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# **Caspian Sea Region**

The Caspian Sea region, including the Sea and the states surrounding it, is important to world energy markets because of its potential to become a major oil and natural gas exporter over the next decade. However, this potential has been complicated by several factors, including a lack of adequate export infrastructure, disagreement over new export routes, and border disputes between the littoral states.

Note: Information contained in this report is the best available as of August 2003 and is subject to change.



## GENERAL BACKGROUND

The Caspian Sea has become a landmark for the former Soviet South's untapped oil and natural gas potential. Herein, the Caspian Sea Region is defined to include the Sea's littoral states of Azerbaijan, Kazakhstan, and Turkmenistan, as well as parts of Russia and Iran and also Uzbekistan --which although not a littoral state, is the region's largest natural gas producer. The oil and gas potential of these states is sizeable. Proven oil and natural gas reserves have been estimated at up to 3% and 4% of the world total,

respectively, and analysts expect that by 2010 regional oil production will meet or exceed 2002 capacity in Venezuela, South America's largest oil producer.

At the moment, however, the countries of the Caspian Sea region are relatively minor world oil and gas producers, struggling with difficult economic and political transitions. Following the break-up of the Soviet Union, the countries' economies languished as regional trade collapsed. And while, the region has enjoyed overall economic growth since the latter half of the 1990s, gross domestic product (GDP), remains below 1992 levels in Azerbaijan, Kazakhstan, and Turkmenistan (when measured in constant \$1995 dollars). Uzbekistan, however, has shown some growth. Moreover, in the region's two biggest oil producers, Azerbaijan and Kazakhstan, 49% and 26% of the populations, respectively, were estimated to be living below the poverty line in 2001. Improving these conditions depends, in large part, on the successful development of the region's oil and natural gas potential.

Although there is still no overarching agreement between the five Caspian littoral states on division of the Sea's resources, three states have come to a trilateral agreement on sub-surface boundaries and collective administration of the sea's waters. In May 2003, Russia, Azerbaijan, and Kazakhstan divided the northern 64% of the Caspian Sea into three unequal parts along a median line principle, giving Kazakhstan 27%, Russia 19%, and Azerbaijan 18%. Accordingly, development of the northern Caspian Sea's hydrocarbon potential, where most of the region's oil reserves and largest international projects are found, will likely move forward despite the lack of a comprehensive regional consensus. Meanwhile, offshore development in Turkmenistan and Iran, which were present at these negotiations but refused to sign on, could fall even further behind. (For more information, see: Caspian Sea Region: Legal Issues)

# OIL

Estimates of the Caspian Sea Region's proved crude oil reserves vary widely by source. For this reason, we have estimated proven oil reserves as a range between 17 and 33 billion barrels, which is comparable to OPEC member Qatar on the low end, and the United States on the high end. In 2002, regional oil production reached roughly 1.6 million barrels per day, comparable to annual production from South America's second largest oil producer, Brazil. By 2010, the countries of the Caspian Sea Region are forecast to produce between 3 and 4.7 million barrels per day, which exceeds annual production from South America's largest oil producer, Venezuela. (For more information, see: Caspian Sea Region: Key Oil and Gas Statistics).

Growing oil production since independence (an increase of roughly 70% since 1992) has come

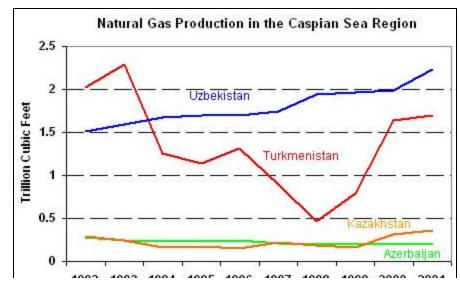
Country	Project	Proven Reserves	2002 Production	Projection
Azerbaijan	ACG Mega- Structure (BP et al)	5.4 Billion Barrels	125,000 bbl/d	2005: 460,000 bbl/d 2008-9: 1 million bbl/d
	<b>Shah Deniz</b> (BP et al.)	14 Trillion Cubic Feet	N/A	<b>2006:</b> 296 Bcf
Kazakhstan	<b>Tengiz</b> (ChevronTexaco et al.)	6-9 Billion Barrels	285,000 bbl/d	2006: 450,000 bbl/d 2010: 700,000 bbl/d
	<b>Karachaganak</b> (BG, Agip, et al.)	2.4 Billion Barrels	100,000 bbl/d	<b>2008:</b> 240,000 bbl/d
	<b>Kashagan</b> (ENI-Agip, BG, et al.)	7-9 Billion Barrels	N/A	<b>2005:</b> 100,000 bbl/d
Turkmenistan	<b>Cheleken</b> (Dragon Oil)	0.6 Billion Barrels	10,000 bbl/d	<b>2003:</b> 11,000 bbl/d
	Nebit Dag (Burren Energy)	0.1 Billion Barrels	10,000 bbl/d	<b>2003:</b> 12,000 bbl/d
Uzbekistan	Central Ustyurt and Southwest Gissar (Trinity Energy)	Being Developed		<b>2006:</b> 2,600 bbl/d 71 Bcf

