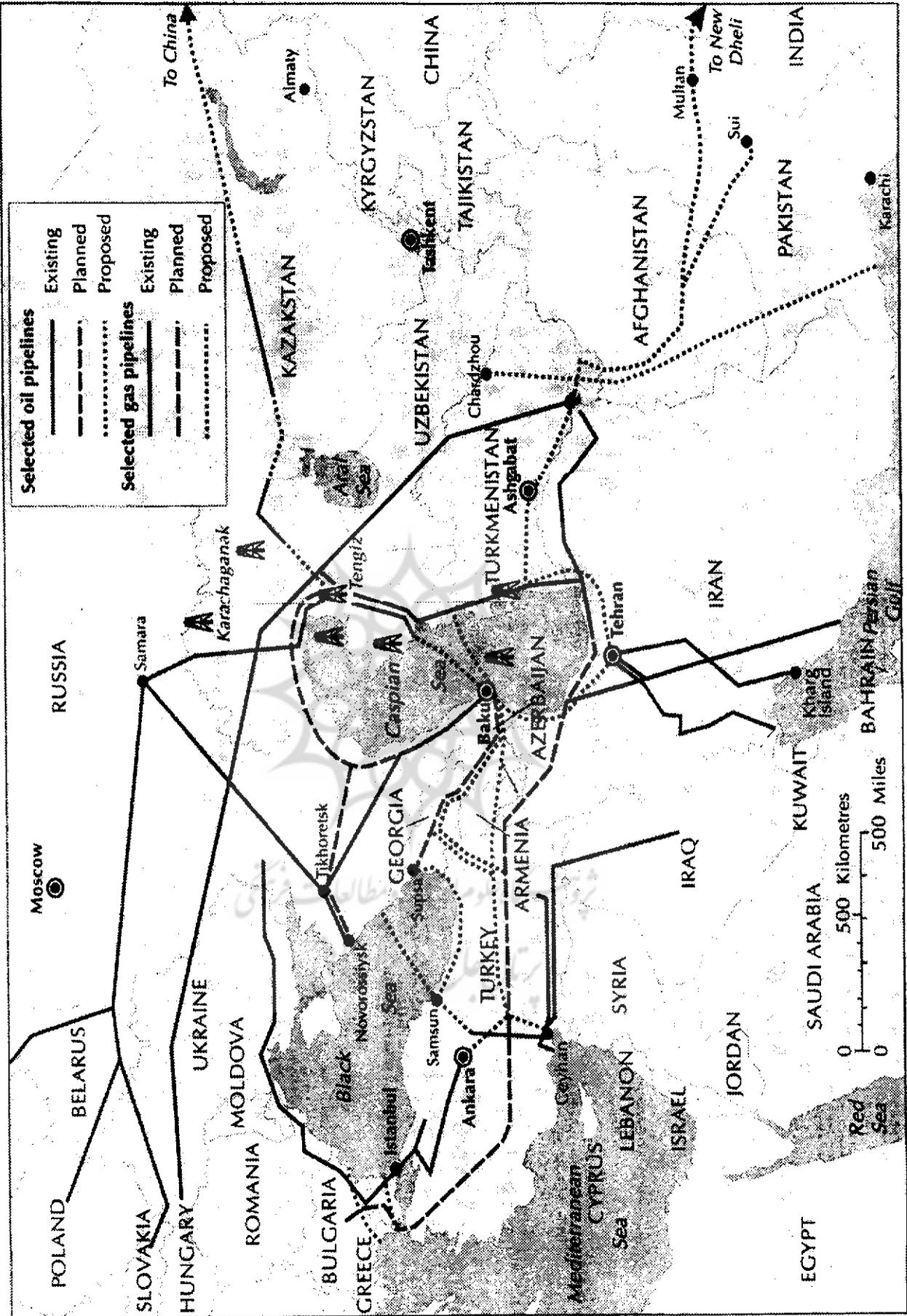
