

Interaction Between Russia and India in the Field of Hydrocarbon Logistics

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Abstract

In the last decade the Russian Federation has become a major player in international trade. It provides world market with a large range of products: from mineral raw materials to products of manufacturing by the its industrial complex. Establishing ties and even bigger integration in international trade is an important aspect for the development of the country's economy. Russia's major trading partners are China, CIS countries and Europe, but the strengthening of relations with the countries of the Asian region (the Republic of India, the countries which are locates next to the Persian Gulf) is also important. A prospective partner in the field of trade relations in this region can become the Republic of India because the relationship between countries has a history that can characterize them as fairly friendly and based on the principles of equality and respect for each side's points of view. Many industries are spheres of cooperation, including oil and gas. The purpose of this study was to identify perspective ways of interaction between Russia and the Republic of India in the field of hydrocarbon logistics. To achieve the research goal the following tasks were formulated: • Identification of potential and/or already implemented opportunities to strengthen cooperation between the Russian Federation and the Republic of India in the field of hydrocarbon logistics; • Analysis of the world experience in organizing the interaction of various states in the field of research; • Formulation of an innovative proposal to strengthen cooperation between the Russian Federation and the Republic of India in the field of hydrocarbon logistics; While solving the following tasks a comprehensive version of the relationship development between the Russian Federation and the Republic of India in the field of hydrocarbon logistics was proposed, which includes the following elements: • Regular supply of crude oil by sea; • Creation of a strategic reserve of oil for the Republic of India in the territory of the Russian Federation; • Alternative option in case of force majeure circumstances – the arbitration transaction; • Construction of the pipeline as option of strategic long-term interaction. Carrying out this study the following methods were used: general scientific methods, methods of economic analysis, content analysis. The theoretical significance of the work is essential since all the elements of this option are proposed to be implemented as a whole with the aim of strengthening the relations between the countries under consideration and establishing long-term partnerships in the oil and gas sector. Practical significance lies in the possibility of leveling down the risks associated with the disruption of hydrocarbon supplies to the Republic of India.

Keywords: Export; Trade; Oil; Construction of pipeline; Strategic oil reserve.



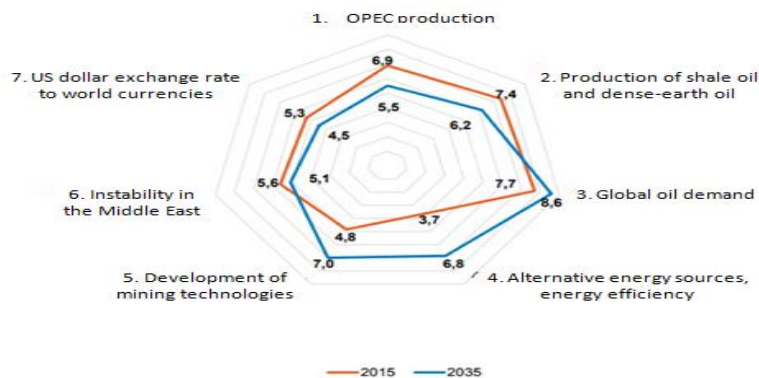
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1. Introduction

The energy markets is undergoing profound changes, caused by a combination of a number of factors that have a different nature. These changes are reflected in the aspects of the functioning of markets and radically change the working conditions of its players and the role of the state.

One of the life constants is a continuous change, the other is energy. The ability to understand and perceive world trends allows foreseeing in what quantity, quality and correlation the world will need energy in the future.

The direction of development of modern energy is formed under the influence of many factors. We can identify key factors among them, which determine the architecture of the world energy markets until 2040. Based on the study of forecasts and studies of the IEA, INEI RAS, International Gas Union, EIA, Bloomberg, BP, ExxonMobil, we identified and ranked the main world trends (Fig. 1) ([LLC Vygon consulting Analytical report, 2015](#)). The significance of the factors was estimated on a 10-point scale (where 1 is the smallest factor, and 10 is the most significant, while the probability of implementing the factor was also considered in significance).



