Economic Effects of the Arctic Continental Shelf Development

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Abstract. This paper discusses the possible risks and economic effects of the projects of exploitation of the Arctic continental shelf, in particular, of the oil and gas field development. The relevance of the study is due to the fact that the Russian oil industry may lose about $1 trillion of investments from 2015 to 2045 years because of the economic and political sanctions imposed in 2014. Because of that, the losses of the country budget revenue are estimated about 27÷65 billion dollars until 2020. The main positive effects of the Arctic shelf development are assessed in the article: political (confrontation with major players in the world, which are also interested in the development of the Arctic shelf), economic (possibility of finding additional resources and attracting investment and implementing international projects) and socio-economic aspect (creation of new working places in framework of the Arctic exploitation and obtaining additional funding for regional programs for the development of the Arctic and nearby regions). Economic risks are also evaluated; in particular, the problems of organizing work in the Arctic and the costs of implementing projects for the Arctic shelf development; the ratio of the possible costs of implementing these projects and economic benefits was calculated.

1. Introduction

Now the clash of political and economic interests of different states is due to the Arctic region (including the United States and Russia). This collision is due to geographical position of the Arctic, the problems of the division of territories between states and the possibility of access to the Arctic Ocean and significant hydrocarbon reserves. Today new opportunities for developing the Arctic and exploitation of its industrial and transport infrastructure open thanks to science and technology development, but at the same time the problems of determining the jurisdiction of its territories, environmental protection in the Arctic and organizing mutually beneficial international cooperation are more acute [1-2]. The maintenance of Russian-American diplomatic cooperation in the Arctic region acquires political and social significance in such conditions.

The key factors of such cooperation may be the nearness of the positions of Russia and the United States on a variety of fundamental points. First, it is the necessary to protect the Arctic territories. However, it needs to take into account that Russia is trying to adhere to the recommendations of the Arctic Council, while the United States officially recognizes the decisions of the Council, but continues to maintain its previous line contrary to them. In particular, the idea of aviation search, which was originally Russian-American-Canadian, was transformed into a multilateral at the suggestion of the United States with the participation of all the Arctic Council member countries. It is
assumed, that thus the USA conducts exploration of the Arctic region with the help of technical means and vessels of other states.

The United States has fears that Russia will increase its economic presence in the Arctic and strengthen its position because of Russia's obvious dominance in the Arctic region [3-4]. If before the intervention of the United States, the struggle for the Arctic was a pure and open competition of the subarctic countries for the expansion of territories, and then the struggle took on a slightly different character after the introduction of NATO [5-6]. The Russian Ministry of Foreign Affairs has repeatedly expressed misunderstanding in connection with the presence of NATO in the Arctic. There is no need to presence of a military-political bloc, because there are no military problems in this region. Moreover, the presence of NATO greatly aggravates the situation in the Arctic, forcing Russia to worry about its economic and territorial security.

Not only has the expansion of Russia’s influence in the Arctic, but also the growing appetites of Canada caused concern of the United States. About 200 kilometers of ocean floor explored by the United States and Canada together. On the one hand, such projects are aimed at infringing on the interests of Russia (Canada claims to delimit the Lomonosov Ridge; today the Russian Federation advocates the right on it too) [2, 7]. It is likely that the interests of the United States and Canada may collide during the development of the Arctic, since Canada is also extremely interested in the resources of the Arctic and has opportunities for their sole development. On the other hand, the United States is ready to unite with Canada against the Russian Federation, since it is easier to establish diplomatic relations with it in the Arctic than with its traditional rival - the Russian Federation.

So, the development of the Arctic promises for Russia new political clashes with sufficiently strong countries, in view of it the economic assessment of the potential and results of the Arctic region development is an actual issue.

2. Research Method
The analysis of state development programs and literary sources on the problems of development of the Arctic region were used as the main research method; methods of comparative data analysis were also used.

3. Results and Discussion
Today considerable attention is paid to the discussion of the economic effects of the development of the Arctic by Russia. The main task of this field is to create a concept for the Arctic exploitation along with the actualization of the Russian Arctic Strategy. Together with that, it is necessary to develop a strategy for the Arctic shelf exploitation, as well as to ensure its socio-economic development (it should be noted that Russia is competing in this direction with Canada).

