

Impact of Caspian Crude Oil on Turkish Straits

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The Turkish Straits, for the last 10 years at least, have turned into one of the key shipping foci of the world seaborne oil trade, such as the Suez Canal, the Strait of Malacca and the Strait of Dover. It was previously the same in 1892. In that year, oil cargoes loaded in the Black Sea port Batumi were delivered by tankers to their customers in the Far East destination(s), all passing through the Turkish Straits.

Nearly 123 million tons of oil passed through the Strait of Istanbul in 2002, representing 5 per cent of the oil traded by sea. The number of crude carriers that passed through the Strait for that period, up or down, was 6022. In other words, 15 crude oil carriers a day sailed through the Bosphorus, laden or in ballast. Similarly, 1330 tankers carrying LPG and chemicals also used the Strait, meaning 4 additional but smaller size tankers a day on top of the above figure. Shipping traffic in the Strait was 4125 transits in the year 1841 and almost tripled in 1856, during the Crimean War. There are now an average of 25.000 transits per year in each direction including, *inter alia*, tankers, chemicals, product tankers, LNG and LPG carriers—the largest size passing through being 150 to 160.000 tonners fully laden or vessels of around 300 m in length partly laden. Almost one-third of the total transits are the local ships passing through the Strait. This paper provides an overview of the impact of Caspian crude on Turkish Straits and also explains the geographical location of Turkish Straits and includes lines that connect to Caspian crude.

Key Words: Impact, Caspian crude oil, Turkish straits.

INTRODUCTION

To determine the problems which will be caused by carriage of increased Caspian crude through the Straits in the future, we must first determine the amount that will pass through the Straits and therefore find an answer to the question of how much amount of Caspian crude will likely be carried. By establishing the amount of petroleum that will come out of Caspian Rim and be pumped to Black Sea, the dimensions of the problem will be clear. In the first step, proved and estimated amount of Caspian crude must be determined. Then considering the oil consumption of regional countries, export amount of exporting countries, the pipelines through which they export this crude, the amount of this exported

petroleum that is carried to Black Sea and accordingly the amount of this petroleum carried through the Straits and determining the amount of petroleum future carriage through the Straits is important.

Geographical Location of Turkish Straits

The term "Turkish Straits" includes the Bosphorus, the Dardanelles and the Marmara Sea and it connects the Black Sea to the Aegean Sea. Total length of the region is 165.44 sea-miles on the vessel transfer routes with Bosphorus measuring 16.64 sea-miles, Marmara Sea measuring 111.7 sea-miles, and Dardanelles measuring 37.1 sea-miles. The geographical border, on North Bosphorus, starts with the line that connects Anadolu Lighthouse to Turkeli Lighthouse, and on South Dardanelles, ends with the line that connects Cape Mehmetcik Lighthouse to Kumkale Lighthouse¹.

Bosphorus

Bosphorus connects the Black sea to the Marmara sea and divides the city of Istanbul (population 10,018,735*) almost equally into two.

Between mentioned lines and on vessel transfer routes, the length of Bosphorus is 16.64 sea-miles (33,280 yards) and its width is on North entrance 3640 yards, on South entrance 3090 yards. The narrowest spot is between Cape Kandilli and Cape Asiyan and it is only 770 yards long. The widest spot is between Umuryeri and Buyukdere ort and is 3740 yards wide. Average depth is 65 m and the deepest spot is between Kandilli and Bebek measuring 110 m. The shallowest spot on the North course², on the waterfronts of Kadikoy-Inciburnu is 18 m and on the South course on the waterfronts of Cape Asiyan is 12.8 m. Rocky turns of Bosphorus cause vessels to change their course 12 times and in some of them this change reaches to very sharp degrees such as 80 degrees (Yenikoy). Oceanographically the flow reaches to 6–8 knots. Strong winds cause very strong flow, which is locally called "orkoz". Also reverse flow affects vessel manoeuvre in a negative way.

On the Bosphorus, there are two suspension bridges that link Asia to Europe. These two bridges are called from South to North Istanbul Bosphorus Bridge and Fatih Sultan Mehmet Bridge. Bosphorus Bridge is located between Beylerbeyi and Ortakoy. Fatih Sultan Mehmet Bridge is located between Kavacik and Bebek. The distance between the two bridges is 6030 yards and the heights of these bridges are designed to be 58 m to clear vessels transiting through safely.

