



Among Turkey-Caucasus–Central Asia Energy Economy and Marketing Relations

KEYWORDS

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ABSTRACT *In this study, it is analyzed the relationship between Turkey and the Caucasian- Central Asian countries with respect to the energy economics and marketing relations. In this respect , especially depending on the coal and lignite reserves, power generation and distribution of it on high-voltage transmission lines to the interested countries, and the marketing of energy that necessitate the cooperation among countries are discussed. In addition to oil and natural gas pipelines, power transmission lines have also been proposed to be built.*

1. INTRODUCTION

In recent years, after China, Turkey has been among the most energy consuming countries in the world. The required energy is obtained by the natural gas, petroleum, coal mines and renewable resources. To achieve the economic prosperity and social development objectives, Turkey should meet her energy needs from reliable sources in economic ways. Because Turkey, with her high energy consumption and transportation facilities is one of the world's most dynamic energy economies.

Turkey to meet the rapidly growing energy needs largely dependent on imports for oil and natural gas resources. Approximately 26% of the energy used at present are met from domestic sources, 74% are met from the imported sources. Turkey is highly dependent on foreign energy sources. In the future, energy consumption of Turkey is estimated as; 398-434 billion kWh for electricity, 59 billion cubic meters for natural gas, and oil is estimated to reach the level of 59 million tons in 2020 [1].

Turkey plans to meet the growing energy needs from nuclear energy since 2030. Today within the present system in Turkey, in meeting the energy needs, the share of coal and lignite is about 28%, hydroelectric power 22,80%, natural gas 44,71 %, while others close to about 4,03 % [1]. In this case, the share of the fossil fuels in power generation is about 73 %. Alternative green energy group is also planned to meet 30% of Turkey's total energy needs by the year 2023 [2].

Cultural affinity, plays an active role in the initiation of international relations. However, in today's world, economic factors are seen to be more effective in maintaining good relations between the countries. As the basis for the development of closer relations among the peoples of Turkey and Central Asian Countries, the most important is to belong to the same language group (Altaic Languages) that gives ways to the excellent ethnic and cultural proximity [3]. Belonging the same religion and ethnic affinity, can contribute directly or indirectly to closer political and commercial relations between the states.

Relationships with Turkey and the Caucasus and the Central Asian Turkish Republics, started in the economic, cultural and political spheres, in 1991, during the disintegration of the Soviet Union. In addition, Turkey was the first country in the world to recognize the political independency of these states, albeit limited, has supported them in political and economical spheres. Formerly, these countries were assumed to be in the backyard of the Russian Federation. By taking into account this reality friendly relations were developed be-

tween the Russian Federation and Turkey. Today, Turkey tries to develop relations in all areas with countries in the geography of the former USSR [3].

Economic development of a country depends on both, the most effective use of the production factors of labor, technology, financial and natural resources and marketing skills by integrating the internal market to the foreign global markets. Expansion and deepening in markets result in to increase the productivity of the economy and thus also increase the growth rate. In closed economies, the growth relies mainly on increased domestic market demand, and major marketing problems can be seen in entering to external markets. This is because of imperfect competition, low productivity and poor quality. In small-scale economies, the production of each product can be of high cost, low efficiency and low profitability due to the lack of economic size in production infrastructure. To overcome the economies of scale problems, it is necessary to improve bilateral relations with friendly countries and to make joint investments to gain competitive advantage on foreign markets. If the population of any country is small, but having large geographical area and rich energy resources absolutely requires joint economic efforts in production and marketing. As for the Central Asian countries, with bilateral and trilateral alliances, the co-production companies could be established to produce energy and to market it in third-party countries. Through a competitive advantage to be gained in production and marketing then, strategic objectives, such as optimal growth and profitability. In domestic and global markets can be easily achieved. Turkey can be a strategic partner for these countries.

Turkey's energy sources as proven reserves are: 1,126 billion tons of coal, 13,3 billion tons of lignite, 9.129 tons of uranium, 380.000 tons of thorium, and 49,3 million tons of oil [4]. This insufficient reserves of fossil fuels forced Turkey to meet its energy resources through imports. In recent years, Turkey have been trying to meet energy needs more secure with the help of pipelines (pipe -line) transportation, while the share of its own production of oil and natural gas are very limited. Here is one of the main problems. Although, it is assumed that in free market economies and global markets, buying and selling of goods and services are realized in accordance with the rules of the free market system does not appear to be happening in the field of energy market due to the undeclared hidden embargoes. Turkey is also not immune from this type of embargoes. In Turkey, the most obvious example of these embargoes can be seen at the failures of nuclear power plant tenders.

Central Asian Turkish Republics, including Azerbaijan, have

strategic importance in terms of the production and export facilities of energy resources, such as, crude oil, natural gas, coal, lignite, uranium, and thorium. Additionally, they have a limited capacity to export a small number of industrial products. As for imports, they need to procure essential nutrients, machinery, production equipment, medium- and high-tech products and consumer goods.

