

## Case Study From



### Oil Monetization in Azerbaijan<sup>1</sup>

*Azeri oil production peaked at 500,000 b/d during WWII and fell significantly, especially after the break-up of the Soviet Union. Today, most of the production of 280,000 b/d is offshore. Historically, offshore output has been stable, but a lack of investment has led to declines in new drilling and rehabilitation of existing wells. Since 1994 AIOC deal, though, foreign investors signed 22 major PSCs. The oil industry now accounts for 70-80% of total foreign investment. By 2010, investment in the oil industry may reach \$23 billion. New development is expected to boost exports to 1 mb/d by 2010 and 2 mb/d within 20 years.*

*But, uncertainty over the Caspian Sea's legal status and the difficulty of getting equipment into this landlocked region complicate development plans. The lack of western style legal and business framework for the petroleum sector presents another challenge. Also, current transportation system for exports is not sufficient for the projected levels. The AIOC exports its production via a Russian route and a Georgian route, both with limited capacity. A new main export pipeline of 1 mb/d capacity is deemed necessary. Several options, all with economic and geopolitical pros and cons as well as supporters and opponent, have been considered in the past, but the Baku-Ceyhan line now appears to be the final choice. However, the concerns about the cost of the pipeline and the ability of Azeri exports to fill the line remain. Key questions regarding the Azeri experience are:*

- *What are the characteristics of the past Azeri strategy that helped attract foreign investment?*
- *What strategy would help Azerbaijan resolve the remaining problems with further development of the country's oil reserves and better access to global oil markets?*



### Background

Azerbaijan covers an area of 86,600 square km on the southeastern flanks of the Caucasus Mountains, with its eastern portion bordering the Caspian Sea. About 25% of its population of 8 million people lives in the capital, Baku. GDP per capita was about \$3,300 (PPP-based) in 2000. Azerbaijan is one of the oldest oil exporters in the world and is also endowed with fertile agricultural land and a well-educated labor force.

Following independence, trade among the Former Soviet republics collapsed. In Azerbaijan, this was exacerbated by the conflict with Armenia and fighting in Chechnya that restricted oil exports, leading

<sup>1</sup> This case study was prepared using publicly available information.

to output decline and high inflation. GDP declined about 63% between 1988 and 1994. This decline does not, however, reflect the underground economy, which is estimated to account for over half of the overall economy. Nevertheless, virtually all sectors of the economy were hard hit, with output in agriculture falling by about 43% and in industry about 60% during the period from 1989 to 1994.

The oil and gas sector was particularly affected from the growing problems with poor infrastructure, production practices, and depletion of oil fields. In what was described as "the deal of the century," an international consortium - the Azerbaijan International Operating Company (AIOC) - signed an \$8-billion, 30-year contract in September 1994 to develop three fields - Azeri, Chirag, and the deepwater portions of Guneshli - with total reserves estimated at 3-5 billion barrels.

Fueled by foreign investment in oil and gas, real GDP rose by almost 6% in 1997, 10% in 1998, 7% in 1999 and 11% in 2000 with 2001 and 2002 seeing 5% growth. Also, with the gradually stabilizing political situation and the ceasefire in the Armenian conflict, the government began implementing an economic program supported by the World Bank and the IMF. Inflation fell from 1,664% in 1994 to less than 1% at the end of 1997. The consolidated budget deficit has been brought down to 5.6% in 1999. Azerbaijan was minimally affected by the 1998 Russian ruble crisis, but falling oil prices in 1998 severely curtailed investment in the petroleum industry. Foreign direct investment fell significantly, from \$1 billion in 1998 to \$355 million in 1999, following completion of the initial round of investments in offshore oil and gas exploration.

