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Northern Sea Route: Opportunities and Prospects

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Abstract

Northern Sea Route (NSR) is under the discussion of different economic forums, meetings and strategic planning all over the world. Canada, United States, Sweden, Norway and other northern countries with the access to the northern seas consider the options of cargo transportation thru the north. Moreover, such countries as China and Japan had revealed their wish to participate in the Northern Sea Route development and use. The question is logical: what is so specific in this transport artery, that it causes numerous discussions all over the world? Multiple actors in the world arena are actively holding discussions regarding the prospects in the Arctic, including transport communications. The Northern Sea Route is the key shipping route in the region. The article shows that the NSR transportation capabilities justify its international relevance today. In the course of the study, a retrospective analysis of the main activities along the NSR is provided, and forecasts, in particular, Rosatom's plans to increase the transportation volume, are given. As a result of the study, the quantitative advantage of the NSR regarding the costs of transporting liquefied natural gas is calculated, and the key benefits of using the route in comparison with the western route through the Suez Canal are highlighted. They include fuel savings, lower personal labor and ship rental costs, as well as absence of ship passage fees and queues.

For citation

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Keywords

Northern sea route, Arctic, icebreakers, cargo transportation, cargo traffic, Novatek, Suez Canal, LNG transportation, Rosatom.

Northern Sea Route on the map

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The question is logical: what is so specific in this transport artery, that it causes numerous discussions all over the world?

First of all, it is necessary to look at the general route on the map (Figure 1)

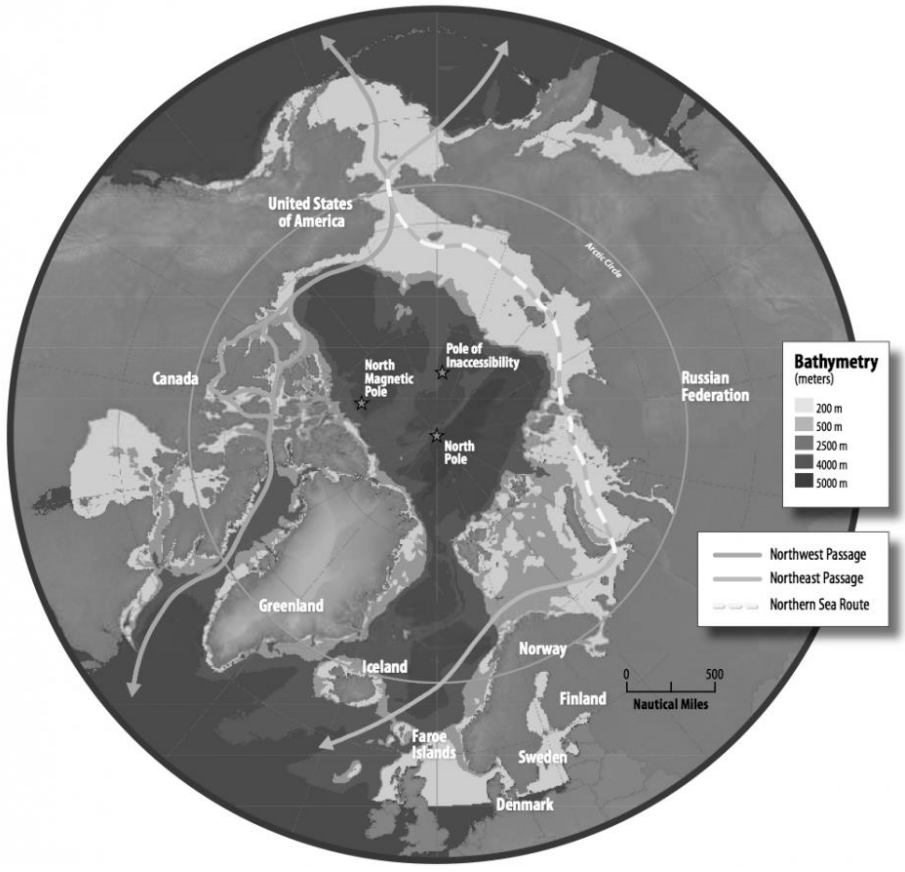

Figure 1 - Northern Passages [Northern Sea Route…, www]

Within the Arctic, there are territories, continental shelves and exclusive economic zones of the 8 Arctic states – Russia, Canada, USA (Alaska), Norway, Denmark (Greenland and the Faroe Islands), Finland, Sweden and Iceland.

