Russia's Arctic Potential and its Development Prospects

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***Abstract*—The article considers the tasks related to the development of the shipbuilding industry in the Arctic. The analysis of the development prospects of the Northern Sea Route and its value for Russia and the world as a whole is carried out. Recommendations are given on increasing icebreaking support, development of the Arctic shelf and development of coastal infrastructure of the Russian Arctic.**

Keywords—Arctic; shipbuilding; transport; resources; Northern Sea Route; Russia

I. INTRODUCTION

The Arctic is a whole integral physiographic region of the Earth, which is adjacent to the North Pole and includes the margins of the Eurasian and North American continents, almost the entire Arctic Ocean with islands (but does not include the coastal islands of Norway), as well as adjacent parts of the Atlantic and Pacific Oceans. The southern border of the tundra is known to coincide with the southern border of the Arctic.

The Arctic Ocean contains a large number of undeveloped energy sources - oil and gas. According to the US Geological Survey, oil reserves in the Arctic in 2008 were estimated at 70 billion barrels. According to British Petroleum, the world consumes about 659 million barrels of oil (about 1.9 million barrels per day). So, taking into account the demand for oil in 2017, the Arctic reserves will be sufficient for another 130 years.

Since the Arctic is considered a strategic area with large reserves of oil and gas industry of the Arctic continental shelf, fresh water, as well as the possibility of reducing the routes of transcontinental transportation, this is a zone of interest not only for Arctic countries, such as Russia, Canada, Norway and so on, but also for other developed economies [1].

The Arctic is an important component of the Russian economy. It is enough to consider the volume of production, which provides 11% of national income and 22% of the country's exports. There are significant reserves of natural gas, diamonds, gold, silver and other minerals. The US Geological Survey estimates Russia's Arctic resources at 150 billion tons of oil equivalent. Currently, 60 large hydrocarbon deposits have been discovered in the Arctic, 43 of which are accounted for by the Russian Federation. Also, 30% of the world's undiscovered recoverable gas reserves and 13% of oil reserves are concentrated in the Arctic. The total value of all explored mineral reserves is 1.5-2 trillion dollars.

Russia's Arctic zone is several times larger than in other countries. The plateau in Russia is located in the north. It covers more than a third of the country's territory and is characterized by a high degree of heterogeneity in the conditions of severe climate and socio-economic development. The Russian Arctic is characterized by favorable transport and geographical conditions, as there are the shortest routes between Russia, the United States and the countries of the Asia-Pacific region [2].

It should be noted that Russia's national interests are largely concentrated in the Arctic. Further systematic development of this region is a priority task in the XXI century, in connection with which the role of the Northern Sea Route is increasing.

II. DEVELOPMENT PROSPECTS FOR THE NORTHERN SEA ROUTE

Today, the Northern Sea Route (NSR) is gaining more and more attention worldwide. More and more states and shipping companies, especially those located in the Asia-Pacific region and North-East Asia, are showing interest in studying the possibilities of the Arctic water area for the organization of commercial transportation of goods.

The importance of the NSR cannot be overestimated for Russia. It is the national maritime transport superhighway of Russia in the Arctic. The functioning of the NSR largely determines the life support of the polar regions of the Russian Federation. It provides a significant part of cargo transportation between the European part of Russia and the Far East. Expansion of the use of the NSR will stimulate the economic development of the northern territories of the Russian Federation. Also, one should not forget about the income from escorting foreign ships along this route. In addition, the NSR plays an important role in the organization of transportation of Arctic field resources. The significance of the NSR as a national transport superhighway is evidenced by the fact that by the early 1990s it carried 6.6 million tons of non-transit Russian cargo per year. However, by 1999 this figure had been reduced more than 4 times and amounted to only 1.5 million tons due to the collapse of the Soviet Union and crisis phenomena in the Russian economy. Currently, cargo turnover is gradually recovering. In 2016, it reached 6.9 million rubles. According to the plans of the Russian Government, by 2020 it should reach 50 million tons per year [3].

Of course, mining projects in the Russian Arctic, primarily Yamal LNG, will and will continue to make the main contribution to the growth in cargo turnover. In particular, the main cargoes of the NSR in the coming decades will be raw materials, as well as machinery and equipment for the mining sector.

