ISSN 0970-3888

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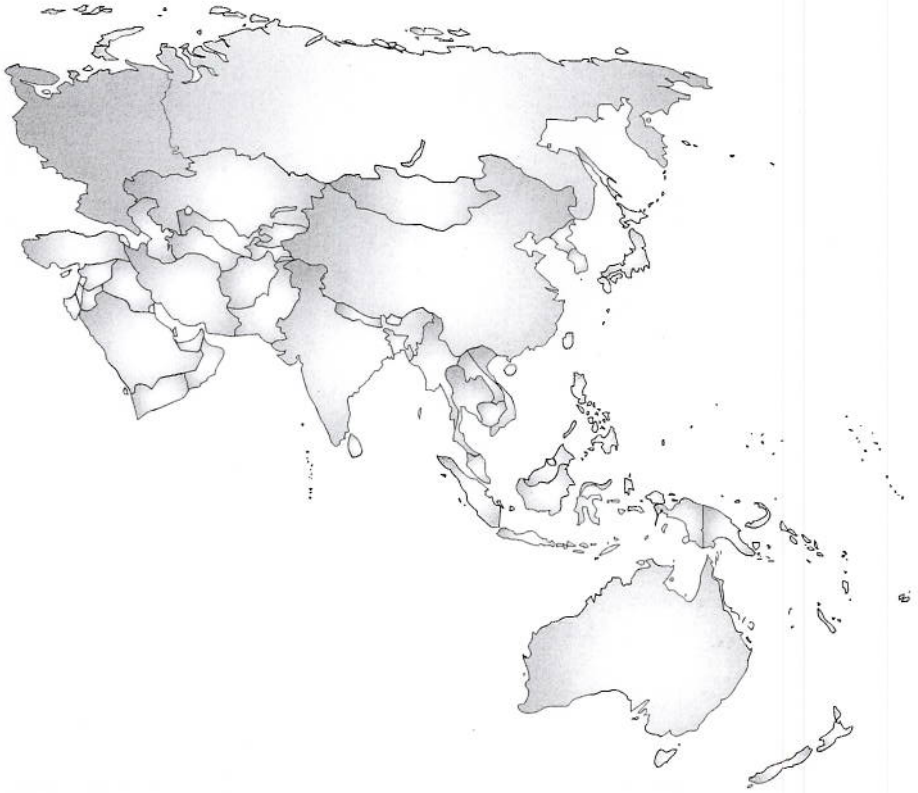
PAJE

Volume 9
Number 2

December 1999

Pacific and Asian Journal of Energy



Special issue on Russia

Fund of Development of Energy and Investment Policy and Financing

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Caspian petroleum*

Pacific and Asian Journal of Energy 9(2): 227–244

Possibilities for extraction

This paper presents the potential for petroleum extraction in the countries of the CR (Caspian region) over the next 30 years. The estimates are based on the levels of petroleum extraction at comparable fields in other countries of the region, arising from the present value of proven explored reserves. (The value of proven explored reserves in a field is equivalent to the accumulated extraction for the entire period of its working.) Along with the pre-Caspian states, this paper includes in its analysis some new export-oriented petroleum and gas projects in Russia in the Timano-Pechorskiy provinces and on the Sakhalin shelf, which will compete with Caspian petroleum in different markets. The geopolitical aspects of new petroleum and gas flows in the Eastern Hemisphere on account of processing the Caspian fields are discussed by Konoplyanik (1998).

Estimates show that Azerbaijan (in the first phase of exploitation of its Caspian field) alone is capable of supplying 60–70 MT (million tonnes) of petroleum annually to the market. Export from Kazakhstan is likely to be almost twice as much. Thus, by 2010 petroleum extraction in the CR may touch almost 180 MT in a year. The paper examines the potential for extraction in the CR, and does not consider the limitations of setting up export pipelines. Further, the level of extraction in the CR is determined by the rate of exploitation of the Kazakh shelf.

Available data fall in the upper half of the range of petroleum extraction levels in the CR projected by the IEA (International Energy Agency) (IEA 1998). Accordingly, the extraction level in the CR will constitute 140–195 MT by 2010. The technical feasibility of petroleum extraction in the CR is, therefore, significant. There are two relevant questions regarding the economic limitations for the CR to emerge as a new and major petroleum extraction province.

1 Will the market demand match the volume of supply from this region? (Are there limitations on the demand for Caspian petroleum?)
2 Will the projects of processing and transporting Caspian petroleum be assured necessary investment? (Are there limitations on investment proposals in the exploitation of Caspian petroleum?)

The demand for petroleum in Europe and Asia

In the Eastern Hemisphere (the markets of which will receive Caspian petroleum supplies), there exists today two main markets for the consumption of liquid fuels, the APR (Asia-Pacific region) and West Europe. Both have similar levels of petroleum consumption

* Translated, adapted, and edited version of two published Russian papers: Konoplyanik A and Lobzhanidze A. 1999. **Caspian oil.** *Oil of Russia* **5**: 39–45 and **6**: 72–77

(750–800 MT in 1995. In the beginning of the 21st century, the demand for petroleum in the world, and specifically in these regions, will tend to rise steadily. The growth of consumption in Asia will be particularly dynamic. According to IEA predictions, by 2010 (when Caspian fields will have peak extraction levels), the rise in the annual consumption of liquid fuels in Europe may constitute almost 80 MT. At the same time in Asia, it will be substantially more than 500 MT. As these projections were made before the Asian financial crisis, the figures must be corrected; a reduction in these figures will, in turn, reduce the market niche for Caspian petrol. Taking into account the reduced extraction in the existing fields, the net growth of petroleum demand (the growth in consumption plus the compensation for the reduction of its own extraction in the region) will be more significant in Europe.

Petroleum extraction levels in the North Sea will peak by 2000 after which they will begin to reduce. By 2010, this reduction may result in an increased demand for petrol of the order of 80 MT in the region.[1] By 2015, the net growth in petroleum demand in Asia will increase 3.3 times (almost 800 MT as opposed to 240 MT) the fresh rise in demand for petrol in West Europe.

More than 50% of the fresh rise in petroleum demand in West Europe after 2010 will be determined by the need to compensate the lagging flows of North Sea petrol. Therefore, supplying Caspian petrol to Europe may require the optimization of

1 the technological structure of West European region (taking into account the physical and chemical properties of petrol from the Caspian fields); and
2 the geographical structure of the consumption of Caspian petrol in the West European petroleum processing factories with the reconsideration – at least partly – of the present structure of petroleum flows.

The existing surplus capacity of petroleum processing in West Europe (estimated at almost 100–120 MT/year by British Petroleum) has a definite 'free manner' while selecting the optimal entry structure for Caspian petrol into the European petroleum processing industry. However, it is not possible to completely avoid a slight increase in the cost of consumption of Caspian petrol in Europe.

In the Asian market, 95% of the rise in demand will be because of the increase in consumption. It will require the creation of new production capacity for processing and consumption under new petroleum flows. That is why in the case of the implementation of the eastern scenario (explained later in the paper) supply of Caspian petroleum, the technological structure of new Asian NPZ will initially be oriented on the physical and chemical contents of the supplied petroleum. And the characteristic problems faced by Europe for restructuring the existing capacity of the NPZ under the new petroleum flows will not arise here. The result will be that economy has exhausted such 'restructuring'.