The significance of the factors' influence in the short-term perspective is not considered in detail in the framework of this study and the significance of factors in the long term is ranked as follows:

- Demand as the integral indicator of the oil market development within the time horizon until 2035 has the greatest impact - 8.6 points.
- Technological factors that can significantly change the global oil market are among the most significant factors. The factor of mining technologies development was estimated at 7.0 points and the factor of alternative energy sources development and technologies aimed at energy efficiency and energy saving had 6.8 points.
- The dollar exchange rate as a factor of influence is taking a back seat and the factor of instability in the Middle East can still affect the balance of the oil market for a long time.

The slowdown of the world economy is combined with the growth of the share of Asia, a sharp increase in the spread of GDP dynamics across countries and the retardation of former leaders - China's slowdown, the current crises in Brazil, Russia and South Africa. Given the various kinds of unfavorable factors, the world economic situation is difficult for the oil-exporting countries recently, which are trying to diversify their sales markets. In the framework of this study, a mechanism for increasing the efficiency of Russian oil exports to the countries of the Asian region (on the example of the Republic of India) will be considered.

2. Methodology

The methods of theoretical generalization, logical and economic analysis are used during working on the article. Attention is drawn to research in the field of geo-Economics, logistics, international trade, as well as storage and transportation of oil and oil products. Theoretical materials and works in the field of storage and transportation of oil and oil products, programs of development of oil industry of the Russian Federation and India, data of social and economic statistics, analytical reviews and materials of scientific conferences are used as initial information.

3. Research Results and Discussion

3.1. Analysis of Trade Relations between the Russian Federation and the Republic of India (Including in the Oil and Gas Industry)

Today, relations with Russia are one of the main directions of India's foreign policy. India considers Russia as its long-time, time-tested partner. The signing of the "Declaration on the Strategic Partnership between Russia and India" in October 2000 gave impetus to the development of even closer relations between Russia and India and led to the expansion of cooperation in almost all areas. In December 2010, the Strategic Partnership between India and Russia reached the level of the "Special and Privileged Strategic Partnership". The leaders of Russia and India gave target indicators by 2025 to increase the volume of bilateral trade to \$ 30 billion and mutual investments to \$ 15 billion on each side ([An Overview of the Economic Performance and Major Directions of India's Foreign Economic Activities in 2016/17 financial year, 2017](#))

India is becoming a leader in fuel consumption in the Asia-Pacific region. It has already outscored Japan in this indicator and is expected to outrun China in the near future. In 2015/16 the share of import in India's oil consumption was about 80% (202.9 million tons), an increase by 6.4% (189.43 million tons) compared to the previous year. In the under-review period, crude oil import accounts for the largest share in the structure of imports at 26.4% ([An Overview of the Economic Performance and Major Directions of India's Foreign Economic Activities in 2016/17 financial year, 2017](#)). According to forecasts, by 2030 India's demand for oil imports could reach 6.5 million barrels per day, and by 2040 - 9.3 million barrels per day. Such a high dependence of India on oil imports is caused by a high level of consumption due to the developing industry, population level growth, the high level of oil refining development and the subsequent export of petroleum products.

Today the main suppliers of crude oil to India are Saudi Arabia (19% of all deliveries), Iraq (14%), Nigeria (13%), Iran (11%), Kuwait (10%), UAE (9%), Qatar (4%), Oman (2%). However, Iraq and Saudi Arabia, the main exporters of oil to India, are reducing supplies according to the OPEC+ pact, while shipments from Iran fell due to the conflict over the development of the Farzad B gas field, which forces India to find new partners for crude oil supplies, one of which Russia can become. A great advantage of the Russian Federation over other countries can be

not only an established system of trade relations with India, but also the proximity of the Urals brand in quality to many Middle Eastern varieties.