According to the estimates of foreign experts, the size of transit transportations of foreign goods via the Northern Sea Route may amount to 5–6 million tons per year in the direction of the East and 2–3 million tons per year in the direction of the West. International routes passing through NSR, in comparison with the southern routes through Panama and Suez Canals, are 1.5 times less. Navigation through the Panama Canal and the Suez Canal is also limited by a number of requirements (in terms of draft and vessel size). It should be noted that the development of the Arctic region is becoming a priority for both the country's government and large raw material companies. Table 1 shows a number of significant events in the development of the Northern Sea Route in the XXI century.

TABLE I. TABLE I. KEY EVENTS IN THE DEVELOPMENT OF THE NSR IN THE 21ST CENTURY

Year	Event
2000	Complex expedition of the Russian Academy of Sciences "Arctic-2000" Creation of a non-commercial Partnership of users of the Northern Sea Route Approval of the Concept of state support for economic and social development of the regions of the North
2001	Approval of the Maritime Doctrine of the Russian Federation for the period up to 2020
2007	Russian polar expedition "Arktika-2007" under the leadership of A.N. Chilingarov, during which the Russian flag was set on the bottom of the Arctic Ocean
2008	Approval of the Framework of State Policy of the Russian Federation in the Arctic for the period up to 2020 and the future Approval of the new Transport strategy of the Russian Federation for the period up to 2030 Approval of the National Security Strategy of the Russian Federation until 2020
2009	Approval of the National Security Strategy of the Russian Federation until 2020
2010	Restoration of the Arctic road for merchant shipping and international cargo transit Approval of the Strategy for the Development of Marine Activities of the Russian Federation until 2030
2011	Northern Sea Route to Strategic Stability and Equitable Partnership in the Arctic Conference
2012	Fertilization of the Strategy for the Development of the Seaport Infrastructure of Russia until 2030 Adoption of the Northern Sea Route Act
2013	Approval of the Rules of navigation in the area of the SNR Establishment of the Northern Sea Route Administration Approval of the Strategy for the Development of the Arctic Zone of the Russian Federation and the provision of national security for the period up to 2020
2014	Meeting of the Russian Security Council on the Arctic
2015	Approval of the Marine Doctrine of the Russian Federation Adoption of the National Security Strategy of the Russian Federation
2016	Approval of the Concept of Foreign Policy of the Russian Federation
2017	Adoption of the Economic Security Strategy of the Russian Federation for the period up to 2030

The development of the Northern Sea Route in the 21st century can be divided into several stages. Thus, the period of 2000–2007 can be called the period of stabilization of the main parameters of the NSR. Initially it was necessary to suspend the process of the Arctic marine transport system main parameters declining. During the specified period financial issues and economic and legal aspects of conditions for sustainable development of the NSR were developed.

At the end of the first decade of the 21st century, there is a growing focus on the Arctic regions and, as a consequence, on the problems of the Northern Sea Route. This process started in 2007–2010. It was a time of open cooperation and rapid movement of Russia to promote its interests in the Arctic.

In 2008, the new Transport Strategy of the Russian Federation for the period up to 2030 was approved. The main priority in the strategy is the development of the accompanying infrastructure of the Northern Sea Route. The Annex of the Transport Strategy of the Russian Federation identifies a number of major investment projects that will contribute to the dynamic development of the NSR functioning, which in turn will lead to favorable changes in the Arctic region.

In 2013, the Strategy for the development of the Arctic zone of the Russian Federation and National Security for the period up to 2020 was approved, one of the priority tasks of which is the modernization and development of infrastructure of the Arctic transport system, ensuring the preservation of the Northern Sea Route as a single national transport superhighway of the Russian Federation.

In April 2014, a meeting of the Security Council of the Russian Federation on the Arctic took place and the head of state V.V. Putin noted that this region had traditionally been and remained in the sphere of Russian special interests because practically all aspects of national security are concentrated here: military, political, economic, technological, ecological and resource.

Table 2 presents the results of comparing the transit traffic of 20-foot containers by 4 different routes from Vladivostok to Rotterdam.

