

Prospects for the use of Arctic routes in the context of climate change and the implementation of the concept of sustainable development of the Arctic zone

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Abstract. The urgent need to solve environmental problems and meet the needs of people requires finding alternative ways to deliver goods in the most environmentally friendly and safe way. In addition, the climatic changes occurring on our planet open up additional prospects for the use of the Arctic for economic purposes, in particular, the use of the Northern Sea Route for cargo transportation. In the modern world economy, sea cargo transportation accounts for about 80% of all cargo transportation. The main cargo flow is carried out through the Southern Sea Route (SSR), along which goods are transported from Europe to Asia. For quite a long period of time, shipowners and logistics companies did not perceive the Arctic region as an alternative to traffic from Asia to Europe or North America, while navigation in the Arctic was much more than just transport shipping. At the same time, the situation has changed significantly in the 21st century. The interest in this region among the states of the Arctic zone, as well as other countries, is connected not only with the presence there of large reserves of mineral resources, solving geopolitical problems, but also the search for alternative sea routes for cargo transportation between Europe, North America and Asia. In connection with the blockade of the Suez Canal in March 2021, the question of the need to redirect cargo transportation to alternative routes – the Northern Sea Route (NSR), as part of the Northeast Passage, and the Northwest Passage became acute. The Suez Canal is the busiest and longest sea artery. In addition, this area is unsafe due to frequent attacks by pirates. Due to the geographical features of the SSR - the presence of sufficiently narrow places along the route - under the condition of increasing traffic, does not contribute to the free passage of ships. Meanwhile, the active melting of the Arctic ice in the foreseeable future will allow navigation along Arctic routes at higher latitudes and without the escort of icebreaker transport. All of the above allows us to consider navigation in the Arctic latitudes as an actual alternative to the Southern Route, which will serve as the beginning of sustainable development of the Arctic region.

1 Introduction

The UN Global Climate Conference was held in Glasgow from October 31 to November 12, 2021. The purpose of the meeting with thousands of participants from all over the world was to approve a plan for the transition to a global economy with zero greenhouse gas emissions by 2050. Only its achievement will make it possible to contain global warming at the current level. The problem is that the commitments already made around the world to reduce emissions are categorically insufficient. And in order to achieve the goal, huge funds, efforts and sacrifices will be required from the

whole world. The whole world will need to pay trillions of dollars and make huge organizational efforts to make the transition "organized" - otherwise the world risks being stuck halfway to a clean future without sufficient energy sources and with huge prices for them. Probably, political cataclysms await the world in the process of transition: from geopolitical revolutionary shifts to social discontent of large groups of people.

But even if the goal is successfully achieved, from today, the new clean world of 2050 does not seem comfortable: in winter it will be colder in houses, in summer it will be hotter, driving cars (of course, electric) will be allowed rarely, and flights on airplanes (on

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hydrogen fuel) on vacation will not be available to everyone. However, if warming cannot be stopped, the world will probably be even less comfortable.

The main task of countries to meet the needs of citizens for the necessary goods is their timely delivery in the most environmentally friendly way. existing international channels are permanently overloaded. And the recent crisis in the Suez Canal has shown the need for alternative routes.

In our article, we propose an informed solution combining ecological approaches to the development of effective directions of traffic flows.

Until recently, navigation in the Arctic region was hampered by difficult ice conditions. At the same time, a number of scientists believe that in the next 50 years, the predominant traffic flows will pass through the Arctic routes. Geographically, two transport routes have developed in the Arctic space: the Northern Sea Route (NSR), also called the Northeast Passage (NEP), passing along the northern shores of the Russian Federation, and the Northwest Passage (NWP), passing through the Canadian Arctic [1]. These polar routes between Asia, North America and Europe are currently the most promising from the point of view of commercial use. The Northwest Passage has a length of approximately 900 nautical miles and runs from the Atlantic Ocean to the Pacific Ocean along the route: the Labrador Sea and Hudson Strait, then through the Bering Strait or the Beaufort Sea. The length of the NSR is somewhat longer and is about three thousand nautical miles. However, despite this, the use of the NSR as an alternative route seems to be the most promising in the conditions of geopolitical and climatic changes, since it has a number of significant advantages.

Let us turn briefly to the legal side of the issue of securing sovereignty over the Arctic sectors.