The development of the Arctic shelf can be a key factor in attracting foreign direct investment (FDI) to Russia; it is especially important in the current political situation and lack of capital for the development of the country. A special role in this process will belong to Russian oil and gas corporations [8].

It should be noted that today Russian oil and gas companies have the opportunity to attract investments not only in a “traditional” way, but also through participation in various innovative, scientific projects and government programs, which will be the Arctic shelf development. A vivid example of such participation and active attraction of investments is the Gazprom activity for the gasification of separated regions of Russia. Thus, in 2005-2017 the total amount of Gazprom’s attracted investments in the gasification process of separated Russian regions is exceeded 295 billion rubles. The company received both public investment (from the budget) and funds from partners involved, including foreign ones, at implementing the project. 2 046 gas pipelines with a total length of more than 28 thousand km were built; about 815 thousand apartments and households and 5060 boiler rooms provided with the conditions for gasification from 2005 to 2016. An additional economic effect was the fact that during the program events the company increased the number of gas consumers; in particular, the average gasification level in Russia increased from 53.3% to 64.4% from
2005 to 2016 [9-10]. Thus, Gazprom managed not only to raise funds and implement assistance in the implementation of a social project, but also to get long-term benefits from its realization (from gas consumption by residents of gasified regions).

The Shtokman project rather interestingly illustrates the non-market strategies of Gazprom, when politics invaded the production and economic spheres. Initially, in 2005 the head of Gazprom named five companies that had to compete for the right to join the consortium: Statoil, Norsk Hydro, Chevron, ConocoPhillips and Total. However, in the autumn of 2006 the possibility of participation of foreigners was denied; a “priority change” was announced, i.e. gas was to be transported to Europe, and Germany could become the center of gas supplies to Europe from Russia. The choice of suppliers for the Stockman development was also influenced by political factors. For example, a contract on 59 billion rubles was received by the Vyborg Shipyard, in which the owners changed, who are close to the "Russia" bank [11]. It was expected that the Shtokman project production at would begin in 2013. However, it was stopped due to the crisis, but in 2019 the project is expected to be revised and updated.

The example of including the development and production of oil into the activities of Gazprom is indicative. In particular, in the spring of 2004 Gazprom announced that it would also be engaged in oil production. In framework of this, the company was invested funds into Sibneft. In fact, Gazprom absorbed it and strengthened the state’s presence in the market sector of the economy. Thus, these investments can be considered both as a tool for absorbing companies and as for growth of state influence in the oil and gas industry.

In this regard, a significant factor, which regulates the process of attracting FDI to Russian companies, is lobbying by the country’s leadership for the most promising and profitable areas of activity and projects. Thus, now special emphasis is placed on investments in corporations, which are exploring the depths of the Arctic shelf in the framework of political differences regarding the status of the Arctic and its sectoral division. This situation is developing against the background of the fact that at present mining in the Arctic shelf is difficult, and there are preparatory works mostly. Attracting FDI to companies operating in the Arctic region is conditioned by political support rather than the economic benefits of such investment.

It also illustrates by the tax policy of the last twenty years in relation to the enterprises of the oil and gas industry in Russia. In particular, in the 2000s, a very favorable tax situation arose for oil companies. The mineral extraction tax (MET) on gas production has not changed since 2006; it is equal to 147 rubles per 1000 cubic meters. The question of the possible increase of the tax burden on mining corporations was discussed in 2007. From 2008 to 2010, a proposal to increase the rate of MET in five times (up to 735 rubles) was made [12-13]. However, this proposal was protested because it could objectively lead to a decrease in revenues from the sale of oil and gas and a decrease in profits. In 2009, the Ministry of Finance tried to raise the mineral extraction tax by 10% from 2010 and at the same time increase the export duty from 30 to 35%, which could bring an additional 60 billion rubles to the Russian budget. Gazprom again appealed this decision, pointing out that it is possible to find the same funds from other sources. This influence of the oil and gas industry on the internal policy of the state is also manifested outside the country. As an example, the agreement of export prices for energy resources and the coordination of relations of Russia with other countries through export prices can be given.

