



# Northern Sea Route: Development Prospects and Uncertainties

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In 2018, the Northern Sea Route development project was added to Russia's "2019-2024 Comprehensive Long-Haul Infrastructure Modernization and Expansion Plan" with a budget of over RUB 580 billion (USD 9.25 billion). Rosatom, the Russian state nuclear agency, has announced plans to establish a commercial shipping company and compete with the largest companies in the container shipping business.

On the global market, the idea of developing the Northern Sea Route has generated controversial discussions on ecology, climate change and strong competition in the market. The largest shippers and manufacturers, including CMA CGM, MSC and Nike, have stated they will not ship goods through the Arctic Ocean due to the high impact on the regional ecology.

PwC has recently completed a comprehensive analysis of the opportunities and threats related to developing the Northern Sea Route. Below, we summarize the major issues and challenges covered in our research.

### Who needs the Northern Sea Route?

Although the Northern Sea Route was opened for international navigation back in 1991, step traffic dynamics was recorded only after 2012. The increase was driven by amendments to Federal Law No. 155 "On Internal Waters, Territorial Sea and Contiguous Zone", which legally defined the boundaries of the Northern Sea Route and established the Northern Sea Route Administration to ensure navigational safety, including monitoring and support for icebreaker escorts and ice pilotage on the route.

The development of the Northern Sea Route took a new step forward when Yamal LNG facilities were commissioned in 2017, followed by the inclusion of the Northern Sea Route project in the "2019-2024 Comprehensive Long-Haul Infrastructure Modernization and Expansion Plan" with a total budget of over RUB 580 billion for the next five years.





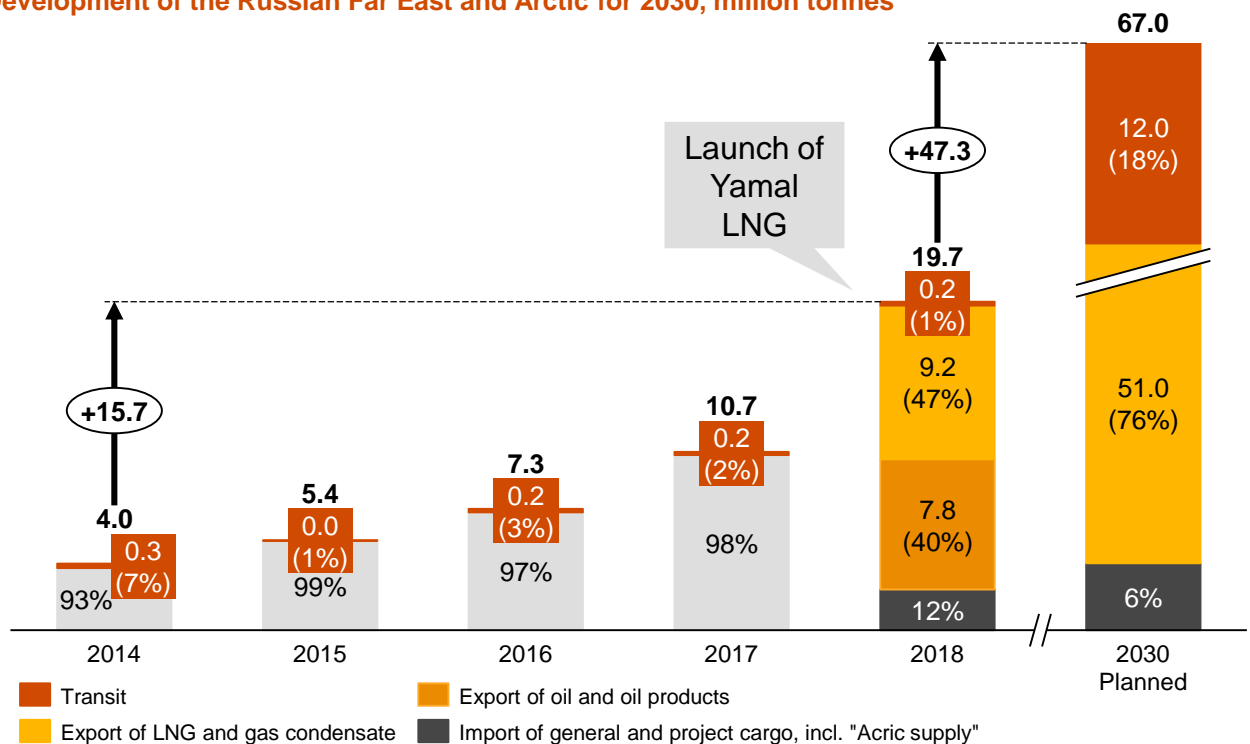
According to Northern Sea Route Administration, freight shipments increased fivefold in 2018 vs. 2014 and doubled vs. 2017 thanks to the launch of the Yamal LNG.