primarily from the north Caspian states of <u>Kazakhstan</u> and <u>Azerbaijan</u>. Development of the region's oil resources has been led by two major projects: Kazakhstan's *Tengiz*, and Azerbaijan's *Azeri*, *Chirag, and deepwater Gunashli (ACG) (see Table 1.)* Combined, these two projects produced

about 410,000 barrels per day in 2002, one-fourth of the regional total, and are expected by the operating companies to produce 1.7 million barrels per day for world oil markets by 2010. Development of these vanguard projects, which are each roughly ten years old, has given rise to the influx of new investment and infrastructure development that constitutes the "second Caspian oil rush," the first having occured in the late 1800s. Following theses discoveries, major new finds were announced in Azerbaijan at Shah Deniz in 1999 ("potential recoverable resources" of roughly 14 Tcf of natural gas), and in Kazakhstan at Kashagan in 2000 (recoverable reserves estimated at 7-9 billion barrels of oil equivalent, with further potential totaling 9 to 13 billion barrels using secondary recovery techniques--See Table 1).

By comparison, other countries in the Caspian Sea region have made little progress towards developing their hydrocarbon resources since independence. Turkmenistan's and Uzbekistan's leading oil projects--also listed in Table 1-- are significantly smaller and markedly less developed than those in Azerbaijan and Kazakhstan. This is because proven oil reserves in Turkmenistan and Uzbekistan are considerably smaller than those in their neighboring states, and the political regimes in Ashgabat and Tashkent have been considered less favorably by foreign investors. As a result, while multinational oil companies have initiated numerous large-scale projects in Azerbaijan and Kazakhstan (many more than are mentioned in Table 1), Turkmenistan and Uzbekistan have achieved only smaller-scale deals.

Oil and gas development in Russia's and Iran's sectors of the Sea has been similarly stunted, although exploration efforts are reportedly underway. Russian oil company, LUKoil, began exploration of the north Caspian in 1995 and is reportedly working on a drilling program for 2004-2010, with initial production of natural gas expected by as early as 2005. In July 2003, two Russian oil and gas firms, LUKoil and Gazprom, established a joint venture with Kazakhstan's state oil company, KazMunaiGaz, to develop the Tsentralnaya hydrocarbon structure, located on the border of the Russian and Kazakhstani offshore sectors. According to LUKoil, the Tsentralnaya structure holds recoverable reserves of roughly 20 Tcf of natural gas, with drilling expected to begin in 2007. Russian natural gas monopoly, Gazprom, is also party to another project in the offshore Caspian Sea, Kurmangazy. The Kurmangazy field also sits astride the border between Russia and Kazakhstan's sectors of the sea, and accordingly is also being developed in conjunction with Kazmunaigaz, as well as Rosneft (Russia). Exploratory drilling at Kurmangazy is expected to begin by the end of 2003 or early 2004. Iran has made less progress towards developing its Caspian Sea resources. In June 2003, a representative from Iran's Caspian Oil Company told reporters that the company intends to begin developing its Caspian Sea shelf within two years.



#### NATURAL GAS

The Caspian Sea region's natural gas potential is, by some measures, more significant than its oil potential. Regional proven natural gas reserves are estimated at 232 trillion cubic feet (Tcf), comparable to those in Saudi Arabia. Natural gas production in 2001 was approximately 4.5 Tcf, comparable to the combined production of South America, Central

#### America, and Mexico. But

companies and governments have thus far shown greater interest in oil than in natural gas--owing, in part, to the greater capital expenditures necessary to start up new natural gas projects, as well as the region's lack of existing infrastructure. As a result, regional natural gas production has increased only modestly since independence. With only one major foreign investment focused primarily on gas (Azerbaijan's Shah Deniz --see Table 1 and below), the region will still need considerable investment in upstream projects and export infrastructure before its full potential can be realized.