Great economic importance has socioeconomic effect of such projects; first, it is development of adjacent territories to the Arctic, improvement of their demographic situation and technological re-equipment, which will also lead to some savings of budget funds and natural resources. A pilot project to convert boilers to natural gas in Murmansk can be cited as an example. A program for the conversion of all 3 921 boiler houses of the Ministry of Defense in the Murmansk region, which are partially located in the Arctic zone, will be developed in case of a positive result. It will bring a significant economic effect (up to 12 million rubles for each converted boiler). Total economic impact may reach 47 billion (€614 million) [14]. The project is carried out in cooperation with the Novatek gas company, whose facilities in Yamal allow producing more than 16 million tons of liquefied natural
gas (LNG) per year. Novatek intends to build a large LNG transshipment complex in the Ura bay on the coast of the Kola Peninsula; natural gas from this terminal can become a source of a large-scale transfer of the Murmansk region to another energy source. According to Novatek, the construction of the complex, whose capacity will be about 20 million tons per year, should be completed in 2022 [15]. The authorities of the Murmansk region have long been promoting the idea of gasification of the region. Now the region has to spend a lot of money on expensive and environmentally dirty fuel oil; the Governor Marina Kovtun has repeatedly raised this issue at his meetings with the Federal authorities and Novatek. Back in 2014, a working group of representatives of the government of the Murmansk region and the gas company was established to prepare for region gasification. In April 2018, Kovtun announced the need to take a decision on gasification of the region for the period up to 2025 at the meeting of the Federation Council (in the upper chamber of the Russian Parliament). According to Kovtun, the region will need about 5 billion cubic meters of gas per year. In her opinion, it will give impetus to the development of the region’s economy and will greatly facilitate the creation of new industrial production on the Kola Peninsula [16].

Earlier, the regional authorities planned gasification in connection with the development of the Shtokman field. The project included the construction of gas pipelines from the Barents Sea to the Baltic States. After several years of preparation in 2012, Gazprom decided to postpone the project for an indefinite period; it is planned to launch it as a trial version in 2019.

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At present, the rules for issuing licenses for subsoil use are tightened; it is led to the possibility of obtaining a license for using the shelf’s subsurface resources only for major players in the oil market (first of all, these are Gazprom and NK Rosneft). On the one hand, this innovation is designed to provide a higher level of environmental protection, but on the other hand, it limits the composition of potential shelf development companies and creates conditions for monopolizing work on the shelf.

A more detailed specification of the norms for creating permanent geologico-technological models for individual fields is among the most important trends in the regulation of hydrocarbon production processes. A more detailed specification of the norms for creating permanent geologico-technological models for individual fields is among the most important trends in the regulation of hydrocarbon production processes. Regulation (RF) No 153-39.0-047-00 on the creation of permanent geological and technological models of oil and gas and oil fields establishes these norms [15]. This regulation indicates that the address permanent geological and technological model should allow to investigate and predict the processes, both ongoing and potentially possible during the development in the volume of the tank. At the same time, this model should be updated according to the norms constantly and detailed according obtained new information about the developed subsoil area. The use of such models allows you to prevent possible negative processes in the development of subsoil in connection with the specification of standards for their development and use and in the course of hydrocarbon production. Currently, the use of such models is considered mandatory.

The order of the Government (RF) No 816-r “On approval of the scheme of territorial planning of the Russian Federation in the field of Federal transport (in terms of pipeline transport)” can be noted among the trends of state regulation of the hydrocarbon production process; it establishes the norms and features of pipeline laying [16].

At the same time, even additional investments for oil and gas companies, as a rule, pay off even under the condition of significant modernization of technological processes. In view of this, any costs of oil companies will be profitable.

The development of the Arctic region will provide funding for solving the problems of a number of northern regions by earning profits and providing funds to local budgets in the period of 5-30 years.
Today, many subarctic regions are faced with the problem of lack of funding for socio-economic development programs; in view of what, it is necessary to seek additional funds or allocate subsidies from the federal budget for them. The development of the Arctic will additionally provide funding for the development programs of nearby territories [17].

Large-scale projects in the Arctic zone and in the North of Russia will create new working places, which will also have a positive impact on the socio-economic development of Russia. This is especially true in the context of imposed economic sanctions, under which Russia needs additional sources of financing and investment. The sanctions have led to a lag in production in Russia, as the lion's share of imported components refers to advanced technologies that are not produced in Russia. Today level of dependence of our country on imports is quite high, i.e. up to 80% of the medical industry, 90% of heavy machinery and about 100% of computer technology.

