and Russia, and between China and the West. Although it is true that the geo-strategy of pipelines is seriously affected by this game, not all the external forces play the game on energy considerations; more complex strategic aims may be involved.

Being an integral part of the former centrally-planned Soviet economy, most of the existing transportation routes, economic logistics and communication systems in the Caspian states are directed to the former centre. This, together with longstanding political and economic ties, has provided Russia with a central role in the Caspian region. In this regard, Russia pays special attention to the geo-strategy of oil pipelines and provides strong support for the northern export routes to the Black Sea. On the other hand, the existing Russian control of the major export pipelines for Azerbaijan and Kazakhstan's oil has produced a tendency among these two

The question arises as to why Caspian oil and gas resources have become of intense interest to major international oil and gas companies when the huge, low-cost fields in the Persian Gulf, with direct access to sea transport, are open to foreign investment?

The early political competition in this region was so intense that some analysts compared the situation to the "great game" of the 19th century rivalry between Victorian Britain and Tsarist Russia in the region.

followed by the demise of the Soviet Union in 1991, initiated intense political and commercial competition for the undeveloped oil and gas resources in the region. Since Kyrgyzstan and Tajikistan do not possess any significant reserves of oil and gas, the major oil companies focused their attention on the three Caspian littoral states of Azerbaijan, Kazakhstan and Turkmenistan, as well as Uzbekistan.

The early political competition in this region was so intense that some analysts compared the situation to the "great game" of the 19th century rivalry between Victorian Britain and Tsarist Russia in the region. However, such a comparison was soon proved to be unfounded since the attitudes and objectives of the new external players on the one hand, and the social and political structures of the newly independent states on the other, were utterly different from the previous scenario.

The geo-strategy of pipeline construction, market, investment, and hence the pace of development of oil and gas resources in the Caspian region are the outcome of the interaction of a number of factors at work within a balance-of-power framework. These can broadly be classified into three main categories, internal, regional and external factors, as follows.

Internal factors are the results of the historical background, social structure and political evolution of these newly independent states. These factors include the following variables: the degree of internal political stability; the state of legal,

management and administrative developments; the level of expertise in international finance and trade; and, more importantly, the capacity of the domestic economy to absorb oil and gas export revenues while maintaining competitiveness and efficiency in the production sectors.

Regional factors may include the following: intra-regional conflicts; dependency of Caspian states on their neighbours for export routes; and finally, the legal disputes regarding Caspian demarcation.

The political and commercial interests of the US, Russia and China are the main external factors, which affect the development of Caspian oil and gas resources by way of investment and the geo-strategy of pipeline construction.

4. The Significance of Internal, Regions and External Factors in Caspian Oil and Gas Development

An examination of the significance of these factors and their possible interactions will establish a basis for evaluating the current and future development of Caspian oil and gas while outlining the impact of Caspian oil and gas resources on global supply and security. Let us start with the internal factors.

Internal Factors

Many of the above-mentioned conditioning internal factors are the outcome of divergence from the command economy of the Soviet Union and subsequent adoption of independent market-based economic policies while the appropriate institutional settings were absent and welfare expectations were high. Social transformation, cultural change, development of an entrepreneurial spirit, encouragement of economic competition, adoption of dynamic management, and reform of commercial laws and legal infrastructure all need time, patience, prudence and careful strategic planning.

Unfortunately, the general expectation is that oil and gas export revenues can, in principle, solve most of the domestic economic and social bottlenecks. In this regard, domestic problems act



as a strong impetus for acceleration of Caspian oil and gas development. Although developing these valuable resources for economic growth and social progress is quite sensible, the point which is usually overlooked is that economic development is not a commodity which can be purchased in international markets with petrodollars. With an enlarged and inefficient bureaucracy and a lack of economic competitiveness and appropriate institutions especially in the money and capital markets,

Region Energy Development, which gives an estimated 200 billion barrels for proven and possible oil reserves in the region. However, many analysts regard this forecast as an utterly exaggerated estimation and have proposed the hypothesis that such over-estimation is designed to discredit the Persian Gulf as the only major reliable source of supply in the foreseeable future.

It is useful to examine the status of the Caspian proven oil and gas reserves in relation to the world total. Evidently, this status varies according to the different available estimates for proven Caspian reserves. To simplify the analysis, we use the estimates reported in the *BP Statistical Review of World Energy*. The share of the Caspian states' oil and gas reserves as a percentage of the world total is reported in Table 2.

As Table 2 shows, the Caspian region's proven oil reserves

constitute only 1.7 percent of total world proven reserves. The similar figure for gas is about 5.2%.