The economies of Turkey and the Turkish Republics, their production structures, and the export and development potentials of these countries are considered together, it can be said that they complete each other to a greater extent. Only the independent Turkish Republics has a geographical area of about 4 million km² and their population is about 64 million. The population density is very low. In contrast, Turkey's position is important as a bridge between strategic oil and natural gas producers in Asia and consumers in Europe, about 40% of known natural gas reserves and 67% of oil reserves belong to the Middle East and Central Asia [5]. Therefore, Turkey should assess its good position to win the economic and political advantages by controlling the oil and natural gas transportation lines.

Today, Turkey's per capita electricity production is 2122 Kw/h, for the EU countries in 2020, it would be about 6345 Kw/h and Turkey also wants to reach this target at the same time [1]. Given Turkey's growth rate, it is imperative that year by year \$ 4,5 billion is to be invested for the production of electrical energy. Thermal energy, oil and its derivatives used in different areas of the industry are outside of this figure. The majority of electrical energy is generated by hydroelectric and thermal power plants. Clean or environmentally friendly energies such as wind, geothermal and solar energy seems to be very attractive, but today's technological conditions and needs of the industry reveal that it could be insufficient to achieve the country's stable and sustainable development goals. But, of course, in the future with development of new technologies, the production of clean energy would be increased, but in the short term, it could be only utopia. Therefore, today, after the oil and natural gas, the coal as an energy source seems to be the most important for Turkey.

The effectiveness of Turkey in the world energy market results mainly from the bridging role between the most important energy resources market and the major European energy consumption markets. The oil pipe-lines passing through Turkey are, Iraq-Turkey, Ceyhan-Kirikale, Batman-Dörtyol, elmo-Batman, Baku-Tbilisi-Ceyhan, Kirkuk-Yumurtalik, and the Azerbaijan-Turkey-Greece pipelines. [1,6]. As for natural gas pipelines, those are Russia-Samsun Blue Stream, Turkey-Western European lines, Iran-Turkey natural gas pipeline and the Baku-Tbilisi-Erzurum gas pipe-lines. More than half of the gas transported by way of pipe-lines is used for electricity production, and remaining is used by various sectors of the economy [6]. Another important potential source in electricity generation to come forward is lignite. The lignite produced in Turkey has low-energy values but high-sulfur and carbon dioxide rates, that's why it is not very economic and also significantly pollutes the environment. Thus, barely 35% of this source can be used to produce energy. In the future, remaining portion can be used to generate energy by utilizing efficient and environmentally friendly green technologies.

2. ECONOMIC TIES WITH THE CENTRAL ASIAN REPUBLICS

Azerbaijan is one of the Caucasus region countries that is growing on a regular basis, from the economy point of view that is seen as a stable country. The underground wealth reserves of Azerbaijan can be seen as 4,5 billion tons of crude oil and 118,65 billion m³ of natural gas. Additionally, 788 thousand tons/year production capacity of cotton and meeting 80% of the world caviar production increase its strategic importance in economic terms. The Soviet Union remained as a superpower for a long time, the strategic economic resources of Azerbaijan played a crucial role behind this suc-

cess. Russia's oil production was 8 million tons in 1913 and 7 million tons of this oil was produced from the territory of Azerbaijan. During the Second World War, in the Soviet Union, 30 million tons of oil was produced but, 22 million tons of it came from Azerbaijan again [7]. Reserves of oil in the Caspian basin are about 200 billion barrels that is known as 10% of the world's oil reserves. In Caspian basin, Azerbaijan and Kazakhstan have larger shares from these reserves, that aspect increased the strategic importance of these countries in this region [8]. Azerbaijan, with current crude oil prices which is available today, an average of 100\$/barrel=143kg, and having 1 billion tons of oil reserves can be valued as (700 billion dollars), moreover having 1,31 trillion m³ of natural gas can be valued as (524 billiondollars), and has domestically sufficient amount of coal reserves, and also has the major uranium deposits that can not be identified their proven reserves so far [9].

