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Strategic Opportunities for South Korean Development of Energy Resources in Central Asia

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I. THE STRATEGIC VALUE OF CENTRAL ASIA'S ENERGY RESOURCES

Due to the rapid increase in global energy consumption caused by accelerated growth in China and India, as well as the recent skyrocketing of international oil prices, global interest in oil and gas, the world's major energy sources, as well as the competition to secure these resources, have intensified. At the same time, resource nationalism or resource nationalization by oil-producing countries has fueled even greater competition among European and Asian counties which are desperate to import energy resources.

In this environment, several countries throughout the world have started paying closer attention to Central Asia as a new source of energy supply. Since the early 1990s, Central Asia, including Kazakhstan and Azerbaijan, has been called the "Second Middle East," and major oil companies have actively pushed forward oil exploitation projects there. As its oil transport routes have been extended, Central Asia has come to play a more substantial role as a global supplier of energy resources.

As Table 1 shows, Central Asia's proved oil reserves are about 47.9 billion barrels, which account for 3.9 percent of the world's proved oil reserves. Its proved gas reserves are approximately 9.8 trillion cubic meters, which account for 5.0 percent of the world's proved gas reserves. However, its potential oil reserves are estimated to be 250 to 300 billion barrels, and their potential gas reserves to be 15 to 20 trillion cubic meters. These are the largest oil reserves outside of the Middle East, larger than those in the United States and the North Sea. Consequently, along with Russia, Central Asia has come into the spotlight as a new source of oil and gas supply.

Table 1: Proven Oil and Gas Reserves of Central Asian Countries (2006)

	Oil			Gas		
	Proven Reserves (Billion Barrels)	**Global Portion (%)**	**R/P Rate**	**Proven Reserves (Trillion Cubic Meters)**	**Global Portion (%)**	**R/P Rate**
Kazakhstan	39.8	3.3	76.5	3	1.7	Over 100
Uzbekistan	0.6	-	13	1.87	1	33.7
Turkmenistan	0.5	-	9.2	2.86	1.6	46
Azerbaijan	7	0.6	29.3	1.35	0.7	-
Total	**47.9**	**3.9**	**-**	**9.08**	**5**	**-**

Note: R/P Rate is calculated by dividing reserves by production.

Table 2 shows that the annual oil production of Central Asian countries is 112.1 million tons (2.37 million barrels per day). This accounts for 2.8 percent of the global annual oil output. Their annual gas production is 147.8 billion cubic meters or 5.1 percent of global annual gas output. Kazakhstan and Turkmenistan are attracting special attention as important oil-producing countries. In fact, it is because the R/P ratio of Kazakhstan's oil and Turkmenistan's gas is similar to that of oil-producing countries in the Middle East that their development potential is estimated to be abundant.

Since the tragic events of September 11, 2001, the strategic value of Central Asia has deepened. The United States and Russia have engaged in a fierce diplomatic battle to develop and secure energy resources in Central Asia, in order to decrease their dependency on Middle Eastern oil. For example, Russian President Vladmir Putin visited Central Asia six times and tried to contain the United States' penetration into Central Asia through strategic cooperation with China. In May 2006, U.S. Vice President Richard Cheney also paid a visit to Central Asia, and invited Kazakh President Nursultan Nazarbayev to the United States in October 2006. In order to counter the strategic cooperation between Russia and China, the United States also sought strategic cooperation with India in its attempts to broaden its access into Central Asia. In response to this partnership, Chinese President Hu Jintao visited Central Asia in July 2007 and invited the top political leaders of several

Central Asian countries to China; and the battle for Central Asian loyalty and access continues.

Table 2: Annual Oil and Gas Production of Central Asian Countries (2006)

	Oil		Gas	
	Production (Million Ton)	Global Portion (%)	Production (Billion Cubic Meters)	Global Portion (%)
Kazakhstan	66.1	1.7	23.9	0.8
Uzbekistan	5.4	0.1	55.4	1.9
Turkmenistan	8.1	0.2	62.2	2.2
Azerbaijan	32.5	0.8	6.3	0.2
Total	112.1	2.8	147.8	5.1

Source: BP (2007)

Central Asia is located at the intersection of China, Russia, and India, and is on a path to achieving economic growth as quickly as these economic rising stars. By exporting crude oil, Central Asian countries are expected to achieve as high as 7 percent average annual economic growth from now to 2015. Kazakhstan, Turkmenistan, and Azerbaijan, which are the three main energy exporting countries in Central Asia, are leading the economic growth of the region.

South Korea first entered Central Asia during a wave of opening in the 1990s. Since then, it has put forth great effort to gain better access to Central Asian energy resources. From short- and mid-term perspectives, it is possible for South Korea to gain returns by delivering the energy produced in Central Asia to Korea through existing transport infrastructure throughout Central Asia, Russia and East Asia. However, from a long-term perspective, it is to Korea's benefit to construct a pipeline directly from Central Asia to South Korea through Iran; that is, assuming that diplomatic relations between the U.S. and Iran normalize and the economic sanctions against Iran are lifted.

Beyond South Korea's energy needs, Central Asian countries and South Korea have complementary economic structures. South Korea has capital and technology, which Central Asian countries need for industrial diversification and building social infrastructure; while Central Asian countries have natural and energy resources and labor, attributes which South Korea sorely lacks. Therefore, both sides stand to benefit from increasing cooperation.