TABLE II. COMPARISON OF CONTAINER DELIVERY ROUTES

Route	Delivery cost F, $ / container	Route length L, km	Delivery time T, day	Relationship by Optimality (1)			Sum of criteria optimalities
				F	*L*	*T*	
Through the Suez Canal	1932	20,920	40	0.78	0.54	0.75	2.07
Through the NSR	1509	13,112	30	1	0.86	1	2.86
Railway transport	2582	11,285	35	0.58	1	0,86	2.44
Mixed transportation of TSR– Yenisei–NSR	2782	11,969	33	0.54	0.94	0.91	2.39

It can be seen from Table 2 that the most advantageous route is the NSR. The least advantageous route at the moment is the route of the Trans-Siberian Railway–Yenisei–NSR, but in case of consolidation of carriers it will be possible to achieve a significant reduction in transportation costs close to the same costs of transportation through the Suez Canal.Analysis of the price of transit transportation through the Suez Canal and the Northern Sea Route shows that thousands of 20-foot high containers save money by reducing the duration of cargo transportation. Thus, it is more advantageous to use the NSR for transit, as the difference can be between 150,000 and 1 million dollars per voyage.

On average it takes about 20 days and 625 tons of fuel oil to move from Rotterdam to Yokohama by Northern Sea Route, and 33 days and 875 tons of fuel oil when using the Suez Canal. Depending on the route chosen within the NSR, the savings on the transition from Europe to Asia may be 6–19 days.

Suez Canal is worth $250,000. The SMP has no direct charges for the passage itself. However, the fee for icebreaker escort costs about $380 thousand. It is also worth including such a line of costs as an additional insurance premium due to piracy in the Gulf of Aden and the Red Sea. This is another 120 thousand dollars. Insurance for the passage of the NSR costs $70 thousand.

TABLE III. LENGTH OF SEA ROUTES BETWEEN THE FOLLOWING PORTS IN CHINA, EUROPE AND THE USA, KM

Departure point – destination	North-East Passage	North-West Passage	Suez Canal and Malacca Strait	Panama Canal
Rotterdam – Shanghai	16 100	15 793	19 550	25 588
Bordeaux – Shanghai	16 100	16 750	19 030	24 980
Shanghai	19 160	19 718	16 460	26 038
Joey – Tauro – Hong Kong	20 230	20 950	14 093	25 934
Barcelona – Hong Kong	18 950	20 090	14 693	25 044
New York – Shanghai	17 030	19 893	22 930	20 880
New York – Hong Kong	18 140	20 985	21 570	21 260

The main advantages of the NSR are a short route, so less fuel is consumed, and a rather high transportation speed; lack of insurance premiums related to piracy; the possibility of passing large vessels; the low cost of transporting large shipments of cargo compared to the Southern Sea Route and the Trans-Siberian Railway.

On average, 25 days and 625 tons of fuel oil are needed for the transition from Europe to China by NSR, and 35 days and 875 tons of fuel oil when using the Suez Canal.

In March 2018, in his Address to the Federal Assembly, President of the Russian Federation V.V. Putin set the goal of increasing freight transportation through NSR to 80 million tons by 2025 and making NSR a "global competitive transit artery." This is due not only to the implementation of a number of major projects for the development of mineral deposits in the Arctic regions of Russia, but also to the development of the logistics system and the strengthening of the transit attractiveness of NSR.

Transportation via the Northern Sea Route may take 10% of the market of container cargo imports from Asia to Russia and 5% of the market of international transit from Asia to Europe. The total volume of container traffic along the Northern Sea Route may amount to 455 thousand containers.

Russia will benefit greatly from the expansion of such transit. This applies to the freight of Russian ships, fees for the passage of foreign ships, icebreaker fleet services, etc. For example, the income for guiding of one ship by icebreaker can amount to more than $100,000. There are estimates that ice breaker support can reach large amounts - up to 380 thousand dollars.

The Northern Sea Route is the main transport artery in the Arctic. It connects the European and Far Eastern seaports of Russia into a single transport network, providing transportation of goods from one end of the country to another, as well as providing transportation of products from the northern territories.