Table-1. Structure of India's oil imports in the future

Country	Share of import, %	Prospects for market share for the next 10 years
Saudi Arabia	19	The projected share decline in the structure of importers in India by more than 5%
Iraq	14	The projected decline by 2-4%
Nigeria	13	Presumed preservation of position in the structure of importers
Iran	11	The projected share decline in the structure of importers in India by 3% because of disagreements for a number of political and economic reasons
Kuwait	10	The projected decline by 1-2% due to the possibility of extending the OPEC+ pact measures
UAE	9	Presumed preservation of position in the structure of importers
Qatar	4	The projected share increase in the structure of importers in India by 1-3%
Oman	2	Presumed preservation of position in the structure of importers
Russia	<2	The projected share increase of oil imports by 10-13%

Fig-1. Projected change in the share in the structure of imports for 10 years

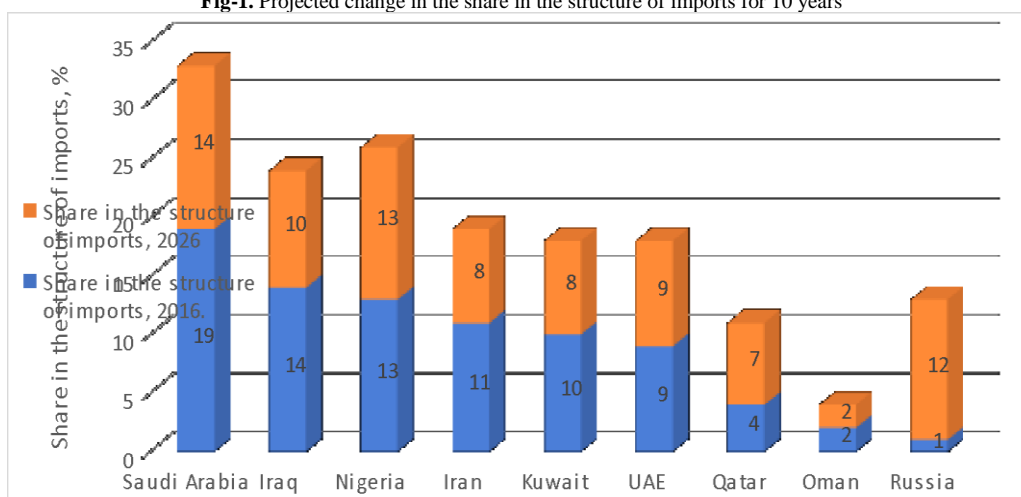


Table 2 presents the largest projects under which Russia and India are interacted in the development, production and supply of hydrocarbons. It can be seen from the data that Indian companies obtained a share in oil production projects in Russia, which ensures the supply of raw materials to the country, and PJSC "NK "Rosneft" - access to the refining sector of one of the largest markets in Asia and guarantees the sale of oil.

Table-2. Investment cooperation between Russia and India in the oil industry

Project/Direction	Terms	Participants	Details
Project "Sakhalin-1"	Since 2001	ExxonMobil (30%), Rosneft Oil Company PJSC (20%), ONGC (20%), SODECO (30%)	The oil and gas project on oil and gas deposits development on the north-east offshore of the island of Sakhalin under the terms of the production sharing agreement.
JSC "Vankorneft"	Since 2016	Rosneft Oil Company PJSC (50,1%), ONGC (26%), indian syndicate of companies (23,9%)	In 2015-2016 transactions on sale of shares of JSC Vankorneft to Indian companies. Primary activity – development of the Vankor oil field in Krasnoyarsk region.
Taas-Yuryakh Oil and gas production Ltd.	Since 2016	Rosneft Oil Company PJSC (70,1%), indian syndicate of companies (29,9%)	March, 2016 – the contract of sale of 29.9% of shares in Taas-Yuryakh Oil and gas production Ltd. – development of the Srednebotuobinsk oil-and-gas condensate field
Essar Oil	Since 2016	Rosneft Oil Company PJSC (49%), syndicate of investors (49%), Essar Group (2%)	October, 2016 – an agreement on acquisition of assets of Essar Oil Ltd. (production and oil refining, realization of oil products) with assistance of the financial consultant (VTB Capital). The price za acquisition is estimates at 3.5 billion dollars.
Supply of oil to India	Contract since 2015	Rosneft Oil Company PJSC, Essar Oil	The contract for the delivery to India within 10 years in total 100 MT of oil for processing at oil refinery in Vadinar