Fog in Bosphorus appears between January and May and also in October and may cause sea transport to be blocked for 10–15 days. Bosphorus connects two seas with different salt levels. Thus there is a flow system created by these two flows. Black Sea's less salty waters flow to Marmara Sea on surface and Marmara's more salty waters flow to Black Sea from bottom. Surface flow is speedier compared to bottom flow. Speed of this flow reaches to 4–5 miles in waterfronts of Kandilli and sometimes reaches to 7 miles. Dominated wave direction of Bosphorus is through North in January and February and through North-east in other months.

The Bosphorus is one of the busiest waterways in the world, handling annually 50,000 ships in addition to fishing boats and local traffic; this waterway is crucial to the economies of Turkey and other countries that border the Black Sea.

The problem of traffic through the Bosphorus is now getting more attention because of the emergence of Caspian oil. The two pipelines for Caspian oil now in existence end on the Black sea as will other pipelines that are being planned or built. This production will create a burden on the Bosphorus unless measures are taken. Turkey, supported by the United States, proposes to avoid the Bosphorus by building a pipeline from Baku to Ceyhan on the Mediterranean. The difficulty with this solution is that pipelines are, except for very short distances, more expensive than tankers. The estimates of the cost of moving oil from Baku to Ceyhan range from \$1.00 to \$2.00 per barrel. The cost of moving oil from the Black sea to the Mediterranean by tanker is less than twenty cents per barrel. The cost differential, in combination with low oil prices, is making some oil companies reluctant to invest in this pipeline.

There are three main ports/piers in the Bosphorus and its approaches. These are Tophane and Haydarpasa Ports and Harem Pier. In addition to these, there are harbours and piers located at various spots. There is very dense boat traffic between east and west shores. To provide a proper control and safety navigation there are Ahrkapi Traffic Control Center, Turkeli Lighthouse, Rumeli Kavagi and Kandilli Traffic Control Stations¹. Also in scope of Vessel Traffic Services (VTS), 8 non-manned observation stations have been built.

Marmara Sea

Marmara sea is in between Bosphorus and Dardanelles covering the inner side of the geographically called Marmara Region and its surface is 11.350 km square. The distance from Bosphorus exit to Dardanelles entrance is 109 sea-miles and from Dardanelles exit to Bosphorus entrance is 111.7 sea-miles according to vessel transfer routes.

Dominated winds are NE and NNE every season. In winter season SSW and SW winds are effective. Strong winds are generally formed on the east side of Marmara Sea and last for 10.7 days in Bosphorus in January. The fog that blocks sea traffic usually is formed in the Black Sea end of Marmara region. Bosphorus and Dardanelles are more affected by fog.

Dardanelles

Dardanelles is the international water way that connects Marmara Sea to Aegean sea and divides Canakkale city (population 464,975) into two. Dardanelles' north entrance is the longitude passing over Zincirbozan Lighthouse and South entrance is the line that connects Cape Mehmetcik to Kumkale Lighthouse.

Length of Dardanelles is 37.1 sea-miles (74200 yards); width is 5600 yards on North entrance and 4740 yards on South entrance according to vessel transfer routes. The narrowest spot is between Canakkale and Kilitbahir measuring 1430 yards and the widest spot is on waterfronts of Intepe Port measuring 7900 yards. Average depth is 65 m. The deepest spot is on the waterfronts of Cape Dalyan

measuring 94 m and the shallowest spot on North course Cape Kabageven measuring 25 m and on South course waterfronts of Kilitbahir measuring 27 m.

During their passes vessels change their courses 11 times and in front of Cape Nara they have to change their course for 75 degrees.

Fog in Dardanelles forms in January, February, March, November and December and may block traffic for 5–6 days. There is a surface flow from Marmara Sea to Aegean Sea. Average speed of this flow is 1.5–2.5 sea-miles and may increase according to wind. There's Canakkale port and combined to this port there are Canakkale, Eceabat, Gelibolu and Lapseki piers from which there is dense ferry traffic. To control the sea traffic, there is Canakkale Traffic Control Center with Gelibolu and Mehmetcik Traffic control stations. Also in scope of Vessel Traffic Services (VTS), 5 non-manned observation stations have been built.

Unique characteristics of the Strait of Istanbul

The Strait of Istanbul is a Turkish waterway of economic and strategic importance and its navigation regime is regulated by the Montreux Convention in force since 1936. It separates the two continents, Asiatic and European Turkey, and is also the integral part of the Turkish Straits which comprise the Dardanelles, Sea of Marmara and Bosphorus, the whole area being known as the Turkish Straits Region (TSR).