The balance of demand for and proposed export of Caspian petroleum

How does the volume of growth in demand correlate with the possible scale of exports of Caspian petroleum? Today, the main demand of Europe and Asia is met by petroleum

[1] Such an event would be favourable for Caspian exporters. However, it is quite possible that extraction in the North Sea will not start before 2005, thus reducing the European niche for Caspian petrol. By this time, the general rise in demand in Europe will constitute about 160 MT a year. In 2010, levels of domestic extraction in Asia (without considering the CR) may fall by almost 40 MT, thus increasing the petroleum demand in the region by this order. The net value of these changes by 2010 will be about 600 MT.

supplies from the Near Eastern regions. This is one of the main reasons for the entry of petroleum from the CR into global market. According to IEA estimates, almost 300 MT of existing surplus petroleum can be annually extracted in the Near Eastern region. This will significantly exceed all predicted levels of extraction of Caspian petroleum. With the implementation of new projects in the Russian petroleum and gas industry given a favourable investment climate, the Russian countries of the Near and Middle East, and the CR will simultaneously influence the present directions of the flows and distribution to the petroleum markets of the Eastern Hemisphere. There are two main scenarios of supply of Caspian petroleum: western and eastern. The western scenario assumes that the main flow of petroleum is to Europe (Table 1), with the assumption that the KTK project for the export of petroleum from Tengiski and other fields of Kazakhstan is implemented. Work on the petroleum pipeline highway has begun, and the construction of petroleum pipelines Baku-Jaikan (pipeline capacity: 40 MT/year) for the export of Azerbaijan petroleum has been completed. What will be the potential volume of petroleum that can enter the market in the beginning of the 21st century?

The volume of supply from Kazakhstan will be limited by the pipeline capacity of KTK (28 MT). After the implementation of the first phase of the project, a release of about 67 MT is expected by 2015. Azerbaijan already partly uses the Baku-Novorossisk petroleum pipeline (present annual capacity of 17 MT with prospects of increase up to 25 MT), and also the Baku-Supsa petroleum pipeline commissioned on 17 April 1999, at a capacity of 7 MT/year. Laying out of a pipeline up to Jaikan will add another 40 MT/year. Thus, maximum annual petroleum exports from Azerbaijan are 64 MT.

Petroleum extraction from Iraq is an important element that determines the balance of demand and supply of Caspian petrol. Economic sanctions on Iraq will eventually be withdrawn and it will export a large volume of petroleum into the global market. According to the predictions of the Arab Petroleum Research Centre (Paris), within two to three years after the withdrawal of embargoes Iraq will be capable of extracting almost 120 MT

Table 1 Western scenario: petroleum supplies to Europe and Asia (million tonnes)

Year	*Rise in demand (relative to 1995)*	*Rise considering own extraction levels*	*Azerbaijan*	*Kazakhstan*	*Russian Timano-Pechorskiy*	*Iraq*	*Total*	*Deficit(–)/ surplus*
Europe								
2000	30.00	30.00	11.00	5.00	0.00	40.00	56.00	9.00
2005	54.00	84.00	44.00	28.20	18.00	60.00	150.20	33.20
2010	79.00	159.00	64.00	38.00	43.00	80.00	225.00	33.00
2015	109.00	239.00	52.00	67.00	16.00	80.00	215.00	–57.00
Asia								
2000	153.00	168.00	0	0	5.00	0.00	5.00	–163.00
2005	357.00	382.00	0	0	36.00	60.00	96.00	–286.00
2010	535.00	575.00	0	0	16.00	120.00	136.00	–439.00
2015	748.00	793.00	0	0	8.00	220.00	228.00	–565.00

of petroleum annually, and 300 MT annually by 2010. The present production infrastructure is insufficient to process such a volume of petroleum (the existing capacity allows export up to 80 MT/year in the western direction). However, taking into consideration the economic viability of projects in Iraq (the cost of petroleum extraction here is among the lowest in the world), necessary infrastructural investments will soon be available.

By 2010, the Timano-Pechorskiy Basin will supply more than 40 MT to North-West Europe only if the passive Russian government is actively involved. It is necessary to adopt legal guidelines that facilitate investment and resolve the differences of opinion between various investors and the local regional authorities. State Duma has taken some positive legal steps. The list of ores is being expanded on account of projects of the North European region, and the rights to their use may be granted on certain production conditions.

Projections made for 2000 estimated a 30 MT growth in demand in Europe. Kazakhstan exports are expected to remain at the present level of 5 MT, within the export quota set by Russia for its pipeline network. By 2000, the KTK project (or the some other pipeline project) may not be commissioned. Azerbaijan can supply a little more than 10 MT. Exports from Iraq will probably lag behind at around 40 MT even if the sanctions are removed. This is considering the recent relaxation of UN sanctions on the volumes of petroleum exports from Iraq within the framework of the programme 'Petroleum for produce'. Timano-Pechorskiy will begin to supply petroleum only after 2000.

To summarize, by 2000 the growth in supply in the West European market will be 60 MT, almost twice the net growth in demand. This is assuming that supply from traditional sources (North Africa and Near and Middle East) will remain unchanged. That is why even by 2000 it is unconfirmed if a free market for Caspian petrol to West Europe will form. Caspian petrol would conquer this market right from its entry by ousting petroleum of the traditional suppliers.

By 2005, the annual demand for petroleum in Europe will grow by 54 MT and with the extraction in North Sea it will grow by 84 MT. By this time, Kazakhstan will probably be able to offer 28 MT to the KTK project. Azerbaijan will attain maximum extraction levels in its first phase. The projected peak of 40 MT may not be attained as the estimates do not take into account the recent substantial reduction in a number of Azerbaijan fields and the closure of work in the fields of Karabakh and Dan-Ulzu-Ashrafi. After the removal of sanctions, Iraq may supply 120 MT of which almost half may be directed to Europe through existing transport systems. Another 18 MT may be provided by Timano-Pechorskiy. Together this will constitute almost 150 MT of supply in the European market. Almost half of this volume is unlikely to find consumers, thus leading to the collapse of the market, even without taking into account petroleum from the members of the OPEC (Organization of Petroleum Exporting Countries).

By 2010, the growth in demand will constitute 160 MT, and supply will be 50% higher. This is more disturbing than the picture for the petroleum market in 2005, and leads to the conclusion that the entry of Caspian petrol into the West European market alone will invariably lead to the collapse of its price. Considering the global character of the petroleum market and the correlation between prices of each of its regional segments through the universal system of stock trading of hydrocarbons, the 'anticrisis' in 1986 is likely to be repeated. There are two ways to avoid market collapse on the entry of Caspian petrol (despite the inevitable closure of Karabakh and Dan-Ulzu-Ashrafi). The first option entails closure of controlling the volume of extraction. This is, however, unlikely considering the absence of practical mechanisms for carrying out such control measures (as is the case with the OPEC, an organization with 40 years of experience)

and that petroleum export is the only source of future economic well-being of the pre-Caspian republics. The second option entails the distribution of the petroleum flows from the CR, Russia, and Iraq between the European and Asian markets so as not to cause sharp imbalances between supply and demand in the markets of different regions. However, for a range of fields there exists a strong preference for certain markets (for example, North-West Europe for Timano-Pechorskiy and APR [Asia-Pacific region] countries for Sakhalin projects). Notwithstanding the feasibility of exporting Azerbaijan petroleum in the eastern direction, it will realistically move towards the European market.