Russia's entry into India's fast-growing energy market is at an early stage and there are many barriers along this path of which the main ones are the absence of a common border of countries, low solvency of demand in India and increased competition in world energy markets, but stable and robust trade relations between countries, the tendency to increase joint projects, as well as the need to search for new markets and reliable trading partners on the one hand, and the growing domestic consumption of oil on the other hand give prerequisites for the strengthening of relations in this sphere.

3.2. Perspective Trend of Relations Between the Russian Federation and the Republic of India in the Field of Hydrocarbon Logistics

To satisfy the needs of the growing Indian hydrocarbon market it is necessary to look for the most optimal supply options for this type of raw material. Based on international experience in this matter and the research objective, a comprehensive development option is proposed in this field which includes the following elements:

- Regular supply of crude oil by sea;
- Creation of a strategic reserve of oil for the Republic of India in the territory of the Russian Federation;
- Alternative option in case of force majeure circumstances – the arbitration transaction;
- Construction of the pipeline as option of strategic long-term interaction.

All these are elements of mineral resources logistics. Each of these basic processes of mineral resources logistics has its own specifics (Plotkin and Khaikin, 2017).

Within the framework of this article, two elements of the proposed integrated mechanism will be considered in detail: the creation of a strategic reserve and the construction of a pipeline.

The creation of the strategic oil reserve is one of the important aspects in formation of national state economy (Ulanov, 2017). Its subsistence allows to regulate the amount of foreign exchange income as well as to level the risks on the world oil market. There are different points of view in the world community. According to some of the experts such a reserve is necessary to solve top-priority mobilization tasks and then to regulate the market. Some of other experts assess strategic reserve as an accumulated product for better times which will give a possibility to use it as a regulator not only during the deficit but also during the excess of oil on the market.

Nowadays, the global oil market is changing rapidly: suppliers of the traditional fuel (oil, coal, etc.) face fierce competition from providers of a new fuel (LNG, CNG, etc.). Thus, traditional oil suppliers in order to maintain their positions on the market should offer an additional range of services. In this paper, we are going to propose to consider the creation of the strategic oil reserve as a type of additional services in order to ensure the achievements of certain market shares in the Republic of India. That will guarantee the fulfillment of obligations of Russian oil companies to Indian partners.

According to the world experience in the creation of strategic reserves of oil and oil products the most common used point is the location of such reserves in the natural and artificial underground cavities. In order to resolve this issue the Republic of India should take into account several factors. First of all it is a possibility of intensification of existing regional conflicts. Second factor is the location of natural caverns suitable for creating such reserve near state borders. Also the country should bare in mind risks that occurs in nature. The last one is economic advantage over alternative options.

In our opinion, from the above factors the most promising and expedient option of the creation of the strategic oil reserve is to locate in an underground storage facility on the territory of the Russian Federation. That allows to regulate geopolitical risks, strength relationship between considered countries, and improve oil industry in both The Republic of India and Russian Federation.

Currently, underground oil reserves are the most economy beneficial and affordable in technological terms. Underground oil reserves are constructed in various natural or man-made tanks (mine workings). This type of storage is based on the exchangeability of the chemical composition of oil within the direct contact with rocks and on the possibility of balancing the excess pressure of their vapors with the pressure of the rocks lying above the reservoir. Underground storage facilities are designed primarily to store large oil reserves in order to ensure their uninterrupted consumption. The choice of the storage type depends on the geological characteristics of the seams, the geographical location and the range of performance indicators that are taken into account in technical and economic calculations.

