Chapter Two
HYDROCARBON ENERGY SECTOR IN KAZAKHSTAN: FROM PAST TO PRESENT
Chapter Two

Outline

This chapter discusses the hydrocarbon energy sector in Kazakhstan from the viewpoint of potential and challenges. Recent developments in this sector and environmental concerns are also briefly covered.

2.1 Historical Perspective

The presence of oil in Central Asia is recorded as far back as the thirteenth century. The nineteenth-century Great Game had been lately based on competition for power and influence by asserting control over oil reserves of the Central Asian region. In both World Wars, oil-fields of the region were the bones of contention. In the late 1800s, Caspian oil resources were developed by the great oil barons of the day like the Nobel Brothers and the Rothschilds. In terms of commercial competitiveness, as far back as 1895, Russia, fearing overwhelming Western – and particularly USA – control over its oil markets, deliberately undermined a substantial deal in the region between the domestic oil company and western companies. Throughout the twentieth century, therefore, Caspian oil, being the source of contention between external superpowers, has played a key strategic role in world politics.

Some of the largest oil deposits in the region are located in Kazakhstan. It has a well-developed oil and gas industry since 1911, when oil was first extracted in the west of the republic. Since then, 160 oil and gas deposits have been found. Major fields are Tengiz (mostly oil), Karachaganak (mostly gas), Kashagan (oil), Uzen, Korolev, Tenge,
Uritau (gas), and Zhanazhol. Till 1991, Kazakhstan, mainly the supplier of primary resources, was lacking in processing or downstream industries. Pre-independence performance is given in the table below:

Table 2.1: Production of Oil and Gas in Kazakhstan

<table>
<thead>
<tr>
<th>Year</th>
<th>Oil (in million tons)</th>
<th>Natural Gas (in billion cubic m.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>-</td>
<td>4.3</td>
</tr>
<tr>
<td>1985</td>
<td>22.8</td>
<td>5.5</td>
</tr>
<tr>
<td>1990</td>
<td>25.8</td>
<td>7.1</td>
</tr>
<tr>
<td>1991</td>
<td>26.6</td>
<td>7.9</td>
</tr>
</tbody>
</table>


2.2 Potential and Infrastructure

Kazakhstan is important to world energy markets because it contains significant oil and gas reserves. These reserves are expected to be in excess of domestic needs over a long period of time. According to the United States Energy Information Administration, Kazakhstan has about 40 percent of oil reserves and 25 percent of natural gas reserves in the Caspian Sea region (see table overleaf). Most of the production facilities or deposits of the country are located in the western part of the country. In particular, the Tengiz oil field alone is estimated to contain between 6 and 9 billion barrels of proven oil reserves.

Table 2.2: Caspian Region Oil and Gas Reserves

<table>
<thead>
<tr>
<th>Year</th>
<th>Kazakhstan</th>
<th>Total Caspian Sea Region*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proven oil reserves</td>
<td>10.0-17.6 BBL</td>
<td>18.4-34.9 BBL</td>
</tr>
<tr>
<td>Possible oil reserves</td>
<td>92 BBL</td>
<td>235 BBL</td>
</tr>
<tr>
<td>Total oil reserves</td>
<td>102-110 BBL</td>
<td>253-270 BBL</td>
</tr>
<tr>
<td>Proven gas reserves</td>
<td>53-83 Tcf</td>
<td>263-337 Tcf</td>
</tr>
<tr>
<td>Possible gas reserves</td>
<td>88 Tcf</td>
<td>328 Tcf</td>
</tr>
<tr>
<td>Total gas reserves</td>
<td>141-171 Tcf</td>
<td>564-665 Tcf</td>
</tr>
</tbody>
</table>

*Includes Azerbaijan, Kazakhstan, Turkmenistan, Uzbekistan and Caspian regions of Iran and Russia.