Domestic and foreign trade regimes have been substantially liberalized with the abolition of the state order system, export and import quotas, licensing requirements, and export registration scheme. The privatization law has been passed by parliament early in 2000. The privatization program envisages the sale of two thirds of state assets in the productive sector. In early 1995, the government introduced laws on agrarian reform and the reform of state and collective farms. The July 1996 Land Reform Law has facilitated transfer of land to private and collective ownership. Land titling and land registration systems have been put in place, and about 85% of titles have been distributed.

### *Energy Sector*

Azerbaijan experienced an oil boom at the beginning of the 20th century and later served as a major refining center in the U.S.S.R. and produced 70% of the U.S.S.R.'s oilfield equipment. Oil production peaked at 25 MT a year (500,000 b/d) during World War II, and fell significantly after the 1950s as the U.S.S.R. redirected resources elsewhere. The break-up of the U.S.S.R. further damaged the industry. Oil production fell from 13.8 MT a year (280,000 b/d) in 1987 to 9.3 MT a year (186,000 b/d) in 1995.

Proved oil reserves are estimated at about 7 billion barrels, or less than 1% of the world's total. But, some estimates for crude oil reserves are higher: the EIA reports a range of 3.6-12.5 billion barrels. Similarly, Azerbaijan has rich gas reserves although the proved reserves are estimated at 0.85 tcm, or less than 1% of the world's total. Increased E&P activity is expected to boost oil and gas potential of Azerbaijan. Oil production reached 14.9 MT a year (300,000 b/d) in 2000. Consumption has dropped sharply from 8.5 MT a year (170,000 b/d) in 1990 to 6.3 MT a year (125,000 b/d) in 1999 but bounced back to 7.4 MT in 2000. As a result, Azerbaijan exported about 7.5 MT a year (150,000 b/d) of crude oil in 2000. Currently, the country is not a significant exporter of natural gas. Azerbaijan does not produce coal and consumes very little.

**Fossil Fuel Reserves, Production and Consumption in Azerbaijan (2000)**

	<b>Proved Reserves</b>	<b>Production</b>	<b>Consumption</b>
Oil	0.9 billion t. (6.9 billion b.)	14.9 MT/yr (300,000 b/d)	7.4 MT/yr (150,000 b/d)
Natural Gas	0.85 tcm (30 tcf)	5.3 bcm/yr (0.5 bcf/d)	5.4 bcm/yr (0.5 bcf/d)
Coal	NA	None	Minimal

Sources: Energy Information Administration (EIA), BP World Energy

Azeri crude is refined domestically at two refineries: the Baku refinery with a capacity of 238,978 b/d, and the Novo-Baku refinery with a capacity of 202,830 b/d. Both of these refineries have been running at well below capacity, with overall refinery utilization rates at about 40% in 1997. Azerbaijan estimates that upgrades at the two refineries will cost \$600-700 million.

Azerbaijan has about 5,000 MW of power generation capacity, 80% thermal (2/3 fueled by mazut and the rest by natural gas) and 20% hydro. But, in 1999, thermal plants generated 89% of 15.4 terawatt-hours consumed. The Soviet-era power infrastructure is in poor condition. Since independence, there has been almost no public investment or maintenance of infrastructure, and Baku experiences occasional shortages. Difficult economic conditions, high taxes, and non-payment by customers have left the power sector without sufficient working capital and investment funds. Although tariffs have been raised several times, rates are still low and collection is not adequate. The industry is scheduled for privatization.

**Oil Industry**

*Infrastructure Issues*

Most of Azerbaijan's infrastructure, built during the Soviet period, is in poor condition. There has been inadequate public investment and maintenance of infrastructure since independence. Roads are inadequate and deteriorating, the power generation and distribution system is in poor condition, and gas, water, electricity, and oil product shortages are common in Baku. Azerbaijan faced a fuel oil shortage at the beginning of 2000, which resulted in problems at power generating plants and cutbacks in electricity to customers. In June 2000, the president issued a decree on measures to improve supply of fuel and energy in Azerbaijan. In order to eliminate an energy crisis, a number of projects have been put into implementation. Construction of new hydro and thermal (mostly gas) plants that would increase the installed capacity by 640 MW or 20% started. Other projects were geared towards ensuring the system reliability. In addition, modern equipment was put into operation to save up to 600,000 tons of fuel.