Thus, among the countries under study, only Iraq and Kazakhstan have the freedom to choose the direction of their hydrocarbon export and the optimal situation when the major volume of Iraqi petroleum will be supplied to South and South-East Asia consumers. Considering that Iraqi petroleum has traditionally been supplied to the Mediterranean region, the practicality of this option has to be explored. Also it is possible that the actual export from Iraq will be much less considering the limitations of investment.

Another way of reducing the pressure on the West European market is by directing part of the Caspian petroleum to meet the demand of the countries of Pre-Black Sea and Central Europe. In case of intense economic progress in this region, the future surplus supply of Caspian petroleum can be substantially lowered or even reduced to zero (Table 1). Though further analysis is needed for a definite conclusion, only such a variant can prevent the collapse of the European market with the entry of a massive supply of Caspian petrol. This is, in fact, one of the reasons that the firm LUKoil, which has been working in the CR, has been much more active as compared to other Russian petroleum companies in penetrating the market of East European republics. The company thus ensures a much more effective market for its own petroleum from the CR (from the viewpoint of increase in volumes, as also according to the level of expenses for supply).

Taking into consideration the slow legal process in the SRP and its dependence on the internal political dynamics in Russia, it is necessary to consider another alternative to the western scenario in which projects in the Timano-Pechorskiy province are not fully implemented. In this case, taking into consideration the demand in the Black Sea region and no supply from Timano-Pechorskiy, the situation in the West European market comes closer to equilibrium till the year 2005. After this, there is possibility of a deficit in supply, which will continue to increase till 2015 and may reach 70 MT. The supply of petrol from Timano-Pechorskiy can also be blocked if its competitiveness in West Europe (i.e. at the point of supply) is lower than that of Caspian petrol, which is not compliant with LUKoil's aggressive policies.

The situation in the Asian market is turning out to be different from that in the European market. Under similar conditions (i.e. without considering supplies from the OPEC), there is a deficit in supply, which by 2015 will exceed the volume of production of OPEC reserves. This means that Asia continues to be the main prospective market for new petroleum projects.

The eastern scenario proposes that part of the Caspian petrol should be directed to Asia (Table 2). In this case, 20–50 MT of petrol from Kazakhstan and other Central Asian republics will go to the East, which will result in the strengthening of the European market. Therefore, the direction of petroleum supplies from a range of Russian projects (Timano-Pechorskiy and Sakhalin) is predetermined on account of their geographical location. As in the western scenario, all of Azerbaijan petrol will flow into the European market.

Kazakhstan petroleum supplies to the West will continue to remain at the present export

Table 2 Eastern scenario: petroleum supplies to Europe and Asia (million tonnes)

Year	*Rise in demand (relative to 1995)*	*Rise considering own extraction levels*	*Azerbaijan*	*Kazakhstan*	*Russia Timano-Pechorskiy*	*Iraq*	*Total*	*Deficit(–)/ surplus*
Europe								
2000	30.00	30.00	11.00	5.00	0.00	40.00	56.00	26.00
2005	54.00	84.00	44.00	5.00	18.00	60.00	127.20	43.20
2010	79.00	159.00	64.00	5.00	43.00	80.00	192.00	33.00
2015	109.00	239.00	52.00	5.00	16.00	80.00	153.00	–86.00
Asia								
2000	153.00	168.00	0	0	5.00	0.00	5.00	–163.00
2005	357.00	382.00	0	20.00	36.00	60.00	116.00	–266.00
2010	535.00	575.00	0	20.00	16.00	120.00	156.00	–419.00
2015	748.00	793.00	0	20.00	8.00	220.00	248.00	–545.00

level (5 MT/year). The KTK project will remain unutilized, and the entire growth in exports will be made in the eastern direction to China within the framework of the pipeline project with the CNPC (Chinese National Petroleum Company). Supply is determined by the declared capacity of this pipeline (20 MT/year). The basic elements of the eastern scenario do not significantly change the market situation (Table 2). The supply of surplus Caspian petroleum to Europe is maintained, although the volume is relatively lower than in the western scenario. Delays due to the incomplete implementation of petroleum projects in Timano-Pechorskiy, and the rise in demand for petrol in Pre-Black Sea region can significantly improve prospects of the petroleum market in Europe under both scenarios.

The question, however, is how realistic (in terms of fast implementation and cost-effectiveness) the eastern scenario is. The construction projects for pipelines to the South are riddled with political problems and those to the East with economic problems. The eastern option is less attractive as export of petroleum through pipeline from the CR to Asia will require substantial funds for transportation. Added to the cost of extraction, this will increase the cost of petrol to the consumer. Also, transcontinental projects of transporting hydrocarbons from the CR will require massive investments. The political scene in the region which is fraught with high and multifaceted risks, will lead to significant rise in transaction costs. Consequently in this scenario, financial expenses for completion of the projects (taking into account the costs of attracting investments) may significantly increase its technical costs (not taking into account the costs of attracting investments).

In case of a mixed scheme of transportation (transport of Caspian petroleum by the shortest route to the terminals in the Persian Gulf and further by tankers to Asia), the economics of the eastern scenario drastically improves as compared to the option of transcontinental pipelines. In this case, political solutions such as those arrived at between the US and Iran and the UN and Iraq hold the key to solving the problem of creating transit pipelines from the CR to the South. Today, such a possibility exists. The question thus is, can the given political solution be reached in the foreseeable future?

Facts reveal a possible shift in the American stance relating to Iran. First, the American

business will suffer losses due to American sanctions on the exploitation of the CR. Second, because the recommendations (which are soft as of now) for the reconsideration of the US policy in relation to Iran is giving in to the lobbying of forces which recommend the same. Third, the stance of the official American representatives has changed in relation with Iran. In one of his recent lectures, the special representative of the President of the US answering a question regarding energy security in the CR, revealed that the possibility of laying out of pipelines through Iran is not excluded in the case of warming up of American–Iranian relations. A year ago it was impossible for such a notion to arise in a conversation with any American official representative.

The cost of extraction of Caspian petrol

The IEA report is the single source that gives a comprehensive assessment of some economic indicators for the exploitation of different Caspian projects in Azerbaijan and Kazakhstan. However, it reveals only the ideal specific capital inputs for each unit of peak capacity (level of maximum extraction) for the main petroleum and gas projects, which, on an average, for the Azerbaijan fields constitute 535–625 thousand dollars per tonne per year (10.7–12.5 thousand dollars per barrel per day), and for Kazakhstan, 600–715 thousand dollars per tonne per year (12–14.3 thousand dollars per barrel per day) of maximum extraction. The IEA report does not calculate the level of expenditure for petroleum extraction in the Caspian fields.