Since independence, regional natural gas production has been characterized by modest annual increases from Uzbekistan, and a dramatic collapse (then partial recovery) from Turkmenistan (see graph). This is because, after 1991, natural gas from the Caspian Sea region, mostly from Turkmenistan, became a competitor with Gazprom, the Russian state natural gas company. Because all of the pipelines connecting the region to world markets were owned by Gazprom and routed through Russia (see *Export Issues*), Caspian natural gas was squeezed out of the hard currency market.

As a result, Turkmenistan's incentives for increasing its production of natural gas disappeared. The country's output dropped throughout the 1990s, plummeting from 2.02 Tcf in 1992 to just 466 billion cubic feet (Bcf) in 1998 when the country was locked in a pricing dispute with Russia over the export of Turkmen natural gas. In 1999, a Turkmen-Russian agreement took hold, and in 2000, production skyrocketed to 1.64 Tcf before reaching 1.7 Tcf in 2001 (see graph). In April 2003 the country signed new agreements with Uzbekistan and Russia to increase exports to both countries substantially over the next twenty years.

In contrast, Uzbekistan has secured modest annual production growth by avoiding Russia's pipeline system and by concentrating on domestic consumption and neighboring natural gas markets. Uzbekistan is the third largest natural gas producer in the Commonwealth of Independent States, and one of the top ten natural gas-producing countries in the world. Since becoming independent, Uzbekistan has ramped up its natural gas production by nearly 50%, from 1.51 Tcf in 1992 to 2.23 Tcf in 2001 (see graph). Uzbekistan's state oil and gas concern, Uzbekneftegaz, is attempting to slow the natural depletion of its existing fields, and to develop new projects, but has failed thus far to secure a major collaboration with foreign investors. Uzbekneftegaz signed its first Production Sharing Agreement (PSA) in April 2001 with Britain's Trinity Energy (through a specially formed subsidiary known as UzPEK Ltd). The project entails the development of fields in Uzbekistan's central Ustyurt and Southwest Gissar regions, and the partners expect natural gas production of roughly 71 billion cubic feet by 2006 (see Table 1).

The region's leading oil producers, Azerbaijan and Kazakhstan, are both net natural gas importers, purchasing gas primarily from Uzbekistan and Russia. However, both states plan to increase their own natural gas production significantly over the decade and become net natural gas exporters. Azerbaijan's major natural gas production increases in the future are expected to come from the development of the aforementioned Shah Deniz field. The Shah Deniz offshore natural gas and condensate field, is thought to be one of the world's largest natural gas field discoveries of the last 20 years, and contains "potential recoverable resources" of roughly 14 Tcf of natural gas according to the project's operator, British Petroleum (BP). The field is expected to begin producing natural gas for export in 2006 and will be capable of producing approximately 296 Bcf of natural gas per year. Kazakhstan's natural gas production increases are expected to come primarily from associated gas at Kazakhstan's three largest fields, Tengiz, Karachaganak, and Kashagan.

#### **EXPORT ISSUES**

As increasing exploration and development in the Caspian Region leads to more production, the

littoral states (and Uzbekistan) will have large new quantities of oil and natural gas available for export. Earning hard currency from these resources is essential to regional development plans, as well as to recouping the huge investments made by multi-national oil companies. However, for these purposes, the infrastructure left after the collapse of the Soviet Union is inadequate. Numerous new pipelines and pipeline expansions in each of the cardinal directions have been proposed, and some have been constructed.

## West

Changing the region's energy flow to an East-West axis towards Europe, from the existing North-South axis towards Russia (which will effectively minimize dependence on Russia), is integral to the development goals of these newly independent states. The region's three biggest pipeline projects, the Caspian Pipeline Consortium Project (CPC), the Baku-Tiblisi-Ceyhan oil pipeline (BTC),



and the South Caucasus natural gas pipeline (a.k.a.Baku-Tiblisi-Erzurum --BTE) are establishing the framework for this new axis.

The **Caspian Pipeline Consortium** project connects Kazakhstan's Caspian Sea area oil deposits with Russia's Black Sea port of Novorossiysk (see map). Oil loaded at the port of Novorossiysk is then taken by tanker to world markets. Although the pipeline transverses Russia and was developed in conjunction with the Russian government, development of the CPC has, for the first time, given the Caspian Sea region a viable alternative to the Russian dominated northern export routes (namely Atyrau-Samara, see below). The pipeline's first crude oil was loaded at Novorossiysk on October 15, 2001, and the pipeline was officially opened on November 27, 2001. Most of the oil routed through CPC comes from Kazakhstan's Tengiz field, however, several other Kazakhstani fields are developing spur connections to the pipeline. Accordingly, these new connections are expected to increase throughput from 260,000 bbl/d, in 2002, to between 350,000 and 415,000 bbl/d by the end of 2003. Current capacity of the CPC pipeline is 560,000 bbl/d, with plans to increase capacity to 1.34 million bbl/d.