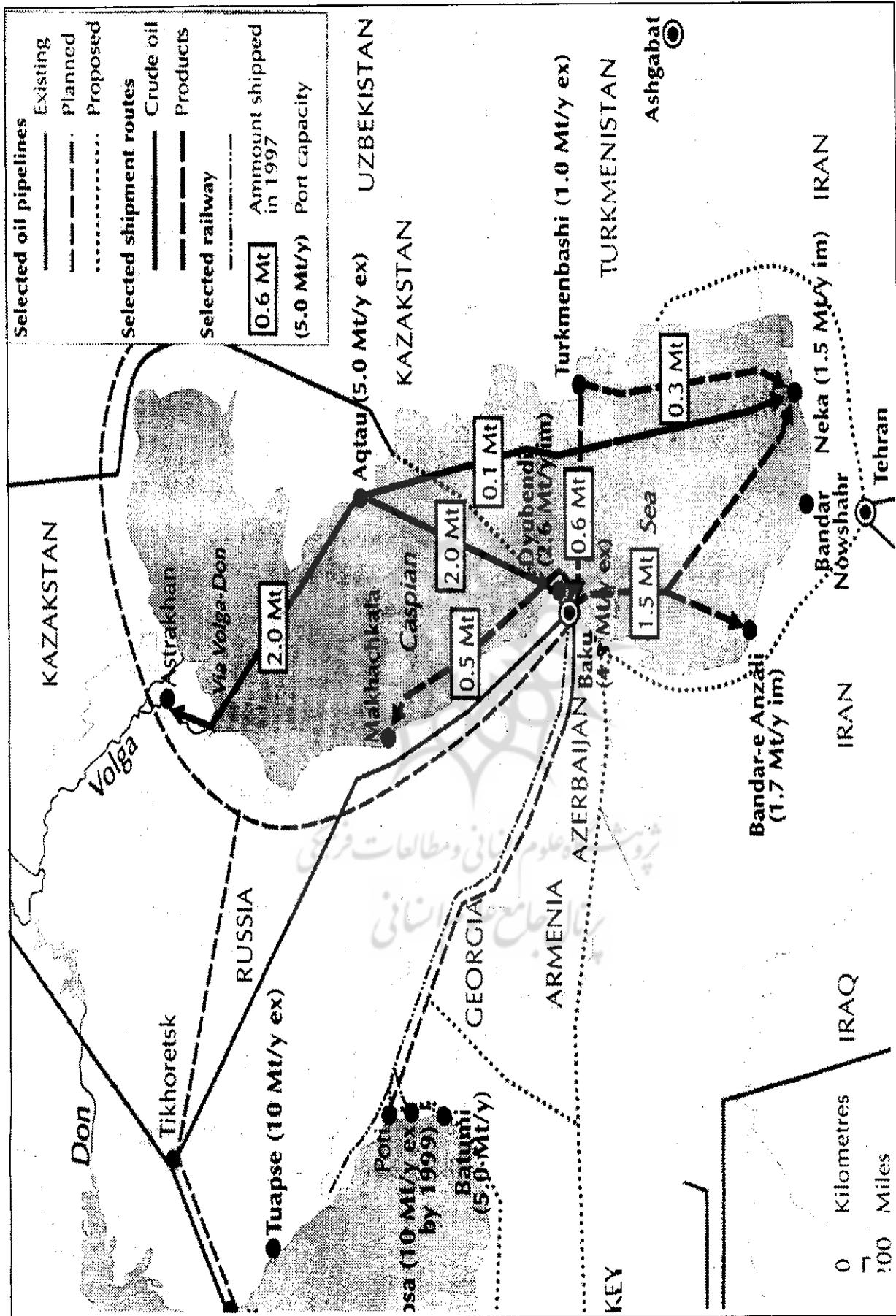