However, the IEA data for specific capital inputs in the extraction of Caspian petroleum allow the comparison with data of other petroleum-extracting countries, namely with the results of calculations done by the CGEI (Centre of Global Energy Investigations) in London, carried out in relation with the OPEC republics (Figure 1). The specific capital inputs for the increase by one barrel per day (or one tonne per year) at peak capacity (estimated at maximum extraction level) in the CR are principally correlated with the analogous OPEC indicators. The average for the CR is 2.5 times more than the average of the six main petroleum-extracting nations of the OPEC, but

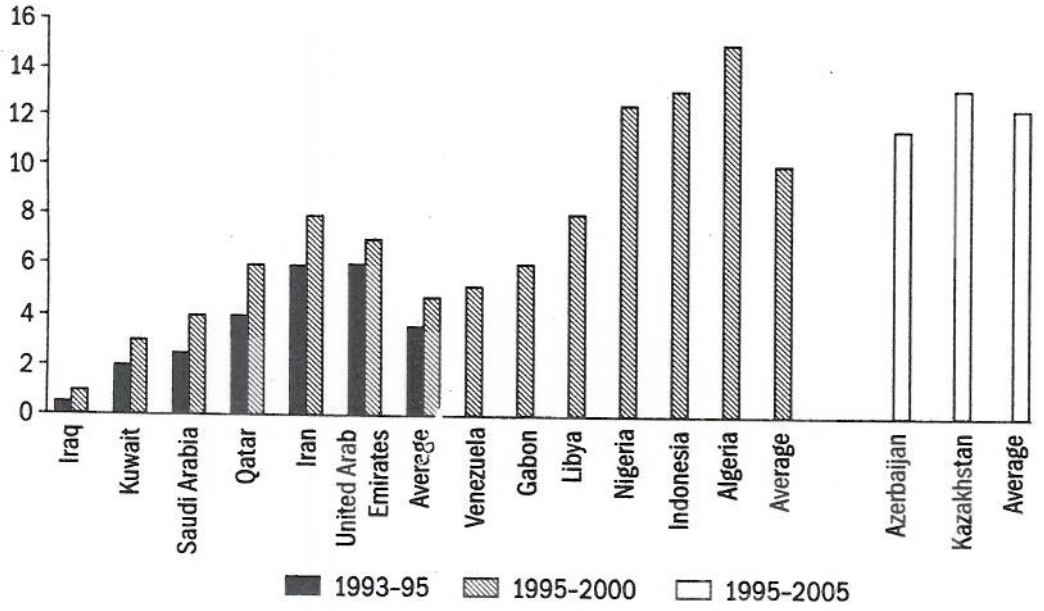

Figure 1 Essential capital for petroleum extraction in the OPEC countries and in the Caspian region (thousand dollars per day peak capacity)

only one-fourth that of the remaining OPEC nations. The given specific capital inputs in Azerbaijan and Kazakhstan are at the level of Nigeria, Indonesia, and Algeria.

Estimates of expenditure for the extraction of petrol from the Caspian fields are not available at present. Therefore, their approximate level in this region has been calculated. Usually, data related to the necessary investments in different projects is presented in a special periodical publication. These evaluations were systematized and the more improbable ones filtered out. For simplification, the correlation between capital and exploitation expenses for the entire period of processing of the field was taken as 1:2 analogous to the data and worked out for modern marine projects like the Sakhalin-2. Thus, the total expenditure for the entire period of exploitation of the Caspian fields was calculated. The data for total expenditure was for several years (taking into account that the period of exploitation constituted 30 years). It was discounted at 10% and correlated with the respective values of the given extractable reserves. Thus, the following values of expenditure for the extraction of Caspian petrol were arrived at (average expenditure for the entire period of processing of the field is that used in the international petroleum business category of full-cycle costs).

- 19 dollars a tonne for Azerbaijan (for calculation, data of the fields of Azer-Chirag-Guneshli, Shak-Denis, Karabakh, and Dan-Ulduzu-Ashrafi were used.
- 27 dollars for a tonne for Kazakhstan (for calculation, data of the fields of Tengis were used).

Assessment of expenditure on petroleum extraction from the new fields in different countries was taken for comparison. This evaluation is by Stauffer (1993), which is the most detailed study in evaluating full-cycle costs. Correlation of data revealed that the level of costs for petrol extraction by the government in the CR is lower than that by all the Near East nations of the OPEC. This is also characterized by lower expenses (in the conditions of free on board), as compared to new Russian petroleum projects (Figure 2).

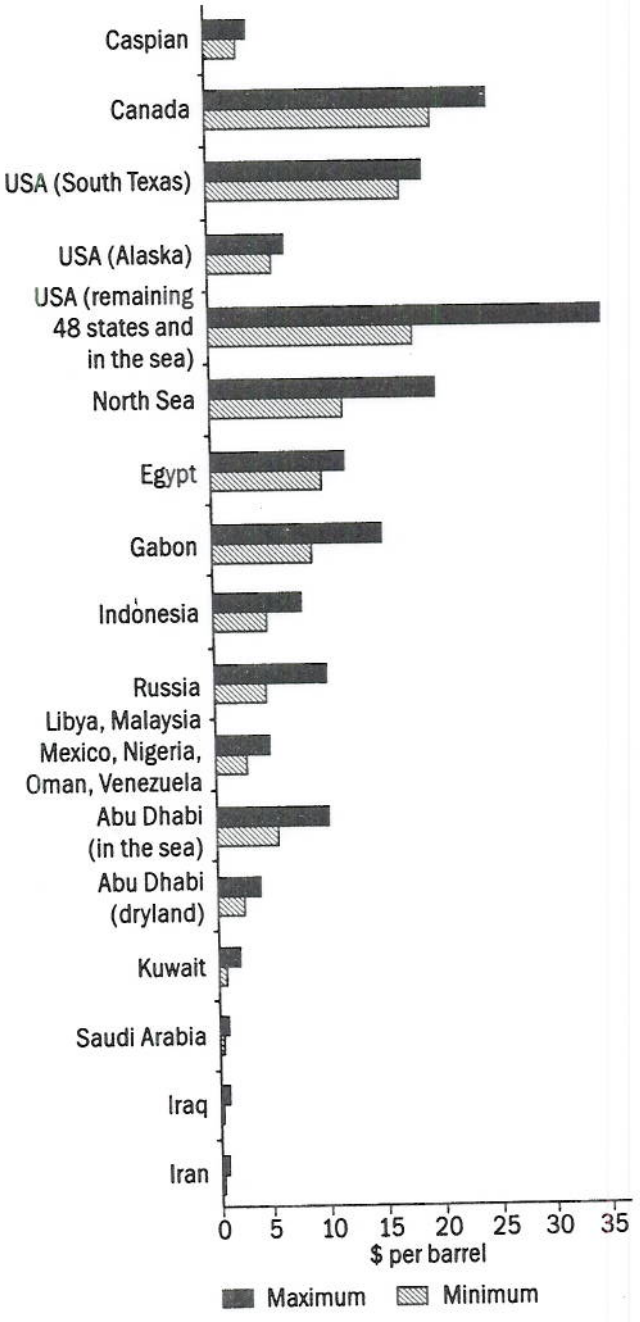

Figure 2 Approximate expenditure levels for the extraction of petroleum in the Caspian region

However, the cost estimates of extraction do not answer the main question in determining the competitiveness of the Caspian petrol, i.e. whether it will be cheaper or costlier than the competitive sorts in the conditions of cost insurance, and freight, i.e. for the consumer. For this, it is important to calculate the transport component in the cost. This will clarify whether it will be possible to supply Caspian petrol to prospective Asian markets or whether economic limitations of transporting Caspian petrol will make it possible to export it only in the western direction.