II. THE STATUS OF KAZAKHSTAN'S ENERGY RESERVES

Ranked as the ninth largest country in the world, as well as the world's largest landlocked country, Kazakhstan has a territory of 2,727,300 square kilometers (greater than Western Europe). It is bordered by Russia, Kyrgyzstan, Turkmenistan, Uzbekistan and China. The country also borders on a significant part of the Caspian Sea. Kazakhstan has the sixty-second largest population in the world, with a population density of less than six people per square kilometers.

The Russians began advancing into the Kazakh steppe in the 18th century, and by the mid-19th century all of Kazakhstan was part of the Russian Empire. Following the 1917 Russian Revolution and subsequent civil war, the territory of Kazakhstan was reorganized several times before becoming the Kazakh Soviet Socialist Republic in 1936, a part of the USSR. During the 20th century, Kazakhstan was the site of major Soviet projects, including Khrushchev's Virgin Lands campaign, the Baikonur Cosmodrome, and the Semipalatinsk "Polygon," the USSR's primary nuclear weapon testing site. Kazakhstan was the last Soviet republic to declare independence on December 16, 1991, and its communist-era leader, Nursultan Nazarbayev, became the country's first president.

Since independence, Kazakhstan has pursued a balanced foreign policy and worked to develop its economy, especially its hydrocarbon industry. Located in the center of Eurasia, Kazakhstan is a contact point between Russia and China, and between Islamic and European sway. Based on the vast reserves of natural resources, such as crude oil and nonferrous metals,

it has achieved amazing economic growth year after year, especially since 2000.

Production of crude oil and natural gas condensate in Kazakhstan amounted to 51.2 million tons in 2003, which was 8.6 percent more than in 2002. Kazakhstan raised oil and gas condensate exports to 44.3 million tons in 2003, 13 percent higher than in 2002. Gas production in Kazakhstan in 2003 amounted to 13.9 billion cubic meters, up 22.7 percent compared to 2002, including natural gas production of 7.3 billion cubic meters; Kazakhstan holds about 4 billion tons of proved recoverable oil reserves and 2,000 cubic kilometers of gas. Industry analysts believe that planned expansion of oil production, coupled with the development of new fields, will enable the country to produce as much as 3 million barrels per day by 2015, lifting Kazakhstan into the ranks of the world's top 10 oil-producing nations. Kazakhstan's 2003 oil exports were valued at more than $7 billion, representing 65 percent of overall exports and 24 percent of the GDP. Major oil and gas fields and their recoverable oil reserves are Tengiz with 7 billion barrels; Karachaganak with 8 billion barrels (and 1,350 km³ of natural gas); and Kashagan with 7 to 9 billion barrels.

Table 3: Energy Production, Consumption, and Export Capabilities in the areas around the Caspian Sea (2004)

		Kazakhstan	Azerbaijan	Turkmenistan	Uzbekistan	Russia*	Iran*
Oil	Production (10 Thousand Barrels)	129.5 (1.3%)	31.8 (15.5%)	20.2 (0.5%)	15.2 (-2.7%)	928.5 (8.9%)	408.1 (2.3%)
	Consumption (10 Thousand Barrels)	19.2 (9.1%)	9.1 (7.3%)	9.8 (8.9%)	12 (-0.9%)	257.4 (3.1%)	155.1 (5.1%)
	Max. Export Capacity (10 Thousand Barrels)	110.3	22.7	10.4	3.2	671.1	253
Natural Gas	Production (100 Million m³)	185 (42.9%)	46 (-3.5%)	546 (-0.9%)	558 (4.1%)	5,891 (1.8%)	855 (4.9%)
	Consumption (100 Million m³)	152 (17.3%)	85 (6.9%)	155 (5.7%)	493 (4.5%)	4,021 (2.3%)	871 (5.1%)
	Max. Export Capacity (10 Million m³)	33	-39	391	65	1,870	-16

* Note: In case of Russia and Iran, figures are the total national production and consumption.
Source: BP (2005)

In order to attract foreign investment in the exploitation of crude oil, the Kazakh government set up Production Sharing Agreements (PSAs) which granted foreign companies intending to invest in any Kazakh oil field to receive certain tax breaks and investment incentives when seeking joint venture with any private Kazakh company. Over the last several years, these PSAs have fueled fierce competition among foreign energy companies to invest in several of Kazakh's oil fields, including North Buzachi, Sazankurak, Saztobe, Chinarevskoye and Airankol, which are all currently in production. In addition, other oil fields in Alibekmola, Urikhtau, and Kozhasai are almost ready to produce crude oil. As a result of this heightened activity, the oil production of Kazakhstan is expected to increase steadily for the next 10 years.

In Kazakhstan, major oil fields, including Tengiz, Karachaganak, and Kashagan, are taking the lead in crude oil production. Tengiz is estimated to have 6 to 9 billion barrels of oil reserves. It is being exploited by a joint venture called "Tengizchevroil." In April 1992, Chevron (presently Chevron Texaco) concluded a contract for the foundation of Tengizchevroil worth $20 billion. The crude oil production of Tengiz increased sharply from 25 thousand barrels in 1993 to

Table 4: Kazakhstan's Crude Oil Production and Export Outlook

		Outlook			
		2006	2005	2010	2015
DOE/EIA, US (July 2002)	Production	47.2	-	100	-
	Export Volume	35.9	-	85	-
RPI (March 2003)	Production	47.2	80	100	150
	Export Volume	35.9	46	80	100

Unit: Million Ton/Year
Source: US DOE Energy Information Administration (DOE/EI)

290 thousand barrels in 2001. If appropriate export routes are opened up, the crude oil production of Tengizchevroil would reach as much as 750 thousand barrels in 2010.