Selected Central Asian and Transcaucasian oil and gas pipelines



Crude oil and product shipments across the Caspian Sea (1997)



**Table 8. Bosphorus Bypass Oil Export Routes
(for Oil Transiting the Black Sea)**

Name/Location	Route	Crude Capacity	Length	Investment	Status
Albanian - Macedonian - Bulgarian Oil (AMBO) trans-Balkan line	AMBO line from Burgas (Bulgaria) - Vlore (Albania)	750,000 bbl/d for AMBO line (could be expanded to 1 million bbl/d)	560 miles for the AMBO line	\$1.13 billion for AMBO line to Vlore	Construction AMBO line proposed 2001-2002. Completion targeted for 2004-2005.
Burgas trans-Balkan line	Burgas (Bulgaria) - Alexandroupolis (Greece)	600,000-800,000 bbl/d for the Burgas-Alexandroupolis line	200 miles for the Burgas line to Alexandroupolis;	\$800 million for Burgas line to Alexandroupolis;	Initial agreement 1997 Bulgaria, Greece, Russia for Burgas line.
Constantza to Trieste Pipeline (CTPL); Romanian -Italian project version called South-East European Line (SEEL)	Constantza (Romania) - Trieste (Italy). Alternative destinations could include Omisalj (Croatia)	660,000 bbl/d	855 miles	\$1.2 - \$1.6 billion	HLP-Parsons moving CTPL project forward after feasibility study completed end-1999. ENI (Italy) signed a cooperation agreement with Romania 2/98 for the SEEL.
Ukraine Odessa-Brodi-Gdansk	Odessa to Brody; optional spurs to the northern Druzhba line at Adamowa Zastawa Poland, or Schwechat, Austria.	180,000 bbl/d; ultimate capacity 600,000 - 800,000 bbl/d	415 miles	\$400-\$450 million for pipeline and terminal; \$140 million spent using revenues from the Friendship and Trans Dnieper pipelines	Yuzhnyi oil terminal near Odessa 15% complete; pipeline 75% finished with target completion 2001

	(Azerbaijan) - Erzerum (Turkey)					and Shell will be operators of the project. Initial completion target date 2002 - may be delayed until 2006.
Trans-Georgian	Russia-Turkey via Georgia and Armenia	425 billion cubic feet/year of	125 miles	\$250 million		Gazprom's plans to complete preparations in 1999 were shelved
Turkmenistan - Iran	Korpeje (Turkmenistan) to Kord-Kui(Iran)	283 - 350 bcf/year; expansion proposed to 777 bcf/year by 2005; 1.1 Tcf/year 2010	90 miles	\$190 million; 2005 expansion \$300-\$400 million		Commissioned December 1997
Turkmenistan - Iran	Serakhs (Turkmenistan) - Teheran (Iran)	Initial 0.7 Tcf/year; expansion to 1.8 - 2.1 Tcf/year	N/A	\$1.2 - \$1.5 billion		Proposed
Turkmenistan - Iran - Turkey	Ekarem (Turan - Tabriz)	1 Tcf/year	1,350 miles	\$3.8-4.0 billion		Feasibility study done by Royal Dutch/Shell; plan shelved

Table 7. Natural Gas Export Routes in the Caspian Sea Region

Name/Location	Route	Gas Capacity	Length	Investment	Status
Baku-Tbilisi-Erzurum	Azerbaijan via Georgia to Erzurum (Turkey)	Initial 175 bcf/year rising to 350 bcf/year. Additional pipelines could raise capacity to 565 bcf/year.	300 mile renovation Gazi Mahammad-Agdash-Gazakh pipeline Azerbaijan - Georgia; 174 miles extension to Erzurum (Turkey)	Renovation \$82 million in Azerbaijan; extension Georgia - Erzurum \$600-\$700 million	Feasibility study done by Sofregas (France); completion target 2002-2003.
Centgas (Central Asia Gas)	Dauletad or Yashlar Fields (Turkmenistan) - Pakistan. May extend to India	700 bcf/year	900 miles to Multan, Pakistan (additional 400 miles to India)	\$1.9 billion to Pakistan (additional \$0.5 billion to India)	Memorandum Understanding Turkmenistan, Pakistan, Afghanistan & Uzbekistan. Project stalled with financing difficulties because of Afghan fighting.
Central Asia - Russia - Europe	Turkmenistan - Kazakhstan - Russia	3.5 Tcf	N/A - uses existing routes	Uses Existing route	Operational - uses existing Russian system. Turkmenistan signed an agreement to increase exports to Russia to 1.8 - 2.1 Tcf/year by 2005-2006.
China Pipeline	Turkmenistan - Xinjiang (China); may extend to Japan	1 Tcf/year	5,000 miles; more if to Japan	\$10 billion China; more if to Japan	Preliminary feasibility study done by Exxon, Mitsubishi & CNPC
Trans - Caspian (Kazakhstan Twin Pipelines)	Caspian coast (Kazakhstan) - Baku (Azerbaijan) - Ceyhan (Turkey)	N/A	N/A	N/A	Feasibility study agreement December 1998 Royal Dutch/Shell, Chevron, Mobil, Kazakhstan
Trans - Caspian (Turkmenistan)	Turkmenbashi (Turkmenistan) - Baku	1.1 Tcf/year	1054 miles	\$2.0-\$3.0 billion	Preliminary feasibility studies completed. PSG