However, additional Caspian oil exports through the CPC pipeline will increase congestion in Turkey's Bosporus Straits, which connect the Black Sea to the Mediterranean. Turkey has raised concerns about the ability of the Bosporus Straits,



## already a major <u>chokepoint</u> for oil

tankers, to handle the additional tanker traffic, given that most of Russia's existing oil export pipelines also terminate at Novorossiysk. <u>Turkey has stated its environmental concerns</u> about a possible collision (and ensuing oil spill) in the Straits as a result of increased tanker traffic from the launch of the CPC's pipeline. As a result, there are a number of options under consideration for oil transiting the Black Sea to bypass the Bosporus Straits. (For more information, see: <u>Caspian Sea</u> <u>Region: Bosporous/Black Sea Issues</u>)

Another westward pipeline, **Baku-Tbilisi-Ceyhan**, will export Azeri (and quite possibly Kazakhstani) oil along a 1,040-mile route from Baku, Azerbaijan via Georgia to the Turkish Mediterranean port of Ceyhan, allowing oil to bypass the Bosporus Straits (see map). Construction of the 1-million-bbl/d pipeline, which is estimated to cost \$2.9 billion, is scheduled to be completed in 2004, with oil to begin flowing in 2005.

The BTC project has faced numerous challenges in its development. After allaying initial fears that the pipeline was technically infeasible given its considerable distance through rugged terrain, the projects developers now face criticism from local and international non-governmental organizations which consider the project to be environmentally hazardous, threatening to regional archeological treasures, and in violation of international human rights. Critics of the pipeline have taken theses grievances to the major international financial institutions involved in the project, the World Bank and the European Bank for Reconstruction and Development (EBRD), and have asked that they withdraw their support. According to statements from BTC Co., the pipeline's developer's, plans are still on schedule for completion in fourth quarter of 2004.

A third natural gas pipeline, known as the "South Caucasus Pipeline," a.k.a "**Baku-Tbilisi-Erzurum**", or "BTE", will run parallel to the Baku-Tbilisi-Ceyhan oil pipeline for most of its route before connecting to the Turkish infrastructure near the town of Erzurum. The South Caucasus pipeline is designed to carry natural gas from Azerbaijan's Shah Deniz field, and have a capacity of 258 Bcf per year. The project is scheduled to be completed in time for the Shah Deniz project's first contracted exports to Turkey in 2006.

#### East

However, there is some question as to whether westward to Europe is the right direction for Caspian oil and natural gas. Oil demand over the next 10 to 15 years in Europe is expected to grow by little more than 1 million bbl/d. Oil exports eastward, on the other hand, could serve Asian markets, where demand for oil is expected to grow by 10 million bbl/d over the next 10 to 15 years. In particular, <u>Chinese</u> oil consumption is projected to rise dramatically.

But, supplying this Asian demand would necessitate building some of the world's longest pipelines. Geographical considerations would force any pipelines to head north of the impassable mountains of Kyrgyzstan and Tajikistan across the vast, desolate Kazakh steppe, thereby adding even more length (and cost) to any eastward pipelines.

# South

An additional way for Caspian region exporters to supply Asian demand would be to pipe oil and natural gas south. This would mean sending oil and natural gas through either <u>Afghanistan</u> or <u>Iran</u>. The Afghanistan option, which Turkmenistan has been promoting, would entail building pipelines across war-ravaged Afghan territory to reach markets in <u>Pakistan</u> and possibly <u>India</u>. With the ouster of the Taliban in Afghanistan in December 2001, proposals to build a <u>Trans-Afghan natural</u> gas pipeline and the Central Asian Oil Pipeline have re-emerged. However, in July 2003, one of the Trans-Afghan natural gas pipeline's key supporters, the <u>Asian Development Bank</u>, called for

additional feasibility studies, thus further delaying the project.

Development of a southern pipeline through Iran would be problematic under the Iran and Libya Sanctions Act, which imposes sanctions on non-U.S. companies investing in the Iranian oil and natural gas sectors. U.S. companies already are prohibited from conducting business with Iran under U.S law. In 1997, however, Turkmenistan and Iran completed the \$190 million Korpezhe-Kurt Kui pipeline linking the two countries, thereby becoming the first (and so far, only) natural gas export pipeline from Central Asia to bypass Russia. Turkmenistan and Kazakhstan have initiated lowvolume oil "swap" deals with Iran, delivering oil in tankers to refineries in Iran's northern regions in exchange for similar volumes of crude at Iranian ports in the Persian Gulf. Iran has recently undertaken efforts to upgrade its domestic distribution network to allow for swap capacity to increase from roughly 50,000 bbl/d to 150,000 bbl/d by the end of August 2003.