Important Transport Routes and Exploitation Outlook

Due to the rapid increase in its crude oil production, Kazakhstan has undergone a large-scale extension of its oil pipelines. Its major oil pipelines are in the north and are connected to the Atyrau-Samara Transportation and Railway Network through which Kazahkstan's crude oil is exported. In June 2002, Kazakhstan concluded a contract with Russia for the use of the Russian transportation network. Through this, it has exported 340 thousand barrels of crude oil every year. However, as this transportation network is also being used for the export of Azerbaijan's crude oil, the settlement of accounts is complex. Export operations are also temporarily suspended for severe cold during the winter months. Moreover, there is always a danger that the crude oil exported by Kazakhstan is plundered in Chechnya.

Figure 1: Caspian Region Oil Pipelines

Source: EIA

One of Kazakhstan's major pipelines is the Caspian Pipeline Consortium (CPC), an international consortium of a 1,510-kilometer long oil pipeline from the Tengiz field to the Novorossiysk-2 Marine Terminal on Russia's Black Sea coast. In 2004, 450 thousand barrels of Kazakhstan's crude oil (produced in Tengiz, Kenkiyak, and Karachaganak) were exported via the CPC. Kazakhstan plans to export 1.35 million barrels via the CPC in 2009. The Baku-Tbilisi-Ceyhan (BTC) Pipeline is a competing pipeline put forth by U.S. interests to bypass dependence on the Russian pipeline. Its construction was completed in May 2005. By late 2006, 50 thousand barrels of crude oil were exported via this pipeline.

Kazakhstan first began making oil swap deliveries to Neka, a small city in the Mazandaran province of Iran, in early 2002. Iran's interest in oil swaps is longstanding, and its proposals have great appeal to Kazakhstan for a number of geostrategic

and economic reasons. For instance, oil swaps with Iran bring exports significantly closer to the booming East Asian markets. Moreover, Kazakh President Nazarbayev has consistently advocated diversifying Kazakh energy export routes, reiterating in June 2004 that he preferred an oil export pipeline to the Persian Gulf through Iran over a connection to BTC through China or Russia.

In 2005, Kazakhstan exported 300 thousand barrels to China. The Kazakhstan-China oil pipeline is China's first direct oil import pipeline. When fully completed, the 3,000 kilometers (1,900 miles) long pipeline will run from Atyrau in Kazakhstan to Alashankou in China's Xinjiang Uygur Autonomous Region. The pipeline is being developed by the China National Petroleum Corporation (CNPC) and the Kazakh oil company KazMunayGas. In 2006, the 987 kilometers long Atasu-Alashankou pipeline was in full operation. Its current capacity is 20,000 barrels per day, but will be upgraded to 400,000 barrels per day by 2011.

Kazakhstan owns proved natural gas reserves around 1500-2500 billion cubic meters, eleventh in the world. However, Kazakhstan became a net gas exporter only in 2003. In 2005, Kazakhstan produced 16 billion cubic meters of natural gas and plans to increase this to 60-80 billion cubic meters per year in 10 years. The major natural gas fields are Karachaganak, Tengiz, Kashagan, Amangeldy, Zhanazhol, Urikhtau and Chinarevskoye. The natural gas trunk pipeline system stretches roughly 10,000 kilometers. The major transit pipelines are the Central Asia-Center (CAC) gas pipeline system and the Bukhara-Urals (BU) pipeline, which transport natural gas from Turkmenistan and Uzbekistan to Russia; and the Orenburg-Novopskov and the Soyuz pipelines which transport natural gas from the Orenburg processing plant in Russia to Europe. The Gazli-Bishkek pipeline transports natural gas from Uzbekistan to Kyrgyzstan. There are also plans to build a natural gas pipeline to China for which the Ishim (Rudny)-Petropavlovsk-Kokshetau-Astana supply pipeline is also planned. The CAC and the BU pipelines, as also the Bukhara-Tashkent-Bishkek-Almaty pipeline, are also the main import pipelines.

South Korea's Participation and Outlook

South Korea is actively investing in the exploitation of Kazakhstan's energy resources. The Korea Oil Corporation, Samsung, LG, SK, and Daesung formed a consortium which has energetically sought to exploit oil fields in the Caspian Sea and on land. In 2004, then South Korean President Roh Moo-hyun visited Kazakhstan and negotiated a basic contract for the exploitation of oil fields in the Zambil Region. The Korea Oil Corporation, LG, SK, and Serim have taken the lead on this project and on projects in other regions of Kazakhstan. LG has secured 50 percent of the Egizkara Oil Field's total shares (estimated reserves: 200 million barrels). In cooperation with Serim, KS Energy has also secured the exploitation of two oil fields in Kazakhstan and started drilling operations there. In 2006, the Korea Oil Corporation discovered a new oil field in the Bashenkol structure inside the ADA Block of Actobe. Although it is estimated to hold about 20 million barrels of oil by itself, the estimated reserves in three other promising oil fields puts the total volume of the block at about 170 million barrels.