							provide financing
Iran - Azerbaijan	Baku (Azerbaijan) - Tebriz (Iran)	0.2 - 0.4 million bbl/d	N/A	\$500 million			Proposed by Elf Aquitaine and Total/Fina
Iran Oil Swap Pipeline	Iranian Caspian port of Neka - Tehran	175,000 bbl/d, rising to 370,000 bbl/d	208 miles	\$400 - \$500 million			Construction planned to begin 2000.
Kazakhstan - China	Aktubinsk (Kazakhstan) - Xinjiang (China)	0.4 - 0.8 million bbl/d	1,800 miles	\$3.0 - 3.5 billion			Agreement 1997; feasibility study halted September 1999 because insufficient Kazak oil flows could be committed for the next 10 years.
Kazakhstan - Turkmenistan - Iran (KTI)	Kazakhstan - Turkmenistan - Kharg Island on Persian Gulf (Iran)	1.0 million bbl/d	930 miles	\$1.2 billion			Proposed completion date 2005
Khasuri-Batumi pipeline	Port of Dubendi (Azerbaijan) - Batumi (Georgia)	Initial 70,000 bbl/d, rising to 140,000 bbl/d.	Rail system and 144-mile Khasuri-Batumi pipeline	\$70 - \$100 million for pipeline renovation			Chevron signed agreement September 1999 to rebuild the existing Khasuri-Batumi oil pipeline in 18-24 months
South Pipeline (Central Asia Oil Pipeline)	Kazakhstan - Turkmenistan - Afghanistan - Gwadar (Pakistan)	1 million bbl/d	1,040 miles	\$2.5 billion			Memorandum of Understanding
Trans - Caspian (Kazakhstan Twin Pipelines)	Aktau (western Kazakhstan coast) - Baku (Azerbaijan); could extend to Ceyhan (Turkey)	N/A	370 miles to Baku	\$2 - \$4 billion if to Ceyhan			Feasibility study agreement December 1998 Royal Dutch/Shell, Chevron, Mobil, Kazakhstan

Table 6. Oil Export Routes in the Caspian Sea Region

Name/Location	Route	Crude Capacity	Length	Investment	Status
AIOC - Main Export Pipeline	Baku-Tbilisi-Ceyhan	1.0 million bbl/d	1073 miles	\$2.4 billion (other estimates as high as \$3.7 billion)	Istanbul Accord signed November 1999 to build the line along the Baku-Tbilisi-Ceyhan route. Completion targeted 2004-2005.
AIOC - Early Oil Western Route	Baku (Azerbaijan) - Supsa (Georgia)	0.115 million bbl/d design capacity; upgrades by 2002 to 0.21 million bbl/d	515 miles	\$600 million with no upgrade	Exports began April 1999
AIOC - Early Oil Northern Route	Baku (Azerbaijan) - Novorossisk (Russia) via Chechnya	0.1 million bbl/d capacity; possible upgrade to 0.3 million bbl/d	\$68 miles; 90 miles are in Chechnya	\$600 million to upgrade to 0.3 million bbl/d	Exports began late 1997
AIOC Northern Route - Chechnya bypass with link to Mahachkala	Baku (Azerbaijan) via Dagestan to Tikhoretsk (Russia); connecting to Novorossisk (Russia)	2000 pipeline capacity - 0.12 million bbl/d (rail and pipeline 0.16 million bbl/d) 2005 - 0.36 million bbl/d	204 miles	\$140 million	Completed April 2000. 11 mile spur connects bypass with Russia's Caspian port of Mahachkala.
Ayrau -Samara	Ayrau (Kazakhstan) - Samara (Russia)	Current 0.21 million bbl/d; increase to 0.31 million bbl/d	432 miles	Increase would cost \$37.5 million	Project modifies existing pipeline to Russia by adding pumping and heating stations. Upgrades began 1999.
Caspian Pipeline Consortium (CPC)	Tengiz (Kazakhstan) - Novorossisk (Russia)	0.56 million bbl/d Phase 1; 1.34 million bbl/d peak	930 miles	\$2.4 billion for Phase 1; \$4.2 billion total when completed	Construction has begun. Phase 1 flows begin October 2001; peak 2015
Gardabani-Batumi Pipeline	Gardabani (Azerbaijan) - Batumi (Georgia) oil refinery	N/A	Rebuild of an existing pipeline	N/A	The World Bank and the European Bank for Reconstruction and Development may

The Most important issue in Caspian oil production is appropriate export routes to world market

refinery in Neka with a capacity of 100-120 thousands bpd for domestic use. This refinery can be designed, based on Caspian Sea crudes.

