



Norwegian Experience as a Promising Measure for the Russian Energy System Development

Elena S. Balashova¹, Elizaveta A. Gromova^{2*}

¹Peter the Great St. Petersburg Polytechnic University, Saint-Petersburg, Russia, ²Peter the Great St. Petersburg Polytechnic University, Saint-Petersburg, Russia. *Email: lizaveta-90@yandex.ru

ABSTRACT

At the moment, Arctic is in the interest of many countries, and not only near the Arctic. A high degree of the region promising in the context of undiscovered oil and gas resources is the explanation for it. Russia possessing the most significant share of these reserves has a fairly low rate of investigation of the Arctic shelf. Arctic hydrocarbon resources occupy the important strategic place in the development of the fuel-energy complex of Russia, ensuring its energy security. Hence, the goal of this research is to identify effective model of the offshore fields development in the Arctic zone of the Russian Federation. The Norwegian model of formation of consortia for the development of the offshore fields is analyzed and it is examined in the context of the Russian Arctic. The effectiveness of the introduction of this model in Russia is proved.

Keywords: Consortium, Energy System, Arctic Shelf, Arctic Zone of the Russian Federation

JEL Classifications: Q43, Q48, R11

1. INTRODUCTION

In recent years, the issues of exploration and exploitation of hydrocarbons in high Northern latitudes are at the center of attention of the most diverse groups of the international community - politicians of national and regional levels, representatives of social movements and environmental organizations, and of oil and gas business. Significant resource potential of the Arctic raises many discussions taking place almost simultaneously in several countries around the world and dedicating to prospecting and exploration, and subsequent development of hydrocarbon fields located in the far North. Forecasted volume of undiscovered Arctic continental shelf reserves is estimated at 90 billion barrels of oil and 47 trillion cubic meters of natural gas (Gautier, 2009). According to these estimates, offshore oil and gas resources in the Arctic in the medium and long term can play a significant role in maintaining the current level of hydrocarbon production and its growth. Even with relatively small amounts of exploration conducted in the world in the northern regions, unique deposits such as the Shtokman field, natural gas reserves in the Ob Bay and Tazovskaya Bay (Russia), Hibernia (Canada), Snøhvit and

Ormen Lange (Norway) have already been identified. In addition, the prospects of the oil and gas potential of other less studied areas of the Arctic shelf were confirmed. Among the main reasons for close attention to Arctic hydrocarbons are the following:

- Trends towards the exhaustion of oil and natural gas reserves in the main traditional regions of activity of the world's leading oil and gas companies (World oil consumption becomes commensurable with its production (at the end of 2015: 32,4 billion barrels/32.7 billion barrels) (<http://www.ereport.ru/articles/commod/oilcount.htm>). According to the OPEC and the International energy Agency, primary energy consumption will increase by 40-60% in 2040 compared to 2010. While in the global energy mix oil will continue to take a leading place — its share will account for 25-27%, and the share of gas — 24-26% versus 35% and 26%, respectively);
- Technical and technological innovations that made it possible to develop hydrocarbon resources in extreme natural and climatic conditions with an acceptable economic efficiency;
- The strengthening of the role of factors and conditions underlying the political and energy stability and security of the world's leading industrialized countries.

The last point is one of the dominant reasons for the general interest in the northern territories. The northern seas and territories with a large hydrocarbon potential are in the jurisdiction of countries that have direct access to the Arctic Ocean: USA, Norway, Russia, Canada, Denmark. And in this connection, they are the regions from which it is possible to carry out sustainable supplies of hydrocarbons to the main world markets.

Russia's high competitive position in the global economy is largely determined by the presence of a strategic reserve of natural minerals in the Arctic, which will ensure the economic stability of the country both now and in the future. According to experts, there are more attractive facilities for long-term investment in the North of Russia than in any other state. So, Russia has the largest share of oil and gas resources: 41% of the undiscovered technically recoverable resources of the oil and 70% of the gas (Ryzhova, 2016). Arctic hydrocarbon resources constitute a strategic reserve of the fuel and energy complex of Russia, ensuring its energy security. That's why there is an actuality for realizing of the actions for the development of Arctic offshore fields at the present time and it is one of the main long-term directions for sustainable development of Russia's energy policy. Especially, taking into account the exhaustion of the known Russian oil fields, if the current rate of production continues, the reserves on the mainland will be developed in 30 years (<http://sever-press.ru/vse-novosti/item/22137-osvoenie-arkticheskogo-shelfa-stanet-prioritetnym-dlya-rossii>). Consequently, the aim of the research is to identify the most effective model of the offshore fields development in the Arctic zone of the Russian Federation.