BBL- billion barrels, Tcf-Trillion cubic feet


Oil

Apart from oil fields mentioned above, Kazakhstan has three major oil refineries supplying the northern region (at Pavlodar), western region (at Atyrau), and southern region (at Shymkent). The refinery at Pavlodar (162,666 BL/d capacity) is supplied mainly by a crude oil pipeline from Western Siberia, the Atyrau refinery (104,427 BL/d capacity) runs solely on domestic crude from Northwest Kazakhstan, and the Shymkent refinery (160,000 BL/d capacity) currently uses oil from Kazakh fields at Kumkol, Aktyubinsk, and Makatinsk, but utilisation is only 60% because it is unable to process other oils. Large distance between major deposits and refineries has resulted in less than optimal utilisation of the potential.
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Atyrau and Aktau on the Caspian Sea are oil ports of Kazakhstan. In March 2001, the Caspian Pipeline Consortium's (CPC) pipeline was launched, sending Kazakh oil for export from the Tengiz field in western Kazakhstan to the Russian Black Sea port of Novorossiisk. Although the CPC pipeline has an initial capacity of 140,000-160,000 BL/d, the pipeline's capacity eventually will increase to 1.34 million BL/d, allowing Kazakhstan to boost its oil exports substantially. Kazakhstan's largest oil export line prior to the opening of the CPC pipeline was the Western Kazakhstan pipeline system, which transports oil from fields in Atyrau and Mangistau in the northern Caspian region to Russia. This 1,800-mile pipeline runs from Uzen-Atyrau-Samara has accounted for most of Kazakhstan's oil exports. Although it has a capacity of 240,000 BL/d, exports have been limited by Kazakhstan's annual oil export quota through the Russian pipeline system. Kazakhstan's oil export quota in 2000 was increased to 170,000 BL/d, and the pipeline's capacity will be increased to 310,000 BL/d with the addition of another pumping station. Another export pipeline is the Kenkyak-Orsk line that transports oil from western Kazakhstan to Russia. This pipeline runs from the Aktyubinsk fields to the Orsk refinery in Russia, and has a capacity of 130,000 BL/d.

Oil is imported via the Eastern Kazakhstan and Central Asia pipeline system that transports oil 1,268 miles from Russia to southern Kazakhstan. The pipeline has a capacity of 460,000 BL/d, and brings Siberian oil to the Pavlodar refinery in Kazakhstan. The other major
pipeline transports oil from the Kumkol fields in central Kazakhstan to the Shymkent refinery in southern Kazakhstan.

Natural Gas
Kazakhstan's giant Karachaganak field (having more than 40% of Kazakhstan's reserves), located close to the Russian border and 240 miles from Russia's Orenburg gas field, is believed to contain 2.4 billion tons of condensate (17.5 billion barrels) and 16 trillion cubic feet (Tcf) of gas. Thus far, development of the field has concentrated on gas condensate. According to the Kazakh government, in 2000 the Karachaganak field produced 4.6 million tons (92,000 BL/d) of liquid hydrocarbons, with production eventually set to increase to 9-12 million tons (180,000-240,000 BL/d) of condensate a year. However, development of the field has been hampered because the former Soviet Union intended for this gas to be processed at Orenburg in Russia and exported via pipelines from Russia. Since Kazakh gas now is a competitor with Russian gas, the Orenburg plant has accepted only a fraction of Karachagnak's potential output. In addition, although Russia's Gazprom originally agreed to take a 15% stake in the consortium developing Karachaganak in exchange for processing and exporting the gas, it has since left the project.

Kazakhstan's other significant producing areas include the Tengiz, Zhanazhol, and Uritau fields, with the undeveloped offshore areas also believed to hold large amounts of gas. In addition, rising associated gas production at the Tengiz field will result in Tengiz becoming the
second largest producing field for natural gas in Kazakhstan. By 2012, Kazakhstan expects to produce up to 47 Bcm (1.7 Tcf) of gas from Kashagan, Karachaganak, and Tengiz.

The Kazakh gas sector faces a lack of infrastructure, especially pipelines. Although six gas pipelines connect Kazakhstan to other Central Asian republics and Russia, gas-producing areas within Kazakhstan in the West are not connected to consuming areas such as the populous Southeast and industrial North. As a result, Kazakhstan has two separate gas pipeline networks, in the West and in the Southeast. Several gas export pipeline options from the Caspian Sea region are in development or under consideration. In the meantime, however, Kazakhstan does serve as an important gas transit centre for Turkmen and Uzbek gas to Russia and beyond.