#### North or Northwest

For its part, Russia has proposed multiple pipeline routes that utilize its existing and proposed infrastructure. Shortly after independence, two new northwesterly pipelines were constructed known as the "Northern" and "Western" Early Oil Pipelines, which extend from Baku to Novorossiysk (Russia), and Baku to Supsa (Georgia), respectively, and have a combined capacity of roughly 215,000 bbl/d (see map). Also, an existing northbound pipeline from Atyrau in Kazakhstan to Samara in Russia has been upgraded, but is expected to become relatively less significant as throughput at CPC increases. However, there are political and security questions as to whether the newly independent states of the former Soviet Union should rely on Russia (or any other country) as their sole export outlet, and Caspian region producers already have expressed their desire to diversify their export options.

#### **Regional Conflicts**

In almost any direction, Caspian region export pipelines may be subject to regional conflicts, an additional complicating factor in determining final routes. Despite the ouster of the Taliban government in December 2001, Afghanistan remains scarred and unstable after years of war. The Azerbaijan-<u>Armenia</u> war over the Armenian-populated Nagorno-Karabakh enclave in Azerbaijan has yet to be resolved. Separatist conflicts in Abkhazia and Ossetia in <u>Georgia</u> flared in the mid-1990's, and on August 9 2002, Russia's Defense Minister said that the Georgia's Pankisi Gorge had emerged as the world's second main "nest" of terrorism. Russia's war with Chechnya has devastated the region around Grozny in southern Russia. In addition, the Uzbek government has been cracking down on Islamic fundamentalism in Uzbekistan. (For more information, see: <u>Caspian Sea Region:</u> <u>Regional Conflicts</u>)

#### **Environmental Issues**

The spotlight on the Caspian region's oil and gas reserves also highlighted the appalling state of the environment in and around the Sea. Years of neglect have left the Sea and the surrounding region in a precarious position environmentally. Petrochemical and refining complexes on the Absheron peninsula in Azerbaijan are major sources of land-based pollution, and discharges and spills from oil and gas drilling--both onshore and in the sea itself--have had serious impacts on the environment. Untreated waste from the Volga River--into which half the population of Russia and most of its heavy industry drains its sewage--empties directly into the Caspian Sea, while pesticides and chemicals from agricultural run-off are threats to the Sea's flora and fauna. Thousands of seals that live in the Caspian Sea have died since 2000 due to pollution that weakened their immune systems, and overfishing, especially of the prized sturgeon, has caused a dramatic decline in fish stocks. (For more information, see: Caspian Sea Region: Environmental Issues)

In addition to the existing problems, several other issues could compound the Caspian region's

environmental difficulties. <u>Oil and gas production</u> in the Sea inevitably will result in the construction of <u>pipelines and infrastructure</u> to export these resources to consumers, raising the possibility of loss of habitats for marine life as well as the specter of accidental spills. The <u>mysterious rise of the Caspian Sea</u> could flood oil wells, rigs, and earth-walled reservoirs on the coastline, spilling into water tables and contaminating drinking water supplies. A lack of regional cooperation, highlighted by the still <u>unresolved legal status of the Caspian Sea</u>, as well as weak <u>environmental laws and regulations</u> and the inability to enforce them, already is affecting efforts to protect the Caspian's environment. Continued economic development, improved regional cooperation, and the implementation of modern technology will be required in order to improve <u>the state of the environment in and around the Caspian Sea in coming years</u>.

Sources for this report include: Agence France Presse, BBC Monitoring Central Asia Unit, Central Asia & Caucasus Business Report, Caspian News Agency, Caspian Business Report, CIA World Factbook, The Economist, Environment News Service, The Financial Times, FSU Oil and Gas Monitor, Global Inisght, Hart's European Fuels News, Interfax News Agency, The Moscow Times, PlanEcon, PR Newswire, Radio Free Europe/Radio Liberty, Reuters, RosBusinessConsulting Database, The Times of Central Asia, Turkish Business News, Ukraine Business Report, Stratfor, U.S. Department of Energy, U.S. Energy Information Administration, and U.S. Department of State, World Markets Research Centre.

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Contact:

David Correll David.Correll@eia.doe.gov Phone: (202) 586-7057 Fax: (202) 586-9753

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