Cost-cutting of Caspian petrol for supplies

Calculations carried out on cost-cutting of Caspian petrol extracted in the sectors of different countries enable the estimation of the average level of costs for its production and transportation on different routes to the European and Asian markets. The tax component has not been included in these costs but, along with the total costs, linked to the extraction and transportation, the norm of 15% reliability has been used.

Calculations show that cost-cutting is least in West Europe in the case of export of Azerbaijanski petrol along the Baku-Novosibirsk route followed by its export along the Baku-Supsa route. The difference is one dollar a tonne, or less than 2% of the level of cost-cutting implying that these two routes are equally cost-effective. This calculation is only as per the costs, without considering the different taxes in Azerbaijan, Georgia, and Russia. After these is the Kazakhstan petrol with supplies along the KTK route. All three routes for the supply of Caspian petrol to West Europe through Black Sea terminals are more competitive than the route along Baku-Jaikan either through the Turkish Straits (a cheaper option), or by way of constructing bypass pipelines (Burgas–Alexandrupolis) (a costlier option).

In the next few years, the spectrum of petroleum price fluctuation swings between $10 and $15 per barrel or $75 and $100 per tonne (as is projected by a majority of economists), i.e. at a lower level than the one in the market till its steady lowering in 1997/98. The project for using trans-Caspian petrol pipeline for supplying Kazakh petrol to West Europe has become unsuitable considering its economic implications. This is independent of how much the recipient states are ready to subsidize investors. The economic expediency of using the Jaikan route becomes doubtful at such a cost. The remaining share of tax and collections of the country extracting petrol (Azerbaijan) and all the countries in the route of the pipeline (Georgia and Turkey) constitutes $10 per tonne. This requires a regime of excessively high rates of tax and low rates of rent tariff for the flow of petrol for its implementation. However, the main economic aim for laying out pipelines to Jaikan is due to these differences regarding transit tariffs on the flow of petrol. Petroleum companies are interested in this proposition under simplified equal terms, and in cheaper routes from the viewpoint of financial costs considering the many investment risks involved. Would these potential transit countries want to lose this future income?

On the other hand, the lowering of rent tariffs on the pipelines for introducing cost cutting, under the guise of price on petrol, can drastically reduce the chances of financing the Baku-Jaikan project. This is because the period of its viability gets prolonged and, thus, would lead to the exit of this project from the market of project financing (i.e. from the non-political, large-scale market of private investments, and the market of commercial finances) into the market of limited government finances of the interested countries and (it is possible) some (primarily regional) international financial institutions.

This gives rise to many questions. How will the refusal for project financing (in case of the impossibility of its organization) and the handling of government finances by the participating countries in the project (in the form of

direct participation of the government in the financing of the project through the budget or in the form of government guarantees) disturb the balance of the ongoing operations in the payment balance of investments of these countries?

How bad will the budget parameters become, particularly in countries like Azerbaijan and Georgia, which have to abide by the recommendations of the IMF (International Monetary Fund) and have to maintain these parameters at certain levels to receive economic support from international financial institutes?

The level of cost-cutting of Caspian petrol during its supply to Asia through the southern routes at today's petroleum prices allows an insignificant part of this price for taxes. However, in case of supplying this black gold to the voluminous market (even considering the reduction in the expected growth of demand for petrol in this region following the Asian financial crisis), there is an absence of a clear threat of its stockpiling and, consequently, the danger of lowering of price from surplus of supply.

This means that there remains a high probability of the presence of a positive price gap between the level of cost of petrol in the Asian market and the level of cost-cutting of Caspian petrol during its supply to this market, more so if ways are found to reduce the high transportation of Caspian petrol to Asia.

Thus, economic factors bind the CR to the European market but the implementation of the West European scenario will enable the strengthening of a non-favourable cost climate for a long time in the global market. In such a situation, it is coincidental that there is a slowing down in the rate of exploitation of the Caspian fields. Probably, western petroleum companies are trying to delay their entry to a much later date, closer to the time when the extraction in the North Sea starts reducing. In this case, the entry of Caspian petrol into the West European market will become more harmonious, although it could still create many problems for producers linked with the supply surplus.

Direction of supply: possible scenario of solutions

From the economic point of view, a solution to the above could be the following two scenarios, which need to be further worked out.

1 Supply of Caspian petrol to the markets of Central Europe and the Black Sea Basin so as to reduce the supply of surplus to West Europe. In this case, the supply routes of Caspian petrol, passing through the Black Sea terminals and not going out of the Black Sea become more sought after. Besides, this can help completely solve the 'problem of Bosphor', which is brought up by interested circles as the main reason in favour of the using the Baku-Jaikan route against the routes to Novosibirsk and to Supsa.

2 Supply of Caspian petrol to the Asian market, which can absorb supplies from the countries of the Middle East, the CR, and the Russian Far East, thus minimizing the length of transcontinental pipelines. From this point of view, it is possible to supply Caspian petrol to Asia in the following directions.

- In the southern direction through Iraq and Iran to the terminals in the Persian Gulf through tankers to South and South-East. From the economic point of view, this route is acceptable even in the most capital-intensive alternative, namely, construction of a transit pipeline from the Caspian field to the terminals in the Persian Gulf. However, the first phase of this scenario can be implemented in a less capital-intensive way by using 'swaps'. The first step in this direction has been already taken when during the visit of a Russian delegation in April 1999 to Iran talks were held regarding the supply of Russian petrol to the petroleum refinery in the

north of Iran. In that case, Iran will unload equivalent volumes of its own petrol from the southern terminals of the country for meeting the demands of the corresponding export obligations of the Russian companies. This swap plug is also better than the laying out of transit pipelines. Iran and Iraq (in the perspectives of the post-sanction era) are major petroleum exporters. In the case of laying out of transit pipelines in their territory, these countries will undergo a serious conflict of interests if the petrol market worsens and there is a fall in demand for petrol. What should be reduced in the first place: flow of transit petrol within the framework of shared responsibilities or its own extraction and export? What will be more important: international contractual obligations or their own economic interests? Answers to these questions are not evident, all the more, because both these Near East countries are not signatories of the Energy Chapter, which, within its framework, has adopted that in the transit of supplies of energy resources there should be rightful guarantees of a non-discriminatory regime. According to this, the contractual supplies of Caspian petrol would be protected from possible infringement from the sides of the country of transit. An analogous problem is the non-sanctioned selection of Russian gas by Ukraine during export supplies through its territory. The deals of swaps, because of its own internal mechanism of correction, is devoid of such threats.