2.3 Post Independence Performance

Kazakhstan is the second largest oil producer among former Soviet republics after Russia, producing over half a million barrels per day (BL/d). Almost half of Kazakh production comes from three large onshore fields - Tengiz, Uzen, and Karachaganak. Kazakhstan has been eager to tap its production potential of over 3 million BL/d. Figure below shows surplus production of oil in Kazakhstan.
Figure 2.1: Kazakhstan Oil Production and Consumption

From the figure 2.1, it is evident that with increasing production and stagnant consumption, Kazakhstan is expected to generate huge surplus for exports. Former Prime Minister Nurlan Balgimbayev (now the head of Kazakhoil) has estimated that Kazakhstan could earn $700 billion in revenues (including taxes) from offshore oil and gas fields over the next 40 years\(^2\).

In natural gas, however, the situation is opposite as shown in the figure overleaf:

\(^2\) US Energy Information Administration, Ibid.
Despite the proven reserves of between 65 and 70 trillion cubic feet, the country must import gas to meet domestic demand because the country's gas sector is underdeveloped. To begin with, the country's proven reserves are mainly located in the western part of the country, while its domestic demand is generally in the South, in the industrial belt between Almaty and Shymkent. The lack of pipelines has hampered Kazakh gas production, with many oil producers flaring the gas instead of using it.

Another important point worth noting here is that domestic demand for both oil and natural gas has contracted significantly mainly because of decrease in income and industrial output and partially because of end of subsidised supplies under erstwhile Soviet Union. Despite its fuel endowments, Kazakhstan, remained a net importer, gradually
declining, of refined products, partly because of falling production in the early 1990s and partly because of remaining barter agreements from the Soviet era. Undeveloped east-to-west transportation infrastructure has prevented efficient supply of domestic fuels to industries, which are energy intensive. As a consequence, Kazakhstan imported oil, natural gas, lubricating oil, gasoline, and diesel fuel from Russia.

Kazakhstan has imported (net) an estimated 318 billion cubic feet of its natural gas consumption needs mainly from Turkmenistan, Uzbekistan and Russia in 1999. The southern areas of Kazakhstan, which need 53 billion cubic feet of gas per year, are almost completely dependent on imported supplies. On the other hand, its net export of oil is estimated as 452,000 BL/d in 20003.

2.4 Initiatives taken so Far

In order to develop its production, Kazakhstan has opened its resources to development by foreign companies, as envisaged in long-term plans for the oil and gas sector4. International oil projects have taken the form of joint ventures, production sharing agreements (PSAs), and exploration/field concessions. In first couple of years, Kazakhstan signed contracts with more than 40 foreign companies from 17 different countries5. From a negligible level in 1990, foreign direct investment in Kazakhstan has increased to 284 million US $ in

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3 US Energy Information Administration, Ibid. (Internet Edition)
5 Sagers, M.J., 'Long-Term Plans for Oil and Gas Sector in Kazakhstan', in Post-Soviet Geography, January 1993. P.68
1995 and has reached a high of 1.16 billion US $ in 1998. Most of these have gone in oil and gas energy sector.

**Major initiatives taken in oil sector** are given below:

- The largest of these is the Tengizchevroil joint venture. In April 1993, Chevron concluded the $20 billion Tengizchevroil joint venture to develop the Tengiz oil field. The Tengizchevroil joint venture produced 190,000 BL/d in 1999, and production could increase to 340,000 BL/d by 2002. Given adequate export outlets, the Tengizchevroil joint venture could reach peak production of 750,000 BL/d by 2010. Tengizchevroil exported about 170,000 BL/d of crude oil in 1999 through the Russian pipeline system; by barge and rail to the Baltic; and by ship, pipeline, and rail to the Black Sea. Tengizchevroil is also considering using the $100 million upgrade of the Tengiz-Aktau pipeline, which will increase the pipeline's export capacity from its current 60,000 BL/d to 160,000 BL/d in 2000.

- Kazakhstan projects that its crude oil and gas condensate production will rise to 660,000 BL/d in 2000, to 750,000 BL/d in 2001, and to 830,000 BL/d in 2002. Most of the growth will be provided by the Tengizchevroil venture, the Karachaganak gas condensate field consortium, and from new fields coming on stream: North Buzachi, Sazankurak, Saztobe, Airankol, and others.