The point of the latest international attention is the part going along the Russian coast. The Russian part of the route is the longest one as per the map. Russia has the maximum length of borders in the Arctic as 22 thousand kilometers.

Russian press runs that the Northern Sea Route is a shipping route officially defined by Russian legislation as lying east of Novaya Zemlya and specifically running along the Russian Arctic coast from the Kara Sea, along Siberia, to the Bering Strait. The entire route lies in Arctic waters and within Russia's exclusive economic zone (EEZ). The overall route on Russia's side of the Arctic between North

Cape and the Bering Strait has been called the Northeast Passage, analogous to the Northwest Passage on the Canada side. While the Northeast Passage includes all the East Arctic seas and connects the Atlantic and Pacific oceans, the Northern Sea Route does not include the Barents Sea, and it, therefore, does not reach the Atlantic [Arctic zone of the Russian Federation…, www]. Russian Arctic zone and NSR are shown on the map (Figure 2).

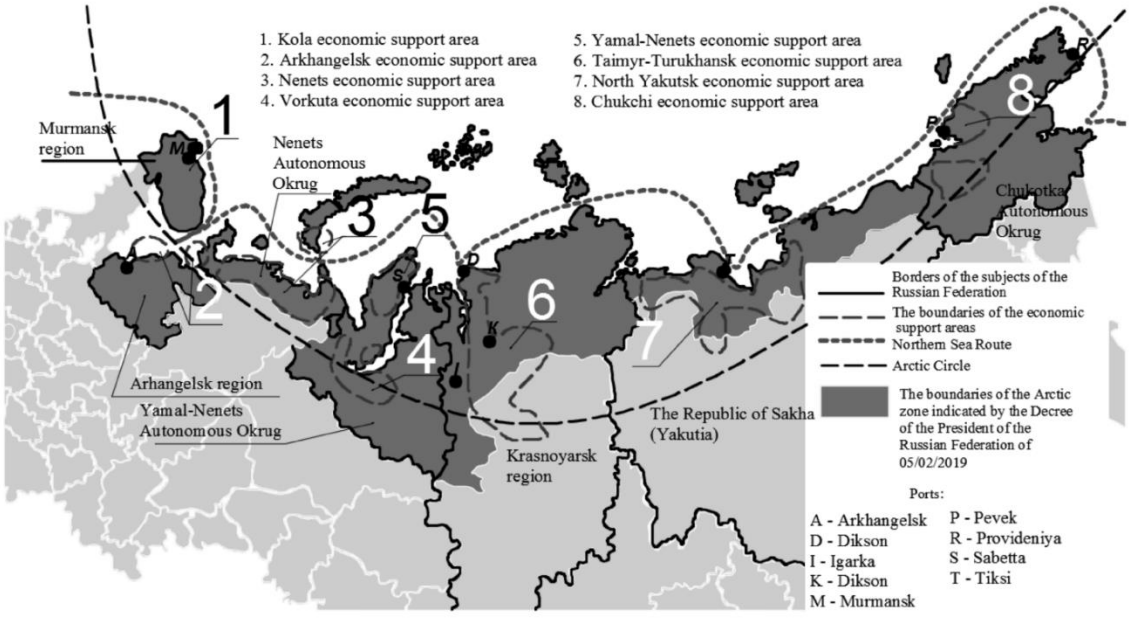

Figure 2 - Russian Arctic zone and NSR [NSR transit statistics, www]

The territory of the continental land of the Russian Arctic is 4.9 million km^2. The islands cover an area of 0.2 million km^2. The shelf and inland seas of the Russian Arctic reach an area of 4 million km^2 [Arctic zone of the Russian Federation, www].