However, there is insufficient fight with energy losses and fuel misuse. Azerigaz have not taken necessary measures to prevent leakage of natural gas during transmission and unauthorized connection to main pipelines, and have not implemented fixing and repair activities in a timely and complete manner. SOCAR allowed the leakage of oil and gas during transmission from offshore fields and theft of oil and gas from pipelines. There are shortcomings in registration of output in oil refineries and fuel supply to electric power plants. In order to meet fuel oil requirement of power plants, technological regime of refineries have been changed to increase fuel oil output which leads to reduced efficiency and hurts international competitiveness of these refineries.

In order to address these issues, the presidential decree called for improved efficiency in generation and transmission of electricity and heat as well as oil, products and gas. The decree required building new facilities and renovation of existing ones. Metering and billing was also supposed to be improved. Better monitoring of transmission systems and

prevention of theft were also required from the state companies responsible for those services. SOCAR was required to import gas with the revenues from sale of oil and oil products through special account. The cabinet of ministers was to adopt a special resolution of exemption of imported gas from VAT and customs duties. SOCAR, Azerenerji and Azerigaz were to ensure stock of 450,000 tons of fuel oil and at least 500 million cm of natural gas by October 2000. SOCAR redirected its crude oil exports during winter for domestic needs, and fired Azerigaz and Azerenergy energy officials for negligence.

### *Foreign Investment in the Oil and Gas Industry*

Azeri administration has taken care to ensure that powerful neighbors such as Russia and Iran receive a stake in the country's oil development. Russia desires to maintain a sphere of influence in the Caspian region and to benefit from its oil boom. Iran, home to 20 million Azeris, is Azerbaijan's largest trading partner. In addition, Azerbaijan has worked to increase economic cooperation with Georgia and Turkey. Baku is poised to become a major regional transportation and communications hub. The TRACECA Program (Transport System Europe-Caucasus-Asia, informally known as the Great Silk Road) was launched at a European Union (EU) conference in 1993, and encourages the development of a transport corridor from Central Asia, through the Caucasus, across the Black Sea, to Europe.

The energy sector (and, in particular, the oil and gas subsector) represents the most promising source of exports and economic growth in the medium term. The oil industry currently accounts for 70% to 80% of total foreign investment in Azerbaijan, and foreign direct investment increased from \$15 million in 1993 to \$827 million in 1999, about 20% of Azerbaijan's GDP. In 1998-99, oil-related revenue brought in nearly 50% of budget revenues, including 57% of total indirect taxes. To encourage additional investment, President Aliyev signed numerous treaties protecting the rights of foreign investors, and announced the creation of a new foreign investments agency that would become the sole institution responsible for carrying out state policy on foreign investments.

With Azerbaijan's policy change on the development of onshore deposits that allows investors to work through Production Sharing Contracts (PSCs) as well as traditional joint ventures (JVs), several project agreements were signed in 1999 and 2000. In a JV, a foreign company can have a maximum ownership stake of 49% and must pay eight separate taxes, while a PSC allows an investor to hold even a greater interest than SOCAR, and is subject only to the profit tax.

The switch from JVs to PSCs is prompted by the JVs' tax regime, estimated from 65-94% of revenue with additional weight from the expensive enhanced oil-recovery required by many of the onshore fields due to surplus water after decades of Soviet reservoir management. Also problematic is the requirement that JVs sell base oil - the amount of oil (or oil-equivalent) produced before an investor joined the project - to SOCAR. SOCAR's debt to JVs for oil received totaled over \$100 million by the time PSCs became a possibility in 1997. Without generating profits, JVs could rarely boost investment or increase the production rate to a level that would enable them to produce enough oil to sell to solvent consumers. And none of the JVs were producing at a higher level than the base in any case. SOCAR in turn has considered the small foreign companies that formed the JVs as inexperienced in upstream activities, and unable to make the larger investments that would be required.