- By 2002, Kazakhstan plans to have other major fields on stream: Alibekmola, Urikhtau, and Kozhasai. In addition, drilling has begun
on the offshore Kashagan block being developed by the Offshore Kazakhstan International Operating Company (OKIOC). This project, with estimated possible oil reserves of up to 40 billion barrels, is being closely watched as an indicator of the Caspian region's oil supply potential. In February 2001, Italy's ENI SpA won a fiercely contested battle to be the operator for the Kashagan field. Kazakhstan expects that the first oil from the field, which OKIOC is still exploring, will flow in 2005. However, in mid-April 2001 the Kazakh Ministry of Natural Resources & Environmental Protection temporarily suspended drilling in the Kashagan block after two recent oil spills.

- Because their pipeline networks are interconnected, Russia and Kazakhstan plan to swap 50,000 bbl/d of oil. Kazakhstan will deliver oil to Russian refineries on the Atyrau-Samara pipeline and Russia will deliver oil on the Omsk-Pavlodar pipeline for processing at Kazakh refineries. Oil refining output fell during early 1999 because of an inability to pay for oil imports, resulting in a shortage of oil products that affected industrial production.

- In addition, Kazakhstan and Iran are poised to begin a swap system whereby Kazakhstan would send its crude oil by ship to the Iranian port of Neka, where it would travel by pipeline to a refinery at Tabriz to be refined and consumed locally. In exchange, Kazakhstan would receive the same volume ready for export at an Iranian port in the Persian Gulf. Kazakhstan and Iran signed an agreement in 1996 under which Kazakhstan must swap up to 120,000 BL/d through Iran by 2006.
• The March 2001 opening of the Caspian Pipeline Consortium's 990-mile pipeline from the Tengiz oil field to the Russian Black Sea port of Novorossiisk will allow Kazakhstan to boost its oil exports substantially. The pipeline's capacity, initially 140,000-160,000 BL/d, eventually will increase to 1.34-million BL/d.

Marketing options existing with Kazakhstan are as given below:

• Russia is Kazakhstan's primary export outlet, with Kazakh oil transiting Russia via Kazakhstan's two export pipelines and by rail en route to world markets. Tengizchevroil shipped oil by rail to Finland and the Ukrainian ports of Odessa and Feodosia, and Embamunaigaz shipped oil by rail to Poland and Finland. Kazakhstan's usage of Russian routes is projected to increase with the expansion of the existing Atyrau-Saransk-Samara export pipeline through Russia to 310,000 BL/d.

• In addition, oil from the Tengizchevroil joint venture will be exported by the Caspian Pipeline Consortium (CPC) to world markets via a 900-mile, $2.3 billion oil export pipeline connecting to the Russian Black Sea port of Novorossiisk. The pipeline commissioned in 2001 with a first phase capacity of 564,000 BL/d, but it will not reach its full capacity of 1.34 million BL/d until about 2015. Chevron has estimated that during its 35-40 year expected life, the pipeline could bring in $8 billion in taxes for Kazakhstan, and development of the Tengiz field and operation of the pipeline would earn about $150 billion for Kazakhstan and Russia. With the completion of Phase I of
the CPC line in mid-2001 and the expansion of the Atyrau line, Kazakhstan will have about 1 million bbl/d of pipeline export capacity.

- Other oil export pipeline options from the Caspian Sea region are also being explored. Trans-Caspian oil pipelines could be built that would connect with other export pipelines, such as the proposed Main Export Pipeline from Baku (Azerbaijan)-Ceyhan (Turkey).

- Mobil, Shell, and Chevron are conducting a feasibility study on building a pipeline from Aktau in western Kazakhstan to Baku, Azerbaijan that would traverse the Caspian Sea bed from north to south. Capacity at Kazakhstan's Aktau seaport was increased to 160,000 BL/d in 1999.

- Kazakhstan has also discussed shipping oil from its Kumkol field to Turkmenistan's Caspian port of Turkmenbashi, with talks focusing on tariff rates. Oil and gas swaps with Turkmenistan are also a possibility.