Unique characteristics of the Strait of Istanbul^{3,4}:

- It has a winding and quite narrow geographical structure,
- It is 17 nautical miles in length,
- Among the straits of the world it is the narrowest, constricting of a mere 0.4 nautical mile (700 m) between Kandilli and Bebek, leaving only a vessel's length of free-way on either side in an area densely populated,
- It has numerous bends requiring 12 course alterations and some of these alterations are very sharp, about 80 degrees,
- At the bends (Kandilli and Yeniköy) where major course alterations have to be made, rear and forward visibility is totally obstructed prior to and during manoeuvring.
- It is the only strait in the world on which an international convention with regard to navigation regime based on the principle of the freedom of passage and navigation for merchant vessels was laid.

Tanker traffic in the Bosphorus

Nearly 123 million tons of oil passed through the Turkish Straits in 2002*representing 5 per cent of the oil traded by sea. The number of tankers that passed through the Strait of Istanbul, up or down, was 6022 in the same year. In other words, 16 tankers a day, large or small, sailed through the Bosphorus, laden or in ballast. Similarly, 1405 tankers carrying LPG and chemicals further used the Bosphorus, which means additional 4 tankers a day, but smaller in size.

*Relevant figures for previous years are as follows: in 1997, 63 million tons, in 1998, 69 million tons, in 1999, 82 million tons, in 2000, 91 million tons, and in 2001, 101 million tons, respectively.

Tanker traffic is shown in Table-1 in 1997–2002 that the Strait witnessed by vessel type period.

TABLE-1
TANKER TRAFFIC BY VESSEL TYPE (1997–2002)^{5,6}

Tanker type	1997	1998	1999	2000	2001	2002
Petroleum	4303	4100	4452	4937	5188	6022
LPG	438	445	475	474	548	545
Chemical	628	597	577	682	782	860
LNG	—	—	—	—	—	—
Total	5369	5142	5504	6093	6518	7427

Caspian Region Petroleum Reserves

Caspian Petroleum Region is one of the most effective factors that will affect the number of tankers which will pass through Turkish Straits. Today it is known that petroleum in the Caspian Region is 11th out of 15 of world's biggest crude oil reserves. Most of the Caspian Sea Region petroleum reserves are not established yet and most of the area is not being searched. Therefore the amount of petroleum reserves of Caspian Sea Region is given different in different sources. According to United States Energy Information Agency Official Website, proven petroleum reserves in Caspian Region can change between 17.2–32.8 billion barrels. Estimated reserve is 186 billion barrels.

TABLE-2
CASPIAN REGION PETROLEUM RESERVES

Countries	Proven reserves (billion barrels)	Estimated Reserves (billion barrels)	Total (billion barrels)
Azerbaijan	7–12.5	32	39–44.5
Iran	0.1	15	15.1
Kazakhstan	9–17.6	92	101–109.6
Russia	0.3	7	7.3
Turkmenistan	0.5–1.7	38	38.5–39.7
Uzbekistan	0.3–0.6	2	2.3–2.6
Total	17.2–32.8	186	203.2–218.8

Source: <http://www.eia.doe.gov> (Ref. 7).

As is observed in Table-2, Azerbaijan⁸ with its 7–12.5 billion barrels proven, 32 billion barrels estimated; Kazakhstan with its 9–17.5 billion barrels proven, 92 billion barrels estimated and Turkmenistan with its 0.5 billion barrels proven, 38 billion barrels estimated reserves are among the owners of the most important petroleum reserves. Thus while observing the reserves, production and consumption, it would be appropriate to consider these three countries more. Among the proved crude oil reserves Kazakhstan and Azerbaijan are the richest countries.

Petroleum production, consumption, amount of exportations of region countries

According to Table-3, Kazakhstan, Azerbaijan and Turkmenistan share the first three places in the list of petroleum producers.

TABLE-3
PETROLEUM PRODUCTION OF CASPIAN REGION COUNTRIES

Countries	1992 Production		2002 Production		2010 Estimated production	
	'000 barrels/day	Million tons/year	1000 barrels/day	Million tons/year	Highest-lowest ('000 barrels/day)	Highest-lowest (million tons/year)
Azerbaijan	222	11.1	318	15.90	789-1140	39.45-57
Kazakhstan	530	26.5	939	46.90	51617-2400	80.85-120
Russia	—	—	—	—	150	7.5
Turkmenistan	110	5.5	184	9.20	374-964	18.7-48.2
Uzbekistan	66	3.3	152	7.60	205-240	10.25-12
Total	928	46.4	1593	79.65	3135-4894	156.75-244.7

Source: <http://www.eia.doe.gov> (Ref. 7).

Among Azerbaijan, Kazakhstan and Turkmenistan, Kazakhstan is in the first place of crude oil production. It is followed by Azerbaijan and Turkmenistan.