Russia is already in the process of modernizing and building new ports along the Arctic route. In particular, the construction of the port of Sabetta with a border crossing on the Yamal Peninsula is under way. The ports of Tiksi (Republic of Saha (Yakutia), Pevek (Chukot Autonomous Region), Varandei (Nenets Auto District), Khatanga, Dudinka and Dixon (all three located in Krasnoyarsk Krai) are being modernized.

III. RUSSIA'S ARCTIC ZONE POTENTIAL

Nuclear power and related energy industries in modern Russia have accumulated huge potential for new projects that surpass their foreign counterparts [4]. That's why St. Petersburg can become a central city when exploring the Arctic. The city has the Krylov Research Center, which is the basis of domestic shipbuilding science, the Central Institute of the Navy, the Hydrographic Enterprise, the Admiralty Shipyards, the Baltic Plant and other organizations whose activities are directly geared towards addressing the challenges involved.

The world's acute shortage of fresh water is also a global environmental problem caused by poor environmental management. Cooperation between the countries whose territories include the Arctic, i.e. Russia, Canada, Denmark and the United States, can become the largest supplier of water. These countries control the Arctic waters, and Denmark owns Greenland, a large glacial island. Natural ice can provide more than 7,100 km3 of fresh water in the summer season alone, and this amount exceeds the world's water consumption.

Antarctic and Arctic glaciers are of particular interest to use glaciers as freshwater resources in the future. As early as the 1990s, Russian scientists developed the Clean Ice and Iceberg projects, which included the Clean Water Project, part of the international Human and Ocean program, the Global Initiative [5].

Russian specialists have also developed a technology for desalination in the Arctic. To implement the technology, the user needs to choose a suitable ice field, install a sprinkler on it to spray salt water over the glacier. Once the ice freezes, it is cut into blocks that are folded into tankers and can be shipped around the world. The installation can produce up to 1,500 tons of ice per day. Therefore, it is possible to create a single system of desalination of water by the method of freezing. The only problem is how to transport ice to consuming countries that do not have territorial proximity to the Arctic region.

The construction of underwater complexes with a full production cycle, working in the future under the guidance of special robotics is a huge prospect for replenishing the reserves of hydrocarbon raw materials. The creation of an international technology platform linked to the latest advances in robotics could give a huge boost to the development of the Arctic region in the 21st century. At the same time, there are projects aimed at developing robotics, which provides information on temperature, pressure in the well, seismic activity and ecology in general. The Far Eastern branch of the Russian Academy of Sciences, energy companies Rosneft and Gazprom, as well as the central engineering bureaus of Rubin and the Foundation for Advanced Research are actively involved in the development of new technologies [6].

There are a number of measures of development of the Arctic region, which can be implemented primarily by the state. This is the development of specialized ice shipbuilding and shipping, as well as port infrastructure; development and reconstruction of airports and road complexes, provision of integrated transport links in the region; creating a system of rescue systems; addressing the environmental challenges of regional development and hydrometeorology.

Over the course of 30 years, more than 150 Arctic vessels of various purposes, 10 nuclear icebreakers, 30 ice platforms for hydrocarbon production are planned for dynamic development. A feature of Arctic sailing vessels is the growth of their displacement, power, speed of passage and ice-passage (ice thickness up to 3 m). It will take about 10 million tons of cool-resistant steels to build various Arctic sailing vessels [7].

The use of underwater fishing is considered promising because it is based on the use of underwater systems at the end of which their mouths are located on the seabed. Underwater fishing can be fully autonomous and can be used in conjunction with stationary or floating technology platforms. In the global market of specialized equipment, such manufacturers of underwater equipment as FMC Kongsberg Subsea AS, Aker Solutions (Subsea) and GE Vetco can be singled out.

The underwater drilling complex developed by the Central Design Bureau "Lazurit" is designed for year-round drilling in the development of oil and gas fields in the deep waters of the Arctic Sea, regardless of weather and ice conditions. The underwater technologies proposed by the central design bureau "Lazurit" provide for the use of an underwater drilling complex in a drilling vessel and support of the underwater slab of the bottom at depths of 60 to 400 m. The development of the fields is envisaged by drilling and construction of both single wells and a bush consisting of 4–8 wells.

