ENERGY RESOURCES AND ENERGY POLICY

PROSPECTS OF CASPIAN GAS AND ITS POTENTIAL MARKETS

Taleh ZIYADOV

Graduate student at the Center for Eurasian, Russian and East European Studies at Edmund A. Walsh School of Foreign Service, Georgetown University (Washington, U.S.A.)

The Caspian region's natural resources have been a controversial and hotly debated topic for a long time. Some have considered the region as an alternative to the Middle East, while others have preferred to simply ignore it altogether. Indeed, the region's proven oil reserves are far smaller than that of the Middle East. Nevertheless, the importance of the Caspian Basin as another source of oil and gas supply and its strategic location come into play in keeping the region indispensable for the West.

Since the Caspian states have opened their doors to foreign investors, most of the latter's capital has gone to regions' oil sector, while its gas sector has largely remained untouched. Caspian natural gas, which has not been seriously looked into until now, has far greater advantages in comparison with its oil. The U.S. Energy Information Administration (EIA) estimates the region's proven gas reserves in Azerbaijan, Kazakhstan, Uzbekistan and Turkmenistan as much as 232 trillion cubic feet (tcf), compared to those in Saudi Arabia, which is the world's number four in proven natural gas reserves. Today, these four states produce roughly 4.5 tcf, and expect to reach a level of 8.7 tcf by 2010, which will be roughly 8% of the world's projected total consumption of natural gas in 2010.

According to a recent annual report of the International Energy Agency (IEA), in the next two decades, consumption of natural gas will continue to expand, especially in the area of energy generation. Most of the increase in energy demand will come from developing countries of Asia such as China and India. The geographical proximity of the Caspian Basin to the developing nations of Asia will be crucial in defining their energy policies toward the region. China, India and Japan are currently examining several alternative projects for procuring energy from the Middle East and the Caspian region to their domestic markets. Both Chinese and Japanese energy firms have been very active in acquiring interests in exploration and production of the Caspian oil and gas.

On the western shore of the Caspian Sea, Azerbaijan was seen as a potential hub for the Turkish and South European gas markets. It has already succeeded in negotiating two major oil and gas pipeline projects to Turkey. Turkey for its part is hoping to become a transfer corridor for gas supplies to Europe. It has already signed several agreements with Greece on sale of natural gas to this country and further to Europe. In addition to a gas pipeline from Azerbaijan, Turkey is also planning to import gas from Turkmenistan through a possible Trans-Caspian pipeline.

The demand for natural gas in the world is rising and is expected to double in the next two decades. Caspian natural gas, though yet to gain access to world markets, can potentially become an alternative energy source for countries and regions like Europe, China, Japan, Turkey, Pakistan and India, which are striving to diversify their energy supplies. Succeeding in this, however, will require building long distance pipelines as well as attracting enormous capital and foreign investment. The newly independent states of the Caucasus and Central Asia are economically weak and their potential to invest billions of dollars to their energy sectors does not seem imminent. Thus, the main priority for the governments of the Caspian states would be to create markets with a stable political environment fit for foreign investment.

This paper proposes to explore potentials of Caspian gas and to look at possible markets for its sale. On the supply side three countries—Azerbaijan, Kazakhstan, and Turkmenistan—will be analyzed. On the demand side eastern, southern—China, India, Pakistan—and western—Turkey and Greece—markets will be in focus. In particular, issues such as rising natural gas demand, construction of long pipelines and attracting foreign capital will be examined within the general context of the paper.

Eastern Markets: China

On the eastern shore of the Caspian Sea the most potential market for the export of natural gas is China, which is rapidly industrializing. Turkmenistan and Kazakhstan are the two states that are interested in selling their gas to China. These two states possess the largest share of Caspian natural gas reserves. With proven and possible assets Turkmenistan holds the world's fifth largest natural gas reserves (229.9 tcf), while Kazakhstan, the world's fifteenth largest, has 153.3 tcf of natural gas.[1] Today, Kazakhstan produces roughly 14 billion cubic meters (bcm) of natural gas, all of which it either consumes domestically or exports to Russia. By 2010, Kazakhstan is expected to produce 60 bcm per annum, while Turkmenistan's gas production will reach 120 bcm/y.[2] In 2003, Turkmenistan produced 59.09 bcm of natural gas.[3]