If we observe the above mentioned petroleum reserves of Caspian Region countries, we see that Azerbaijan and Kazakhstan are in the first row of proven reserves. Also Turkmenistan which proved itself with natural gas must be valued as it is going to be one of the petroleum exporter countries with potential reserves.

If countries' petroleum production and consumption is examined, it can be seen that Azerbaijan and Kazakhstan exports very high amounts of petroleum after producing and using for their needs. Also petroleum consumption of these countries has reduced but petroleum production has increased with new investments. At the present time Turkmenistan, which has almost similar production and consumption rates, will be more appreciated for its exportations.

According to International Energy Agency estimations⁹, in subject countries total crude oil production is presumed as 139-225.2 million tons in the 2010s and 146-180 million tons in the 2020s.

Equivalent to increasing production⁹, the need of petroleum will be increased. It is expected that these countries' exportation will reach to 75-117 million tons in the 2010s and 146-180 million tons in the 2020s.

Petroleum Pipelines

For Caspian Region countries it is more complicated to take the hydrocarbon sources to the world market than producing it. These countries not being sea-shored countries, the long way they have to take to reach the world market and besides their use of different countries' soils for these passages these countries being culturally and politically different are among the facts that cause problems

when transferring the energy sources. In addition to this, the insufficiency of present petroleum and natural gas pipelines affects investors and producers in a negative way.

At the time of Soviet Union, the pipelines that were built to carry crude oil and natural gas were structures to feed the needs of that time. At the present, old petroleum and natural gas pipelines pass through the Russian Federation. Also because of technical and economical insufficiencies, the maintenance of these pipelines is done limited, thus frequency problems are faced while operating.

Quite a few very operable alternative pipelines to carry the region countries' hydrocarbons were developed shortly after the Soviet Union's independence in the 1990s.

Some of the planned or proposed petroleum pipelines pass through some politically unstable countries such as Karabag, Chechnya and Afghanistan. This situation means that these pipelines are wide open to terrorist attacks while being operated. One of the most important pipeline projects that were developed and some of which are being operated to take Caspian petroleum to the world market is the Baku-Tbilisi-Ceyhan Petroleum Main Export Pipeline which will pass through Turkey. The pipelines involved with this territory are:

East Line

Extending from West Kazakhstan Petroleum Region (Aktyubinsk) to China (Xinjang), also known as CNPC Petroleum Pipeline with the cost of 3.5 billion dollars, this pipeline is the most expensive pipeline considered for the Caspian Region. The planned length of this line is 1800 miles. Because its capacity is limited (0.4–0.8 million barrels/day, 20–40 million tons/year) and Kazakhstan cannot guarantee the amount of petroleum that will be needed in the next ten years by this pipeline (400,000 barrels/day), feasible searches were stopped in September 1991. This pipeline has technical and economic problems because of the long distance and the land of its route.

North Line

This is the line that connects Kazakhstan petroleum to Russian pipeline. Its increased capacity is 310,000 barrels/day (15.5 million tons/year). The present pipeline has been modernized with heat stations and pumps costing 37.5 billion dollars.

West Lines

Baku-Novorossiysk Pipeline: Azerbaijan International Operation Consortium (AIOC) has decided to carry the crude oil produced in Azeri, Guneshli and Crakl petroleum areas to Black sea with Baku-Supsa. Baku-Novorossiysk Line started being operated in 1997.

The most important problem of this line is the share of line operation responsibility and transportation incomes between Transneft and Chechnya Petroleum Company, because most of the line goes through Çeçen soil and this part was devastated during the Çeçen war; with the help of a line of 204 miles,

in 2004 part of the line in Çeçenistan soil was bypassed and it was renewed over Dagestan Mohackale⁹.