The Russian Empire, and later the USSR and the Russian Federation, apart from hydrographic, navigational and technical equipment, also took actions to organizational and legal formalization of the Northern Sea Route, concerning the sea customs strip (1910), arrangement of radio stations and navigation signs on the coast (1911), Decree No. 1606 and Resolution of the Council of People's Commissars of the USSR No. 1873 dated 17.12.1932 established the Main Directorate of the Northern Sea Route; the Government of the Russian Federation adopted a Resolution of 19.06.1994 "On measures to improve the management of the Northern Sea Route" and others [1]. Currently, the organization of the navigation along the NSR is carried out by the following regulatory legal acts of the Russian Federation and international treaties: "UN Convention on the Law of the Sea" 1982 [8], "Convention on International Rules for the Prevention of Collisions of Ships at Sea, 1972" [9], Resolution N MSC.46(65) of the International Maritime Organization "Approval of Amendments to the International Convention for the Safety of Life at Sea 1974" [10], "International Convention for the Prevention of Pollution from Ships 1973" [11], etc.

It should be noted that none of the existing world agreements has defined the legal status of the NWP. At the same time, the NWP is subject to the sovereignty of

Canada, since the route passes within its territorial waters. Concurrently, there has been a dispute between Canada and the United States over the status of the NWP since the late 1960s, which is still unresolved. The State policy of Canada considers the NWP under the jurisdiction of Canada, since it defines waterways through the Canadian Arctic archipelago, its internal waters and, accordingly, the passage of transit vessels through it requires special permission from the Canadian authorities. In 1970, Canada expanded its territorial waters to 12 nautical miles, passed the Arctic aquatic Pollution Prevention Act, empowering it to apply strict measures against potentially dangerous vessels navigating in the Arctic, and established a control zone of 100 nautical miles. The USA, motivated by the violation freedom of navigation, categorically protests against this law [3]. It should be noted that this position of the United States is shared by the European Union [4].

Tensions over the legal status of the NWP between the United States and Canada persisted until January 1988. In order to resolve the differences, the Agreement on Cooperation in the Arctic was signed, regulating the relations between the parties in exploring the Arctic region and navigating the parties' icebreaking vessels in their Arctic zones. At the same time, the United States has not recognize Canada's position regarding the extension of its sovereignty over the Canadian Arctic Archipelago, but agreed to obtain permits from Canadian authorities for the transit passage of its vessels through Canadian waters [5]. Nevertheless, the dispute over the status of the NWP has not been resolved to date. It is worth noting that at present the NWP is currently a system of interconnected individual short passages in the Canadian Arctic Archipelago and is sufficiently developed in terms of organizing navigation and search and rescue activities, but for commercial purposes the Northwest Passage is still underused [6]. Until the middle of the twentieth century, the NWP was not of commercial interest for the passage of cargo ships from due to the presence of sufficient ice cover and the complexity of the geographical landscape. Meanwhile, the ongoing climatic changes in the world in general, and in the Arctic region in particular, contributing to the reduction of the ice cover first in the southern and then in the northern part of the NWP, have helped to pay attention to the NWP as an alternative sea trade route. According to experts, climate change opens up the possibility of almost year-round navigation on the NWP for the transportation of goods from Japan and China to Europe or the east coast of the United States. Firstly, the NWP is several thousand nautical miles shorter than the Suez and Panama Canals. Secondly, the Government of Canada has high hopes for commercial use of NWP, since mining is increasing in the Canadian Arctic region, which will entail an increase in maritime traffic. However, other experts believe that the NWP will not be able to become an effective and economically profitable trade route, since it is less favorable for navigation for several reasons: the presence of a large number of islands in the region that contribute to ice blockage, the lack of deep-water ports, and the aforementioned disagreement over the legal status and access to the

passage between Canada and the United States together with the European Union. Recently, Canada has strengthened its military presence in the region; in 2009, the Canadian Parliament voted almost unanimously to change the name of the strait to the "Canadian Northwest Passage" [4].

It should be emphasized that Russia's position regarding the status of the Northeast Passage (its main part is the Northern Sea Route) regarding the extension of sovereignty largely coincides with Canada's position. At the same time, the United States and other countries consider the NSR as an international route for the transit of foreign vessels. However, it should be noted that the overwhelming majority of researchers believe that in the future, with the expansion of the navigation capabilities of the NSR and NWP, navigation in higher latitudes will require the world community to develop new international norms and rules regarding the regulation of navigation in the Arctic region [7].