Despite the fact that China's domestic natural gas reserves are estimated as much as 53 tcf,[4] gas has yet to become a commonly used fuel. China's primary energy consumption product is coal (70 percent of total consumption), followed by oil, which makes up roughly 20 percent of total primary energy. Natural gas in China is used primarily in industry and accounts for 82 percent of industrial energy consumption.[5] Its current natural gas consumption is roughly 3 percent compared to a world average of 24 percent and an Asia-wide average of 8.8 percent.[6] Although China is a self-sufficient country with regard to its natural gas consumption, its demand is expected overrun supply by the end of 2005. And in the long run the share of natural gas in economy will increase as well. Official figures show that the use of natural gas by 2020 will be around 8 to 10 percent of total energy consumption.[7] It is projected that during the same

[1] See: *Caspian Sea Region: Key Oil and Gas Statistics*, Energy Information Administration (EIA), August 2003. Available online at [http://www.eia.doe.gov/emeu/cabs/caspian.html].

[2] See: D. Sarsenova, "Kazakhstan a Player in Eurasian Gas Cooperation", *The Times of Central Asia*, 1 April, 2004.

[3] "Turkmenistan Gas Production up 4% in Q1", *Interfax*, 7 April, 2004.

[4] See: *EIA: Country Analysis Brief: China*, June 2003. Available online at [http://www.eia.doe.gov].

[5] See: "Natural Gas Pipeline Development in Northeast Asia," *Asia Pacific Energy Research Center (APERC)*, April 2000, p 11. Available online at [http://www.ieej.or.jp/aperc/final/ne.pdf].

[6] See: Bernard D. Cole, "Oil for the Lamps of China—Beijing's 21st Century Search for Energy," *McNair Papers 67—the Institute for National Strategic Studies*, National Defense University, Washington, DC, October 2003, Chapter 4. Available online at [http://www.ndu.edu/inss/mcnair/mcnair.html].

[7] Ibid., p. 27.

period, the demand for natural gas will grow at an average rate of 11.7 percent per year.[8] The share of domestic production will make up of 60-130 bcm/y of this growth while imported gas, including Liquefied Natural Gas (LNG) will range from 25 to 50 bcm/y.[9]

The Chinese government understands the growing importance of natural gas and has been actively improving the country's infrastructure and distribution networks. One such attempt is the ongoing construction of the West-East Pipeline. This 3,900 kilometer gas pipeline will carry 12 bcm/y of natural gas from the Tarim basin in Xinjiang to Shanghai over the period of 30 years, linking less developed western provinces with China's central transmission network system. The region's reserves are the second largest in China and estimated as high as 527 bcm in 2001.[10]

As far as the Caspian Basin is concerned, the West-East Pipeline will create an additional gas network that can potentially connect the gas routes of Central Asia, China and Japan. There are two pipeline projects with the prospective of becoming viable in the long run. The first pipeline is from Turkmenistan to China. The initial agreement to build a 6,700 kilometer long pipeline that would cross Uzbekistan and Kazakhstan before reaching China was signed in 1994. After an initial joint feasibility study by Turkmenistan, China and Japan the pipeline's cost was $12 billion, with transport capacity ranging from 10 to 20 bcm/y.[11] Although China has been committed to moving ahead with this project, due to a lack of investment, political risk, and poor relations between neighboring states, the project has been suspended for an indefinite time.

The second possible pipeline is from Kazakhstan to China. China has long viewed Kazakhstan as a potential oil supplier, and there are some scenarios for building a natural gas pipeline as well. One such scenario proposed by the Asia Pacific Energy Research Center in 2000 is a potential Kazakh-Chinese natural gas pipeline with 32 bcm/y capacity.[12] This pipeline has several advantages: it does not cross any other state's territory on its way to China, and it helps Kazakhstan to diversify its natural gas sale. However, for the time being China has put a hold on gas and oil pipelines from Kazakhstan, as it is actively exploring the possibility of getting Russian oil and gas from Russia's Far East and Siberia. Therefore, the fate of this pipeline will depend on how well the Russian-Chinese negotiations go and whether enough investment is found to build this long distance pipeline.

Even though building long pipelines require huge investments and a great amount of time, China seems to be committed to the realization of these projects in the long run. Nonetheless, it is too early to say whether these projects will ever get off the ground. There are numerous factors that will play in the process including: Chinese development process and the share of natural gas in the economy, the political situation in the Central Asian states, the commitment on the side of Chinese and Central Asian governments and, more importantly, multi-billion dollar investment.