Due to the harsh climate, only a small number of people live in the Arctic Circle. The Arctic Circle is the parallel 66 ° 33' north of the equator, geographically defined as the southern border of the Arctic. Most of the settlements in the Russian Arctic are located on the coast of the Arctic seas or in close proximity to it, as well as in the lower reaches of rivers flowing into the Arctic Ocean. The 3 largest cities located beyond the Arctic Circle are located in Russia: Murmansk (325 000 people), Norilsk (205 000 people) and Vorkuta (85 000 people). 4th in terms of population is the Norwegian city of Tromso (62 000 people) [ibid.].

Historical documents [NSR 2.0, www] tell that NSR was discovered by Adolf Erik Nordenskiöld sailing expedition on the ship “Vega” in winter 1878-79. Since the mid-1930s the Northern Sea Route has been an officially managed and administered shipping route along the northern / Arctic coast of Russia.

NSR activities retrospective and forecasts

The performed retrospective analyses of the activities along NSR are presented in the diagram in Figure 3. The following diagram was prepared based on the statistics data available in different sources source [NSR transit statistics, www; Starodubtsev, www], showing the dynamics of traffic on the Northern Sea Route.

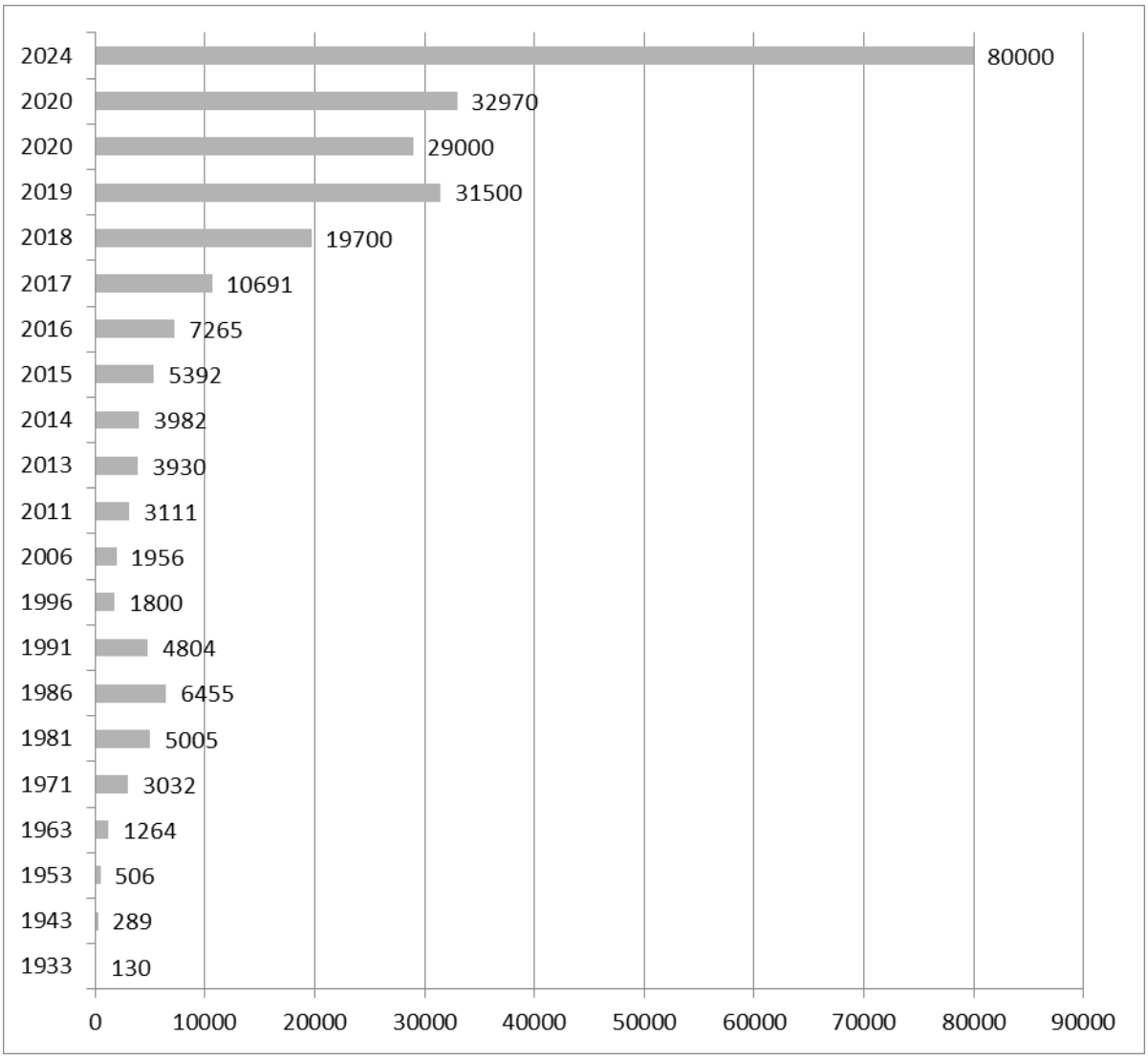

Figure 3 - The volume of transportation along the Northern Sea Route, including transit cargoes, thousand tons