Despite a number of advantages, currently the use of the NWP in terms of the commercial transit route is somewhat inferior to the NSR. In particular, due to its geographical location, the NSR reduces the length of the sea route from Europe to the countries of the Asia-Pacific region by up to 50%. According to experts, as a result of global warming, by 2030 it will be possible to navigate the NSR in ice-free water for 6 months, and by 2050 – all year round without the escort of icebreakers [12]. This will allow the NSR to become the most commercially attractive route, including for the transportation of transit cargo.

The ongoing climate changes make it possible to confidently speak about the almost year-round use of the NSR and NWP as a single Arctic marine transport artery, which will contribute to the sustainable development of the Arctic zones.

2 Main Body

It should be noted that the comparison of the NSR and the NWP does not seem quite correct, since they cannot be regarded as alternatives to each other, since the NSR is a short route between Europe and the Asia-Pacific region, which is an alternative to the Suez Canal, and the NWP connects the countries of the Asia-Pacific region with the east coast of the USA, which is an alternative to the Panama Canal.

At the same time, when assessing the prospects of using the NSR and NWP for the movement of transit cargo, both positive and negative factors are identified, and the similarity of both routes is determined.

When comparing the Northwest Passage and the Northern Sea Route, it is obvious that both transport communications are not clearly defined routes, but sea passages consisting of numerous straits and various waterways.

The similarity of both routes is also seen in the fact that both Canada and the Russian Federation consider the NWP and the NSR, respectively, as their internal waters, in contrast to the position of the U.S. and some EU countries, which consider them international straits

with the possibility of open and free (without additional notification) transit passage of foreign vessels. At the same time, such a position of the United States and other countries contradicts the position of the International Court of Justice [13, 14] according to which the definition of international straits requires compliance with certain functional criteria, in particular, whether navigation through a particular strait can be carried out without the help and assistance of the coastal state, without maintenance of the strait by this state, providing emergency rescue measures by the coastal state, if necessary, etc. In the case of the NWP, a sufficient number of registered transits cannot meet the above-mentioned functional criterion established by the UN International Court of Justice. It is also difficult to imagine the possibility of ships passing through the NSR without the provision of icebreakers by Russia. In addition, a certain stumbling block in regulation of the legal status of the NSR and NWP is the desire of foreign states to conduct their vessels through them without special notification and permission of the authorities of neighboring countries.

Thus, the dependence of foreign vessels' navigation on the support and assistance of coastal states is evident, and Canada and Russia quite rightly refer both sea routes to their inland waters. In addition, both the NSR for Russia and the NWP for Canada serve, first of all, the national interests, are used as an internal transport route.

Secondly, the obvious advantage of both sea arteries is that using the NWP, the route between Asia and Northwestern Europe is reduced by 30%, and the route between Asia and the East Coast of the United States is reduced by 20%, and the NSR is 2.5 times shorter than the route through the Suez Canal. Reducing the length of the route significantly reduces transportation costs, the cost of the ship crew salaries, etc. A significant advantage of using the NSR and NWP is their safety, because harsh climatic conditions naturally exclude pirate attack, which otherwise leads to loss of cargo or cargo and vessel. Also, safety of these routes is determined by the absence of military conflicts in the active (firing) phase.

An undoubted positive aspect of using the NSR and NWP is the reduction of harmful emissions into the atmosphere by reducing fuel consumption due to the shortening of the route and the absence of "traffic jams" on it, which directly corresponds to the "green agenda" - as one of the strategies for sustainable development in the face of global climate change.

In our opinion, the positive points in terms of competition between the commercial use of the NSR and the NWP include the absence of overlap between the interests of Russia and Canada in the use of Arctic transportation arteries, since the NWP is an alternative to the Panama Canal, and the NSR is an alternative to the Suez Canal.

The disadvantages today include the limited duration of navigation due to the ice conditions on the NSR and NWP and the need to use auxiliary fleet - icebreakers, which can increase the financial costs of cargo transportation. In addition, to pass the NSR and NWP it is necessary to use vessels of appropriate class with ice-

resistant hull design ; icing of the ship's hull can affect the operability of the equipment; low temperatures and long periods of daylight and darkness affect the well-being and operability of the ship crew, which requires appropriate personnel training.