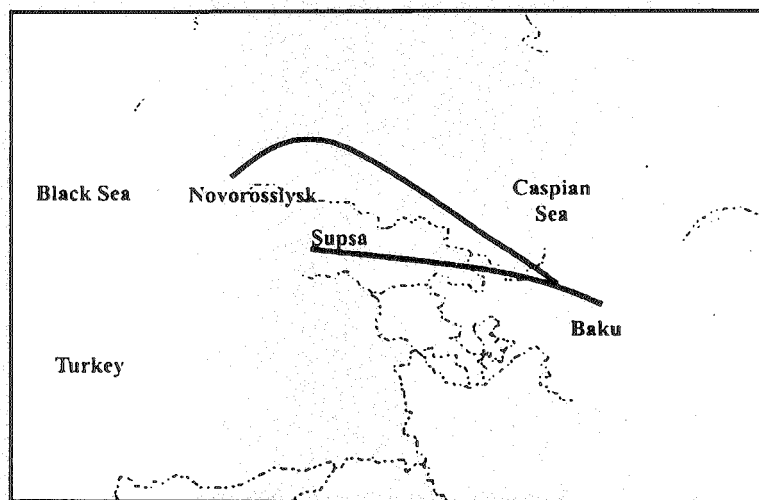


Fig. 1. Baku-Novorossiysk and Baku-Supsa Petroleum Pipelines

The starting capacity of Baku-Novorossiysk pipeline is 100,000 barrels/day (5 million tons/year). It is estimated that this capacity will be increased to 300,000 barrels/day (15 million tons/year). The Project offering the capacity increase costs 600 million dollars. In 2002 it was known that the line's pumping capacity was 50,000 barrels/day (2.5 million tons/year).

Baku-Supsa Pipeline: The second line called as West Line is Baku-Supsa (Georgia) Pipeline. This line has a starting capacity of 100,000 barrels/day (5 million tons/year). Later it was modernized to pump 115,000 barrels/day. But although it was decided to increase capacity to 145,000 barrels/day by the year 2003, it was not approved by the Azerbaijan State Oil Company.

CPC Petroleum Pipeline: This line starts from Kazakhstan (from Tengiz petroleum beds) and extends to Black sea to Novorossiysk Petroleum Terminal *via* the Russian Federation. Its length is 990 miles. The petroleum loaded tankers reach the world market using Turkish Straits *via* Black Sea. The first tanker was loaded in Novorossiysk in October 2001. It is considered that petroleum would be transferred to the Aegean using Burgas-Alexandroupoli or Burgas-Vlore by-pass lines.

The capacity of the CPC line is 565,000 barrels/day (28 million tons/year). This capacity will be increased to 1.34 million barrels/day (67 million tons/year) till the year 2015. Today the average amount of petroleum using this line is 400,000 barrels/day (20 million tons/year).

Trans-Caspian Pipeline: It starts from Kazakhstan under Caspian Sea and extends to Azerbaijan. The line aims to take the region's petroleum to the world market by passing the Iran and the Russian Federation soils. But this line's construction faces problems because of the indefinite legal status of Caspian sea and the probable damage to Caspian sea environment caused by this line.

Feasible searches of the line which will be 370 miles long from Kazakhstan to Baku had been completed in December 1998 but researches of this line have not yet been started. This line is connected to Ceyhan.

South Lines

Trans-Iran Line: This line was planned to carry Kazakhstan's Tengiz petroleum to South Basra Gulf *via* Turkmenistan and Iran.

This line is planned to be 930 miles long from Kazakhstan to Basra Gulf and will be completed in the year 2005. This line's planned pumping capacity is 1.2 million barrels/day (60 million tons/year) and it costs 1.2 billion dollars.

Middle Asia Pipeline (*via* Afghanistan): Middle Asia Pipeline will start from Kazakhstan and extend to Pakistan *via* Turkmenistan and Afghanistan. Afghanistan's inner disputes bring risks of having no investments for the project.

Measuring 1040 miles long, this line is expected to pump 1 million barrels/day (50 million tons/year). The line will cost 25 billion dollars. No research for this line has been started yet.

Transportation by Exchanging with Iran: Addition to the above mentioned alternatives, the Kazakhstan Government carries the limited amount of petroleum from Caspian sea to Basra gulf by exporting it, exchanging it with Iran. Also Turkmenistan is looking for ways to export petroleum by exchanging it with Iran.

The line is under construction. It is expected to pump 175,000 barrels/day (8.75 million tons/year) and 370,000 barrels/day (18.5 million tons/year) after modernization.

Baku-Tbilisi-Ceyhan Crude Oil Main Export Line Project

Turkey, a reliable and stable passage country, has developed Baku-Ceyhan-Tbilisi Crude Oil Main Export Pipeline Project to carry the petroleum produced in Caspian Region at low cost and with more safety using the advantage of its geographical location. This pipeline which will start from Baku and end in Ceyhan is planned to carry region petroleum to Ceyhan, then to the world market with tankers.

TABLE-4
WORK SCHEDULE FOR BAKU-CEYHAN-TBILISI OIL PIPELINE PROJECT

	Start	Completion
Announcement of tender results	IV quarter of 2001	III quarter of 2002
Mobilization and construction of auxiliary facilities	III quarter of 2002	II quarter of 2003
Supply of materials and equipment	I quarter of 2003	II quarter of 2003
Construction of pipeline	I quarter of 2003	IV quarter of 2004
Commissioning into exploitation	III quarter of 200	I quarter of 2005
Operating pipeline	I quarter of 2005	

Source: World of Azerbaijan, Azerbaijani Culture and Solidarity Association, 2004 (Ref. 8).