During the Soviet period of history, the Northern Sea Route was actively used. The volume of annual cargo transportation along the NSR at its peak amounted to almost 7 million tons. But after the collapse of the USSR, the North was abandoned and depopulated, most of the polar stations were closed, freight traffic was reduced to 2 million tons per year. In the 1990s, the infrastructure for servicing the NSR was gradually destroyed, and many port facilities were left without work at all. The situation began to change for the better in the mid-2000s: initially, the nuclear icebreaker fleet breathed new life into the heart of the Russian Arctic. Slowly, towards the end of the decade, cargo turnover along the NSR began to grow. By 2009 compared to 1980, the volume of traffic along the Northern Sea Route has decreased by about 5-6 times. Only in 2016, the cargo turnover along the NSR for the first time exceeded the Soviet indicators, reaching 7.26 million tons.

The diagram above contains year 2020 two times: it shows the plan and the actual numbers for the year as 29 million tones and 33 million tons respectively.

In January-May 2021, 12.8 million tons of cargos were transported along the Northern Sea Route, which is 0.43% less than the same period last year. Lignified natural gas (LNG) and gas condensate

account for 64.5% of the total cargo [12.8 million tons…, www].

Thus, Russian plans and forecasts for cargo transportation through the north published in different sources source can be presented by the following comparison diagram (Figure 4):