In favor of the priority of the NSR, it should be noted that the intensity of changes in the ice cover of the Arctic region, associated with global warming, is most noticeable in the Eastern hemisphere. With approximately the same duration of "clear water" navigation at present - about three to five months, the use of both Arctic routes in the remaining time requires the involvement of icebreaker fleet vessels for piloting. The Russian Federation currently, unlike Canada, has a sufficient nuclear and diesel icebreaking fleet, which already allows the use of the NSR practically year-round.

Also in favor of the NSR it should be noted that in conditions of global warming, intensive melting of the Arctic ice, geographical features, the prospects for active use of the NWF are associated with environmental risks related to possible man-made disasters. The greatest threat is represented by accidental spills of oil and petroleum products from ships or leaks from broken pipelines. Meanwhile, the strategy for the development of the Arctic zone of Russia until 2035, approved by the President of the Russian Federation Vladimir Putin in the fall of 2020, among other things, is focused at minimizes such risks.

As practice has shown, the last (and far from the only) incident in the Suez Canal is a "thin" place in the global economy, which allows us to intensify the work on the search and use of alternative logistics routes in addition to the NSR and NWP. The traditional and well known route for sailors is around Africa via the Cape of Good Hope. However, such a route adds transportation costs and increases by 10,000 km. One of the best alternative routes can be considered the Chinese "One Belt, One Road" - the transportation of goods to Europe by land, transiting through Russia, which is currently actively promoted by the PRC. According to some publications, in the first two months of 2021, China sent more than 2,000 trains with goods to Europe, twice as much as in the same period last year. Even before the closure of the Suez Canal in March 2021, tariffs for maritime transportation had significantly increased (several times), which became comparable to tariffs for rail transport tariffs. At the same time, as practice shows, rail transport is quite efficient and very competitive for the transportation of a certain category of goods – consumer goods, electronics, various components. The most exotic alternative is a return to the ancient plan of building a double of the Suez Canal - a canal through Israel using nuclear charges with a total capacity of 1.04 Gt. Another alternative route is the Transpolar Sea Route passing through the North Pole, connecting Europe and Northeast Asia. However, the use of this transport artery is possible only in decades, when the ice conditions in the region will radically change. And in the near foreseeable future, this route will require not only powerful icebreakers, but also vessels of the appropriate class.

Thus, taking into account the above, despite the availability of alternative routes, including land routes, the Northern Sea Route opens up new opportunities for cargo transportation, and with the increase in energy trade, the use of existing short trade routes for economic activity is a matter of time.

3 Conclusion

Using modern approaches to solving environmental problems and preventing the onset of energy collapse due to the lack of traditional energy sources, the expansion of the use of the Northern Sea Route for the delivery of hydrocarbons through alternative routes and other goods needed by the population of different countries, in our opinion, seems very promising and effective.

Summing up, we can confidently say that the Northern Sea Route can compete not only with the Southern Sea Passage, but also with alternative transport routes, but only on condition of innovative development of the NSR (availability of high-level coastal infrastructure, including land, services), equipping the route with efficient ports, developed railway network, in the future - connecting mainland and port infrastructure into a unified logistics network; modernization of existing ports and construction of new efficient transshipment hubs, formation of support development zones; taking into account the different levels of depth both in ports and in certain sections of the NSR, carry out measures to deepen the seabed to increase the number of passes of high-tonnage vessels; attract both private investors and foreign partners to implement projects; update and improve the organization of the icebreaker fleet; ensure the safety of vessel passage through the NSR (providing anti-terrorist protection, improving and developing the network of rescue and coordination centers, ensuring continuous monitoring of the location of vessels, ice, hydrometeorological and navigation conditions; improving navigation and hydrographic support and communication systems in order to ensure the ice wiring of vessels); strengthening radio and radar surveillance; modernization of the polar air fleet; in connection with the increase in economic activity, strengthening of measures to ensure environmental protection, to intensify work to eliminate environmental damage already caused.

Thus, the analysis allows us to conclude that the use of the Northern Sea Route is promising, which will lead to the economic development of the circumpolar regions and the regions of the Far North, allow Russia to increase the potential of international maritime cargo transportation, expand the boundaries of trade cooperation [15].

This strategy is based on the Russian concept of solving environmental problems and preventing climate change processes due to greenhouse gas emissions and other toxic substances.

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