In 2018, exports of LNG, gas condensate, oil and oil products accounted for almost 90% of shipments or 17 million tonnes. Due to the lack of inland infrastructure and extreme climate conditions in the far north of Russia, there is no other way to export the hydrocarbons that are mined in the region. Thus, the expected growth of exports to 51 million tonnes by 2030 seems realistic if projects by NOVATEK, Arctic LNG-1 and Arctic LNG-2 are completed as planned.

Approximately 2.4 million tonnes (12%) of the shipments consist of imported cargo, mainly general and cargo for project, the mining sites, and also so-called Arctic supplies (state-subsidized goods for people living in the far north). These cargo flows seem to be relatively stable and are projected to be under 4 million tonnes by 2030.

Transit cargo flows accounted for less than 1% of the traffic in 2018. Transit volumes on the Northern Sea Route have been around 200,000-300,000 tonnes per year in the past. The plan to increase volumes to 12 million tonnes is highly controversial. Maersk and COSCO have made only several trial passages and have abstained from making any statements regarding the prospects of regular traffic.

**Figure 1. Traffic via Northern Sea Route in 2014-2018 and planned by the Ministry for the Development of the Russian Far East and Arctic for 2030, million tonnes**



The icebreaker  
fleet is essential  
for developing  
the Northern  
Sea Route



### Global warming in the Arctic

There are several climate change scenarios for the Arctic Ocean. The most pessimistic is the anthropogenic scenario based on observations over the past 40 years. The scenario stipulates that the summer navigation period will increase by 7 days every 10 years. This would be a dramatic change for the whole region, including towns located on the permafrost and all inhabitant species. However, from the transportation perspective, it would extend the NSR summer navigation period to only 135 days.

However, considering the current ratio of winter to summer navigation, this is a marginal increase. Moreover, it would not simplify the incredibly challenging and unpredictable navigation conditions.

NSR waters are divided into seven zones. Depending on the ship's ice class, the navigation period and the weather, an icebreaker escort may be required in certain zones or along the entire route.

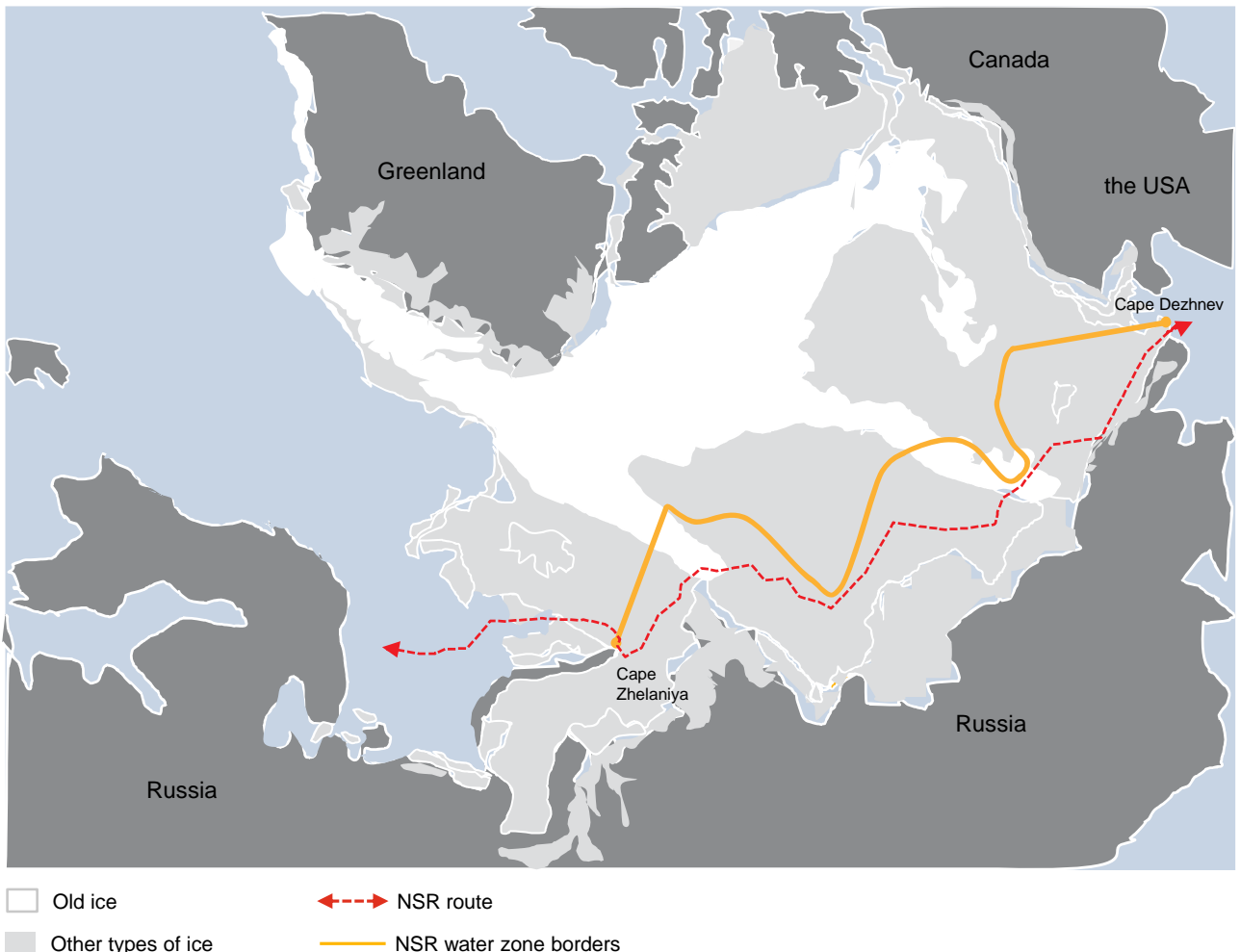
The need for icebreaker assistance creates two key restrictions: speed and dependence in the icebreaker fleet.