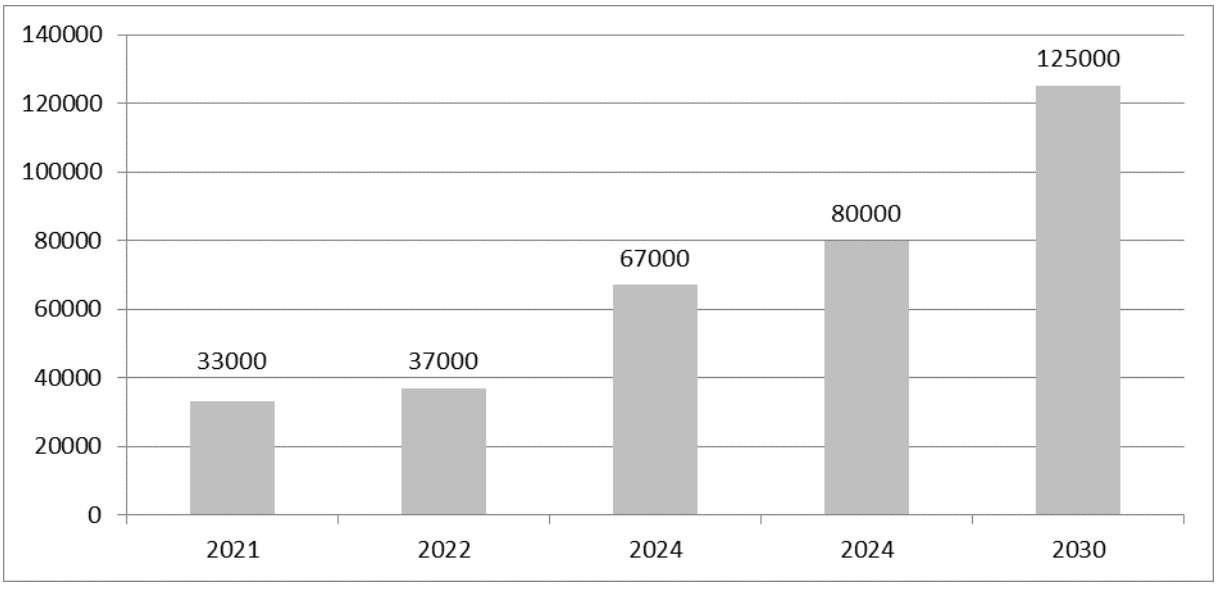

Figure 4 - Russian forecasts for cargo transportation along NSR, thousand tons

It should be mentioned that Russian President Vladimir Putin, in a decree dated May 7, 2018, set the task to increase the annual volume of cargo transportation along the NSR to 80 million tons per year in 2024 [Freight traffic…, www]. However, Russian Ice-Breakers company ("Rosatom" [Icebreakers of the Arctic…, www]) estimates this number as 67 million tons. Year 2021 will probably lead to the same number as 2020 in the amount of 33 million tons. 2022's plan is 37 million tons. Impressive are the estimates for 2030. Russian Ice – Breakers Company plans to increase the transportation amount to 125 million tons in 9 years from now.

Ice-breakers

In connection with the forecasts, it is important to review the technical side of the shipping potential.

Russian nuclear and diesel icebreakers ensure the operation of the Northern Sea Route and the development of the natural resources of the Arctic.

The nuclear icebreaker fleet currently includes: two nuclear icebreakers with a two-reactor nuclear power plant with a capacity of 75 thousand hp. ("Yamal", "50 Years of Victory") and two icebreakers with a one-reactor installation with a capacity of about 50 thousand horse-power. ("Taimyr", "Vaygach"). They are complemented by the nuclear-powered container ship "Sevmorput" (reactor capacity – 40 thousand hp). In addition, "Rosatomflot" Company operates three service vessels and a container ship "Rossita". The company is also in charge of the port fleet vessels designed to serve the water area of the port of Sabetta: ice-class tugs "Pur" and "Tambey"; icebreaking tugs Yuribey and Nadym; and also the port icebreaker "Ob" [ibid.].

Significant cargo traffic is recorded on the NSR mainly due to the nuclear icebreaker fleet (Figure 5).

Figure 5 - Ship pilotage with the nuclear icebreaker, Northern Sea Route [Nuclear icebreaker fleet, www]

Russia is working hard on bringing new ice – breakers into operations. "Arctic" is the lead ship of Project 22220 [ibid.], or LK-60Ya (Ice-breaker, 60 MW, with a nuclear power plant) already working in the Far North (Figure 6). 3 ice-breakers have been constructed and 2 are under the construction as of now.

Figure 6 - "Arctic" is the lead nuclear ice-breaker [Icebreakers of the Arctic, www]

The main tasks of the icebreakers of the new project are servicing the Northern Sea Route and conducting various expeditions to the Arctic. Thanks to the use of variable draft, the icebreakers of this project can break through ice up to three meters thick and are able to work equally effectively both in deep water and in shallow water in the beds of Siberian rivers. This feature allows these icebreakers to replace two types of their predecessors at once and, consequently, to reduce the total cost of operating the nuclear icebreaker fleet, fully preserving all its capabilities.

According to the Russian newspapers, "Rosneft" Oil Company [Freight traffic…, www] is

prospectively working on the construction of up to 50 Arctic-type tankers to provide hydrocarbons transportation from its arctic fields.

North vs South

The interest in cargo transportation in the polar latitudes is growing all over the world lately, because it is not overloaded, like the Suez Canal, there is no piracy there, like in the Indian Ocean. Most importantly, the new intercontinental route saves the most valuable resource – time.