Theoretical and practical issues of the Arctic development as a strategically important object are analyzed by following scientists: Bogoyavlenskii (2013; 2014), Suprunenko (2014), Remizov (2015), Zolotukhin (2016), Panichkin (2015), Bogoyavlenskii (2014), Ryzhova (2016), who focus on the research of the Russian part of the region, and Saburov (2013), Konyshov and Sergunin (2012; 2015), Koptelov (2012), Harsem et al. (2011), Gautier (2009), Mikkelsen and Langhelle (2008), Johnston (2010), who study foreign parts of the Arctic. It is noteworthy that, according to these experts, Norway is the country that pursues the most consistent and rational policy in the region. However, the question of the practical application of the Norwegian experience for the Russian Arctic shelf is not well explored.

2. NORWEGIAN EXPERIENCE OF THE OFFSHORE FIELDS DEVELOPMENT

The dominance of state participation at all stages related to the development and adoption of key decisions is one of the most important distinctive features of the hydrocarbon resources development in the Far North of foreign countries. At the same time, it is necessary to pay attention and take into account in detail the interests of provinces, individual municipalities, as well as indigenous peoples and ethnic groups, compactly residing on the territories of development of oil and gas resources. This conclusion leads to the study and analysis of the experience of natural resources exploitation (Balashova and Gromova, 2016) in

various northern regions of the world, the undisputed leadership among which belongs to Norway. The Norwegian experience of the creation of consortiums, consisting in the combination of permission to access the development of the shelf of private companies with strict state administration allows to select the best solutions, increase the resources involved in exploration and production, and accelerate the pace of development.

So, Norway began development of offshore hydrocarbon deposits with the involvement of foreign companies 40 years ago. Among the main objectives of the state policy in the field of the use of oil and gas resources in Norway can be noted:

- Creation of the maximum possible profitability of the development process, development and production of hydrocarbons, as well as ensuring a stable level of welfare and employment;
- Creation of conditions for the internationalization of the Norwegian oil and gas industry in order to ensure the development of this sector of the economy and during the depletion of major reserves;
- Combination of the role of one of the leading energy producers with the role of one of the advanced countries in achieving production indicators that meet environmental requirements, including in terms of reducing greenhouse gas emissions.

The state policy of Norway, based on encouraging partnership between foreign and Norwegian companies, ensures a high level of use of hydrocarbon resources in the public interest. Thus, the Norwegian government has made compulsory research programs for foreign companies that have enabled oil and gas technologies developed and implemented in Norway to be among the best. Since 1970, the state has recognized the importance of encouraging competition in the oil and gas industry and at the same time the need to stimulate the development of the domestic oil and gas complex. Thus, the primary use of local goods and services in oil and gas projects was explicitly defined by law: In the period 1972-1974, The Norwegian share of supplies reached 90%. In 1972, the creation of the Norwegian state-owned company "Statoil" and the provision of participation in the development of the shelf of two private Norwegian companies - "Norsk Hydro" and "Saga Petroleum" - was aimed to forming the key role of Norwegian companies in the oil and gas sector. International and foreign companies were given the important role of technological support in joint alliances with Norwegian companies, as well as the role of "catalyst" in the process of turning Norwegian companies into full-fledged operators of offshore field development.

Joint ventures in the service sector were also created on the basis of the principles that led the Norwegian engineering companies to gain access to advanced technologies. The Norwegian experience shows that the procedure for access of foreign companies to the development of hydrocarbon deposits can be effectively used as a tool for solving a wide range of technological, economic and social problems.

The Norwegian government intends to contribute to the further development of the oil and gas sector by maintaining a high level of business activity within its framework, increasing attention

to the development of new technologies, and by encouraging the process of internationalization of the sector. The creation of consortia to develop the Arctic shelf is an effective model in the long term across the entire Norwegian continental shelf.