Southern Markets: Pakistan and India

The southern markets have been one of the promising and yet controversial ones.

Turkmenistan is very interested in selling its gas to its southern neighbors including Iran, India and Pakistan. In 1995, Turkmenistan signed an agreement with Iran which proposes to supply eight billion

[8] See: J. Choo, "The Geopolitics of Central Asian Energy," in: *Limiting Institutions? The Challenge of Eurasian Security Governance,* ed. by James Sperling, Sean Kay and S. Victor Papacosma, Manchester University Press, Manchester, New York, 2003, p.113.

[9] There are various estimates for future natural gas production in China. The range provided here is a combination of data provided in Table 9 of APERC 2000 report (see: "Natural Gas Pipeline Development in Northeast Asia," p. 15, note 50).

[10] See: "Developing China's Gas Market—The Energy Policy Challenges," *International Energy Agency*, 2002, Chapter 7. See also: *EIA: Country Analysis Brief: China*, note 4.

[11] Ibid., p. 226.

[12] Ibidem.

cubic meters of gas each year for 25 years.[13] Since 1997, Turkmenistan has been exporting gas to Iran through its Korpedzhe-Kurt Kui pipeline (see Map 1).

Map 1

Source: BBC.

[13] "Turkmen Oil and Natural Gas: The Viability of Delivering Prosperity to Global Markets," *The TED Case Studies. An Online Journal,* American University, Case No: 385. Available online at [http://www.american.edu/projects/mandala/TED/turkmen.htm].

As far as the Pakistani and Indian markets are concerned, the Trans-Afghan pipeline (TAP) is the major project that has potential and yet has never moved beyond feasibility study. The idea of building a gas pipeline via Afghanistan first surfaced in the mid-1990s when Turkmen President Saparmurat Niyazov and the then Pakistani Prime Minister Benazir Bhutto signed a "founding" agreement.[14] In 1997, another trilateral agreement between Turkmenistan, Pakistan and the two energy companies, namely the U.S. Unicol and Saudi Delta Oil was signed. It proposed to build a 20 bcm (700 bcf) pipeline with an estimated cost of $2 billion ($2.7 billion if extended to India). The construction was scheduled to begin in 1998. However, the civil war in Afghanistan and disapproval of the U.S. government forced Unicol to withdraw from the project. Nonetheless, the parties succeeded in finishing a feasibility study, as a result of which India was invited to join the project.[15] Another feasibility study by the Asian Bank of Development is expected to finalize this year. Besides ABD, the world's largest natural gas producer, Russian Gazprom, has also held talks with Pakistan about building the proposed Trans-Afghan pipeline.[16]

After the overthrow of Taliban regime in Afghanistan, the leaders of Afghanistan, Pakistan and Turkmenistan signed another agreement in December 2002, confirming the route of TAP. The framework agreement proposed to pump 30 billion cubic meters of natural gas annually through a 1,500 km long pipeline, which would start in Turkmenistan and go through Afghanistan to the Pakistani port of Gwadar. The cost was estimated at $3 billion.[17] Although the deal brought the TAP back to life, it did not include India, whose participation is crucial for the project's economic viability.

India's participation in the project will certainly speed up the plan. Recently interest in importing natural gas by pipelines has revived in India, and it has been looking for alternative suppliers. Its natural gas consumption is projected to reach 1.2 tcf in 2005 and 1.6 tcf in 2010.[18] However, India has been reluctant to meet the rising demand through the TAP primarily due to three factors: (a) a reluctance to allow its energy vessels to pass through a 'foe' neighbor, Pakistan, that can gain leverage over India's energy supplies; (b) India has been rapidly developing natural gas industry of its own that it needs to make use of it first; (c) there are several alternatives that India can choose from.[19] Moreover, India also seriously considers using LNG instead of building a long distance pipeline.