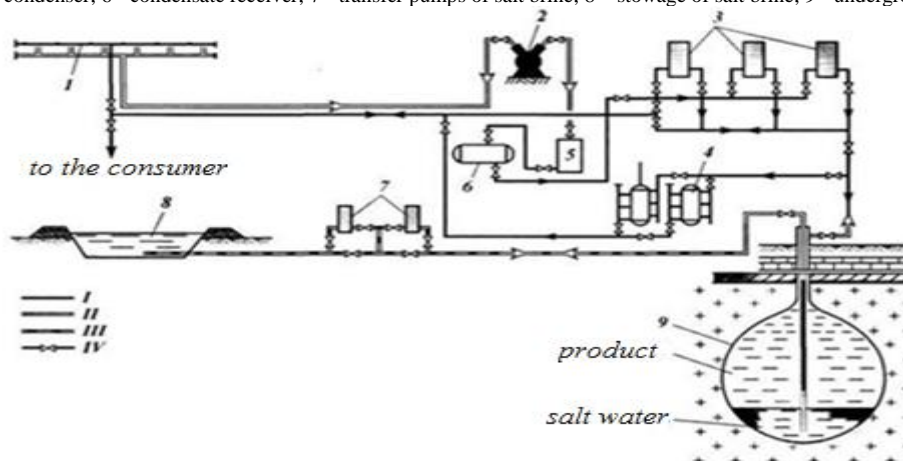
There are several types of underground storage of oil products based on the scheme of the device and the method of their construction. However, the most widespread are depositories created in the deposits of rock salt, since in most cases they are the most economical, and deposits of rock salt are widely distributed on the territory of Russia.

The minimum depth of the underground reservoirs is determined by geological conditions, physical properties of oil, and elasticity of its vapours. Underground oil storage with the volume of 100 000 - 300 000 m³ can be built at a depth of 200 - 300 m (Antsiferov, 1981). Determination of the depth and thickness of the salt reservoir-the quality of rock salt required for the selection of the erosion method is carried out by geophysical methods and exploratory drilling. The size of the container during leaching is continuously monitored by determining the concentration values and the amount of brine extruded. Figure 4 shows a scheme for operating an underground storage facility for hydrocarbon feedstocks in a salt reservoir.

In the framework of this task, it is proposed to create caverns allowing to store a reserve equivalent to the consumption of crude oil within 90 days. The daily consumption of crude oil by the Republic of India is 4,159,000 barrels, hence the necessary volume of the oil storage is 51,275,340 tons. The rock salt caverns located in Eastern Siberia allow the placement this specified volumes. "The Great Siberian Salt Field", located near the Trans-Siberian Railway and stretching from Kansk to the Baikal Lake, it contains huge reserves of rock salt and has a great potential for exploitation by the aforementioned method of storage. Potential place for the construction of such a storage system is the Canaray rock salt deposit, where exploration work was carried out and reserves of 584 million tons were identified. The only drawback of this complex is the need to conduct an additional geological exploration complex, which can lead to increase investments for the implementation of this project.

The East Siberian Group of deposits can provide filling of underground reservoirs, such as Verkhnechonskoye oil and gas field in the Irkutsk region (industrial reserves of categories A + B + C + C2 - 230 million tons), Yurubcheno-Takhomskoye and Kuyumbinskoye oil and gas condensate (total - 438 million tons), and also Lodochnoye, Tagul, Vankor and Agaleevskoye (Federal Agency for Subsurface management Rosnedra).

Fig-2. Scheme of operation of underground storage in a salt caverns: 1 - pipeline system; 2 – compressors; 3 – oil transfer pumps; 4 – gas drier (if necessary) 5 - condenser; 6 - condensate receiver; 7 - transfer pumps of salt brine; 8 – stowage of salt brine; 9 - underground storage tank



With a preliminary assessment of the implementation of the project for the construction of an underground oil storage facility for 1 million tons, it can be said that the required investments amount to 4.785 billion rubles. Table 3 shows the cost associated with the construction of industrial facilities under the project.