- Several proposed routes for Kazakhstan could bring oil towards markets in Asia instead of to European markets. One proposed pipeline would bring Kazakh oil via Turkmenistan to outlets in Iran and the Persian Gulf. Kazakhstan and Iran could also continue their arrangement for oil swaps between the two countries, where up to 40,000 BL/d of Kazakh oil would be delivered by tanker via the Caspian Sea to refineries in northern Iran in exchange for the delivery by Iran of a similar value of crude to Kazakh clients via the Persian Gulf. In addition, the proposed Central Asia Oil Pipeline
would bring oil from Kazakhstan to Pakistan and to other customers via the Arabian Sea.

- Kazakhstan is also considering the Chinese market. Kazakhstan exported 50,000 BL/d to China via rail in 1999 and Tengizchevroil has made test deliveries to China by rail. Aktobemuniagaz, which is 60% owned by China's China National Petroleum Corporation (CNPC), exported about 9,000 BL/d of oil to China in 1999, with the total expected to increase to 10,000 BL/d in 2000. The oil is exported via rail to the refinery at Urumchi, China. Kazakhstan has been building ties with China, and in June 1997, the China National Petroleum Corporation signed an agreement with Kazakhstan for a proposed $3.5 billion 1,800-mile pipeline to China. Under this agreement, China is responsible for financing the project. A feasibility study was undertaken, but the study was halted near its completion date. Kazakhstan has stated that if China would not undertake the project, Kazakhstan would turn its attention to other projects.

Kazakhstan has recently said that it would not make a decision on another main route for its oil exports until it received the results of test wells in its sector of the Caspian Sea, and had a better idea of its export potential. By 2010, it is likely that only 3 or 4 large projects will be producing oil - Tengiz, Karachaganak, Uzen, and possibly OKIOC's Kashagan project.
Major initiatives in natural gas sector are as given below:

- In 1997, an international consortium signed a $7 - $8 billion final production sharing agreement to develop the Karachaganak field for 40 years, with a planned investment of $4 billion by 2006.

- Because of the difficulties in processing output at the Orenburg plant, a new $600 million gas processing plant at Karachagnak has been planned to process the condensate with a target date of 2005. Liquids production is expected to exceed 300,000 BL/d by 2006, with the output to be exported using the CPC pipeline, and gas output should reach over 883 billion cubic feet (Bcf) annually.

- Kazakhoil and Phillips, two of the partners in the Offshore Kazakhstan International Operating Company (OKIOC), have agreed to conduct a feasibility study on the construction of a proposed $500 million gas liquefaction plant at Atyrau. The proposed plant would be built by 2004, and liquefied gas would be transported to consumers by rail.

- KazTransGaz, responsible for transporting natural gas in the country, is focusing its efforts on making Kazakhstan self-sufficient in natural gas supplies, with plans to invest more than $18 million in 2001 to develop the Amangeldy gas field in southern Kazakhstan in order to end Kazakhstan's dependency on gas supplies from Uzbekistan.

The undeveloped offshore areas are also believed to hold large amounts of gas. Other investment needs include capturing previously
flared gas, appraisal work for gas fields located near consuming areas, meter installation at cross-border locations, and environmental rehabilitation and protection. In order to reduce the flaring of natural gas, Kazakhstan passed a new law in August 1999 requiring subsoil users (such as oil companies) to include gas utilisation projects in their development plans.

Some of undeveloped offshore fields are near the Russian gas pipeline system, they are not currently linked to it, and Russia's Gazprom is a potential competitor with Central Asian gas on world markets. Kazakhstan must either negotiate to connect its fields with the existing Russian gas pipeline system, or develop new ways of getting gas to markets. Kazakhstan had considered constructing a pipeline network linking gas fields with consuming centres at a cost of over $1 billion. Other developments in marketing infrastructure are

- Kazakhoil, Kaztransoil, British Gas, Lukoil, AGIP, and Texaco have signed an agreement to construct a new 285 mile pipeline to transport the condensate from Bolshoy Chagan (Southwest of Karachagnak) to Atyrau, where it will connect with the CPC pipeline. The pipeline will have an initial capacity of 140,000 BL/d, rising to 240,000 BL/d, and cost $440 million.