B) gas

As far as export of natural gas is concerned, Iran is currently purchasing about 3 bcm per year from Turkmenistan, and with the implementation of Iran - Turkey gas pipeline this quantity could be increased by 10 bcm for domestic consumption or re-export.

- Iran also is ready to purchase Shahdeniz gas from AIOC partners via old Astara - Baku gas pipeline.

- Iran is prepared to enter into long term contract with Kazakhstan to directly purchase or receive Kazakh crude oils based on swap arrangement.

- Iran is also ready to purchase or swap Azeri crude oil from sozar for her domestic use. To materialize such a deal a pipeline should be constructed to connect Baku either to Tehran or Tabriz crude oil pipeline. By implementation of this project, Tabriz refinery will be able to process 100000 bpd of Azeri crude oil and the rest could be transferred for processing in Tehran refinery.

Caspian sea oil and gas outlook

It is unlikely that Caspian Oil and gas supplies in near future to have a significant impact upon world energy market due to the following factors:

- The reported reserves of oil and gas in

Caspian sea region are misleading, giving wrong signals to producing countries and other players involved in oil and gas business in the region.

- Export routes by pipeline through the caucuses or Turkey are not only costly, but also are threatened by high risk of sabotage.

- Most of Caspian Sea oil would undoubtedly end up in Mediterranean Sea where it is expected to compete strongly with oils from Russia, Persian Gulf and Africa. More over the resumption of Iraqi export to pre-war level may have extreme pressure on prices in the mediterranean market.

- The oil export routes terminating at the Russian Black Sea port of Novorossiysk or Georgian port of Supsa, requiring tankers to transit the crowded and ecologically and politically sensitive Bosphorus in order to gain access to the Mediterranean and world markets.

- Many proposed gas export routes are complicated by transit issues or must traverse politically difficult regions which make export gas more expensive than those offered by other competitors in the market.

- The market for Caspian sea natural gas is not so promising due to number of factors as follows:

* Afghanistan remains a risky transit country.

* Turkey, central and Western Europe are well supplied under the existing contracts.

* Ukraine will probably remain a key market as payment problems abate.

- Russian influence can hamper the central Asia and Transcaucasian countries efforts of becoming significant gas producers and exporters in number of ways, such as:

* An investor or partner in field development and

Iran as potentially an important outlet for Caspian oil and gas has undertaken some projects to accommodate part of exports

pipeline projects.

* A transit country for their exports to CIS and other markets.

* A competitor in most of these markets, and

* A market in its own right.

Conclusion

Existing difficulties regarding production and export of Caspian Sea Oil and gas including:

Uncertainty over accurate figures for reserves, costly and unfriendly environmental issues of projected and existing export routes, lack of security of some export routes, due to regional conflicts, political influence of Russia and the United States and many other issues involved, would make the outlook of Caspian Sea oil and gas production and export not so promising. However the region may turn out to be a marginal supplier over next two decades and make up the possible decline in North Sea production. Islamic Republic of Iran with its existing infrastructure, the projects under construction, vast cross-country pipeline network, high rate of consumption, has enough capability to engage in directly purchase, re-export or swap deals with Caspian sea countries and bring about many advantages including:

- Safe and secure export routes.

- Cost effective comparing with other routes.

- Easy access to world markets, particularly Asia.

- Permanent and reliable outlet for domestic consumption

(BILLION CUBIC) CASPIAN SEA REGION GAS CONSUMPTION					
METERS					
YEAR COUNTRY	1990	1995	1998	2005	2010
AZERBAIJAN	15.8	8	5.2	9-10	10-12
KAZAKHSTAN	12.5	10.8	7.3	16-18	17-30
TURKMENISTAN	9.8	8	9.5	10-11	12-14
UZBEKISTAN	36.8	42.4	47	51-56	54-62
TOTAL	74.9	69.2	69	86-95	93-118

(BILLION CUBIC) CASPIAN SEA REGION GAS EXPORTS					
METERS					
YEAR CONTRY	1990	1995	1998	2005	2010
AZERBAIJAN	-6.6	-1.8	0	2-7	5-12
KAZAKHSTAN	-5.9	-5.3	0.3	(-4)-(-3)	-2
TURKMENISTAN	72.1	22.1	2.2	39-50	64-72
UZBEKISTAN	1.3	2.9	4.1	3	5
TOTAL	73.4	25	6.6	44-57	69-89

The exploration activities in the region indicate that large volume of oil and gas reserves of Caspian Sea region are located under the Caspian Sea bed. reaching a satisfactory agreement by littoral states will definitely have remarkable impact on the security and profitability of investment activities and could make the caspian sea region more attractive for foreign companies.