3. KEY RESEARCH FINDINGS

3.1. Efficiency of the Norwegian Experience

State policy based on the formation of consortia for the offshore fields development (Saburov, 2013; Hasle et al., 2009; Harsem et al., 2011; Mikkelsen and Langhelle, 2008; Johnston, 2010; Panichkin, 2015), has successfully established itself in the countries near the Arctic: Denmark, Canada, USA and particularly in Norway. The trajectory of the development of this approach differ from country to country. The positive effect of the Norwegian model for creation of consortia for development of the Arctic offshore fields is confirmed by examples of countries that widely use this model (Table 1).

3.2. Development of the Arctic Offshore Fields in Russia

Today, due to emerging trends in the international community and strong support at the state level, the Arctic is becoming a strategically important object for Russia. In February 2013, the

Russian President approved the development Strategy of the Arctic zone of the Russian Federation and national security for the period up to 2020. The issues of sustainable socio-economic development of the Arctic zone of the Russian Federation occupy a significant place. In this area, the state of the fuel and energy complex plays an important role.

The Russian Arctic shelf is characterized by a very low degree of the geological knowledge, along with the above-mentioned leading role in the share of the undiscovered oil and gas reserves. At the same time, some experts give more restrained forecasts in this regard (Bogoyavlenskii and Bogoyavlenskii, 2014; Bogoyavlenskii, 2013; Suprunenko, 2014). Nevertheless, the development of the Arctic shelf is recognized as a promising and relevant problem is formulated at the state level. According to made estimates, investment roughly equal to a trillion of dollars will be needed for the exploration of the Russian part of the Arctic shelf by 2050 (Zolotukhin, 2016).

In 2008, changes that limit the number of companies who may be granted licenses to use subsoil of the continental shelf of the Russian Federation, including the Arctic were made to the Federal law of the Russian Federation "On subsoil" (of

Table 1: Norwegian model for creation of consortia for development of the Arctic offshore fields in the different countries, developed by the authors

Country	Experience of creation of consortia for development of the Arctic offshore fields
Norway	In Norway in recent time, due to the fall in production at the major oil fields in the North Sea and in the Norwegian Sea, the government has stepped up its efforts to attract oil companies to develop oil and gas resources in the Barents Sea. At the current time one field "Snøhvit" with reserves of 193 billion cubic metres of gas and 113 million barrels of gas condensate is located in the industrial exploitation of the Arctic continental shelf of Norway. It was opened in 1984 in 150 km from the Norwegian coast, gas production began here in 2007. Industrial complex, consisting of 19 production wells, wells for injection of carbon dioxide, a pipeline with a length of 160 km and complex "Hammerfest LNG" with a capacity of 4.3 million tonnes of liquefied natural gas per year, was built to develop the field. Operator is the company "Statoil," whose share in the project is 33.53%. The project of development of the oil deposit "Goliat" is in the final stage of the commissioning. The field was discovered with reserves of 174 million barrels of oil and 8 billion cubic meters of gas in 2000. In spring of 2015 floating platform FPSO Sevan 1000, which will also be used as storage for 1 million barrels of oil and a floating terminal at the time of shipment, was delivered here (Saburov, 2013)
Denmark	In 2012 in Denmark, the consortium of oil companies composed of ConocoPhillips (USA), the "GDF Suez" (France), "Nunaoil" (Greenland), "Maersk" (Denmark), Statoil (Norway), "Cairn Energy" (Scotland) and Shell (Netherlands, operator) was created. As a result, 11 of exploration wells in shallow water in Baffin Bay were drilled, but no commercial reserves of oil could not be found. In 2016-2018, the government of Greenland plans to auction a number of licenses on the West coast of the island (Koptelov, 2012)
Canada	In 1997, the government of Canada resumed issuing licenses for exploration in the Beaufort Sea. Further licenses were granted to American companies "Burlington Resources" (in 2006 bought "ConocoPhillips"), "Anadarko," "Chevron," "ConocoPhillips," "Devon," to British companies – "Shell," "BP," "Franklin Petroleum," to Canadian companies – "Petro-Canada," "Imperial Oil," "MGM Energy" and "Encana." The results of exploratory drilling conducted by "Devon" in the period 2005-2006 in the Bay Beluga in the Beaufort Sea, showed the presence of recoverable hydrocarbon reserves, but not enough to start commercial development. Currently, several consortia: "Imperial Oil," "BP" and "ExxonMobil;" "Chevron" and "Statoil" were created with the aim to start joint drilling presumably in 2020 (Konyshev and Sergunin, 2012)
USA	Nowadays, production of only oil and only in the Beaufort Sea is carried out on the Arctic continental shelf of the United States - either from the mainland with the help of horizontal drilling, or artificial islands built on shallow depths (up to 10 m). Now the company "Shell" rents the largest number of the sites in the Beaufort Sea and in the Chukchi Sea. In addition, "Statoil" (Norway), "BP" (England), "ConocoPhillips" (USA), "Eni" (Italy), "Murphy Oil Corporation" (USA), "Iona Energy" (Canada), "OOGC America" (subsidiary of the China national petroleum Corporation) and "Repsol" (Spain) act as tenants. Oil and gas companies adhere to the strategy of the gradual development of the Arctic fields with the aim of creating appropriate infrastructure in the region to be fully prepared by the beginning of the "Arctic boom," which will probably take place before 2050 (Konyshev and Sergunin, 2015)