SOCAR has created a new model to attract foreign investment: The Revenue Sharing Agreement (RSA). It is modeled after the PSC form with all its benefits and principles that allow an alliance to operate like a foreign subcontractor, avoiding the adverse tax consequences of the joint venture. This is a flexible, robust alliance structure that is familiar to the Azerbaijan authorities and international contracting community. Similar to a PSC, the RSA would aim to create the unique fixed term legal and fiscal framework for the

existence of an alliance and its corporation with Azeri industry. It would be sanctioned by the Azeri Government and incorporated as a national law as an alternate structure to the JV structure. Some of the RSA's key features are:

1. All loan and finance costs on each phase are to be repaid to the international partner before any profit distributions commence (Phased Cost Recovery is negotiable);
2. After repayment of loans and finance costs, the profit of each phase could be distributed as negotiated and this arrangement will be reflected in the RSA.
3. Regarding new capital, the RSA will be flexible arrangement whereby if Azeri and international partners mutually agree, new participants can join the RSA and any new participation equity can be partly used to repay existing loan. This would mean that distributions can be made at an earlier date.
4. RSA framework would provide contractor/investors with protection against changes in the laws affecting the resultant alliance.

The main differences between JV and RSA are summarized in the following table:

ISSUE	JOINT VENTURE	RSA ALLIANCE
Profits Tax	32% tax on Profits Not all business costs are deductible	5% tax withheld on revenues attributable to services performed only in Azerbaijan for CONSORTIA
Value Added Tax (VAT)	Must be paid since Azeri JV's are not covered PSC and tax protocol	Exempt from VAT
Dividends	Taxable at 15%	Not Taxable
Banking	Must get permission from Central Bank to open foreign bank account Payroll must be in Manats Restricted withdrawals and repatriation of Dollars	No restriction on foreign bank accounts No restriction on payroll currency No restriction on Dollar withdrawals
Accounting	Must be done in accordance with Azeri standards in Manats	According to international practices
Reporting requirements	Many	Minimal and well defined
Government Audits	Subject to various governmental audits	Not applicable
Labor laws	Subject to Azeri Labor Code predating the PSC which is cumbersome and not conducive to international contract activity	Subject to provisions which are consistent with international practices
Import/Export Protocol	Subject to existing import/export regulations	Similar to provisions of the PSC's

Source: SOCAR 2001

#### *Laws Regulating the Oil and Gas Exploration*

Despite the number of oil and gas deals concluded, until recently, Azerbaijan lacked even the basic modern rules and procedures that normally regulate oil and gas operations, other than the general foreign investment protection laws and regulations. The following table provides a comparison of Caspian countries in terms of the laws and regulations they have to administer their oil and gas industries as of mid-2000. Clearly, Azerbaijan is behind its Caspian neighbors in creating a predictable legal environment that would attract foreign investment.

<b>Legal Status of Azerbaijan in comparison to other Caspian countries</b>				
	<b>Azerbaijan</b>	<b>Kazakhstan</b>	<b>Turkmenistan</b>	<b>Uzbekistan</b>
<b>Petroleum Law</b>	No	Partial	Yes	No
<b>Regulations</b>	No	No	Yes	No
<b>Environmental Law</b>		Yes		Yes
<b>One-stop Shop</b>	No	No	Yes	No
<b>Pipeline Law</b>	No	No	No	No
<b>Tariff Regulations</b>	No	Yes	No	No

However, two laws have recently been enacted that should serve as the basic legal framework for future (and presumably existing) oil and gas contracts. These laws are the Subsoil Law and the Energy Law. Under the Subsoil Law, natural resources such as oil and gas are the sole and exclusive property of the government of Azerbaijan. The Subsoil Law governs the exploration, use, protection and supervision of subsoil reserves located both within Azerbaijan and its sector of the Caspian Sea. The right to engage in E&P activities may be granted to Azeri citizens and entities as well as to foreign individuals and legal entities by special licenses. Licenses are awarded by tender, auction or, in exceptional cases, negotiation. Tenders may be open or closed, and licenses are available to foreign investors for exploration or production or both. While an exploration lot (block) may be granted to several subsoil users, a production license for a lot (block) is granted only to a single subsoil user.