B) export routes

Perhaps at the present the most important issue in production and export of hydrocarbons in the region is appropriate export routes to take oil and gas out from the landlocked Caspian Sea region to world market.

The existing export routes, the projects under construction and proposed projects are shown in tables (6-8)

Caspian Sea and I.R. Of Iran's Role

Considering the geographical position, national policies and interests, Islamic Republic of Iran is prepared for constructive involvement for the safe, secure, short and cost effective export routes for oil and gas in the region,

Although the geography has placed iran, in comparison with other routes, in the most suitable position to link the land - locked countries to world market, it seems that political factors have more influence on selecting the final route than economic criteria.

While we believe in importance of politics in the outcome of many issues in the region, one must not underestimate the economic factors which play an equally important role. Islamic Republic of Iran is potentially an Important outlet for Caspian

Oil and gas and has undertaken some projects to accommodate part of exports destined to world market including the following.

A) oil

By the early 2001, with the replacement of existing Neka -Ray pipeline, the capacity of pipeline will be expanded to 50,000 bpd.

In later stages there are some projects to be implemented in order to equip Iran with needed infrastructure to facilitate the flow of about 500000 bpd of Kazakhstan and Turkmenistan crude oils to be processed in Iranian refineries namely Tehran, Tabriz and Arak refineries. The projects include the following:

- Improvement of tanker fleet
- Infrastructure's investment in northern port of Neka including expansion of storage facilities, jetties and blending facilities to accommodate larger tankers.
- The capacity of existing Neka - ray pipeline in 2nd stage will be increased to 115000 bpd by 2002
- Construction of new 336,km 32-inch Neka-Rey crude oil pipeline with capacity of 370000 bpd is planned to be completed by 2002.
- Modification of Tehran and Tabriz refineries and make them compatible to process Kazakh and Turkmen crude oils.

- A new project for construction of 1200 km crude oil pipeline from Kazakhstan to Neka in two phases :

Ist phase : a 800 km 28-inch crude oil pipeline connecting Kazakhstan to Turkmenistan.

2nd phase: a 400 km 32-inch pipeline from Turkmenistan to Neka, Iran.

The feasibility study for the above project has been carried out. Completion of this project at the cost of about \$ 700 million which take about 2 years will not only secure a reliable market for these crude oils but also reduce the transportation cost, making this route more competitive compared with any other route. Another option under consideration is to construct a

sea oil and gas supply.

A) oil

Total oil output of Azerbaijan, Kazakhstan, Turkmenistan and Uzbekistan, before the breakup of soviet union was 995000 barrels per day. (Table 1)

The said figure dropped to below 900000 bpd in 1995 mostly due to decline in Azerbaijan and Kazakhstan production, however as a result of recent investment in the region the total production of these four countries reached 1.06 million bpd in 1998.

The future production of the said countries in two scenarios of high case and low case is estimated to grow 1-1.5 and 1.7 - 2.8 million bpd by 2005 and 2010 respectively.

This indicates the production growth of maximum 2.8 million bpd within next 20 years. Such an output growth rate is not comparable with that of middle east during the same period and it may only make up possible decline in north sea's oil production.

Oil export volume has almost been doubled in 1998 since the breakup of soviet union (Table 2) reaching 455000 bpd and is expected to be accounted for about 1.2 and 2.35 million bpd by 2005 and 2010 respectively.

B) natural gas

The total natural gas production of the said four countries at the end of 1998 indicates that Uzbekistan with the production and consumption of 51.1 and 47 billion cubic meters had the highest production and consumption of natural gas among them. (Tables 3 and 4)

Despite of significant potentiality of Turkmenistan, the natural gas production in that country fell sharply from 30.1 bcm in 1995 to 11.7 bcm in 1998 mostly as a result of transit problem with Russia and disagreement with Ukraine

- As its main buyer - over price and payment of exported Turkmenistan natural gas.