21 February 1992). Consequently, users of subsoil on the Arctic shelf of Russia can be companies with state participation 50% and over 5 years of experience in this field. Only the companies “Rosneft” and “Gazprom” meet these requirements. Private companies are allowed to the Russian shelf only in joint ventures (respectively, with a share of <50%). Recently, the question of the admission of the private companies to the development of Russian resources in the Arctic zone is quite often discussed. In early 2015, the Ministry of natural resources and ecology of the Russian Federation made a proposal to allow private companies to the shelf, temporarily halting the issuance of licenses to the state-owned companies, thus trying to replicate the model to create consortia for the development of the offshore fields. But the consideration of this issue at the government level, has been repeatedly postponed.

At the moment, almost all of the promising areas of the Arctic shelf are covered by the licenses of the companies “Rosneft” and “Gazprom,” which are not able to carry out a full study on its own. Development of the oil field “Prirazlomnoye” opened in 1989 in the Pechora Sea is the first and only oil and gas project in the Russian Arctic shelf. The reserves of the field are estimated of 72 million tonnes of oil. The company “Gazprom Neft shelf” has the license for its development. In 2011, the offshore ice-resistant oil platform “Prirazlomnaya” with a design capacity to 6.5 million tonnes per year was delivered here. In 2013 commercial development of the deposit began. And in 2014, 300 thousand tonnes of the oil “Arctic Oil” (about 2.2 million barrels) from the platform was shipped and delivered to the port of Rotterdam. By 2021 it expects to get 5-5.5 million tonnes of the oil per year (Remizov, 2015).

The advantages of the introduction of the model for creation of consortia in the Arctic zone of the Russian Federation are:

- Possibility of achieving a synergistic effect;
- Ability to neutralize the anti-Russian sanctions;
- Commonality of interests of the different companies;
- High level of the motivation of each participant of the consortium;
- Ability to implement projects that require large investments;
- The mechanism of the state-private partnership is appropriate, taking into account the immensity of the tasks;
- Russia is not ready to implement an independent set of events (the lack of the required technical and technological level, extremely low level of scrutiny of the shelf; only by 2020-2025 Russia will be able to overcome the high degree of dependence from western countries in this direction) (Panichkin, 2015);
- Relevance of the strengthening the cooperation of the Arctic States and interested oil and gas companies.

The disadvantages of the introduction of the model for creation of consortia in the Arctic zone of the Russian Federation are:

- High price of the private companies’ mistakes for Russia;
- Admission of the private companies on the shelf is a step, opening the way for foreign transnational corporations, which do not need to be in the form of a partner, neither “Rosneft” nor “Gazprom;”
- Motivation of the private companies is one-sided and has

nothing to do with national interests;

- The most negative outcome is the loss of a part of the deposits of the Russian Arctic shelf.

The main positive aspects of the Norwegian experience application in the context of the Arctic zone of the Russian Federation surpassed the main negative aspects. Like any mechanism, the idea of consortia has a number of, rightly pointed out weaknesses, united by a common fear, which is unacceptable at the present stage of the development.

In general, despite the objective difficulties, the development of Arctic oil and gas resources remains a strategic priority for Russia. The approach of the formation of consortia is an effective step towards the achievement of success in solving this problem.