Since India's position vis-à-vis the TAP is not clear and Afghanistan gas consumption is too modest, Pakistan remains the only relevant market for this project. Pakistan has roughly 25 tcf (710 bcm) of natural gas of its own. According to the Ministry of Oil and Gas of Pakistan, the country's demand for natural gas is expected to rise substantially, reaching 1.6 tcf by 2006.[20] However, the level of demand will not be enough to consume 20-30 bcm from the TAP and a potential "improvement in upstream development could considerably constrain Pakistan's demand for Turkmen gas".[21]

The main concern for the TAP project, nonetheless, is the long-term contracts that Turkmenistan has signed with Russia. Russian domination of future gas exports and routes may endanger this project. In recent years, Turkmenistan and Kazakhstan have pursued northward routes linking their gas pipelines with the Russian gas networks. In 2003, Turkmenistan signed a 25-year contract for Turkmen gas delivery to Russia, while Kazakhstan is under pressure to sign similar contract. These long-term contracts could jeopardize the countries' potential natural gas supplies and unable them to deliver enough gas for the TAP.

Some estimations show that by 2010 a demand for Turkmen gas will be roughly 183 bcm, while the country's production target is actually 120 bcm. Despite the country's huge reserves, it will be "the size

[14] See: A. Vatansever, "Prospects for Building the Trans-Afghan Pipeline and Its Implications," *The Pacific Northwest National Laboratory*, PNNL-14555, 31 August, 2003. Also available online at [http://www.pnl.gov/aisu/pubs/tapvatan.pdf].
[15] See: Ibid., p. 5.
[16] See: "Gazprom in Talks over $3 Billion Afghani Pipeline," *Pravda.Ru*, 29 May, 2002.
[17] See: "Trans-Afghan Gas Pipeline a Pipe Dream?" *The Hindu,* 30 December, 2002.
[18] See: *EIA: Country Analysis Brief: India*, May 2003.
[19] See: A. Vatansever, op. cit., p. 17.
[20] *EIA: Country Analysis Brief: Pakistan*, May 2003.
[21] See: A. Vatansever, op. cit., p. 15.

of the contracted volumes [as well as] Turkmenistan's gas relations with Russia and Ukraine [that] will determine Ashgabat's ability to meet future gas export commitments at current production targets. A major indicator will be provided by infrastructure development aimed at exporting gas to the North".[22] In 2004, Turkmenistan has renewed and signed four gas export contracts. Ukrainian *Neftegaz Ukrainy* will receive 36 bcm, Russian *Itera,* 10 bcm, Russian *Gazprom,* 5 bcm and the National Gas Company of Iran, 7 bcm. In 2003, Turkmenistan gas exports were up 10% reaching 43.4 bcm.[23] Moreover, if in the long run Turkmenistan is planning to commit some of its natural gas to the Trans-Caspian pipeline, then the prospect of the TAP seems shady.

Besides economic obstacles there are also some political issues that can further complicate and postpone the construction of the TAP. An unstable environment in Afghanistan and different interests of regional powers are the major impediment. For instance, Gazprom wants Turkmenistan and Kazakhstan to export their gas using available Russian gas networks. It also strongly supports Iran-India pipeline which is a rival pipeline to the TAP. Furthermore, neighboring Uzbekistan, which can contribute additional gas to the project, is not in good relations with Turkmenistan.

Despite seemingly positive developments in recent years, the future of the Trans-Afghan pipeline remains uncertain. The agreements that were signed between interested parties do not have explicit details such as volume of sales and purchases. A successful construction of this pipeline in the long-term is also impeded by some political and economic issues. Unless issues such as India's involvement in the project, an increase in Turkmenistan's gas production capacity, and international support for the TAP are resolved, the future of Caspian gas running to Pakistan or India via the TAP is vague. Moreover, the TAP has yet to attract other international companies to secure its financing. Thus, both Kazakhstan and Turkmenistan are more willing to consider exporting their natural gas to western markets using the western routes either through Iran, Russia or via potential Trans-Caspian pipeline.