Such problem resulted in drastic decline

**(THOUSAND BARRELS)
PER DAY**

CASPIAN SEA REGION'S OIL PRODUCTION

YEAR COUNTRY	1990	1995	1998	2005	2010
AZERBAIJAN	255	185	230	500-600	900-1400
KAZAKHSTAN	550	435	540	1100-1400	1500-2000
TURKMENISTAN	120	85	110	130-220	140-240
UZBEKISTAN	70	170	180	200-220	200-240
TOTAL	995	875	1060	1930-2440	2740-3880

**(THOUSAND BARRELS)
PER DAY**

CASPIAN SEA REGION OIL EXPORTS

YEAR COUNTRY	1990	1995	1998	2005	2010
AZERBAIJAN	85	15	90	340	1100
KAZAKHSTAN	120	195	285	720	1100
TURKMENISTAN	30	5	40	80	100
UZBEKISTAN	-185	35	40	40	40
TOTAL	2355	250	455	1180	2340

**(BILLION CUBIC)
METERS**

CASPIAN SEA REGION GAS PRODUCTION

YEAR COUNTRY	1990	1995	1998	2005	2010
AZERBAIJAN	9.2	6.2	5.2	11-17	15-24
KAZAKHSTAN	6.6	5.5	7.6	12-15	15-30
TURKMENISTAN	81.9	30.1	11.7	49-61	76-86
UZBEKISTAN	38.1	45.3	51.1	54-56	59-63
TOTAL	135.8	87.1	122.4	126-149	165-203

in total net export of natural gas in the region at the end of 1998. (Table 5)

The estimates show that Turkmenistan may re-emerge as a main potential natural gas exporter of the region over the next decade, provided that the existing export difficulties to be eased in forthcoming years. Uzbekistan case is quite different and despite of having significant potentiality of

natural gas production will be remained as a marginal exporter merely due to high growth rate of domestic consumption.

Key issues affecting oil and gas production and export in Caspian sea region.

Key issues in the region include :

A) Legal status of Caspian sea

Caspian Sea Oil and Gas and Role of Islamic Republic of Iran

Presented by:

H. Ghanimi Fard, Ph.D.

Acting vice President National Iranian Oil Company
& Faculty Member, University of Oil Industry

**Seminar on
The challenges to the international oil market
in this new decade
12 september 2000
The Hague-Netherlands**



It is indeed a privilege and honor for me having the opportunity to address this Academic gathering the issues related to caspian sea.

The break-up of the soviet union in the early 1990s is generally known as the most important event in last decade of 20th century which resulted in significant changes either globally or regionally.

The subject i have been asked to focus upon is caspian sea.

Background

The Caspian Sea region is important to world markets because of its large oil and gas reserves and potentiality to become a significant producer and exporter of energy. The nations surrounding the Caspian Sea are Azerbaijan, Islamic Republic of Iran, Turkmenistan, Kazakhstan, Russia. However for purpose of this study, Uzbekistan is also included in discussion brought forward.

The breakup of soviet union paved the way for liberalization and acquiring further investment opportunities in central asia and transcaucasia and therefore a number of countries in the region such as Azerbaijan and Kazakhstan had made significant progress in attracting foreign investments to their oil and gas sectors.

Oil and gas reserves

IEA estimates proven oil and gas in Caspian Sea region between 18 and 35 billion barrels (comparable to that of north sea of 17 billion barrels) versus the initial figures of 200 billion barrels.

The same source estimates proven natural gas reserves of the region between 236-337 trillion cubic feet and possible reserves of about 328 tcf. This represents 1% - 4% of the world's proven oil reserves and 6% of the world's gas reserves. Most of oil and gas reserves in the Caspian Sea

region have not been developed and many areas thereof remain unexplored.

Most of Azerbaijan oil reserves and perhaps one third of total oil resources of Kazakhstan and Turkmenistan are located offshore.

Besides current proven oil reserves, the possible oil reserves in the region may account for 235 billion if proven.

The prospect of such potentially huge hydrocarbon reserves is part of the allure of caspian sea region.

Oil and gas production and exports

The existing oil and gas production in Caspian Sea region excluding Iran and Russia is not too considerable to have a significant impact on global oil and gas structures and their balances; however, due to region's potential resources and projected investments, most observers consider its resources as a significant alternative to north