- From Kazakhstan to China within the framework of swaps of Russian petrol from West Siberia (the scheme is of a triad of swaps). The logic of swapping of obligations of the sides in this case can be the following: Russia swaps the supplies of its West Siberian petrol obligations of Kazakhstan as per the contract with the KNNK. It does this by giving corresponding volumes of its petrol from the West European market (improving its market and is also cost-effective because of the difference in the transportation costs). Kazakhstan, on its part, will supply the equivalent of additional volumes of petroleum export to West Europe as per the KTK (by filling the pipeline and improving its economy, for example, by reorienting to the western direction, the contracted KNNK in SUAR of China supplies Kumkolya and Uzeni and receives payment for transit of Russian petrol to China). China also does not lose anything, but gets the chance to start importing supplies as per the contract of KNNK-Kazakhstan in a much earlier time period because of the early supplies of Russian petrol. Also, the completion of the transport infrastructure for supplies to SUAR China of Russian petrol can be completed at lesser costs and in lesser time, than the construction of similar infrastructure in the above-mentioned Kazakh KNNK fields. Other advantages exist, which is clearly seen in the win–win situation that will develop.

Demand for investment: main scenarios

Calculations have revealed that in the first phase alone, the entire demand for investment in exploitation of Caspian petrol may constitute not less than 60–70 billion dollars. This is the lower level of the investment demand of the CR as calculations were carried out for not all the Caspian projects but only for two Caspian states. During this phase, more than 80% of the indicated reserves will be directed towards extraction of the Caspian petrol

(almost in similar quantities in the Azerbaijan and Kazakhstan sectors, the remaining goes to the transportation systems). The given investment demand exceeds by one-third the competitive Caspian demand for investment from the side of two important groups of new Russian projects: in Timano-Pechorskiy and in Sakhalin (Table 3).

Table 3 Estimated investment levels for extraction and transportation of Caspian petrol and competing Russian projects (main scenarios) (billion dollars)

Indicators	*Scenario 1*	*Scenario 2*
Caspian		
Total extraction, including	54.5	54.5
Azerbaijan	26.5	26.5
Kazakhstan	28.0	28.0
Total transportation, including	7.8	14.7
Azerbaijan	5.1	5.1
Kazakhstan	2.7	9.6
Total extraction +		
Transportation, including	62.3	69.2
Azerbaijan	31.6	31.6
Kazakhstan	30.7	37.6
Russian (new competing projects)		
Extraction	39.0	39.0
Transportation	3.0	3.0
Extraction + transportation	42.0	42.0
Caspian + Russian		
Extraction	93.5	93.5
Transportation	10.8	17.7
Extraction + transportation	104.3	111.2

The question of the future satisfaction of the investment demand depends on two fronts: on the one hand, it is necessary to evaluate the future satisfaction of the total demand for investment (arising from its average annual value), and, on the other, the prospective of the passing of the peak investment demand in the extraction of the Caspian petrol (from the real dynamics of the investment demand specified by the characteristics of the competitive projects).

Total investment demand

In the first half of the 1990s, the annual investment for global exploration, processing, and extraction of petrol constituted 80 billion dollars, as per the studies on the future of financing world energy carried out under the aegis of the WEC (World Energy Council).

Annual capital input in the petroleum industry during 1996–2001 constituted 100–120 billion dollars (or 600 billion dollars in all the five years (WEC 1997). During this, the investments in the petroleum sector for the CR, within these limits, can compete with other participant countries (namely with the new Russian projects in the Timano-Pechorskiy, Sakhalin, and others). This will constitute not more than 450 billion dollars for the five years – the predicted volume of the 'open' (competitive) segment of the investment market in the global petroleum extraction industry. It constitutes of 400 billion dollars of capital by international petroleum companies and 50 billion dollars of investment by government petroleum companies (which comes to almost half the entire investment proposal of the latter). The remaining 150 billion dollars, of which 100 billion are of the participant countries of the OPEC, make up the closed (non-competitive) zone of the investment market for global petroleum extraction. It is used by the country donors for the self-financing of petroleum projects located in their territory, as a rule, through national petroleum companies (whose investments form this chunk of the market). Consequently, this segment of the investment market is not available for the non-government financing of the Caspian projects.

Total demand for investments in Caspian petrol is 7%–8% of global investments essential for the exploration, processing, and exploitation of petrol excluding transportation. The investment cycle for the exploitation of Caspian petrol will take almost 10 years. Thus,

60–70 billion dollars is necessary to correlate the value of the expected capital inputs in the global petroleum extraction. Within this framework, investment will be sought for financing the exploitation of the CR for 2000–2010 (approximately 900 billion dollars). This share exceeds the share of all countries of the CR by almost three times in the global established extractable reserves of petroleum. And such a correlation substantially limits the prospects for organizing project financing for the exploitation of Caspian fields. As this means that the possibilities of ensuring mutual funds due to internal reserves of the project itself will only be one-third of the total. This will arise from natural tendencies of international petroleum companies to balance capital inputs to different regions and to balance risks and expectant incomes as a whole for companies. In other words, for optimization of financing risks carried out by most of the petroleum companies mainly by mutual funds, the share of the region in the global capital inputs should not differ much from its share in the global established reserves. The value of the established potential reserves of the field is equivalent to the accumulated extraction for the entire period of implementation of the project. This, along with the 'right to use' the ores in turn may be used in the capacity of much more liquid shares for ensuring the attraction of credit resources for cultivation of this field.

Peak investment demand

The problem of overcoming the peak is one of the most difficult tasks. Peak investment in the first phase of exploitation of the Caspian petrol will only be in the beginning or middle of the next decade. Figure 3 shows the results of the dynamics of investment demand for new projects for petrol extraction in the CR and in the competitive projects in Russia (Timano-Pechorskiy and Sakhalin). In accordance with this, the peak of the investment demand for processing and extraction of petrol in Azerbaijan (first phase) in 2001 is 6 billion dollars a year, while in Kazakhstan in 2004, it is 7 billion dollars a year. The general demand for peak investment in extraction in the CR will be in 2003/2004. The calculated value for the peak demand constitutes 8–9 billion dollars. This is equivalent to 10%–11% from the