It was presumed that this project would be completed in December 2004 but completion date has been revised to 2005.

Financial supporter on Turkey side is MEP (Main Export Pipeline) Consortium. Total cost of line will be 2.4 billion dollars. With maximum capacity of the line as 50 million tons/year (1 million barrels/day), this line will start from Azerbaijan's Sangachal Region, come to Turkey and end in Ceyhan *via* Georgia. Its partial lengths are 468 kilometres within Azerbaijan's borders, 225 kilometres within Georgia and 1.037 kilometres within Turkey borders, and total length is 1730 kilometres (1038 miles).

Advantages of the Line: Though it has a very long land course of 1730 kilometres, it has quite a few advantages to Turkey and the region countries when compared to the aforementioned alternative projects.

With this course we have an opportunity to diversify export alternatives of carrying Caspian petroleum to the world market. This project will help Turkey to develop relationships with Asia and the Caucasus countries and will also help Caspian Region countries to be free of dependence on one country for carrying the hydrocarbon sources and help them to gain their own economic independence, development of regional democracy and market economy and will make them unite with the world economy.

At present, Turkey, which is an important market for the region countries, will be able to feed its own need of petroleum with carrying it.

There is a terminal at Ceyhan, the ending point of the line. When compared to the world's general terminals, Ceyhan Terminal has a good export facility with good operation opportunities. At the same time it is a deep port which can load large tankers (up to 300.000 tons). Because of weather and sea conditions most part of the year there cannot be loading at Black sea. If a passage statistics *via* vessels that pass through the Straits is observed, it can be seen that the amount of petroleum carried *via* Black sea is limited because of tanker lengths which are generally less than 200 m and thus there is a need of repeated voyages. Also Ceyhan's tanker course to the world market is shorter than every Black Sea Port's.

The present sea traffic at the Straits brings very serious problems such as oil pollution, noise pollution, stress, material losses, costs of removing pollution, damages to natural beauty and damages to cultural and historical treasures of Istanbul that has at least three thousand years of cultural and historical heritage and a population of 10 million. The Baku-Tbilisi-Ceyhan Line will bring advantage to Turkey of reducing the passage of dangerous goods through the Turkish Straits. Besides, reducing this passage will be advantageous in having petroleum at lower costs, it will bring new work opportunities for private sector and will be very advantageous in the field of construction such as equipment, workers and materials. It will have good effects on Mersin and Iskenderun Ports with Ceyhan Terminal and it will help in the development of the maritime sector.

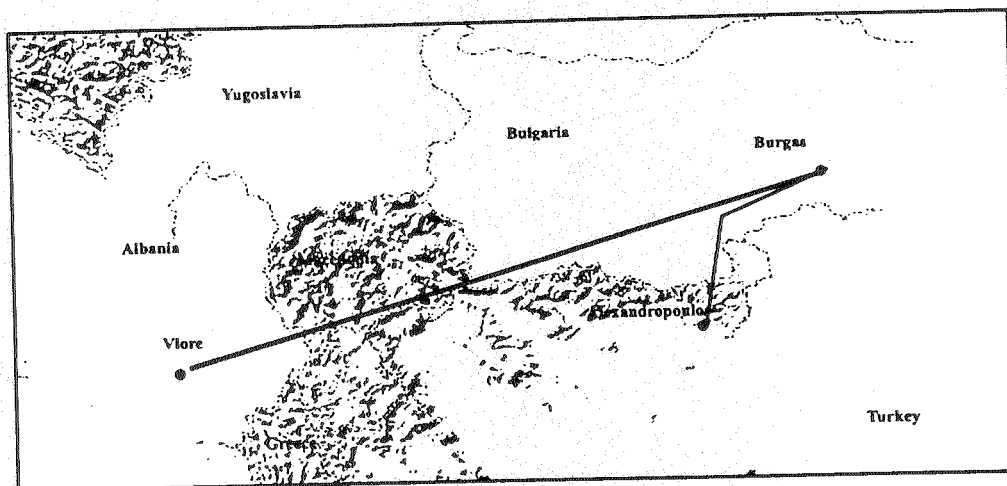


Fig. 2. Burgaz-Alexandroupoulos and Burgaz-Vlore by-pass lines

By-Pass Lines

Burgaz-Alexandroupoulos (Trans-Balkan) Pipeline Project: This line which is designed to pump 600,000–800,000 barrels/days (30–40 million tons/year) will cost 600 million dollars. It was signed among Bulgaria, Russia and Greece in 1997 but it has been delayed.