The sanctions, imposed against Russia in 2014, reinforced the negative trends. Imports fell sharply: imports of electronic and mechanical equipment decreased by 46% to March 2016 and by 34% over the past three years. The fact that the level of investment in Russia is extremely low also has a negative effect; it amounts to 18.4% of gross national product (for example, the share of investment is above 45% in China); investments in human capital of Russia lag behind the level of developed countries. In the framework of current trends, the state is increasingly interfering in the economy: oil and gas assets are being renationalized; it crowds out private investment and negatively affects the development of the Russian economy.

In this regard, Russia needs to establish more smooth and business relations between large corporations and the state without artificial political pressure. A special role of the settlement of such relations belongs to oil and gas companies. Industrial development, which can be achieved through the development of the Arctic, will allow Russia to significantly increase the production sphere level, to develop "lagging" production industries and to create prerequisites for the socio-economic development of the Northern territories. It necessitates the creation of large projects primarily in the most developed and profitable industry for Russia: in the production of hydrocarbons. Therefore, the development of the Arctic zone is not only economically viable, but also necessary.

An important factor is the fact that the Arctic is not only a region with reserves of natural resources, but also a region with a unique nature, the study and protection of which will contribute to the development of humanitarian and scientific relations of Russia in the world and strengthen its reputation as a reliable partner. This is true in modern conditions of pressure from Europe and the United States.

At the same time, the development of the Arctic by Western companies, their involvement in the investment of “oil-producing" projects may cause the need for the withdrawal of Russian weapons from subarctic territories (mainly the Murmansk region). In addition, the environmental impact in the Arctic will require taking measures to rationalize environmental management in order to preserve the Arctic nature. The implementation of environmental protection measures will require additional funding from the state and oil producing companies for the extraction of hydrocarbons, since the process of restoring the natural environment and reclaiming land requires considerable financial costs.

Prevention of significant costs can be achieved by purchasing the most modern equipment (in the first place, pumps), most of which is produced abroad today. The purchase of such equipment implies the establishment of new trade relations between Russia and other countries, which ultimately can speed up trade in foreign trade and have a positive impact on the economic development of our country.

One of the significant conditional and technological risks of developing the Arctic is that production oil is quite expensive in Russia. The wells are difficult to operate and do not allow to fully pump oil out of oil-bearing strata. This results in the fact that Russia, in general, spends much more resources on oil production than, for example, Saudi Arabia and the United Arab Emirates, where a fountain method of production is possible (oil comes up under internal reservoir pressure virtually without technical devices in this case). With regard to the Arctic, this factor will determine the high cost of produced oil; it is necessary to correlate the costs of technological support for oil production
and land reclamation and economic effects from the sale of extracted hydrocarbons in a framework of the Arctic shelf projects realization.

Attracting Russian and foreign experts in the field of economics, ecology and environmental management, biodiversity, geology and oil production will be of particular relevance in this process.

It poses not only training qualified specialists task (accordingly, finance costs for developing quality engineering education) in front of Russia, but also organizing the exchange of experience with foreign scientists and engineers, as well as finding motivation systems for inviting qualified personnel for development of Arctic projects. Solving these problems requires additional planning and financing, but ultimately this can have a positive effect on economic development, since educational and personnel policies are one of the factors for the development of modern states in the information society.

Today an important approach is an alternative approach at assessing the economic effects of the development of the Arctic region, according to which the development of the shelf and the production of hydrocarbons is not necessary for the further development of the economy. In this regard, it is advisable to consider a scenario in which the Arctic will remain completely untouched, and its nature will be used for tourism purposes. The replacement of the missing energy sources can be achieved through the development of new technologies, alternative energy sources, etc.

In addition, there is a risk of underestimating of the need of infrastructure and transport development of this region at assessment of the economic efficiency of projects of exploitation of mineral resources and the Arctic shelf. First, it applies to transport communications (in particular, it is impossible to use railway transport in the region due to the inability to lay railways at the permafrost conditions), as well as the provision of electricity.

It is necessary to organize the generation of electricity for offshore companies to work on the shelf. It should be carried out either by connecting with the nearest power plant (so the need of laying power lines occurs), or using gasoline-powered electric generators (this is less economical and requires constant fuel delivery of crude oil or mixture of oil and gas, which is extracted from the depths).

This fact of the Arctic's lack of electricity and transport makes it necessary to take into account the economic costs of infrastructure and energy in the overall calculation of the cost of the implementation of a project.