The Energy Law is intended to complete the legal framework affecting subsoil reserves such as oil and gas. While the Energy Law provides a very general framework for use of energy resources, in many instances its provisions appear to contradict the Subsoil Law. Given the fact that neither of these laws has thus far been tested (nor, in some instances, even implemented), it is unclear how these contradictions will be reconciled in practice. It is also unclear whether the Energy Law, which is the more recent of the two, will take priority over the Subsoil Law since it provides the general framework for state energy resources regulation and is not intended to encroach upon specific laws such as the Subsoil Law.

The impact of this new legislation on existing PSCs is another cause for concern, as both laws ignore existing PSCs. Most of the existing PSCs do not correspond to the requirements established by these two laws. Although the general investment protection laws and relevant provisions in PSCs seem to immunize such contracts against adverse effects of future legislation, the complexity of the regulatory framework contained in the new laws suggests the possibility of forced compliance with the requirements in the new legislation. Given the complexity of this regulatory framework, the new legislation may hinder the process of future subsoil deals rather than promote them.

#### *Transportation constraints*

Almost all of Azerbaijan's production increases in recent years have come from the AIOC. Oil revenues from this project are projected to be roughly \$80 billion over the thirty-year life of the AIOC. By the end of 1999, the AIOC had spent about \$2 billion, with cumulative production of 7 MT (51 mb) of oil. The AIOC produced 96,000 b/d in 1999, with production from Chirag expected to reach 100,000 b/d in 2000. AIOC announced that the planned Phase-1 program to develop the Azeri-Chirag-Guneshli block, which will increase production to 400,000 b/d, would not begin until 2004-2005.

However, current transportation system for exports is not sufficient to support the projected exports. The AIOC exports its initial production - the "early oil" - via a northern route through Russia since late 1997 and a western route through Georgia since April 1999, with a combined initial design capacity of about 200,000 b/d. The AIOC has been reluctant to increase exports along the northern route because: 1) it is longer and more expensive than

the western route; 2) the northern route mixes AIOC crude with other crude oils while in transit to Novorossiysk, reducing its value; and 3) the conflict in Chechnya, which occasionally leads to rerouting of 70,000 b/d around Chechnya by rail from Dagestan to Stavropol. Azerbaijan shipped about 85,000 b/d via the western route in 1999. Several proposals have been made to expand each of these routes. AIOC expects production to peak at about 800,000 b/d within the next 15 years. In effect, full-scale development of the AIOC project will be delayed until a decision has been made on the main export pipeline (MEP). The following table summarizes Azerbaijan's options.

#### Export routes for Azeri oil

	Promoters	Length (miles)	Investment (\$ billion) <sup>1</sup>	Throughput (mb/d)	Tariff (\$/barrel) <sup>2</sup>	Market
<b>Northern Pipeline</b>						
Baku-Novorossiysk (early oil)	Russia	850	In use	0.10	2.12	Mediterranean
<b>Western Pipelines</b>						
Baku-Supsa (early oil)	AIOC	550	In use	0.10-0.20	1.98	Mediterranean
Baku-Ceyhan (MEP)	U.S., Turkey, Azerbaijan and Georgia	1125	2.4-2.7	1.00	2.70 Tengiz	Mediterranean
<b>Southern Pipeline</b>						
Baku - Persian Gulf	TOTAL	1560	4.5	1.00	3.40 to 4.05	East Asia
<b>Swap with Iran</b>						
				0.40	1.62 to 1.76	
				0.40-0.80	1.76 to 1.89	
				0.80-1.60	1.89 to 2.16	

Notes: 1. Investment includes all expenses. 2. Collected from different sources, these are rough estimates. All tariffs are for transportation of a ton of crude oil from entry to exit.