In Central Asia, **Kazakhstan** that has the largest geographical area steadily growing in a stable economic structure. National income per capita is \$12800 and has rich energy resources. Kazakhstan has the highest per capita income among the independent Turkish Republics. It is rich in natural resources. It had, 90% chromium, 50% of zinc reserves of the former Soviet Union respectively. It has one-third of the world chromium and manganese reserves, that is, a world leader in mining [10]. It had the third largest coal basin (50 billion tons of reserves) and 20% of arable land of the former Soviet Union. There are more than 7 thousand rivers in the country. In the eastern of the country there are 28 million hectares of forest that provides raw materials for the paper and cellulose industry. Other than these wide range of underground riches It has also a significant amount of uranium reserves [7]. Proven oil reserves of the country have been identified around 5.3 billion tons [9]. In turn, Kazakhstan's known coal resources are 45 times as much as that of Turkey [10]. Turkey and Kazakhstan should come to an agreement on the basis of coal and lignite extraction and production of electricity through thermal power plants jointly. The electric energy produced in Kazakhstan firstly used for the domestic needs and excess energy can be transferred through the under ground or aerial high voltage power lines and finally reaching to Turkey. To do this, energy transfer can be made by way of Iran, Azerbaijan or Georgia. In determining these transmission lines, besides the affordability and feasibility economical criteria, political preferences should be of importance.

In **Kyrgyzstan**, the share of agriculture in GDP is 22%, in this sector, livestock has the priority. Only 7% of the country is suitable for agriculture but, thousands of different plants are grown in the mountainous areas. With a large number of hydroelectric plants, it generates greater amount of electricity energy; among the CIS, after Russia and Tajikistan it is on the third place, but can use only 6% of its potential due to lack of demand. Extraction of mines other than gold mining is not inadequate in Kyrgyzstan. In 2009, 17 tons of gold are produced. Other than gold, a small amount of uranium, oil, natural gas, and coal mines reserves are also determined [11]. Mining authorities estimated that, there are 430 tons of gold and 3,5 billion tons of coal mine reserves in Kyrgyzstan [12].

Uzbekistan has the agricultural economy. Formerly, 50% of cotton production of the Soviet Union is realized by Uzbekistan. It has great potential in terms of meat, milk and eggs. Silk production surpassed the production of fruits and vegetables. Kyzyl Kum Desert covers a large part of the country's rich natural gas, gold and uranium deposits that are known to possess [13]. Uzbekistan has a capacity of 100 tons per year gold mine [13], that attract investors of the world's leading countries. Because such amount of gold mine production is the largest in the world production at the moment. In addition, Uzbekistan has uranium deposits, but because of its strategic character, the full amount of its reserves is not made known so far [13]. The Gross Domestic Product of Uzbekistan in 2012 as purchasing power parity estimation is 106,4 bil-

lion dollars. According to estimates of proven reserves it has 1,841 trillion m³ of natural gas and 594 million barrels (84 million tons) of oil reserves [14]. On the other hand, according to data from the country's Turkish Embassy in Tashkent, there are 3,9 billion tons of coal mines and 116 thousand tons of uranium reserves available in this country [15].

Turkmenistan's economy is based on agriculture and livestock other than oil and natural gas extraction. Agriculture plays an important role in producing cotton and viticulture. Only 1% of the cotton produced in Turkmenistan can be processed. It is rich in livestock and agricultural products. Irrigated agriculture is performed at half a million hectares of agricultural land. In mining industry, it has, sodium sulfide, sulfur, iodine, and chromium mineral deposits [7]. According to the year of 2008 figures, 72 billion m³ natural gas was produced annually. Its annual production of oil is approximately 10,5 million tons that cannot be underestimated [16].

The Central Asian Countries are still experiencing the hardships of transition process from planned economy to free market economy. The biggest weakness in these economies is that their export structure is mainly depend on a single or a few products. Basically regional and global powers need to increase their ties with these countries, mainly because of the abundant raw materials and energy resources for their strategic industries. The region is rich especially in oil and natural gas reserves in global scales. As a result of the rise in world oil and natural gas prices, by employing the advanced drilling technologies, the world's oil and natural gas reserves and production are continuously increasing. Turkmenistan is one of those lucky countries. In 2010, reserves of natural gas were estimated as 8.1 billion m³ [9]. According to the most recent calculations, only at Galkinş Field, 26,2 trillion m³ of gas reserves were estimated [17]. It is evaluated that the overall natural gas reserves of the country may increase even more. At the moment, in terms of the size of the reserve, it is 4th country in the world.

Today, the Turkish Republics 4% of the world's oil reserves (1,526 trillion tons), their share is annually 2,5% of world production, that reaches the level of 146,9 million tons. This means that the production is performed under the capacity. It must be understood that more intensive work has been done on oil exploration and extraction activities. If we consider the Turkey's annual oil consumption of 28,7 million tons and providing 25 million tons from imports, it seems to be how much the oil production capacity of these countries [17].

On the other hand, natural gas reserves and actual production are balanced. 5% of the world's known natural gas reserves (187,1 billion m³) are in Central Asia and corresponding to 5% of the annual output, 150,2 billion m³, belongs to the sister republics. These countries produce, nearly four times as much as Turkey's 39 billion m³ of annual natural gas consumption [18]. The economic value of yearly natural gas production of these countries is approximately 63,336 billion U.S dollars, according to the price of natural gas imported from Russia to Turkey [19].