Passage through the seas of the Arctic Ocean is the alternative to the Suez Canal. If the distance traveled by ships from the port of Murmansk (Russia) to the port of Yokohama (Japan) through the Suez Canal is 12 840 nautical miles, then the Northern Sea Route is only 5770 nautical miles [Gaiva, www].

Thus, depending on ice conditions, the journey through the Arctic will take about 18 days, and through the Mediterranean and Red Seas – about 37 days [Russia will offer…, 2019]. The time difference is significant.

In other words, from 14 to 22 days – time that can be saved if a cargo is transported along the NSR to the east.

NSR is very important from the standpoint of lignified natural gas (LNG) transportation from Russian "Novatek" company in the Arctic fields. The fields are located at Yamal peninsula and require ice – class transportation to consumers. LNG transportation options via NSR and Suez Canal are shown on the map in Figure 7.

Figure 7 - Routes for LNG transportation options via NSR and the Suez Canal [Mazneva, www]

Novatek Company producing potential from 4 gas-producing facilities sums up to 17.4 million tons of LNG ["Novatek" wants to build…, www]. Cost for gas transportation to Asian consumers significantly reduces if provided via Northern Sea Route in comparison with the western option, which includes the Suez Canal.

Cost reduction for LNG 1 MBTU transportation is shown in the comparison chart (Figure 8), prepared based on the data available in mass media [12.8 million tons…, www; "Novatek" wants to build…, www].

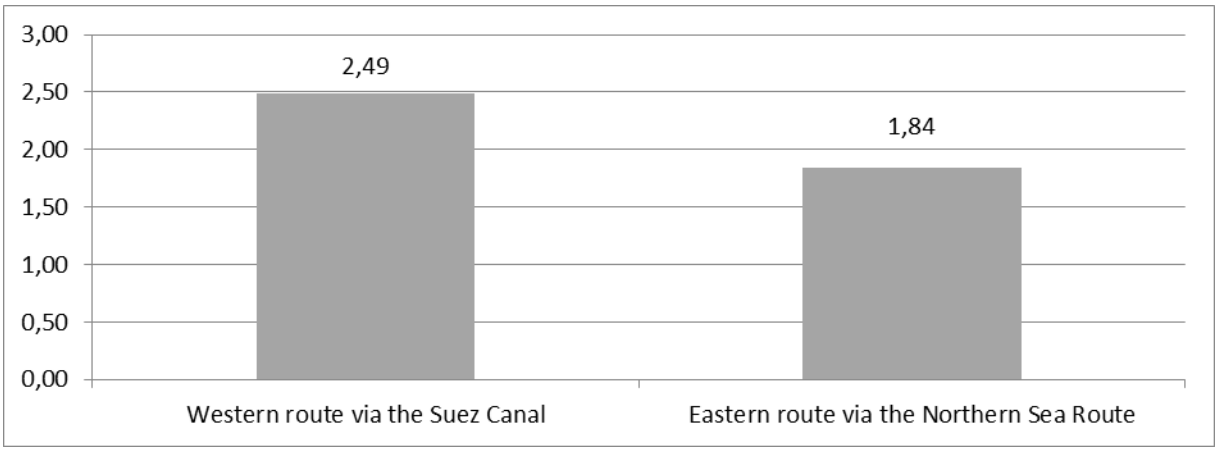

Figure 8 - Cost of 1 MBTU transportation, USD

From the chart's numbers it is clear that NSR significantly reduces transportation costs for delivering LNG to the Asia-Pacific region. As Novatek plans to produce 17.4 million tones, which equals 857,087,443 MBTU of LNG, the total cost savings for the whole annual amount of 17.4 million tons can be calculated as follows:

857087443 MBTU x 2.49 $ = 2,134,147,733 $ (western options)

857087443 MBTU x 1.84 $ = 1,577,040,895 $ (eastern option)

Difference = 557,106,837 $

The difference between the 2 options of 0.65 USD per MBTU leads to the huge annual sum saving as much as 557,106,837 USD for the LNG transportation via Northern Sea Route variant.