IV. Arctic Shelf Exploration and Development of the Coastal Infrastructure

The main task of shipbuilding development in the Arctic region is to create environmentally friendly and reliable models of ships, as well as marine equipment for Arctic latitudes. Also, equally important tasks are the build-up of icebreaker support, the development of the Arctic shelf and the development of coastal infrastructure:

1) Increase of icebreaker support. The main tasks for the export of hydrocarbon products should be solved on the nuclear ice in the Arctic. At the plenary session of the Russian Arctic, Deputy Prime Minister Dmitry Rogozin stressed that the federal authorities and scientific organizations consider it necessary to develop the region and highlighted four priorities, including a key direction to ensure the Arctic Transportation. The surrounding Arctic areas require the development and maintenance of an air traffic network and regional rail networks that open up areas that are not yet accessible to transport and increase freight traffic to North Sea ports.

The main thing is that the Northern Sea Route will not be developed unless the port infrastructure is developed. Starting from 2018, the main cargo flow under the NSR will be formed by the export of hydrocarbon products, mainly liquefied natural gas and crude oil.

The table below shows projects focusing on the Russian nuclear icebreaker fleet.

TABLE IV. Projects of the Russian nuclear icebreaker fleet development

№	Project, operator		Design capacity per year	Period	Project status
1	1.1	Yamal Trade LLC, LNG tankers	16.5 million tons of liquefied natural gas (LNG)	2014–2040	The contract was signed
	1.2	Yamal LNG, Portoflot			
2	Novoportovskoye Gazprom Neft field		8.5 million tons of crude oil	2014–2035	
3	Norilsk Nickel, Dudinka settlement		1.3 million tons of non-ferrous and precious metals	1975–2040	
4	Coal of the Taimyr Peninsula (VostokUgol)		10 million tons of coal	2018–2035	Investment rationale
5	Arctic LNG-2 (NOVATEK)		16.5 million tons LNG	2022–2045	
6	The Payakhskoye field, OAO NNK		7.3 million tons of crude oil	2019–2030	

If all the planned projects along the North Sea Route are fully implemented, goods transported to the western Arctic will have an annual export price of 60 million tons and 50% of them will be liquefied natural gas.

According to the project operator, more than 80% of Yamal LNG production has already been contracted for sale to the Asia-Pacific (APR) markets, and the second phase of the project (Arctic LNG-2) is likely to achieve the same sales volume. The LNG will be delivered by 20 tankers.

The Arc7 class is specially designed for this project, with winter distribution sweted to the western LNG hubs in Sebrugge (Belgium) and Dunkirk (France) for further congestion in conventional tanks and eastwards in summer-friendly ice conditions. According to Yamal LNG, the total capacity of both projects in the Gulf of Ob will amount to 10% of the world annual LNG.

The icebreaker leader's design allows navigation throughout the year in the eastern sector of the Arctic and creates a stable link between the Far East and the Southwest. At the same time, the use of larger transport vessels and further development of transit will require further improvements in the efficiency of Arctic transport. However, since the process of designing two new icebreakers has just begun, and the issue of refinancing their construction has not yet been resolved, the roadmap for their restoration will go beyond 2020. As a result, the multiple availability and sufficiency of icebreakers for expected cargo flow becomes extremely important.

The speed of LNG delivery to the consumer will remain an important component, especially for long-term contracts, where this is likely to be tightly defined. Speed in ice navigation conditions is a key advantage, which, along with ice safety, is provided by powerful nuclear-powered icebreakers and Arctic navigation tankers [8].

However, the limiting factor remains the number of nuclear icebreakers, numbering four units at the moment and four to five units at the same time as the arrival of the third universal nuclear icebreaker.

Taking into account the importance of nuclear icebreakers to provide other large projects (e.g., the Novoport field), it was decided to build the fourth and fifth nuclear universal icebreakers.