Burgaz-Vlore Pipeline Project: Designed to pump 750,000–1,000,000 barrels/day (37.5–50 million tons/year) this line will cost 850–1,100 million dollars. This project was expected to be completed by the year 2005.

Constanza (Romania)-Trieste (Italy) Pipeline Project: This line which will be constructed between Constanza Port of Romania in Black sea and Trieste Port of Italy in Adriatic is expected to be 855 miles long and to pump 660,000 barrels (33 million tons/year). Feasible searches for this line which will cost 900 million dollars have been completed.

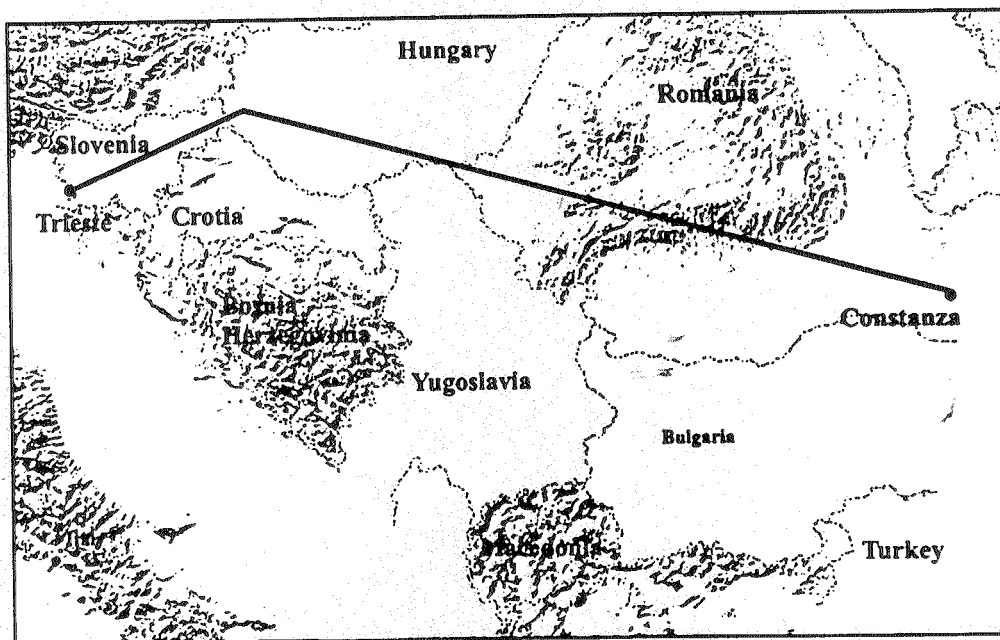


Fig. 3. Constanza-Trieste by-pass line

Odessa (Ukraine)-Brody (Ukraine) Pipeline Projects: This line with a length of 40 miles had been completed in 2001. Ukraine has not yet signed an agreement with Caspian petroleum companies. It is expected to pump 500,000 barrels/day (25 million tons/year). This line will be connected to Druzha Russian Petroleum Line and will take petroleum to Baltic sea *via* Gdansk Terminal of Poland.

Amount of Petroleum Carried to Black Sea through Turkish Straits

The only way for petroleum to reach Black sea is the west routed pipelines. These lines are the ones explained above as Kazakhstan-Novorossiysk (CPC Line), Baku-Supsa and Baku-Novorossiysk Lines. Also there is petroleum that Russia sends to Black sea *via* Port Odessa.

If petroleum reaching Black sea had not been used for neighbour countries' needs, all this petroleum would pass through the Straits. But petroleum that does pass through the Straits is the amount left after neighbour countries use for their needs.

In 2003, 48 million tons from Novorossiysk, 5 million tons from Tuapse, 10 million tons from Odessa, 6 million tons from Supsa (in total 69 million tons of petroleum) has been carried to Black sea.

Considering the total needs of Black sea neighbour countries, the total amount of petroleum reaches to 557,000 barrels/day (27.8 million tons/year)⁹.

If all these data are evaluated, it can be seen that the total amount of petroleum coming from Caspian Region and passing through Turkish Straits is 30–40 million tons.

In the 2010s when Kazakhstan will export 40–45 million tons, Russia will export 10 million tons and Azerbaijan will export 20 million tons, the total amount of petroleum will reach 110 million tons and this amount is 2.7–3.7 times larger than the amount of petroleum passing through the Straits today⁹.

In the 2020's, the petroleum that will be out of Caspian Region to reach Black Sea is estimated to be 220 million tons/year and this amount is 5.5–7.5 times larger than the amount of petroleum passing through the Straits today⁹.

Activating and using the by-pass lines will be one of the factors that will affect the number of tankers that will pass through the Turkish Straits. None of the lines' activation is the worst scenario⁹.