A regional pipeline and transit system centered on Azerbaijan is beginning to emerge, but export pipelines have been effectively open only to AIOC and SOCAR. JVs (almost all onshore) were required to sell their oil through SOCAR, with exports through the shipping company Caspian TransCo via rail. In January 2000, oil production by JVs was required to remain in domestic markets for use as feedstock at local refineries, where it was sold at rates far lower than in Mediterranean export markets. The promotion of PSCs over JVs is expected to encourage greater investment and progress in these projects.

Kazakhstan and Turkmenistan also ship oil to Azerbaijan. Chevron has contracted with Caspian TransCo to offload Tengiz oil onto trains at the Ali-Bayramli facility near Baku, to ship the oil via pipeline and rail to the Georgian Black Sea port of Batumi. Shipping volumes have risen from 2,000 b/d in 1996 to an estimated 54,000 b/d in 1999. Caspian TransCo was given the exclusive right to use pipelines belonging to SOCAR, including the oil-loading facility at Ali-Bayramli. The company also has been working with the Azeri

government to overhaul and expand the oil terminal facilities at Dyubendi, 30 miles (47 km) northeast of Baku, to allow for further increases. The port's total freight capacity will be back to the 1986 level of 30 MT per year (600,000 b/d). After the collapse of the Soviet Union, use of the port declined dramatically and the number of employees fell from 3,000 to 800. Currently, trade volumes are increasing due to trans-Caspian oil shipments from Kazakhstan. The oil terminal is the transit point for crude oil shipments from the Kazakh port of Aktau. From the tankers, crude oil moves via a two-km pipeline, with a capacity of 73,300 b/d, to railway facilities.

Pipeline connections are also available to SOCAR's pipeline system and the storage facilities of the Caspian TransCo. However, Kazakh crude is lighter than Azeri crude and thus generally not mixed. Chevron would like to transport 10 MT (200,000 b/d) of Kazakh crude to Dyubendi. Expansion of the pipeline capacity and further rehabilitation of the port will be necessary to handle the additional volumes of crude oil. Currently, one of two oil terminals is too shallow to accommodate the 12,000 deadweight ton oil tankers and thus must be dredged.

Iran has also proposed a 190-mile pipeline to transport oil from Baku to Tabriz in northwest Iran, where it would also connect with the existing Iranian pipeline network and refineries. French companies Elf Aquitaine and TotalFina have proposed building a 200,000 - 400,000 b/d pipeline for this plan. Azerbaijan wants to see progress on disputes with Iran concerning the division of the Caspian as well as improved relations between Iran and the West before considering such a project.

In mid-1998, Azerbaijan approached Ukraine to participate in talks on Caspian main oil transport to the European markets. Ukraine was to complete construction of the Odessa-Brody pipeline by end of 1998, thus providing direct access to Europe through Ukraine for transporting the Caspian Sea early oil by a cheaper route than what was available. Besides providing an alternative route, the Ukraine pipeline was considered both economically advantageous and backed by the region's political stability.

In addition, Romania proposed to Azerbaijan an economically profitable and politically stable transportation route for up to 30 MT to Europe via the Black Sea port of Constanta. Oil could be transported by tankers from the Georgian port Supsa to Constanta and then on to Slovenia, the Czech Republic, Croatia, Austria and Germany by an existing pipeline network. Alternatively, crude oil could be processed at oil refineries in Constanta and finished oil products could be exported to Central Europe.

In November 1999, Azerbaijan, Georgia, and Turkey signed agreements affirming the Baku-Ceyhan route for the MEP. AIOC and in particular BP now fully support this route and a parallel gas line to export the gas from the Shah Deniz discovery is also considered. The construction of Baku-Ceyhan, which is scheduled to start in 2002, will lower the need for other alternatives listed in our table or discussed elsewhere.