Table 5: Crude Oil Exploitation Project from 2003 to 2015

Classification	Contents
Targeted Crude Oil Production	• 1.7 million barrels per day by 2010 • 3 million barrels per day by 2015
Foreign Investment	• Total $52 billion pulled in for exploitation of new oil fields and construction of oil pipelines • $11 billion from 2003 to 2005 • $20 billion from 2006 to 2010 • $21 billion from 2011 to 2015
Plan	• Construction of oil pipelines from 2003 to 2005 • Exploitation of crude oil in Kashagan Field from 2005 to 2007 • Exploitation of Caspian Sea from 2010 to 2015

Source: KOTRA (2003), "Business Roadmap in Kazakhstan"

The most dynamic driving force of the Kazakh economy is the exploitation of crude oil around the Caspian Sea. These areas are estimated to have the largest oil and gas reserves outside the Middle East. Major oil companies have already moved to gain exploitation rights in these resource rich areas. China's proximity to Kazakhstan has given China a geographic advantage in terms of expanding its investment and exploitation of the Kazakh oil fields. Gas strife between Russia and Ukraine, has also led the European Union to consider development and exploitation of nearby Kazakh oil for its own energy security, leaving Kazakhstan's export outlook for the future bright.

III. STATUS OF UZBEKISTAN'S ENERGY RESERVES

Uzbekistan is approximately the size of Morocco and has an area of 447,400 square kilometers. Among the Central Asian countries, it is the fifth largest by area and the third largest by population. Uzbekistan is the world's sixth largest producer and second largest exporter of cotton, and the fifth largest producer of gold. It is also a regionally significant producer of natural gas (tenth largest in the world), coal, copper, oil, silver, and uranium (tenth largest in the world). Additionally, about 100 underground resources are deposited in approximately 2,700 areas of Uzbekistan. The breadth of Uzbekistan's energy resources has gained it much attention in the world economy.

Table 6: Territory Size, Population, and Economic Growth of Five Countries in Central Asia

	Population (Ten Thousand)	Size(km²)	GDP Growth Rate (%)	Natural Resources
Kazakhstan	1,514	2,717,300	9.4	Oil, Gas, Coal, Gold, Uranium
Kyrgyzstan	508	198,500	7.1	Gold, Coal, Oil, Gas
Tajikistan	701	143,100	7	Gas, Uranium, Gold, Coal
Turkmenistan	486	488,100	23.1	Oil, Gas
Uzbekistan	2,641	447,400	7	Gas, Oil, Coal, Gold
Total	**5,850**	**3,987,000**		

Source: World Bank (2004)

On August 31, 1991, Uzbekistan declared independence. However, this landlocked country did not push forward oil and gas exploration and exploitation until international energy prices skyrocketed in 2004. This spurred a race for energy exploitation around the Caspian Sea which first began in the energy-rich countries of Kazakhstan and Azerbaijan, and then moved into Uzbekistan. The energy industry is now the second largest industry in Uzbekistan, accounting for 11.5 percent of the total export in 2005.

Among the satellite states of the old Soviet Union, Uzbekistan has the third largest reserves of natural gas (Russia is the first with 1,680 trillion cubic meters and Turkmenistan is second with 71 trillion cubic meters), which accounts for 2 percent of the world's natural gas reserves. Gas production in Uzbekistan has recently increased at a gradual pace. With the exception of its domestic consumption, almost all of its gas production is exported to Kazakhstan, Kyrgyzstan, and other Central Asian countries. The estimated gas reserves of Uzbekistan are 5.5 trillion cubic meters, which is the tenth largest in the world. Its major gas fields, which account for 95 percent of its gas production, are located in its southwestern region. In 1992, Uzbekistan produced 59 million cubic meters of gas. In 2005, however, it produced 59.7 billion cubic meters of gas. All in all, Uzbekistan has more than doubled its oil production since 1991 to become essentially self-sufficient in petroleum and, since 1996, a net exporter of petroleum as well.

In 2005, crude oil production in Uzbekistan was 4.75 million tons, which decreased from 4.96 million tons in 2004. This

decrease was caused, in part, by the exhaustion of some of Uzbekistan's oil fields, as well as by a miscalculated energy policy. In order to prevent inflation, the Uzbek government implemented a dual oil price policy by which the domestic oil price was adjusted to be lower than the export price. This policy created a black market for domestically distributed oil, spurring profit-seekers to smuggle it out to neighboring countries in quantities large enough to cause a domestic oil shortage and for national revenues to tank.

Uzbekistan has three major oil refineries: Fergana, Alty-Arik, and Bukhara. The 50,000-barrels-per-day-capacity facility at Bukhara was built after the breakup of the Soviet Union at a cost in excess of $400 million, and is being expanded to a capacity of 100,000 barrels per day with the ability to handle both crude oil and gas condensate. In 2001, however, the refineries were operating well below capacity because of the decline in Uzbekistan's oil production.