4. DISCUSSION AND CONCLUSION

Summing up, we can draw the following conclusions:

1. The complex of activities related to the research’s goal and the subsequent set of works on the Arctic shelf is a difficult task because of the specificity of the region;
2. The state approach to the implementation of a large-scale project for the Arctic shelf development, which has a high share of undiscovered oil and gas resources, based on the use of a consortium model, will create conditions for Russia’s economic breakthrough;
3. Norwegian experience of the creation of consortia has proved itself from the best side in the Arctic states, as a result of which it is possible to predict with confidence the success of the applying the Norwegian model for the development of the Arctic offshore fields in Russia;
4. An extremely low percentage of the study of the Arctic shelf provokes urgent and decisive steps to overcome the lag in this part from other Arctic states;
5. The development of the Arctic will give impetus to the development of many domestic industries and will ensure Russia’s energy security in the long term.

REFERENCES

- Balashova, E.S., Gromova, E.A. (2016), Resource-based view as a perspective management model in Russian reality. *Problems and Perspectives in Management*, 14(2), 325-330.
- Bogoyavlenskii, V.I. (2013), Prospecting, exploration and development of hydrocarbon deposits in the Circum-Arctic region. *The Arctic: Ecology and Economy*, 2(10), 62-71.
- Bogoyavlenskii, V.I., Bogoyavlenskii, I.V. (2014), Strategy, technology and technical means of search, exploration and development of the offshore fields in the Arctic. *Vestnik MSTU*, 17(3), 437-451.
- Gautier, D. (2009), Assessment of undiscovered oil and gas in the Arctic. *Science*, 324(5931), 1175-1179.
- Harsem, Ø., Eide, A., Heen, K. (2011), Factors influencing future oil and gas prospects in the Arctic. *Energy Policy*, 39(12), 8037-8045.
- Hasle, R.J., Kjellén, U., Haugerud, O. (2009), Decision on oil and gas exploration in an Arctic area: Case study from the Norwegian Barents Sea. *Safety Science*, 47(6), 832-842.
- Johnston, P. (2010), Arctic energy resources and global energy security.

- Journal of Military and Strategic Studies, 12(2), 1-20.
- Konyshev, V., Sergunin, A. (2012), The Strategy of Canada in the Development of the Arctic Region. Available from: http://www.russiancouncil.ru/inner/?id_4=835#top-content.
- Konyshev, V., Sergunin, A. (2015), Alaska is the Golden Fleece of the American Political Elite. Available from: http://www.russiancouncil.ru/inner/id_4=6423#top-content.
- Koptelov, V. (2012), The Strategy of Denmark in the Development of the Arctic. Available from: http://www.russiancouncil.ru/inner/?id_4=308#top-content.
- Mikkelsen, A., Langhelle, O. (2008), Arctic Oil and Gas: Sustainability at Risk? Oxford: Routledge.
- Panichkin, I.V. (2015), Problems of the Development of the Russian Arctic Shelf. Available from: <http://www.pro-arctic.ru/23/11/2015/resources/19076>.
- Panichkin, I.V. (2015), The Development of the Offshore Oil and Gas Resources in the Arctic. Available from: <http://www.russiancouncil.ru/arcticoil>.
- Remizov, M.V. (2015), Russia in the Arctic. Challenges and Prospects of the Development. Moscow: Institute of National Strategy, Book World.
- Reserves, Production and Consumption of the Oil According to the Countries of the World. Available from: <http://www.ereport.ru/articles/commod/oilcount.htm>. [Last accessed on 2017 Apr 16].
- Ryzhova, A.V. (2016), The Arctic shelf - The Area of Strategic Development of Russia. Available from: <https://www.spb.riss.ru/analytics/4303>.
- Saburov, A. (2013), Norwegian Research in the Arctic. Available from: http://www.russiancouncil.ru/inner/?id_4=2608#top-content.
- Suprunenko, O.I. (2014), Mineral resources of the Arctic continental margin of Russia and prospects of their development. The Arctic: Ecology and Economy, 3(15), 52-61.
- The Development of the Arctic Shelf will be a Priority for Russia. Available from: <http://www.sever-press.ru/vse-novosti/item/22137-osvoenie-arkticheskogo-shelfa-stanet-prioritetnym-dlya-rossii>. [Last accessed on 2017 Apr 15].
- Zolotukhin, A.B. (2016), Priorities of Russia in the Arctic. Novosibirsk: Technoprom.