Since the domestic demand is not sufficient for economic growth, small countries in Europe became members of the customs union, common market and economic associations. By way of mergers and acquisitions 51 global corporate have emerged. These companies keep their European interests [20]. In the United States, the multinational corporations have become the world's giants by utilizing the advantages of major markets [21]. In the same way, the countries in Central Asia, to take advantage of the economic size, they should speed up industrialization and solve the problems among themselves, on the basis of energy resources they can go to economic integration. This model will be more stable and also will give rise to rapid growth [22]. To do this, the electrical energy generated by thermal power plants to be established in Kazakhstan, by creating a high-voltage electric

transmission lines inspired by the example of pipelines, must be transmitted. The average transmission unit cost price for the 340KV aerial transmission line is about \$ 148.500/Km [23]. The unit cost of crude oil and gas pipelines is about \$ 2,12 million/Km. In these lines, the average cost to transport 1 ton of crude oil for 1000 km. was. \$ 3,5 U.S[24]. The cost of natural gas pipeline transportation, for 1000M³ natural gas, the average cost of transportation for 1000km is \$ 16 U.S [25].

In thermal power plants, to achieve clean energy "pulverized" and "fluidized bed" coal combustion technologies should be used, but these energy production processes require that, k.cal values of lignite coals burned to be higher than k.cal 6000-7000. In Turkey, average lignite coal k.cal values are around 1000-2000 calories, having low quality lignite coals necessitate that the country should increase the imported lignite coals [26,27]. In this context, the friendly and brotherly Republic of Kazakhstan is the first that comes to mind. Getting rid of the high cost of transportation costs and by utilizing cheap and non-polluting clean energy production technologies in thermal power plants could be established in Kazakhstan, Turkey and brotherly countries finding concrete solutions to energy problems, as well as marketing surplus of energy in the global energy markets are to be considered.

High-voltage transmission lines, compared to the cost of pipelines, their infrastructure and transport cost is very low. The energy produced should be consumed in nearby areas of production, including Turkey, taking electricity from neighboring countries and consuming it locally, in energy transmission, when energy losses depending on the distance will be reduced to a minimum, would be more economical. Political will is to be needed to establish high-voltage aerial transmission lines between countries. In these regions, despite the rich resources of energy, consumption of it in industry is very limited. One of the reasons for this is that their population sizes is not sufficient for the economies of scale. Co-operation and combining the markets justifies the rationality of economies of scale in these countries, by realizing joint investments, production growth will be great. Smaller countries will get the biggest advantage of this co-operation. Economic size of these countries with an estimated production capacity of 1,5 trillion dollars and with a population of 150 million that has the potential to become a global power in their region.

Mining co-operation among countries having a common language, especially if it made with Kazakhstan that is in the interest of all countries in the region could be profitable. Co-operation in coal mining, co-production with clean energy technologies and produce more energy, and marketing excess energy to the third countries will be beneficial for all sides.

3. CONCLUSION AND RECOMMENDATIONS

Turkey has the advantage with its geographical location and cultural proximity that can give an advantage her in utilizing Caucasus and Central Asian energy resources, its policy aims to establish a bridge between the east and west line, give priority to projects should be developed those are related to the hydrocarbons produced in the areas, transmitting it to the world markets in stable, reliable, economical and environmentally compatible transport routes of energy transportation. In the realization of these projects with stakeholders under appropriate conditions, Turkey's security of energy needs will be partially guaranteed. Also the cost of energy and energy efficiency, energy supply in a sustainable manner will be provided in appropriate condition. Energy co-operation between the countries is not a simple commodity trading. Energy trade should be a secret strategic security co-operation between the countries. Therefore secure transfer of energy, and obtaining it from safe sources are needed to achieve stability. If the energy is supplied irregularly, every economy cannot be expected to grow steadily. As a result,

the country may not be able to be in the economic stability and growth that give rise to social events that ultimately lead to chaos in the country. Co-operation between regional states in addition to gas and oil pipelines, power generation, especially coal and lignite, the establishment of raw material, energy source, energy production plants, power transmission lines, produced and co-creating energy needs can be met more economically and at a lower cost. To do this, countries with high economic value creation potential should primarily establish common energy transmission lines.

To ensure the security of energy supply and acquire from reliable and diversified sources, to reduce dependence on foreign sources of energy, and should be given priority to

produce energy from domestic resources. Turkey must give priority and importance to the clean energy projects including renewable energy sources and by using clean energy technologies to generate energy from coal mines. In addition, nuclear energy should be used in electricity production without further delay. The development of electrical transportation vehicles should be encouraged to reduce dependence on oil and natural gas. In planning the future, the energy sector should be supported with special incentives, especially for the development of indigenous technology for clean and sustainable energy production incentives for R&D and high financial support should be given to specific energy projects.

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