Table-3. The construction cost

Necessary equipment/service	Cost, million rubles
Preparatory work	60
Construction of brine storage	900
Drilling of the area	520
Construction of underground storage tank	1 100
System of inlet pipes	410
Compressors	520
Oil transfer pumps	625
Condenser	380
Condensate receiver	190
Transfer pumps of salt brine	80
Total:	4 785
<i>Total costs for the entire planned volume:</i>	<i>239 250</i>

The most rational investment in this project is the involvement of not only both countries but also the funds of the BRICS (New Development Bank BRICS). This will allow to get financial support for the project in a relatively short time on favourable terms. Provision of funds for the implementation of such projects is carried out at a reduced rate and for a long period of time (for example, for the construction of an LNG plant under the Sakhalin-1 project, money was raised from the international bank and the National Welfare Fund of the Russian Federation on terms of return within 15 years). For the Russian side, in case of insufficient funds, it is also possible to attract them from the National Welfare Fund. In this case, the funds are issued on the terms of a pledge, which may be the shares of a newly created industrial facility, or shares of the company that acts as the initiator of an investment project by the Russian Federation. Raising funds from the banking institutions should be seen as a long-term credit line in the form of project financing.

Investments in the newly created industrial facility are proposed to be distributed in the following ratio: 50% - investment of the Russian Federation or the state oil company, 25% - the Indian side, 25% - the bank's funds.

The second important element of the offered option is construction of the pipeline. At present, the delivery of hydrocarbonic raw materials increasingly carried out with use of pipelines. This type of transport wins before others for a number of reasons:

- cost;
- long service life;
- independence from natural factors;
- the possibility of delivering goods to hard-to-reach areas.

In order to ensure strategic interaction in oil and gas branch between the considered countries construction of the pipeline which will connect the growing market of India with the market of Russia is offered. Besides, this option is a priority in another respect: ensuring the growing market of Asia with hydrocarbonic raw materials, evening-out of some geopolitical risks, strengthening of position of member countries of this project on the international arena. Consider the possible option offered within the research and the rejected alternatives.

The route passing through Afghanistan cannot be laid because of the conflicts continuing there and existence of the general border with Pakistan. The possibility of implementation of the construction project of the oil pipeline along a route of Turkmenistan-Afghanistan-Pakistan which was developed by Asian Development Bank is extremely small for a number of the technical and political reasons. Another option, discussed with the participation of India and providing for the laying of a pipeline across China, is also unlikely. Despite the fact that the option of supplying hydrocarbons to India could be a pipeline from Russia to the Chinese province of Xinjiang, with its further mainlaying to India, this option is currently difficult to implement for a number of reasons. According to preliminary feasibility studies the sum of investments can be about 30 billion dollars of the USA that can make the project inefficient (a project payback period more than 30 years). In addition, for projects of this kind, there are a number of risks, the onset of which is difficult to predict, which is also a deterrent to the implementation of the "Chinese" option. But the main constraint for the implementation of the pipeline construction project, which will link Russia and India through the territory of China, is the difficult terrain on which it is supposed to be implemented. All this prevents the establishment of a reliable transport connection with the countries of Central Asia.

At present, it is technologically feasible and profitable from the point of view of the feasibility study to build a pipeline along the following route: Kazakhstan-Uzbekistan-Turkmenistan-Iran, and then mainlaying the pipeline to the Republic of India along the bottom of the Arabian Sea.