#### *Legal Status of the Caspian Sea*

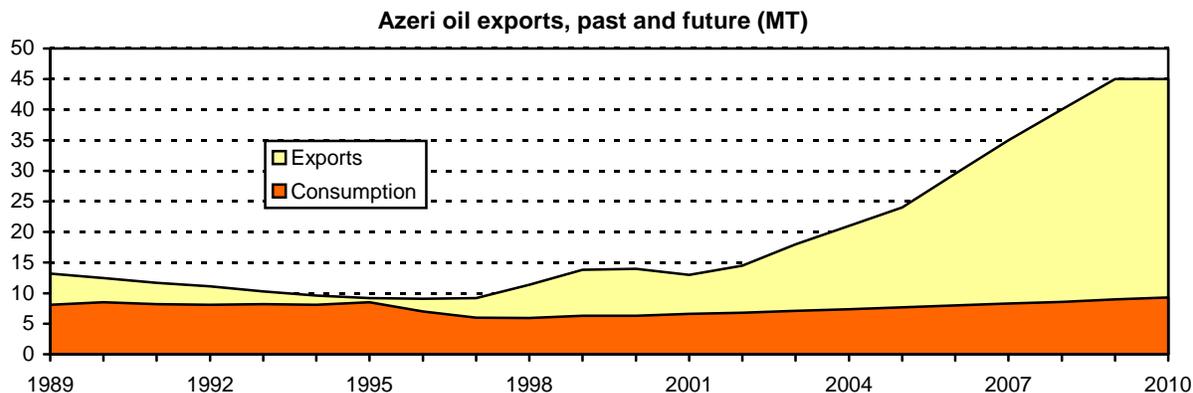
Continued delays in resolving the debate about territorial rights of the littoral states of the Caspian Sea may have a negative impact on Azerbaijan's further development of offshore oil and gas reserves. Currently, Iran and Turkmenistan are supporting the so-called "condominium" alternative – division of the sea into five equal parts. On the other hand, Azerbaijan, Kazakhstan and Russia prefer the principle of sectoral division with some differences: Baku supports the division of both seabed and waters, but Kazakhstan and Russia support the division of the seabed only.

In particular, Azerbaijan is concerned by two disputes. The first is between Azerbaijan and Turkmenistan over the Kyapaz field (called Serdar field by the Turkmens). Azerbaijan

developed the field that was assigned to her in 1970 by the Soviet Ministry of Oil and Gas. The second dispute concerns the Iranians awarding RD/Shell a license to conduct seismic surveys in a region claimed by Azerbaijan. Azeris plan to open some blocks in the same region to bidding process. But, without a final resolution on the legal status of the Caspian Sea, the tender may fail to attract sufficient interest.

### The Future

The following chart clearly indicates the collapse of the Azeri oil industry after the independence and its recovery since 1995 due mostly to foreign investment the country has been able to attract. The full impact of the past and future investments is represented as a significant increase in exports from 7.5 MT in 2000 to more than 35 MT by 2010.



But many challenges remain for Azerbaijan to reach this potential. The problems with the country's crumbling infrastructure, concerns about laws and regulations administering the energy industry, the development of transportation networks within a complex geopolitical environment and the resolution of the legal status of the Caspian Sea are some of the most important issues that will play key roles in Azerbaijan realizing the forecasted export volumes. In addition, the discovery of gas instead of oil in Shah Deniz not only complicates the economics of MEP but also presents Azerbaijan with a new variable to include in its strategic planning. Consequently, the question, perhaps more complicated, remains: given this environment, what strategy should the country follow to ensure the secure development of its oil reserves?

#### Sources:

Business Information Service for the Newly Independent States of the U.S. Department of Commerce, [www.bisnis.doc.gov](http://www.bisnis.doc.gov)

The Oil & Gas Journal web site, [ogj.pennnet.com](http://ogj.pennnet.com)