Let us now examine the importance of the Caspian oil and gas reserves relative to those of the Persian Gulf, with which area the

The political and commercial interests of the US, Russia and China are the main external factors, which affect the development of Caspian oil and gas resources by way of investment and the geo-strategy of pipeline construction.

Caspian region should compete for market share. Table 3 summarizes the proven oil and gas reserves belonging to the major Persian Gulf

producers.

As Table 3 shows, Caspian oil reserves are far less than the proven oil reserves of the Persian Gulf. Kuwait alone has more than six times the proven oil reserves of the whole of the Caspian region, Whereas Iran has more than 3 times the proven gas reserves of the whole Caspian region. In fact, Caspian oil reserves, in comparison, are slightly greater than Nigeria's proven reserves. Nevertheless, taking a highly optimistic estimate (say of 30 billion barrels, equivalent to 2.8% of the total world proven reserves), the Caspian proven oil reserves will be approximately equivalent to those of Libya. Similarly, the gas reserves in this region, at the best estimate, may equal Qatar's proven gas reserves.

The question arises as to why Caspian oil and gas resources have become of intense interest to major international oil and gas companies when the huge, low-cost fields in the Persian Gulf, with direct access to sea transport, are open to foreign investment? The answer to this question may provide an analytical framework for examining the geo-strategic issue of pipeline construction as well as for analysing the impact of Caspian oil and gas and their future prospects. Let us first identify the main factors at work in the dynamics of Caspian oil and gas.

3. Major Factors in the Formation of the Caspian Oil and Gas Industry

There is no doubt that the Caspian oil and gas reserves are some of the largest untapped reserves in the world, and will certainly boost as a major supplier at the margin. The development of Caspian oil and gas will therefore enhance diversification of global supply and will significantly increase potential surplus capacity on the supply side. This will, in turn, promote competition among producers with consequential downward pressure on price while inducing more promising returns for foreign investment.

The emergence of the newly independent states of the Caucasus and Central Asia, which was



CASPIAN OIL AND GAS DEVELOPMENT:

CONSTRAINTS & Prospects

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1. Introduction

This paper* attempts to establish an analytical framework to examine the conditioning factors in Caspian oil and gas development and their future prospects. I will start by a brief reference to the questionably large variance in estimations for the proven and possible oil and gas reserves in the region. The major forces at work in Caspian oil and gas development are then discussed in the three categories of internal, regional and international factors. A brief examination of the significance of these factors in constraining the process of oil and gas development in the region is presented; furthermore, the implications of adopting sub-optimal pipeline routes and the vulnerability of Caspian oil production exports are examined. The Caspian potential for gas export is also discussed. My concluding remarks will focus on the significance of economic fundamentals regarding optimal decisions on Caspian oil and gas production.

2. Large Variance in Estimations of Caspian Oil and Gas Resources

The first point regarding Caspian oil and gas resources which strikes an energy analyst is the serious

discrepancy between the available estimates of oil and gas reserves in the region. Let us examine the following table.

The proven oil reserves for Kazakhstan in the range of 8Bb-22Bb and the estimated oil reserves for Turkmenistan at 1.5Bb-47Bb are uncommon. Similarly, an interval estimation of 2.7Tcm-21Tcm for Turkmenistan's gas reserves is questionably wide. In fact, the estimates made by Russian geologists and by Western companies and independent experts occupy the lower end and the middle ground of the available estimates while the Caspian governments' own estimates fall at the higher end.

There are a number of explanations for this large variance of reserve estimation. Differences in the definition of reserves and resources and the lack of geological and reservoir information are two examples. The politicisation of reserves is also a factor since higher reserves provide bargaining power in competition for foreign investment and also serve to fulfil increasing consumer expectations for higher future living standards.

According to Table 1, Kazakhstan has the largest reserves

of oil in the region while Turkmenistan possesses the largest gas reserves. Although Uzbekistan is not a Caspian state, the problems concerning the transportation of her energy resources to international markets can best be solved within the Caspian pipeline strategic framework. In this regard, it should be mentioned that Uzbekistan's proven natural gas reserves are the second largest in Central Asia.

In summary, the lower bound and upper bound averages of the available estimates for proven oil reserves in the Caspian region plus Uzbekistan are 13 billion barrels and 40 billion barrels, respectively. The same figures for the estimated proven gas reserves are 250 trillion cubic feet and 300 trillion cubic feet (7.1 Tcm-8.5 Tcm), respectively. The only exception among the available forecasts is that of the 1997 *US government's Reprt to Congress on Caspian*