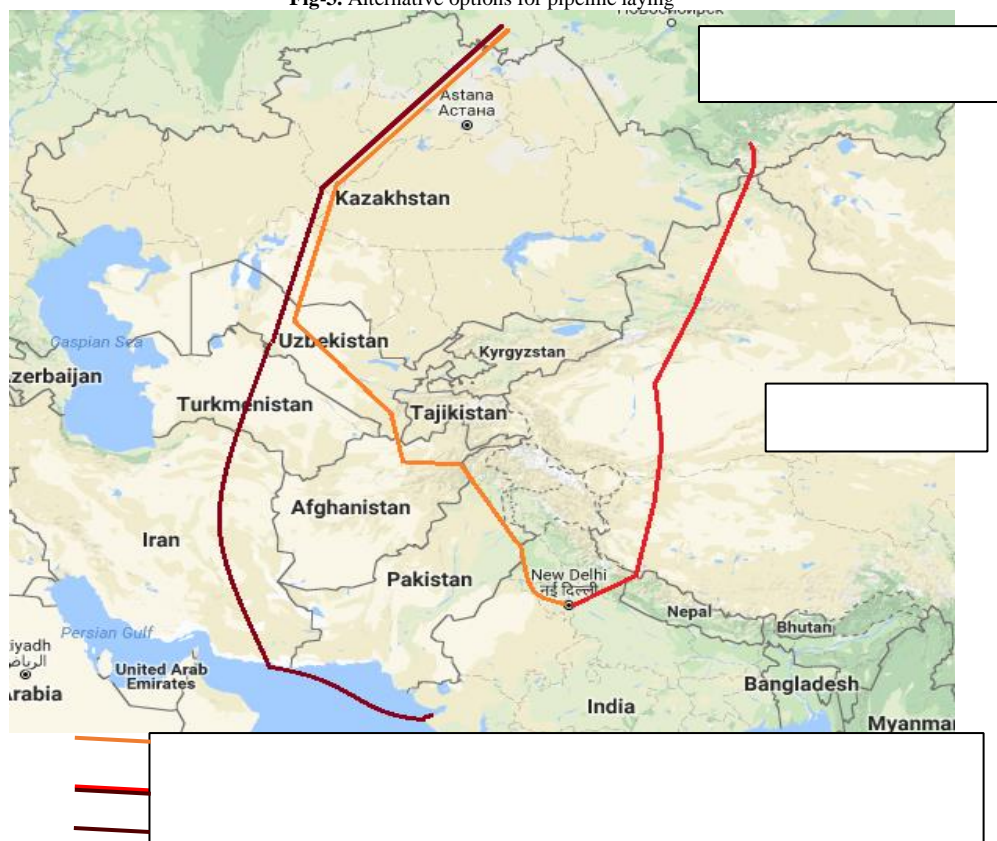
The construction project of the oil pipeline can get serious political support and in all above-mentioned transit countries. So, for example, Kazakhstan and Uzbekistan already expressed interest in this project. The only problem that the Russian side may face is difficulties in resolving issues related to the construction of the pipeline section across Iran. Due to the fact that Iran is a major player in the oil market of India, it is necessary to offer such conditions that would ensure the preservation of the existing market share. These conditions would be interesting to Iran because in the next 10-15 years decrease in volumes of supply of crude oil to Republic of India is predicted. Besides, implementation of this project will allow to create the soil for settlement of the available unresolved questions between these two states (for example, not settled conflict in connection with joint development of the gas field).

The implementation of this kind of project will not only give a direct economic effect in the form of profit, but also indirect - the establishment of an energy balance in the long term and the creation of the basis for the construction of a multipolar international system necessary for global safety.

On the world stage India is a very attractive market. In the nearest future its economy will show growth rates calculated in double digits. And this is what makes it attractive for companies operating in various industries around the world.

Analyzing the dynamics of oil consumption in the Republic of India we can conclude that this segment will be one of the most attractive for international suppliers of this type of raw materials. By 2040 it is projected that daily crude oil consumption will be about 9.3 million barrels per day, therefore, the annual demand of the Republic of India for crude oil will be 465 million tons. Due to the insufficiency of its own explored reserves of hydrocarbon raw materials, India will remain a major importer of crude oil. Today the share of oil imports in the total import structure is 26.4% and this ratio is unlikely going to change.