Western Markets: Turkey and Greece

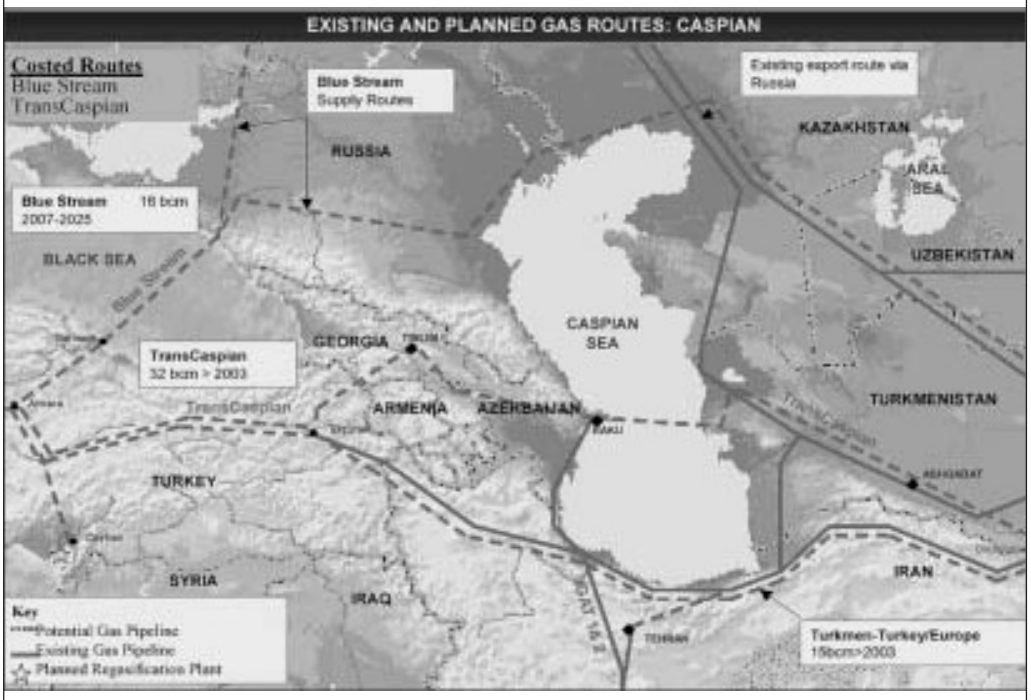
Turkey and Greece will be the two primary consumers and transit corridors for Caspian gas in the future. In the short-term, Azerbaijan and Iran will be exporting their natural gas to Turkey and further to Southern Europe. However, in the long run several projects may surface, including the pumping of Turkmen gas via a Trans-Caspian pipeline as well as Kazakh gas through the Black Sea Blue Stream pipeline. Some of the natural gas may be consumed domestically in Turkey while the surplus will be sold to Greece and other European countries (see Maps 2 and 3).

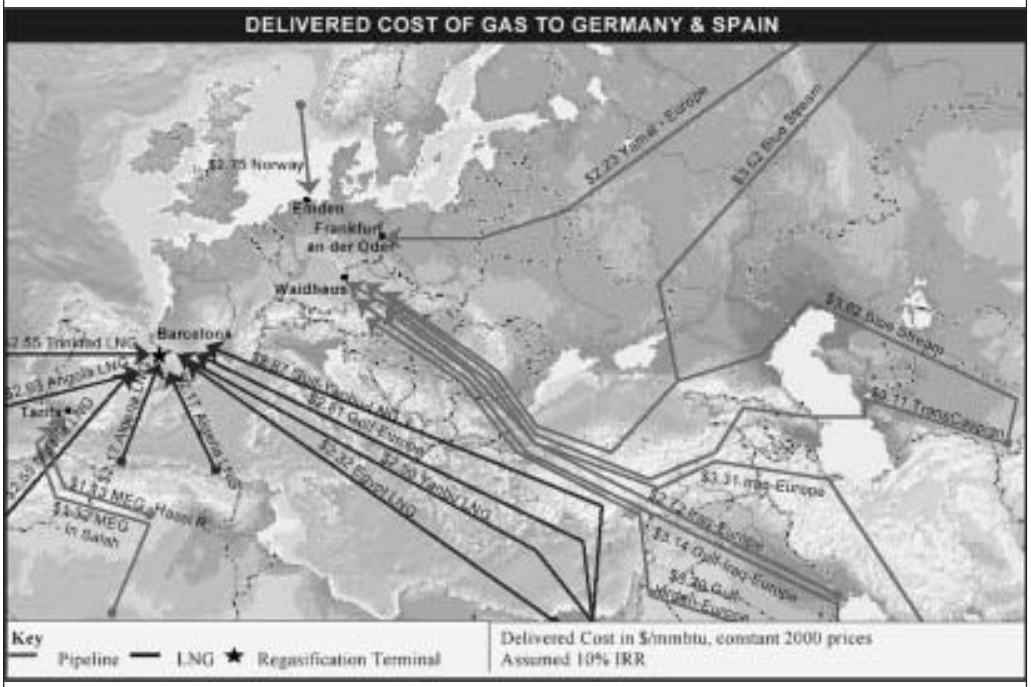
The major source of the gas in Azerbaijan is the Shah Deniz offshore field, which is located in the western Caspian. A production sharing agreement between Azerbaijan and international energy companies was signed in 1996, but the huge discoveries in Shah Deniz field were only confirmed in 1999. The field's gas reserves are estimated at 600 billion cubic meters or between 25-39 tcf,[24] in addition to some 101 million tonnes of condensate. However, it may possess an overall 1 trillion cubic meters of gas and 400 million tonnes of condensate.[25]