Special difficulties, which are to be resolved, primarily may arise at planning the integrated development of the Arctic territory, its infrastructure and energy supply.

At the same time, the planning of the infrastructure of transport routes and transmission lines is advisable to be carried out centrally from economic point of view, i.e., with taking into account the placement of developed and off-balance hydrocarbon reserves and the placement of research centers and industrial enterprises. There is a risk to build “unnecessary” power lines and transport routes without using this general integrated approach, i.e., it may increase unnecessary costs. In addition, the laying of excess transport routes and transmission lines will have a very negative impact on the quality of the environment in the Arctic. It is necessary to take into account the fact that this region is quite “fragile” from the point of view of nature, i.e., environmental damage is very fast unlike the temperate zone, the tropics and sub-tropics; it is often irreplaceable in such northern regions (tundra and the Arctic).

A centralized approach to the development of the Arctic infrastructure implies preliminary coordination of projects of all States in the region, ensuring the coordination of their actions, the creation of a master plan for the development of the Arctic, a common strategy and a General order of project implementation.

It is quite difficult to achieve such coordination between countries and investors from different states for economic and political reasons. In particular, today it is problematic to identify even the moment of division of the Arctic territory between the states in terms of economic activities and socio-economic development as well as the coordination of joint development of the region and planning joint activities there.
Today it is also important in the development of the Arctic to ensure the cumulative contribution of states to the development of its infrastructure. Otherwise, a situation may arise in which one state will ensure the formation of infrastructure by investing heavily, while others will use it improperly. Such coordination of joint efforts to develop the transport communication and energy security of the Arctic also requires prior approval of the states that plan and are interested in the Arctic developing [18].

Most likely, the development of the Arctic will entail a long preliminary coordination of the positions of the states on the development of this region and, accordingly, additional difficulties will arise in the development of the Arctic.

It is quite problematic to take into account all possible risks and positive effects of socio-economic development of the territories of the Arctic region development. On the one hand, the opening of new industrial and energy industries, as shown above, will create new working places, including high – performance ones. On the other hand, the development of the Arctic involves interference in the life and culture of indigenous small peoples of the North. This may lead to the loss of their national identity, up to the destruction and assimilation of these peoples and their culture.

In all likelihood, the development of the region will worsen the environmental situation, which will entail additional costs not only for environmental protection and land reclamation, and for the provision of health services to the local population. The necessary amount of funding for the subsequent provision of such services at the present stage is almost impossible to take into account, and therefore it is impossible to ensure the inclusion of this funding in individual projects for the Arctic development.

Thus, it is necessary to take a comprehensive approach to assessing possible costs and risks, as well as potential social and economic results of the development of the Arctic, both as part of a separate project and as a whole at planning a strategy for developing the Arctic region. Special difficulties to be solved in the first place may arise in the planning of integrated development of the Arctic territory, its infrastructure and energy supply.

4. Conclusion

As was shown above, much attention is paid to the study of the economic effects of the development of the Arctic from the Russian. The main task of Russia is to create a concept for the development of the Arctic, along with the actualization of the Russian Arctic Strategy. Development of the Arctic Strategy is the basis of financial support and socio-economic growth not only of the arctic regions, but also of Russia in the context of the confrontation of the major powers of the world for the development of Arctic resources.

Investments of oil and gas companies in the development of deposits turn out to be profitable despite some difficulties of oil and gas production due to the difficult climatic conditions in the Arctic. An additional economic effect will also be the intensification of the development of the country's economy, the attraction of foreign corporations to work in Russia, social development that is quite relevant for the northern territories, and the rising standard of living of the population. The latter will cause an increase in consumer demand, which in modern conditions is the main “engine” of economic development.

The development of the Arctic shelf and its socio-economic development can be a key factor in attracting foreign direct investment into Russia. The state relies on Russian oil and gas corporations as the main stake in this process. Currently the attracting FDI to companies, operating in the Arctic region, is due to political support, and not the economic benefits of such investment. This influence from the side of the oil and gas industry on the internal policy of the state is also manifested outside the country. As an example, it is possible to coordinate the export prices for energy resources and to coordinate Russia's relations with other countries through export prices.

Also great economic importance has the socio-economic effect of projects of the Arctic shelf development: the development of adjacent territories to the Arctic, improving their demographic situation and technological re-equipment, which will lead to savings in budgetary funds and natural resources.
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