Fig-3. Alternative options for pipeline laying



4. Conclusions, Proposals, Recommendations

The relations between the Republic of India and the Russian Federation have their own history which can characterize them as friendly enough and based on the principles of equality and respect for the views of each side. The spheres of cooperation are many branches including oil and gas. It is no coincidence that the search for innovative ways to develop relationships in this sector is a very promising direction. Within the framework of the task it was proposed to solve a number of issues and formulate our own vision of ways to develop the relationship between the Russian Federation and the Republic of India in the field of hydrocarbon logistics.

According to the results of the study a comprehensive development option was proposed in this field which includes the following elements:

- Regular supply of crude oil by sea;
- Creation of a strategic reserve of oil for the Republic of India in the territory of the Russian Federation;
- Alternative option in case of force majeure circumstances – the arbitration transaction;
- Construction of the pipeline as option of strategic long-term interaction.

Consideration of the regular supplies and the arbitration transaction under this article was not provided.

An important element of the integrated development of the interaction between the analyzed countries was the proposal to create a strategic oil reserve of the Republic of India on the territory of the Russian Federation. We concluded that the implementation of the strategic reserve storage project is technically and technologically feasible, in addition, on the territory of the Russian Federation there are all geological and infrastructure prerequisites for the implementation of such a project. As for the benefits for the parties, they are obvious. For the Indian side the benefit is that placing part of its strategic oil reserves on the territory of Russia, outside the zone of possible defeat in regional conflicts and local terrorist acts, reduces interest in the destruction of strategic warehouses in India since

there will be a worthy alternative abroad. Consequently, the proposed approach will indirectly increase not only the economic but also the national security of India.

The advantage of this approach for Russia is that in times of poor market conditions in the crude oil market it becomes possible, firstly, not to reduce its production by shutting down wells, which is commercially unprofitable and causes technological difficulties when restarting their work, and secondly, not to export the extracted products to the free market, thereby reducing the average price of oil on it.

Thus, the complex of logistical measures described in the article which are aimed to place Indian strategic oil reserves on the territory of Russia promises mutual benefits to the parties and is a solid basis for strengthening peace in the Asia-Pacific region, opens up opportunities for creating a network of warehouses for storing strategic oil reserves of countries EEA and the APR outside their national territories, based on the value of these aggregate reserves of base rates of oil contracts for the real supply of raw materials.

In our opinion, to ensure long-term development of relations between the Russian Federation and the Republic of India it is also proposed to build a pipeline. The only possible alternative, in our opinion, may be the Russia-Kazakhstan-Uzbekistan-Turkmenistan-Iran-India route. This option was chosen since most of the above countries are friendly to the Russian Federation and are ready to cooperate on this issue.

All the measures described in this work will contribute to improving the efficiency of Russian oil exports which was the focus of the study. But in addition, they will contribute to solving a significant range of problems for both the Indian Republic and the international scene.

References

- An Overview of the Economic Performance and Major Directions of India's Foreign Economic Activities in 2016/17 financial year (2017). *Trade representation of the Russian Federation in India*. New Delhi. 115.
- Antsiferov, A. S. (1981). *Geology of oil and gas of the Siberian platform / A.S. Antsiferov, V.E. Bakin, I.P. Varlamov and others. Edited by. A.E. Kontorovicha, V.S. Surkova, A.A. Trofimuka*. Nedra: Moscow. 552.
- Federal Agency for Subsurface management Rosnedra Russian federal geological fund rosgeolfond. Available: <http://www.rfgf.ru/license/>
- LLC Vygon consulting Analytical report (2015). *World oil market, from hands-on management*. Invisible Hand of the Market: Moscow. 49.
- Plotkin, B. K. and Khaikin, M. M. (2017). Formation and development of theoretical principles for mineral resources logistics. *Journal of Mining Institute*, 223: 139-46.
- Ulanov, V. L. (2017). On the formation of a strategic reserve of crude oil in russia to ensure economic security and macroeconomic stability. *The Journal "Upravlencheskie Nauki" Management Sciences*, (2): 6-15.
- (LLC Vygon consulting Analytical report, 2015).