Table 7: Major Oil Exploitation Areas in Uzbekistan

Fergana	- Oil production in operation already - Opportunities for additional oil exploration, but high exploitation costs and low production playability
Bukhara-Khiva (Amudarya)	- Mainly gas Production in operation for the time being - Possibility for new oil exploration
Gissar	- Oldest gas production area in Uzbekistan, and active oil exploration by the participation of Russia recently
Sukhan-Kariya	- Southeastern area, and many gas & oil fields - Possibility for new oil exploration
North Ustyurt	- Locayed in Karakalpakstan - Mostly unexplored are, and enormous possibility for new oil exploration

South Korean Companies' Participation and Outlook

In order to attract foreign investment in Uzbekistan's oil industry, like Kazakhstan, the Uzbek government also implemented the PSA in 2000, giving foreign investors the benefit of tax exemption for a certain period of time. With the PSA, the Uzbek government has managed to secure foreign investment for about 80 oil fields. In November 2004, it signed the PSA with major Russian oil company LUKOIL. LUKOIL is allowed to participate in the exploration and exploitation of new oil fields in Uzbekistan for 35 years. The world largest Russian gas company, Gazprom, has also concluded a PSA through which it is allowed to participate in the production of the Shakhpakhty Gas Field.

The Korea Oil Corporation plans to invest in gas production of Ustyurt and Surgil. For this, it will start a 50-50 joint venture with Uzbekneftgaz. The estimated gas reserves of Surgil is 4 trillion cubic meters, which is as much as the total gas consumption of South Korea for 3.5 years. In 2006, along with national corporations in Russia, China, Malaysia, and Uzbekistan, the Korea Oil Corporation also signed a PSA for the production of the Aral Sea Gas Field. According to this agreement, it has secured 20 percent of total shares in the Aral Sea Gas Field's production for 35 years. The estimated gas reserves of the Aral Sea Gas Field are 8 trillion cubic meters, which accounts for the total gas consumption of South Korea for eight years.

IV. STATUS OF AZERBAIJAN'S ENERGY RESERVES

Azerbaijan is known to be one of the oldest oil-producing countries in the world. Under the dominion of Czarist Russia in the early 19th century, a small quantity of oil was produced in a few hundred oil fields dug solely by human hands. After Azerbaijan experienced the oil boom in the early 20th century, it became an import oil-producing area of the old Soviet Union. Even though many of its oil fields were exhausted by the excessive exploitation of the old Soviet Union, a massive quantity of sea oil still remained unexploited. Azerbaijan's national oil company, SOCAR, has estimated the total proved oil reserves to be 17.5 billion barrels. However, many foreign oil companies have speculated that the exploitable oil reserves of Azerbaijan is 3 to12 billion tons.

In 1991, Azerbaijan declared its independence from the old Soviet Union. Since then, the world economy has paid close attention to Azerbaijan, because of its massive quantities of natural resources, including oil and natural gas. Since the mid-1990s, major oil companies, oil-related companies, and private investors have invested in the exploration and exploitation of massive oil and natural gas deposits around the Caspian Sea and the construction of new oil pipelines. This investment has been instrumental helping Azerbaijan transition to a market economy, a journey which has been fraught with problems.

According to the data presented by the Energy Information Administration (EIA), Azerbaijan's oil production decreased consistently from 1992 to 1997. However after 1997, production started to increase and in 2003, the average daily oil production increased 2 percent (327,700 barrels) compared to the previous year, of which, 320,000 barrels were crude oil.

Table 8: Oil Production and Consumption in Azerbaijan

	2000	2001	2002	2003	2004	2005	2006	2007
Production	288.6	308.9	315.4	325.2	317.6	441	647.7	850
Consumption	136.9	119.9	110.4	110.8	112.6	115	126.7	N/A
Net Export	151.7	189	205.1	214.4	205	326	521.1	N/A
Refine Capacity	441.8	441.8	441.8	441.8	399	399	399	399
Proved Reserves (billion barrels)	1.2	1.2	1.2	7	7	7	7	7

(Unit : 1,000 barrels per day)
Source: EIA (2007)

In early 2004, the average daily oil production of Azerbaijan (324,000 barrels) was 2,000 barrels more than the same period of the previous year. In 2003, its average daily export volume of oil was 214,000 barrels and the countries to which Azerbaijan mainly exported oil were Russia, Turkey and Italy.

The proved natural gas reserves of Azerbaijan are about 30 trillion cubic feet and its potential natural gas reserves are speculated to be much higher. Almost all of the natural gas reserves are deposited around the Caspian Sea. SOCAR is presently in charge of natural gas production around the Caspian Sea. The most important field is the Bakhar Oil and Gas Oil Field located in the southernmost part of the Absheron Peninsula, which produces more than 50 percent of Azerbaijan's total natural gas production. However since 2000, Bakhar production has declined due to competition from the newly opened Bakhar-2 gas field operating in a neighboring area.

The major problem Azerbaijan's energy industry faces, is that the gas transport infrastructure is not well constructed and much of the produced natural gas evaporates before it is delivered to market. To remedy the transport issues, SOCAR has invested $29 million to construct the Bakhar-Neftyaniye Kamni pipeline. From 2010 onward, SOCAR will be able to transport natural gas exploited in Gunashli (which produces roughly 67 percent of Azerbaijan's total oil production and 50 percent of its natural gas production) via this pipeline. When the Bakhar-2 project and the exploitation of the Shah Deniz

Table 9: Natural Gas Production and Consumption in Azerbaijan

	2000	2001	2002	2003	2004	2005	2006	2007
Proven Reserves	1,245	1,245	1,245	8,495	8,495	8,495	8,495	8,495
Production	56.6	57.2	51.5	51.3	50.1	58.2	68.2	N/A
Consumption	56.6	67.2	90.6	92	99.4	103.8	113	N/A
Net Export	0	-9.9	-39.1	-40.6	-49.3	-45.6	N/A	N/A

(Unit: 100 million m^3)
Source: EIA (2007)

Gas Field are in full operation, Azerbaijan will be self-sufficient in natural gas, and gain a significant amount of returns from the export of its natural gas.