- Conoco is moving forward with a plan to ship 1.5 million metric tons of LNG/year from Kazakhstan and Turkmenistan across the Caspian to Baku, where it would then be shipped by rail to Georgian ports en route to Turkey and other Mediterranean
customers. Conoco has set up a joint venture with Georgia's Ajargazi railway and a Turkish partner, and has also spent $600,000 to install facilities at the Georgian port of Batumi.

- Alternatively, other gas export pipeline options from the Caspian Sea region are being considered. One option is a proposed 5,000-mile China Pipeline that would bring 1 Tcf of gas from Central Asia annually to China; this line would pass through Kazakhstan.

- Another alternative is to export gas westwards to Turkey and other European markets. A preliminary feasibility study of this route was conducted by Exxon, Mitsubishi and CNPC.

- In December 1998, Royal Dutch/Shell, Chevron, and Mobil signed an agreement with Kazakhstan to conduct a feasibility study for twin oil and gas pipelines that would pass across the Caspian Sea from Kazakhstan to Baku.

2.5 Issues in the development of Hydrocarbon Sector

The biggest beneficiary of foreign direct investment, so far, in Kazakhstan, is the hydrocarbon sector. A number of foreign investment ventures in the oil and gas sectors like Chevron in Tengiz field, China's National Petroleum Company and British Gas in Aktyubinsk region are in progress. But the success of these projects are weighed down by following key issues:

*Dependence on Russia*

Above projects are critically dependent on Russia for exports as the existing pipeline and railway networks pass through Russia. Plans for
alternative export routes are being delayed because of limited financing options, inadequate policy and institutional framework, rise of Kazakh nationalistic feelings and reassertion of Russia as a regional power.

Under the former Soviet Union, Kazakhstan's pipeline network was integrated with the Russian pipeline system, and all of Kazakhstan's oil was exported through the Russian pipeline system.

- Kazakhstan's oil production is concentrated in the west, and most of refinery capacity is in the east. As a result, about 85 percent of crude oil production is exported for Russian refineries. At the same time, three-fourth of domestic refining requirement is imported from Russia. Moreover, Kazakhstan's urban and industrial centres are concentrated in the east and north, and because they are not connected to the production centres, they must meet their need through import oil via an oil pipeline from Siberia. Kazakhstan's production and pipeline system are fragmented, consisting of the two export pipelines in the west, the import pipeline in the east, and a smaller internal line in the south, making it vulnerable to Russian pressures, at least in short term.

- Similarly, major current export routes to bring Kazakhstan's oil to world markets go through Russia. Kazakhstan exported about 340,000 BL/d of crude oil and condensate in 1998. The majority of Kazakh exports -216,000 BL/d - were shipped by pipeline, of which about 180,000 BL/d were transported by the Atyrau-Saransk-Samara pipeline through Russia. In addition, 88,000 BL/d was shipped by rail, and 36,000 BL/d was shipped across the Caspian
Sea. About half of all Kazakh exports -195,000 BL/d - was exported to countries outside the former Soviet Union.

**Caspian Ownership Rights**

Development of the offshore potential of Kazakhstan in the Caspian Sea has been slowed by a dispute over ownership rights. This disagreement ties in with a broader debate between Caspian Sea Region states over how the Caspian Sea should be treated under international law (including environmental issues). In 1997, Kazakhstan signed a communique with Turkmenistan pledging to divide their sections of the Caspian along median lines, and in July 1998 Kazakhstan signed a bilateral agreement with Russia (not yet ratified) dividing the northern Caspian seabed (but not the rest of the Caspian Sea) along median lines between the two countries. Both of these agreements are interim until the status of the Caspian Sea is settled among all of the littoral states (see *Appendix Two*).

Until 1991, the Caspian Sea was shared between the Soviet Union and Iran, under the terms of the 1921 Treaty of Moscow. But since the break-up of the Soviet Union its legal status has remained in limbo. Russia and Iran, countries with little oil and gas off their Caspian shores, argue that the sea is the joint property of all the littoral states. Such states, the Russians say, should have exclusive rights only to resources lying within 45 nautical miles of their shore. Kazakhstan and Azerbaijan, by contrast, have the biggest fields on their doorsteps, so they want the whole of the Caspian to be divided into sectors and
shared out among the littoral states (see map). Turkmenistan began by supporting the Russian view but is now leaning the other way.