2) The exploration of the Arctic shelf. The development of the Arctic shelf has great prospects due to the large number of hydrocarbon deposits. Russia's coasts are mainly located in the northern part of the Arctic. The exploration of the Arctic highlands is very difficult and costly. The Russian shelf holds up to 25% of oil reserves and up to 50% of the country's total explored gas reserves.

It should be noted that hydrocarbon reserves in the ground have been more or less reliably researched and confirmed, but ocean reserves have been explored below 10%. Nevertheless, Russia lags behind its colleagues, who are actively involved in the study of the shelf. Huge reserves of mineral resources on the continent and the need for significant research and development of the Arctic shelf delayed the beginning of this work. With a gradual decline in agricultural land reserves and a projection that oil will remain on shore for 30 years, the development of the Arctic shelf is becoming increasingly important. 49% of the already studied reserves, which have already been stored on the Arctic shelf of Russia, are in the Barents Sea and 35% in the Kara Sea. According to modern estimates, the development of the Laptevs shelf may reach up to 8700 million tons, and the reserves of the Arctic shelf of the East Siberian and Chukchi Seas are estimated at more than 1 billion tons of hydrocarbons.

The problems of the development of the shelf in the Arctic territories, which Russia possesses, are increasing from west to east, from the Barents Sea, with a warm climate formed under the influence of the Gulf Stream, and shallow depths facilitates the development of shelves to the Chukchi Sea, where even exploration is very difficult throughout the year. For year-round oil and gas production on the Arctic shelf, new ice-resistant platforms are being developed, which have no analogues in the world.

Russia's Arctic shelf contains not only hydrocarbon reserves (gas, oil, gas condensate). There are reasons to believe that the Arctic Ocean reserves contain other minerals. These are nickel, lead, manganese, tin, platinum, gold and diamonds found in coastal areas and present on the shelf. World practice already has examples of successful offshore mining of rare earth elements, but the development of these elements is still a question of the future.

The development of the Arctic shelf in terms of biological resources production is also promising. Thus, up to 17% of the volume of fish in our country is extracted in the Arctic seas. They also produce other seafood such as seaweed, edible shellfish and other organisms.

In addition to the prospects for studying the shelf, there are also problems in some different areas:

- Geopolitical – at least 5 states with access to high latitudes claim the riches of the Arctic, so it is important for Russia to defend its interests here.
- The bottleneck of transport problems for Arctic exploration is due to the short period of time in which the Russian Northern Sea Route is navigable, the complexity and high cost of transporting resources for the development of the region.
- The environmental problems of the Arctic are largely related to transport. The cessation of the removal of worn-out equipment, packaging materials for fuel and lubricants and other industrial waste lasted a very long time, which greatly aggravated the ecological situation in the Russian Arctic. The problem has now been resolved, but difficulties remain. In addition, the conservation of rare and endemic species living in the region remains a problem.

Russia has large territories in the continental part of the region, and our country has already taken the first steps in the development of gas and oil. Residential construction and infrastructure were developed so that research and working groups lived near production facilities, and today the most promising area is the Bovanenkov oil and gas field.

3) Coastal infrastructure development. One of the most important indicators of the level of development of Arctic shipping is the volume of transport, which is determined by a set of the following components: freight volumes, icebreaker support, transport fleet and the availability of sufficient coastal infrastructure for shipping. At the moment, the Arctic ports are very poorly developed. Currently, only the port of Dudinka is considered profitable.

To modernize seaports, some problems need to be solved. For example, it is necessary to redevelop anchor facilities for the entry of modern vessels, and the development and improvement of facilities for the disposal of waste produced on ships is required.

It is also necessary to purchase bunkering devices, pay for wastewater treatment and solid waste management services. When organizing the process of technical re-equipment, considered as re-equipment of the Arctic shelves (platforms for drilling and mining, new MPCs) and cargo reloading, the problem of its infrastructural support will inevitably arise.

The development of the port infrastructure of the NSR requires, in particular, the creation of roads and railway networks, the use of natural waterways, and the development of air passenger transportation. For this, in turn, the development and implementation of an appropriate state program is needed. The development of ports should be consistent with the environmental safety requirements that are ensured by state regulation, taking into account the Arctic Environmental Protection Strategy adopted by the Arctic countries.