South Korea's Participation and Outlook

South Korea has much to gain from doing business in Azerbaijan. One main benefit is that Azerbaijan yields a certain portion of the contracted oil field shares to foreign investors based on direct agreements with the government, which is certainly an unprecedented case. Azerbaijan needs to explore new oil fields, to carry out additional drilling and exploitation of the existing oil fields, and to re-exploit some dormant oil fields around the Caspian Sea in order to grow their energy industries. Azerbaijan is also a point of strategic importance in terms of oil and gas transport. These factors are all opportunities for South Korean companies to increase their participation and investment into Azerbaijan's energy industries. However, Azerbaijan has needs beyond the development of its energy industry for which South Korea could offer assistance. For instance, Azerbaijan is currently trying to develop its IT industry, to diversify its transportation infrastructure, and to repair its refining facilities and pipelines; projects for which the government is in need of foreign investment and which pose unique opportunities for South Korea to build strong economic ties and goodwill with this energy-rich country.

V. STATUS OF TURKMENISTAN'S ENERGY RESERVES

Turkmenistan has vast oil and natural gas reserves around the Caspian Sea. It declared independence on October 27, 1991, and became a member of the Commonwealth of Independent States, an international organization of former Soviet Republics. The former Soviet leader Saparmurat Niyazov remained in power as Turkmenistan's leader after the dissolution of the Soviet Union. He styled himself as a promoter of traditional Muslim and Turkmen culture (calling himself "Turkmenbashi," or "leader of the Turkmen people"), but became notorious in the West for his dictatorial rule and extravagant cult of personality. The extent of his power greatly increased during the early 1990s, and in 1999 he became "President for Life." Niyazov died unexpectedly on December 21, 2006, leaving no heir apparent and an unclear line of succession. His dictatorial rule and eccentricities discouraged international transaction and preserved Turkmenistan as a largely unexploited natural resource-rich country in Central Asia.

According the EIA, Turkmenistan's proved oil reserves with playability is 546 million to 1.7 billion barrels, which account for 0.15 percent of the world's oil reserves. However, when including the exploitable oil reserves (estimated to be 38 billion barrels) in its unexploited areas, its total oil reserves are 38.85 billion to 39.7 billion barrels. Turkmenistan's proved natural gas reserves are 2.01 trillion cubic meters. When including its exploitable potential gas reserves estimated to be 1.5 trillion cubic meters, its total natural gas reserves are as much as 6.51 trillion cubic meters.

Presently, gas production is in underway in 149 gas fields in Turkmenistan. 139 of them are located in inland areas, and 10 of them are along the coast of the Caspian Sea. In the eastern part of Turkmenistan, more than 60 gas fields have been newly explored and exploited in recent years. In this area, there are actually more than 1,000 gas fields in operation, which accounts for one third of Turkmenistan's total gas fields. The Dauletabad Gas Field is the major field currently in operation. In 1982, it started gas production and its potential natural gas reserves are 4.5 trillion cubic meters. The Shatlyk Gas Field has 33 trillion cubic feet of natural gas reserves and has been in operation since the 1970s. Decades of exploitation has left this field past its peak and in decline. Other major gas fields in Turkmenistan are Malai, Ojak, and Samantepe. Almost all of its already exploited gas fields started operating in the 1970s and 1980s, meaning that their remaining exploitation period is probably 15-25 years. Therefore, Turkmenistan urgently needs to explore new gas fields.

According to a report made by a recent gas exploration operation, a significant quantity of natural gas is deposited in the western part of Turkmenistan, as well as in Nardjouski and Marinski. A recently exploited Sag Kenar is the largest natural gas field ever in Turkmenistan. Its proved gas reserves are estimated to be 1.7 billion cubic meters.

In 1992, the natural gas production of Turkmenistan was 56.6 billion cubic meters. In 1993, it was 64.1 cubic meters. After that, it began decreasing. In 1998, it was merely 12.4 cubic meters. The major reason for this situation was that Turkmenistan did not have its own independent gas transport pipeline, but instead, was dependent on the Russian Gazprom Pipeline which subjected Turkmenistan to a quota system. Additionally, while the Ukraine, Azerbaijan, and Armenia, all importers of natural gas from Turkmenistan, experienced economic depression, they were unable to pay Turkmenistan for their gas imports. As a result, in March 1997, Turkmenistan decided to suspend gas exports to the Ukraine. The total amount of the export bill Turkmenistan was unable to collect from Ukraine, Russia, and countries in the southern part of the Caucasus, totaled as much as $2 billion.

In 2003, Turkmenistan signed a contract with Russia for a 25 year gas supply and with the Ukraine for 250 billion cubic meters of natural gas. Since then, its export of natural gas has increased notably. In 2006, Turkmenistan exported 42 billion cubic meters of natural gas to Russia, and 8 billion cubic meters to Iran via the CAC Pipeline. In 2007, its gas production and export volume were a respective 80 billion cubic meters and 58 cubic meters.