Conclusions

It is necessary to take into consideration that the cargo listed above is only Novateks' Company LNG shipments. Other cargo transportation will be additional transactions via NSR. For Russian needs the Northern Sea Route serves the ports of the Arctic and large rivers of Siberia (fuel, equipment, food; export of timber, natural resources).

Speaking about NSR for international needs, the main advantage of the northern passage is time saving. NSR gives 14 – 22 days saving on the way to Asia in comparison with the western route plus the Suez Canal option.

Benefits of using the NSR for transit traffic:

– saving on fuel;
– shorter voyage duration reduces personnel labor cost and reduces the cost of the ship's charter;
– there is no payment for the passage of the vessel (unlike the Suez Canal);
– there are no queues (as is the case with the Suez Canal);
– there is no risk of pirate attack.

It is logical, that NSR has some limits as of now: the summer "window" is 5-6 months when the ships can sale without the ice-breakers: ice-breaker's cost comes on top; some ports need water depth

increase for the big vessels; not all cargo types suit for the arctic temperatures transportation without special packing.

But in any case, it is possible to conclude, that the Northern Sea Route has a high potential in the near future and presents the real alternative to the western route transportation to and from Asia.

References

1. *«Arktika» budushchego. Teper' u Rossii est' samyi moshchnyi v mire ledokol* ["Arctic" of the future. Now Russia has the most powerful icebreaker in the world]. Available at: https://aif.ru/politics/russia/arktika_budushchego_teper_u_rossii_est_samyy_moshchnyy_v_mire_ledokol [Accessed 12/12/2021].
2. Arkticheskaya zona Rossiiskoi Federatsii (AZRF). Available at: https://neftegaz.ru/tech-library/geografiya/668885-arkticheskaya-zona-rossiyskoy-federatsii-azrf-/ [Accessed 12/12/2021]
3. *Atomnyi ledokol'nyi flot* [Nuclear icebreaker fleet]. Available at: https://www.rosatom.ru/production/fleet/ [Accessed 12/12/2021]
4. Gaiva E. *Zachem Rossii nuzhen Severnyi morskoi put'* [Why does Russia need the Northern Sea Route]. Available at: https://rg.ru/2021/04/25/reg-szfo/zachem-rossii-nuzhen-severnyj-morskoj-put.html [Accessed 12/12/2021]
5. *Gruzopotok po Sevmorputi v 2021 godu budet ne nizhe urovnya 2020 goda* [Freight traffic along the Northern Sea Route in 2021 will not be lower than the level of 2020]. Available at: https://oilcapital.ru/news/transport/15-02-2021/gruzopotok-po-sevmorputi-v-2021-godu-budet-ne-nizhe-urovnya-2020-goda [Accessed 12/12/2021]
6. Mazneva E. *Putin Blesses Multibillion-Dollar Bet on Russia Competing in LNG.* Available at: https://about.bnef.com/blog/putin-blesses-multibillion-dollar-bet-on-russia-competing-in-lng/ [Accessed 12/12/2021]
7. *Northern Sea Route: From Speculations to Reality by 2035.* Available at: https://www.highnorthnews.com/en/northern-sea-route-speculations-reality-2035 [Accessed 12/12/2021]
8. *«Novatek» khochet postroit' SPG-terminal pod Murmanskom* ["Novatek" wants to build an LNG terminal near Murmansk]. Available at: https://rucompromat.com/articles/novatek_hochet_postroit_spg-terminal_pod_murmanskom [Accessed 12/12/2021].
9. *NSR transit statistics*. Available at: http://www.chnl.no/ [Accessed 12/12/2021]
10. *Po Sevmorputi za 5 mesyatsev 2021 goda perevezeno 12,8 mln ton* [12.8 million tons were transported along the Northern Sea Route in 5 months of 2021]. Available at: https://nangs.org/news/economics/po-sevmorputi-za-5-mesyatsev-2021-goda-perevezeno-128-mln-tonn [Accessed 12/12/2021]
11. *Rossiya predlozhit doplachivat' za perevozku gruzov cherez Sevmorput'* [Russia will offer to pay extra for goods transportation through the Northern Sea Route]. Available at: https://www.rbc.ru/economics/21/10/2019/5dadff2e9a79476ddbd5fd9e [Accessed 12/12/2021]
12. *Sevmorput' 2.0. Kak sovershit' arkticheskii proryv* [NSR 2.0]. Available at: https://icebreakers.tass.ru/dolgij-put-na-sever/direkciya-severnogo-morskogo-puti [Accessed 12/12/2021]
13. Starodubtsev V. *Shiroty vysokoi vazhnosti* [Latitudes of high importance]. Available at: https://www.kommersant.ru/doc/3254502 [Accessed 12/12/2021]