As the economy of the Arctic zone revives, shipping volumes along the NSR will increase. Wood processing enterprises will develop in the Yenisei and Lena basins, but with the direct support of the government. The development of cruise tourism in the Arctic should also be considered promising, but tourists need to be provided with ports that are reliable all year round, land and air transport associated with a single telecommunication network along the NSR route [9].

The task of the maritime transport system is ultimately to meet certain economic needs. One of the most important in the Arctic region is the restoration of vital activity of existing ports and the creation of new settlements. In these cases, equipment is necessary that can be pre-installed on floating bases, due to the fact that it is most effectively transported.

Navigation along the North Sea route is currently being carried out in various areas: development of oil and gas fields in the West Arctic sector; transportation of goods through the industrial hubs of Norilsk; Arrival and departure of northern transport to the ports of the Arctic; inland coastal shipping; freight traffic in the port of Sabetta for enterprises that are being built in the Gulf of Ob and other Arctic regions; between northwestern and eastern ports, as well as between northern Europe and the Asia-Pacific region.

There is growing interest in the use of the Arctic 's main sea route, the Northern Sea Route, which is associated with the discovery and industrial development of new promising oil and gas deposits on the Arctic coast and the Arctic Sea shelf and, as a result, the growing need for transportation and supply of various goods.

V. CONCLUSION

The Arctic is the object of international influence of developed countries and the point of application of their political, military, economic power. First of all, this applies to the Russian Federation, the United States of America, the countries of the European Union and Canada. Moreover, each country has its own opinion about the future fate of the Arctic and the division of its raw materials and wealth.

The strategic potential of the Northern Sea Route and the entire Arctic zone of Russia as a whole is at a fairly high level. It estimates the large forecast reserves of hydrocarbons, located along the course of the main routes of the Northern Sea Route, which provides access to the explored deposits. The Northern Sea Route is a transcontinental transport corridor, the importance of which will increase in the future.

NSR has been and remains an essential part of the infrastructure of the Far North economic complex and the link between the Russian Far East and the western regions of the country, uniting the largest rivers of Siberia, the land, air and pipeline types of transport.

In general, the Arctic is a zone of strategic interests of economic and military and political security of the Russian Federation. Some experts believe that the share of Arctic resources in the total economic potential of the Arctic countries will be 40% by the middle of the 21st century. Accordingly, the economies of developed countries, including Russia, will depend on the natural resources of the Arctic more and more.

Russian economists believe that the simultaneous exploitation of the natural wealth of the Arctic and Siberia will give Russia a significant economic advantage in the 21 century. Without this advantage, Russia could lose competition in the world's raw materials and hydrocarbon markets, which could lead to a full-scale stagnation of the Russian economy and a significant drop in its GDP.

It is obvious that the sustainable development of the Arctic is linked to the strengthening of the state regulation of the processes taking place in the region. The state should undertake the following activities in the Arctic:

- modernization of the social infrastructure of the Arctic;
- ensuring rational environmental management and development of ecologically safe types of tourism in places of compact accommodation and traditional economic life of indigenous ethnic groups;
- international legal registration of external border of the Arctic zone of the Russian Federation and realization of Russia's competitive advantage in the extraction and transportation of energy resources;
- transformation of the Arctic zone of the Russian Federation into the leading strategic resource base of the Russian Federation.

This will force the legal, technological and economic component of Arctic development in the 21 century. In accordance with the state program "Social and Economic development of the Arctic zone of the Russian Federation for the period up to 2020," in the period 2021-2025 it is envisaged:

- formation and maintenance of development support zones;
- creation of a forward-looking scientific and technological backbone and technologies for the production of advanced technology and the development of an electronic component base to meet the challenges of social and economic development of the Arctic zone and ensuring national security;
- technical support by specialized vessels of the state environmental marine supervision;
- decision on the further treatment of the most dangerous flooded nuclear and radiation-hazardous objects and

radiation waste; the creation of electronic equipment to meet the social and economic development challenges of the Arctic;

- commissioning the upgraded automated ice and information system "North";
- organization of the production of competitive high-tech products for the needs of exploration, extraction and processing of minerals in the Arctic zone.

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