Table 10: Turkmenistan's Natural Gas & Oil Production, and Natural Gas and Oil Consumption & Export

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Oil (Million Ton/Year)												
Production	4.1	4.4	5.4	6.4	7.1	7.2	8	9	10	9.6	9.5	8.1
Consumption	2.7	3	3.1	3.4	3.6	3.6	3.7	3.8	4.2	4.6	4.9	5.2
Export Volume	1.4	1.4	2.3	3	3.5	3.6	4.3	5.2	5.8	5	4.6	2.9
Price (Dubai. $/Barrel)	16.1	18.52	18.23	12.21	17.25	26.2	22.81	23.74	26.78	33.64	49.35	61.5
Natural Gas (100 Million Cubic Meters/Year)												
Production	301	328	161	124	213	438	479	499	551	544	588	622
Consumption	80	100	101	103	113	126	129	132	146	155	166	189
Export Volume	221	228	60	21	100	312	350	367	405	391	422	433
Price ($/Million Cubic Meters BTU) (EU cif)	2.37	2.43	2.65	2.26	1.8	3.25	4.15	3.46	4.4	4.56	6.28	8.77
Price LNG. (Japan cif)	3.46	3.66	3.91	3.05	3.14	4.72	4.64	4.27	4.77	5.18	6.05	7.14

Source: BP Statistical Review of World Energy 2007

In Turkmenistan, the exploitation of oil fields is concentrated around the Caspian Sea. Turkmenistan managed to drill four oil fields in 2004 and nine in 2005. As of today, Turkmenistan has thirty oil fields in operation. Its two most representative oil fields are Cheleken, estimated to have 6 billion barrels of oil reserves, and Nebitdage, estimated to have 100 million barrels of oil reserves.

Natural gas production accounts for 50 percent of Turkmenistan's entire industrial production, and for 80 to 90 percent of its export. This heavy reliance on natural gas leaves the Turkmen economy especially vulnerable. Reliance on foreign owned pipelines to transport its natural gas production is another obstacle facing Turkmenistan's economic stability. Without its own pipelines, Turkmenistan's export operations rely heavily on Russian pipelines (80-90 percent) and partly on Iranian pipelines (15-20 percent), leaving them subject to foreign regulations and political pressures. These factors leave the Turkmen government in dire need of foreign investment to fund the projects and programs that will help Turkmenistan achieve economic stability. Of highest priority, would be developing the ability to secure its export routes through the construction of its own pipelines. Some projects already planned or underway include:

- Construction of a Trans-Caspian Gas Pipeline: This pipeline would connect to the South Caucasus Pipeline via the seabed of the Caspian Sea. The South Caucasus Pipeline is linked to Bahku in Azerbaijan, Tbilisi in Georgia, and Erzurum in Turkey. However, due to the international strife surrounding the dominion of the Caspian Sea, this plan has been met with some opposition.

- Repair of the Central Asia-Center Pipeline: This pipeline was constructed under the dominion of the old Soviet Union. This connects Turkmenistan to Uzbekistan, Kazakhstan and Russia. In May 2007, Russia and Turkmenistan agreed to repair this line.

- Construction of an East-Caspian Gas Pipeline: Following the eastern coast of the Caspian Sea, this new pipeline will connect Turkmenistan through Kazakhstan to Russia. Turkmenistan agreed with Russia on the construction of this line in May 2007.

- Construction of a China Route: This is a 7,000 km long pipeline connecting the Dauletabad Gas Field of Turkmenistan through Uzbekistan and Kazakhstan to Shanghai. In April 2006, a contract for the construction of this line was concluded between Turkmenistan and China.

- Construction of a TAPI Route: This is a pipeline connecting Turkmenistan through Afghanistan into Pakistan and then to India. Construction on this project was scheduled to commence in 2008.

South Korea's Participation and Outlook

Despite their small scale of penetration, LG International Corporation (elevators), LG Electronics (air conditioners), and KP Chemical (PET resin) are currently operating businesses in Turkmenistan. However, no South Korean company has yet invested in Turkmenistan. As the new Turkmen government has announced its will for partial reform and opening, these three South Korean companies are seeking investment opportunities in the exploration of oil and gas fields, as well as in the oil, chemical, and construction industries.

As South Korean companies look to increase access to Turkmenistan's energy resources, they must identify ways in which they can contribute to Turkmenistan's overall economic development and build substantial and sustainable ties to the Turkmen government and people. In fact, as it stands today, South Korea has not been as active in aiding Turkmenistan as it has other Central Asian countries, such as Kazakhstan and Azerbaijan. In addition to expanding cooperation on the exploitation of Turkmenistan's natural resources, what could help South Korea improve its national image and develop mutual trust would be to increase credit assistance and grant-type aid to Turkmenistan and help with the construction of infrastructure. Moreover, as Turkmenistan is a closed, elite society, it is also important to develop working relations with Turkmen power holders and foster both cultural exchange and diplomatic consultation and cooperation.