In 2001, Turkey and Azerbaijan signed a sales agreement in which Turkey committed to buy 6.6 bcm of Azeri natural gas per year. The parties also affirmed a route by which the gas will be pumped to Turkish and European markets. They agreed to build additional gas pipeline, the Baku-Tbilisi-Erzurum (BTE), parallel to the planned Baku-Tbilisi-Ceyhan oil pipeline. The BTE, which is known as the South Caucasus Pipeline, starts in Baku and goes to the Turkish city of Erzurum via Georgia. It is

[22] Ibid., p. 9.
[23] *Interfax*, 7 April, 2004.
[24] See: *EIA: "Azerbaijan: Production-Sharing Agreements,"* June 2002.
[25] "Shah Deniz Consortium, GIOC Sign Gas Export Deals," *Interfax*, 31 October, 2003.

Maps 2 and 3





Source: Clingendael International Energy Program [http://www.clingendael.nl/ciep/pdf/8%20Natural%20gas.pdf].

680 kilometers long with throughput capacity of 233 billion cubic feet. This project is considered the first step in building the Caspian-Europe natural gas network.[26]

In the early stages of the project, Turkey will be the primary consumer. Turkey's gas demand was 14.8 bcm in 2000, out of which 64 percent (9.3 bcm) was used for power generation. The country's natural gas demand is expected to triple by 2010. The Turkish Natural Gas company BOTAS estimates total demand by 2020 at 42,977 mcm and total supplies at 40,791 mcm.[27] According to IEA Turkey study, the share of natural gas in the country's total energy consumption will increase from roughly 25 mtoe in 2000 to 150 mtoe in 2020.[28]

To secure its gas supplies, Turkey has signed several purchase agreement with different states, including 10 bcm/y and 6.6 bcm/y from Turkmenistan and Azerbaijan, respectively.[29] The signed agreement with Turkmenistan proposing to build a Trans-Caspian pipeline via the Caspian Sea and across Azerbaijan and Georgia, is yet to become a reality. The BTE is currently under construction and due to become operational in 2006.[30] It will be linked to the Turkish natural gas network that will further connect it to gas network of Greece.

Greece's natural gas reserves are very small (some 18 bcf), albeit most of its consumption is met from imported gas from countries like Russia and Algeria. As in Turkey, the demand for natural gas in Greece has been growing with remarkable speed, increasing from 1 bcf in 1996 to 76 bcf in 2001.[31] To catch up with rising demand, Greece signed several memorandums with Azerbaijan, Iran, Italy and Turkey to facilitate the process of connecting the gas networks of these states together.

On 28 March, 2002, Greek Public Natural Gas Company DEPA and the respective Turkish company BOTAS signed the Memorandum of Cooperation, which was the foundation of consecutive treaties between the two states. The memorandum established a basis for the construction of a 285 kilometer-long natural gas pipeline from Turkey to Greece. As a result, Turkey attained an opportunity to sell some 500 mcm of natural gas from the Caspian Sea region (i.e. Azerbaijan) and Iran to new consumers in Europe and the Balkan Peninsula.[32] Final agreement between Greece and Turkey to build the $300 million pipeline was signed in February 2003. The pipeline will be completed in 2005 with a throughput capacity of roughly 17.7 bcf per year.[33]

From an economic perspective the gas from the pipelines linking Turkish and European gas markets will be more cost efficient compared to that of Russian gas[34] (see Maps 2 and 3) In particular, the transfer of Caspian natural gas to European markets, where demand for natural gas is also expected to rise, will benefit the South European states that have to diversify their energy supplies in the upcoming decade.[35] The potential pipelines from Kazakhstan to Turkey via the Black Sea pipeline and from Turkmenistan to Turkey via the Caspian Sea will help the European Union in its diversification process.