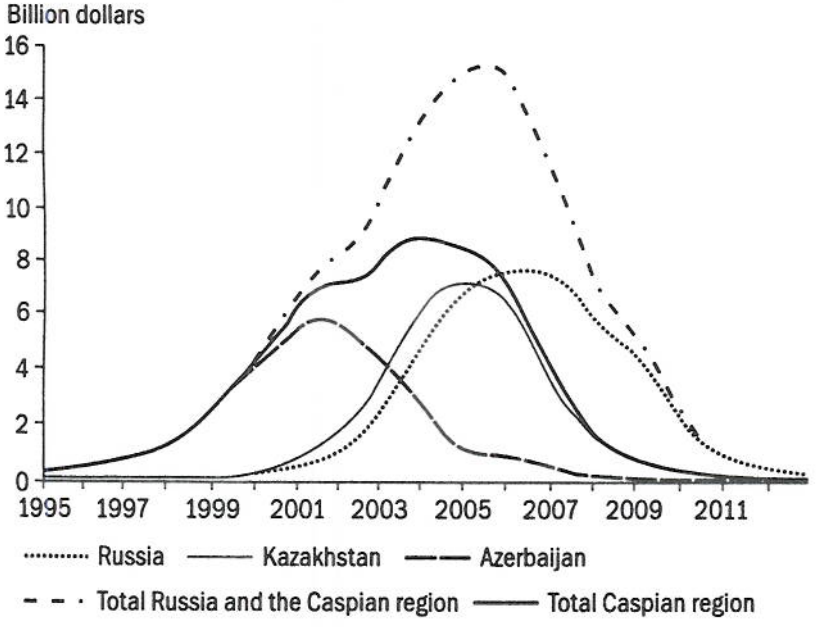

Figure 3 Investments for new petroleum projects in the Commonwealth of Independent States

factual annual capital inputs in the global petroleum extraction (upstream) in the 1990s, or around 10% from the prospective annual investments in the near future for global petroleum extraction (80–90 billion dollars a year). This can give rise to competition between main petroleum extracting countries for capital inputs. This increases the gap between the shares of the region in the established global reserves (i.e. in future accumulated extraction) and in the global investment for exploration and extraction of petroleum. This means that it will worsen the parameters and prospects for attracting project financing for petroleum extraction in the CR within the calculated scale.

The slowing down (deferred) of implementation of projects and the processing of new Caspian fields will reduce the peak values of the total demand for investments in the exploitation of the CR. This will ease (the costs will relatively reduce) the financing of the Caspian petroleum projects.

Calculations reveal that investments in transportation as a whole for the CR will not significantly increase the level of peak values of the total (extraction plus transportation) demand on investment. However, if such a situation does not arise for Kazakhstan within the framework of the given scenarios (investments in transportation are carried out before the peak of investment for extraction arises), then such a situation is quite probable for Azerbaijan. This is because investment costs for transportation schemes (the result of adopting the concept of many routes of supply) will get added to the peak investment demand for the petroleum extraction. Thus, with Azerbaijan adopting the concept of many routes, there will be further slowing down of the progress of petroleum extraction due to the worsening (limitation) of its investment possibilities as the implementation of this concept will put an undue demand on the capital inputs for transportation.

That is why the passing over of the peak of investment demand continues to be an acute problem. Even in the first phase of the exploitation of Caspian petrol, there will be serious problems relating to financing under these conditions. It is possible that some part of the present active Caspian projects will not be fully financed in the present conditions and hence they will continue to remain for a long period in different stages of verification of the reserves, re-evaluations, additional talks, etc. This will enable the petroleum companies to lift at least the vital stages of these projects from a depressed demand situation for petrol in the global market. Along with the depressed state of the global petroleum market, the global financing crisis will prolong the confusion in determining the optimal levels of exploitation, and the parameters of financing for the Caspian petrol.

The route Baku-Jaikan: the stumbling block or the bone of contention?

Calculations revealed that 2000–2010 will be characterized by a chronic surplus of supply in the petroleum market. In other words, nobody will be waiting for the Caspian petrol in the market. Moreover, the world in the 21st century is entering a period of lower rates on petrol (Konoplyanik 1999). During this, the financing of large-scale and capital-intensive construction of fields and pipelines covering vast distances is possible only in the presence of large, stable, long-term, and guaranteed volumes of extraction, supply, and consumption. The problem relates not only to the time period but also to the viability of investment.

- The resource base even for the projects in the first stage of exploiting Caspian petrol is being reduced (Karabakh and Dan-Uldzu-Ashrafi).
- The demand window for Caspian petrol is large in those markets where the costs of its extraction and transportation to the

consumer are sufficiently large in the traditional scheme for transport. For the non-traditional schemes (Asia), it is still not determined and is less in those markets where the costs of its extraction and transportation are acceptable (West Europe), and insufficiently determined in those markets where the costs are minimal (East Europe).

- During periods of limited demand and supply of Caspian petrol, the implementation of the concept of many routes of supply enters into a contradiction with the laws of economics, according to which maximum effectiveness is achieved during the implementation of the 'effect of the scale'. In these conditions the main victims will be those routes for which this concept was lobbied and the first victim will be the Baku-Jaikan route.

The last point today is the main unresolved problem in the path of effective exploitation of Caspian petrol and has been the bone of contention for many months among the representatives of the official circles of the US, Azerbaijan, and Turkey.

The economics of the Baku-Jaikan route today forbids its implementation. Meanwhile, comparative and competitive pipelines, including that around Bosphor, can be constricted. There are, however, opposing views, and no consensus has yet been reached. Moreover, this route was selected under the political guidance of one separate state as repeatedly revealed by the official representatives of the US government, whose position as regards to this route in the recent past boils down to three main conditions.

1 Baku-Jaikan is a political selection of the US and it will assure that it is approved by all the pre-Caspian states.
2 Within the framework of this selection, it is important to find viable economical solutions ensuring commercial viability of this route.
3 In this search, the commercial prospects of this route become more evident.

The US officials have aired this at international forums, e.g. during recent international conferences on the Caspian region (held in Washington and Paris). They were supported by the representatives of the GNKAR (Government Petroleum Company of the Azerbaijan Republic), and of Turkey. As the discussions of one of the authors of this article with the above-mentioned official representatives was held off the record the arguments are summarized below.

- Advantages
  - Shortest possible route
  - Ties two terminals directly (reloading not necessary)
  - Supported by the governments of the US, Azerbaijan, and Turkey. The problem of Bosphor does not exist.
  - Political advantages for the US and its supporters who have declared the Caspian as a zone of vital interests.
  - Goes through the territory of the countries, fully under the control of the US (Turkey is a member of the NATO [North Atlantic Treaty Organization)
  - Avoids Russia (including the problem region of Chechnya)
  - Alternative to the Iran route, closed for American companies

- Disadvantages
  - Prohibited 'cost-cutting' within the present level of cost
  - The growth of 'cost-cutting' with time (constant rise in the value of capital inputs
  - Reduction of the price of petrol has negative impact on the economy of the project (period of viability)
  - Highest capital inputs: problem of organizing financing (costly credits, time factor)

- High possibility of attracting government financing for the implementation of the project (possible destruction of market principles of cost formation on taxed services)
- Lowering of demand in West Europe spoils the economy of the project (reduction in capacity or the incomplete load on the pipeline)
- Within the framework of the concept of many routes of supply, the project remains the sixth in line after five already existing ones (problem of overload)
- The Kurdish problem
- Economically not viable for the petroleum companies in the present and future conditions

After the breakdown of the Soviet Union, the fight for attracting its former republics to the zone of geopolitical interests of these countries began. Putting aside the political aspects of the fight for influence over the countries of the CIS, it is noted that the economical interests in the CR are evident. Those countries, which can have stronger ties with the pre-Caspian states, would get a dominating presence for their companies in these new markets. Under conditions of continuing interest from importer countries for diversification of sources of energy supply and of continuing internationalization of the petroleum business, the fight for influence in the region means getting access to the formation of large-scale petroleum and financial flows by the petroleum companies in the respective countries on the basis of processing of the Caspian petrol fields. The parent countries of these companies would have received a stable flow of income tax from these financial flows. At face value, there is unity of the goals of the government and business. Therefore, the US has declared this region to be the zone of its vital interests simultaneously with the penetration of US petroleum companies into the states of the CR.