**Figure 2.3: Caspian Sea: Sharing Alternatives**

*Source: The Economist, Feb 5th 1998*

**Environmental Concerns**

Most of the environmental concerns relate to oil and gas production facilities around Caspian Sea. The coastal wetlands of the Caspian include many shallow and saline pools, which attract over 400 unique birds and other species. Apart from other sources of pollution like industrial wastes and power plants, refineries and petrochemical plants have contributed heavily to the contamination of the Caspian environment. In Kazakhstan, environmental tests conducted recently noted that cases of blood disease, tuberculosis, and other diseases are four times more common in the Caspian area than on average in Kazakhstan. Although the tests showed that the environmental
contamination in the Northeast Caspian is less than what has been recorded previously, water which has been contaminated by oil products in Kazakhstan is still used for drinking water. This contamination is cited as a main reason for intestinal infections in Kazakhstan's coastal areas. Other problem areas are

- Because the Caspian is land-locked, in order to reach world markets all oil produced there has to be transported via pipeline, which increases the environmental risks. Illegal tapping of the Baku-Novorossiisk pipeline in Chechnya already has caused major leakage problems. In addition, the northern Caspian is home to more the 80 percent of the Caspian's netted fish, and is characterised by relatively shallow waters and the lack of currents, making it more difficult to regenerate its natural resources in the event of an environmental problem. Tanker traffic and trans-Caspian pipelines potentially could impact fish migration routes.

- The Caspian still has miles of undeveloped coastline, especially along the Eastern Shore in Kazakhstan where there are no permanent inflows. Yet the south end of the sea is a deep, dark grey, polluted with the discharges from sewer pipes and factory drains from the land.

- In addition, the sea has exhibited a curious natural variation in its water level that has created more environmental problems and wrought havoc on coastal infrastructure. Since 1978, the sea level has risen almost 7.5 feet—flooding in coastal zones has inundated residential areas, transport, telecommunications and energy infrastructure, chemical and petrochemical industries, croplands
and hatcheries, forcing thousands of residents to be evacuated from flooded homes. Gradual flooding has precipitated abrasive erosion of sea shelves, endangering oil infrastructure, and the rising seawater threatens to flood oil wells along the coast and cause spills directly into the sea. In addition to the danger posed to oil fields in Kazakhstan and Azerbaijan, the sea-level rise results in changes in water regime, hydrochemical regime of river mouths, dynamics and chemical composition of groundwater, structure and productivity of biological communities in the littoral and in river mouths, sediment deposition patterns, pollution by heavy metals, petroleum products, synthetic substances, radioactive isotopes, and other substances.

In response, Prime Minister Nurlan Balgimbayev of Kazakhstan has stated that all foreign companies interested in the Caspian Sea must be ready to meet guidelines on environmental safety. The European Bank of Reconstruction and Development (EBRD) is offering technical aid for estimating the environmental impact of oil and gas development projects. According to Muftakh Diarov, director of the Research Centre for Regional Environmental Problems, In Kazakhstan, the fear of losing the country's competitive edge and scaring off investors has made the government reluctant to issue regulations endorsing more rigorous environmental standards. In addition, Diarov asserts, Kazakhstan has not adopted more stringent environmental standards because
currents in the Caspian transport pollution from the Caspian shelf into Russian waters.

Although governments have not always been diligent in their implementation or enforcement of environmental legislation and regulation, environmental groups are finding more success. Environmental concerns have meant that companies are increasing their use of environmental insurance. The Offshore Kazakhstan International Operating Company (OKIOC), which has begun drilling, has already signed a contract for a $500 million environmental insurance policy from a Kazakh company, which then obtained reinsurance from a Western insurer. In turn, Kazakhstan's parliament now is considering draft legislation requiring oil investors to insure their projects against environmental risks, and the country's Deputy Minister of Natural Resources has criticised the OKIOC, saying its environmental insurance coverage should be much higher.

The present chapter describes the hydrocarbon energy sector of Kazakhstan, only from the economic point of view. Despite possessing huge potential on the basis of endowments, future development of this sector, and the Kazakh economy, is largely dependent on, apart from domestic policies and politics, politics of the region which involves some of the global players. Next chapter is devoted to understand this regional politics.