Возможности и перспективы Северного морского пути

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Аннотация

Перспективы Арктики, в том числе транспортные коммуникации, активно обсуждаются на мировой арене. Северный морской путь является ключевым судоходным маршрутом в регионе. В статье показано, что на сегодняшний день его транспортные возможности

оправдывают его международную значимость. В ходе статьи была проанализирована основная деятельность на СМП в ретроспективе, а также были представлены прогнозы, в особенности, планы компании «Росатом» увеличить объем грузопотока. В результате исследования было рассчитано количественное преимущество СМП, с точки зрения издержек при перевозке сжиженного природного газа, и были выделены ключевые достоинства использования СМП в сравнении с западным путем через Суэцкий канал. Они включают в себя экономию топлива, более низкие трудозатраты и стоимость аренды судна, отсутствие платы за проход судна и очередей.

Для цитирования в научных исследованиях

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Ключевые слова

Северный морской путь, Арктика, ледоколы, грузоперевозки, грузопоток, Новатэк, Суэцкий канал, перевозки СПГ, Росатом.

Библиография

1. «Арктика» будущего. Теперь у России есть самый мощный в мире ледокол. URL: https://aif.ru/politics/russia/arktika_budushchego_teper_u_rossii_est_samyy_moshchnyy_v_mire_ledokol
2. Арктическая зона Российской Федерации (АЗРФ). URL: https://neftegaz.ru/tech-library/geografiya/668885-arkticheskaya-zona-rossiyskoy-federatsii-azrf-/
3. Атомный ледокольный флот. URL: https://www.rosatom.ru/production/fleet/
4. Гайва Е. Зачем России нужен Северный морской путь. URL: https://rg.ru/2021/04/25/reg-szfo/zachem-rossii-nuzhen-severnyj-morskoj-put.html
5. Грузопоток по Севморпути в 2021 году будет не ниже уровня 2020 года. URL: https://oilcapital.ru/news/transport/15-02-2021/gruzopotok-po-sevmorputi-v-2021-godu-budet-ne-nizhe-urovnya-2020-goda
6. «Новатэк» хочет построить СПГ-терминал под Мурманском. URL: https://rucompromat.com/articles/novatek_hochet_postroit_spg-terminal_pod_murmanskom
7. По Севморпути за 5 месяцев 2021 года перевезено 12,8 млн тонн. URL: https://nangs.org/news/economics/po-sevmorputi-za-5-mesyatsev-2021-goda-perevezeno-128-mln-tonn
8. Россия предложит доплачивать за перевозку грузов через Севморпуть. URL: https://www.rbc.ru/economics/21/10/2019/5dadff2e9a79476ddbd5fd9e
9. Севморпуть 2.0. Как совершить арктический прорыв. URL: https://icebreakers.tass.ru/dolgij-put-na-sever/direkciya-severnogo-morskogo-puti
10. Стародубцев В. Широты высокой важности. URL: https://www.kommersant.ru/doc/3254502
11. Mazneva E. Putin Blesses Multibillion-Dollar Bet on Russia Competing in LNG. URL: https://about.bnef.com/blog/putin-blesses-multibillion-dollar-bet-on-russia-competing-in-lng/
12. Northern Sea Route: From Speculations to Reality by 2035. URL: https://www.highnorthnews.com/en/northern-sea-route-speculations-reality-2035
13. NSR transit statistics. URL: http://www.chnl.no/