The sole competitor in this region is the weakened Russia undergoing a complicated period of systemic reorganization and suffering from an acute shortage of funds. The only transport pipeline for Caspian petrol is the Baku-Novorossisk pipeline. The concept of many routes of supply is the only scenario for removing the weakened competitor to the supply of the Caspian petrol (first Azerbaijan petrol) extracted by the American and West European companies to the market. This can be done by forming a new route that bypasses Russia in the territories of the states where the influence of the US and American businesses is maximum. Each of the partners (Azerbaijan and the US) came up with their arguments and their interests in the initial stages were identical. As the supplier of petroleum, both Azerbaijan (recipient) and American companies (extracting this petrol in the waters of the recipient country) were interested in having more than one route for supplying petrol to the market on the one hand, and having a bypass pipeline in Russia with the dangerous Chechnya region on the other. The rejection of the Russian route was supported by economical considerations. The route through Chechnya would have increased the risks of investment for the extraction projects. Based on actual signs, there is the problem of loss of quality due to the mixing of various sorts of petrol etc. Therefore, it gave rise to alternative directions of supply: to Supsa and to Jaikan.

However, this stage of absolute agreement in the positions of Azerbaijan and the US till today has also given rise to insignificant differences which will be evident in the future. For the US, the pipeline to Jaikan is purely a political choice as was reiterated many times by American official representatives. This choice is directed against Russia and Iran and is operative on the reliable NATO partner, Turkey. The US, the richest country in the world, can afford to sacrifice some economical interests for political gains. For Azerbaijan, the choice had to be based on economical

parameters (in the transition period one cannot ignore the economical aspects), however, following a de facto method in the US–Caspian politics, the country exchanged its economical interests for political goals, in truth, not its own but of that of the US. As a result, the choice of the optimal 'main export' route has been determined by non-optimal economical solutions due to political considerations. This is the first paradox in the to-date identical positions of Azerbaijan and the US.

However, there exists another paradox. For Azerbaijan as the exporter, it would have been expedient within the concept of 'many routes of supply' to have alternative routes taking petrol from its country to different markets (first, Europe and Asia). This means that one of these routes should become the priority route to Asian markets. And among these routes, there is no economical alternative as compared to the Iranian one. Consequently, it is more expedient for Azerbaijan to develop (as an addition to the present route to Novorossisk) a pipeline to Supsa and a trans-Iranian route. However, the latter was totally unacceptable for the US as alternative routes of supply of Azerbaijan petrol were closed or had already saturated the West European market. Thus, the economical choice of Azerbaijan may have been dictated by the political interests of the US.

Moreover, instead of developing competitive export supplies of Azerbaijan and Kazakh petrol by sending part of Azerbaijan petrol through Iran to Asia, today, all alternative export routes of Caspian petrol are directed to this oversaturated West European market. There are a few routes which can be called factually operative or realistically under construction. These are Baku-Novorossisk, Baku-Supsa, and KTK (Tengiz-Novorossisk) supplied through the system 'Transneft' to Samara, and further into West Europe and the 'swap' deals.

That is why today the Baku-Jaikan route is least desirable based on purely objective economical reasons. It is the stumbling block in the path of effective exploitation of the petroleum resources of the CR, though it does look like the bone of contention. Taking into account the revised lowering of the rating of the established extractable reserves and the levels of extraction of petroleum in the present Caspian projects, and the revised lowering of the predicted cost of petrol, the already present 'uncompetitive reserve' of the Jaikan route continues to increase. This is becoming all the more evident, especially to the foreign petroleum companies working in the CR.

One of the authors of this article has had a discussion on the absence of economic prospects of this route with both the Russian audience (in the Parliamentary meetings on 'Caspian Sea and the national interests of the Russian Federation' in the Government on 2 February 1999) and foreign specialists (in the above-mentioned international 'Caspian' conferences). None of these audiences rejected these arguments.

The last attempt to revitalize the dying prospects of the Baku-Jaikan project is to support private participation in the financing of the project. This will guarantee the growth of capital inputs for its completion, when compared to the initial rating, equal to 2.4 billion dollars, from the government budget of the interested countries (the idea is still being discussed). As the evaluation of capital inputs into this pipeline has already touched 4–4.5 billion dollars, it means that in case it gets completed as per the proposed scheme, almost 2 billion dollars should be contributed by government sources. It is understood that neither the budget of Turkey nor that of Azerbaijan can float or guarantee even half of this sum (the press hinted government guarantees of around 1.1 billion dollars, arising from the evaluation of the capital inputs into the project equalling 3.5 billion dollars). The financing mechanism will be as follows: the US, through one of its government financial institutes (either Exim Bank, or the OPEC, or some other), will either directly finance Turkey for

the given amount or reguarantee it in the given measure. However, this gives rise to two queries.

First, how will the tariff on the flow of petrol along this pipeline be determined? If American money is represented on a returnable basis, then even in super-taxed conditions of its return, the tariff will be prohibitive for the passage? For the tariff to be acceptable, the above US sources should be written off in the future.

Second, if this is so, then can the American government explain to the American taxpayers, why their money (1.1–2.1 billion dollars) was used to finance a failing project?

The most interesting fact is that the main defender of the economical interests of Azerbaijan could be the American petroleum companies, which are acting against the forced implementation of the Jaikan route. This implementation is actively lobbied by the American government. The American petroleum companies, however, not interested in the political but in effective economic solutions (hence the present economy of the project is totally unacceptable to them). All the same, it is they who can protect Azerbaijan from being forced into this destructive project (or at least unreliable) for all its participants (except Turkey). Thus, the position of the American government and the American businesses on this issue may differ. It had differed also in the American sanctions against Iran (American businesses are beginning to suffer appreciable losses from these sanctions and are actively protesting for their removal or at least the softening of these sanctions).

The position of the international petroleum business in relation with the prospects of the route to Jaikan was accurately and laconically expressed by the head of Remco (one of the first western companies to have come to Azerbaijan in the late 1980s), Steve Ramp, in a Paris conference. This company is the core company in the AMOK project and is aware of all the nuances of business in this region. According to him, the Baku-Jaikan project is not possible for 12–15 dollars for one barrel of petrol. He believes that a large chunk of the supply of Caspian petrol will remain in the Black Sea region and the main task of the US should be not to lobby for the route to Jaikan, but to search for a more effective bypass route around Bosphor. The position fully complies with the interests of Russia (as a state so also for business) in the region. It gives rise to wide possibilities for multilevel cooperation for reaching balanced, goal-oriented, long-term prospects and economical solutions to the problem of exploiting Caspian petrol.

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