Conclusion

In conclusion, it is fair to say that Caspian natural gas, though yet to gain access to world markets, can potentially become a significant energy source for the countries like China, Pakistan, India, Turkey,

[26] See: *EIA: Country Analysis Brief: Azerbaijan*, June 2003.

[27] See: *Natural Gas Supply and Demand Scenarios from BOTAS* (Petroleum Pipeline Corporation). Available online at [http://www.botas.gov.tr/].

[28] See: *IEA: "Energy Policies of the IEA Countries: Turkey 2001 Review*," 2001. See Figure 4: Total Final Consumption by Source from 1973 to 2020, p. 26.

[29] See: *IEA: "Flexibility in Natural Gas Supply and Demand*," 2002.

[30] See: *EIA: Country Analysis Brief: Turkey*, May 2003.

[31] See: *EIA: Country Analysis Brief: Greece*, July 2003.

[32] [http://www.depa.gr/].

[33] See: *EIA: Country Analysis Brief: Greece*, July 2003.

[34] Figures from the presentation of the Chairman and General Manager of BOTAS, Mehmet Takiyüddin BİLGİÇ, "Turkey Energy Bridge Between East and West," show that the cost of natural gas transported through Turkey ($mm/btu) will be around $2-2.17 compared to a cost of the Russian gas which is more than $2.5 (30 October, 2003). For full speech of Mr. BİLGİÇ, see [http://www.botas.gov.tr/eng/presentations.html].

[35] See: *Transport and Energy Infrastructure in South East Europe*, European Commission's strategy paper for Transport and Energy Infrastructure, Brussels, 15 October, 2001. Available online at [http://europa.eu.int/comm/ten/infrastructure/doc/tren_se_en.pdf].

and Greece. Although it requires building long distance pipelines, as well as attracting enormous capital and foreign investment, the prospect of the western markets are the most promising. Thus, pipelines from Azerbaijan and potentially Kazakhstan and Turkmenistan could become a significant supply for Turkey, Greece and other South East European countries. The Baku-Tbilisi-Erzurum pipeline that is currently under construction is due to be operational in 2006. It will be the first project to link the Turkish natural gas network with the Caspian Sea region that could be eventually enhanced by involving Turkmenistan via Trans-Caspian Pipeline.

On the contrary, there are some issues with regard to the transportation of Caspian gas to China. The construction of long-distance pipelines is capital intensive and requires the collaboration of several countries and international investors. Though China acknowledges the importance of Caspian gas resources, its current concentration is on building domestic infrastructure and seeking to get Russian oil and gas from the northern peripheries. Nonetheless, the West-East Pipeline project that China is currently developing domestically will create additional gas network that can potentially connect the gas routes of Central Asia, China and Japan.

As in the case of eastern pipelines to China, the fate of southern projects is also ambiguous. The so-called Trans-Afghan pipeline has never moved beyond agreement stage and is currently on halt. The reluctance of India to participate in any pipeline project that passes through Pakistan is seen as one of the major obstacles, as Pakistan's demand for natural gas will not be enough to make this project economically viable. The main concern for the project, however, is long-term commitments by the Central Asian states to other natural gas buyers, such as Russia and Ukraine. Turkmenistan has already committed to deliver more natural gas than it has projected to produce in 2010. And unless, in the long-term, the country attracts foreign investors and develops its natural gas industry rapidly, Turkmenistan will not be able to satisfy all customers and thus the TAP will be delayed even further.

Nonetheless, there is a potential for the Caspian states to become the major gas exporters in the region. It will require attracting foreign investors and creating politically stable environment with low economic risk. The states should also solve their interstate disagreements and be more cooperative in interstate projects, including Turkmenistan, Uzbekistan, and Kazakhstan—the three key states at the crossroad of possible pipelines to China. The stabilization of Afghanistan and normalization of Pakistani-Indian relations in the long run will help to revive hitherto an unaccomplished construction of the Trans-Afghan pipeline. Moreover, Kazakhstan and Turkmenistan should work with international companies in getting their gas to Turkish markets and further to Europe, diversifying their export routes, which are currently dominated by Russia.