VI. STRATEGIES FOR SOUTH KOREA TO INCREASE PARTICIPATION IN THE EXPLOITATION OF CENTRAL ASIA'S ENERGY RESOURCES

With the growing competition to secure energy resources from Central Asia, South Korea will need to reach beyond cooperation on energy development to gain favor and trust from these sought after resource-rich states. As many Central Asian countries are under authoritarian rule, special attention needs to go to building solid, working relations with Central Asian political leaders and elites, fostering cultural exchange and business development, as well as cooperation on energy development. Individual South Korean diplomatic, industrial and cultural institutions, as well as private companies, also play a role in opening Central Asia and building economic and cultural alliances between Central Asian states and South Korea. Coordination and support from the Korean government can help these civil and private institutions nurture solid relationships with their Central Asian counterparts. Special support systems, like a Cooperation Committee for Development of Natural Resources Abroad, can help maximize business efficiency.

The main thing for the South Korean government to keep in mind is that authoritarianism in Central Asia will last for years to come, as both Azerbaijan and Kyrgyzstan have shown. In Central Asia, civil society is underdeveloped; tribalism, ethnic and ideological conflict and strife are rampant, and anti-government political forces and opposition parties are on the rise. In light of this, while increasing ties with Central Asia, the South Korean government should be careful about criticizing the

domestic politics of any Central Asian country, especially on issues of human rights violations, as this was a major factor contributing to unfriendly relations between Central Asia and the United States. Instead, its efforts would be better spent expanding interchange and mutual cooperation in non-political areas.

Table 11: South Korea's Current Participation in the Exploitation of Central Asia's Oil Production, as of October 2007

Country	Oil & Gas Field	Participating Company	South Korea's Share	Estimated Reserves
Kazakhstan	Zhambyl	South Korean Consortium (Joint Management)	27% (In case of successful exploration; additional right to preempt 23%) * Consortium Participating Companies; individual share: Korea Oil Corporation 35%, SK 25%, LG International Corporation 20%, Samsung International Corporation 10%, Daesung 5%, Daewoo 5%	16.6 billion barrels
	ADA	South Korean Consortium (Joint Management)	50% (Korea Oil Corporation 22.5%, LG International Corporation 22.5%, others 5%)	170 million barrels
	Egizkara	LG International Corporation	LG International 50%	200 million barrels
	South Karpovsky	South Korea Consortium	50% (Korea Oil Corporation 17.5%, GS Holdings 12.5%, Gyungnam 7.5%, Guemho 5%, Hyundai 5%)	460 million ton
	Sarkramabas	KS Energy (Seha, Woori Investment, & Others)	50% (Seha 25%, Others 25%)	270 million barrels
	West Bozoba	KS Energy (Seha, Woori Investment, & Others)	50% (Seha 25%, Others 25%)	160 million barrels
	8 Oil Field	LG International Corporation, SK	100% (LG 50%, SK 50%)	250 million barrels
Uzbekistan	Aral Sea	Korea Oil Corporation	20% (PSA)	36 million ton
	Namangan	South Korean Consortium	Business profitability estimation in December 2006	435 million barrels
	Chust	South Korean Consortium	Business profitability estimation in December 2006	380 million barrels
Azerbaijan	Inam	South Korean Consortium	4% (GS 4, Daewoo International 2%, STX 2%)	750 million barrels

Package Strategies and Fortification of Strategic Investment

In order to pursue strategic energy cooperation with Central Asian countries, the South Korean government should approach the opportunity from a number of angles, rather than to focus solely on participation in energy exploitation. In September 2007, Bulat Sultanov, president of a strategy research center under the direct control of the Kazakh President, said during his visit to South Korea: "It is rather out-of-date to discuss energy cooperation with Central Asian countries. Central Asia needs to seek out industrial diversification. This issue is what South Korea needs to discuss with Central Asian countries." It is certain that Central Asia has an abundant quantity of energy and natural resources of which, South Korea desperately needs. But South Korea does not come empty handed. South Korea has manufacturing industries and technology which Central Asian countries need for their industrial development and diversification. The complementary nature of their economic needs provides an obvious win-win, give-and-take opportunity. Additionally, even though Central Asian countries have massive quantities of energy and natural resources, they do not have industrial infrastructure through which to increase production. In this situation, a good example of a package strategy would be the entrance of the Korea Oil Corporation and South Korean construction companies into Central Asia. While the former produces oil, the latter can construct oil refineries.

Fortification of Civil Cooperation and Cultural Exchange

China has actively worked to improve its diplomatic standing and secure energy from Central Asian countries through the "Shanghai Cooperation Committee." Similarly, Japan has also formed a Central Asia–Japan dialogue committee through which it has managed to strengthen its image as an economic partner. Moreover, Japan had the foresight to anticipate the strategic importance of Central Asian resources to Japan's future and developed a comprehensive and systematic approach to Central Asian opening, including the provision of necessary information and support to private companies. In order to fortify cooperation with Central Asian countries, South Korea needs to follow a similar path and pursue pragmatic diplomacy, along with the maintenance of good-neighborly relations and economic support.

At the same time, cultural exchange with Central Asian countries is also important. Turkey has managed to establish unity with the Central Asian countries of Turk extraction through cultural and academic exchange, strengthening mental and cultural unity in ethnic, educational and linguistic dimensions. In recent years, Central Asian countries have experienced what is called the "Korean Wave," a cultural phenomena where South Korean pop culture, such as movies, music, dance, and television dramas, has acquired huge followings throughout Asia. This is a good opportunity for South Korea to capitalize on its cultural influence and strengthen its national brand image with Central Asian countries, engaging sectors of society that previously, were inaccessible to foreign influence. Youth corps of South Koreans to Central Asia could help foster goodwill and secure future cooperation.

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