TABLE-5
CAPACITIES OF BY-PASS PIPELINES^{*}

By-pass pipelines	Barrels/ day	Million tons/year
Burgas (Bulgaria): Alexandroupoli (Greece) (Trans-Balkan)	600,000–800,000	30–40
Burgas (Bulgaria): Vlore (Albania)	750,000–1,000,000	37.5–50
Contanza (Romania): Trieste (Italy)	660,000	33
Odessa (Ukraine): Brody (Ukraine)	500,000	25
Total	2,510,000–2,960,000	125.5–148

Source: <http://www.eia.doe.gov> (Ref. 7).

It can be seen (Table-5) that with the activation of all the by-pass projects, the total amount of petroleum that will pass through the Straits will be decreased from 148 to 125.5 million tons/year. By activation of these lines the increase of Black sea and Balkan's strategic importance will be inevitable. Balkans will become the area in which all pipelines that distribute energy to Europe are gathered.

While evaluating from the viewpoint of the security of the Turkish Straits, although these pipelines may seem advantageous because of making the Straits less out of use, the Baku-Ceyhan petroleum pipeline must be the most preferred line for both making the Straits out of use and giving Turkey a geo-strategic and geo-economic importance.

USA prefers the Baku-Ceyhan Pipeline to take the Caspian Region petroleum to the world market. Despite the Turkey-USA thesis, Russian Federation, Bulgaria and Greece defend the Caspian-Novorossiysk-Black Sea-Burgas-Alexandroupoli-Aegean Sea course, another alternative is Burgas-Vlore line.

All of these pipelines' probability of becoming a reality is weak because of different reasons. The Ukraine line has problems of financial disagreements; Burgas-Alexandroupoli line has problems because of environment protective precautions of Aegean Sea and also because of economics.

Starting the usage of Baku-Ceyhan Pipeline will make the Turkish Straits traffic less dense so that by-pass lines will reach 200 million barrels of capacity. Total capacity of these lines is close to % 90 of Caspian Region's final production (220 million tons/year). Although it is unlikely to become a reality, the amount of petroleum that will come out of Caspian Region with this pipeline's capacity without bringing extra burden to Turkish Straits, cannot be ignored.

Conclusion

The estimated amount of petroleum that will be carried to Black Sea from Caspian Region is 110 million tons in the 2010s and 220 million tons in the 2020s. There are four scenarios evaluated as possible realities of the future, considering Baku-Ceyhan pipeline and the under construction by-pass lines.

First scenario: None of the by-pass lines with Baku-Ceyhan pipeline will be activated.

This scenario is the worst case in view of the Turkish Straits' security and it will mean that all of the Caspian petroleum will be carried through the Turkish Straits and this means, comparing the present amount of petroleum passing through the Straits, that in the 2010s, 110 million tons/year (2.7–3.7 times) and in the 2020s, 220 million tons/year (5.5–7.5 times) petroleum will be carried through.

Second scenario: All of the by-pass lines and Baku-Ceyhan Pipeline will be activated.

This scenario is the best case for Turkish Straits security and it means that all of the petroleum of Caspian Region will be carried by pipelines in 2010 and in 2020, 10% (20 million tons/year) of this total amount will pass through the Turkish Straits.

Third scenario: All of the by-pass lines will be activated but Baku-Ceyhan

pipeline will not. That means in 2010, all of the petroleum of Caspian Region will be carried by pipelines and in 2020, 37% (80 million tons/year) of the total amount will pass through Turkish Straits.

Fourth Scenario: Some of the by-pass petroleum pipelines (total capacity of by-pass lines is estimated 60 million tons/year) and Baku-Ceyhan pipeline will be activated. This means all of the Caspian Region petroleum will be carried by these lines in the 2010s and in the 2020s, 50% (110 million tons/year) of the whole amount will be carried through the Turkish Straits. In this case the amount of petroleum is almost equal to the amount passing today.

If these four scenarios are examined it is evaluated that the fourth scenario is most likely to happen. According to this scenario, estimating that some of the pipelines and Baku-Ceyhan will be activated, in the next decade there will not be a different traffic in the Straits from what it is today in theory. But because the system of petroleum companies has been built on the Turkish Straits, they will not head to pipelines so quickly and easily and the traffic of 2010s may be two times denser than the traffic today. Also by the end of 2010s these companies may gain full productivity but by this time the old level of petroleum that was carried through the Turkish Straits might be maintained as before and this is possible if the production of Caspian Region petroleum increases much. In the 2020s if all pipelines were used with full capacity, 3 times larger amount of petroleum would be carried through the Turkish Straits.

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