In summer (July through October) with optimal weather and ice coverage under 15%, vessels can travel at speeds of up to 17-19 knots. However, in winter (November through July) when the ice coverage is greater, speeds can be as low as 6 knots, or sometimes zero, resulting in forced downtime.

The severe climate of the Arctic imposes restrictions on what can be transported via this route. The average temperature in winter is  $-30^{\circ}\text{C}$ , ranging from  $-43^{\circ}\text{C}$  to  $-26^{\circ}\text{C}$ .

During the summer navigation period, the air temperature hovers at around  $0^{\circ}\text{C}$ . Such conditions may be unfitting for electronics, plastics, certain types of food and chemical products.

**Figure 3. Climatic ice map, NSR and its borders identify by the Northern Sea Route Administration**



Source: Northern Sea Route Administration

Theoretically, during some periods, sensitive products could be transported in refrigerated containers, but it would increase the cost significantly.

Challenges and restrictions arise not only from the type of cargo, but also from vessel maintenance. The risk of ship icing requires comprehensive operations, including knocking the ice off with an icebreaker's stern. It also poses a threat to fleets and their crews.

Rescue operations in NSR are complicated due to ice and low air temperatures. Crews and cargos face more significant hazards during en route emergencies along the NSR than via the Suez Canal.

### To ship or not to ship

At the moment, most of the vessels cruising the NSR are SNG Yamalmax tankers (Arc 7 class). Transit traffic mostly consists of Arc4 vessels that may need icebreaker assistance even in summer during average or severe ice conditions. However, the navigability of the NSR is still being tested in various combinations.

For example, in the summer of 2018, the Venta Maersk, carrying 3,600 TEU that passed from Pusan to Saint Petersburg, was escorted by the 50 Let Pobedy icebreaker. In 2011, the Vladimir Tikhonov tanker with a beam of 50 meters was assisted by two icebreakers, the Yamal and 50 Let Pobedy, on its eastbound passage from Murmansk to Thailand. In the winter of 2018-2019, the Arc7 class tankers Boris Sokolov and Boris Davydov passed through the NSR without an icebreaker escort, setting a unique precedent that could lead to the lowering of ice class requirements in the future.

The icebreaker fleet is essential for developing the Northern Sea Route. Ice class requirements vary greatly depending on the navigation period and route zone. For instance, there are two complicated zones with old ice located in the eastern part of the NSR. During the winter navigation period, they require Arc4-Arc8 class vessels with icebreaker assistance.

In good weather conditions during the four months of the summer navigation period, vessels may take the Northern Sea Route without external ice reinforcements. In certain zones, bad weather even in summer may call for an icebreaker escort.

Without developing, expanding and upgrading the icebreaker fleet, including building new types of icebreakers, all-year navigation via the Northern Sea Route would be impossible.

Regular all-year navigation via the Northern Sea Route would require sufficient infrastructure to ensure that fleets are operated efficiently, including maintenance and repair services, ice monitoring and infrastructure for handling environmental risks arising from using nuclear icebreakers and working in the Arctic.

**Figure 3. Key factors that influence the choice of transportation route**

Factor	Significance
Cost of delivery	
Reliability of the route	
Time of delivery	
Operational requirements of the cargo owner, delivery flexibility	
Quality of the infrastructure and services provided	
Positive experience   statistics available for the route	
Customs clearance	

Source: interview with industry experts conducted by PwC Russia

Leaving aside infrastructure and fleet issues, what does the Northern Sea Route offer shippers and cargo owners to attract cargo to this alternative route?

The biggest upside of the NSR is that, for some trips, it would be shorter in nautical miles than the route via the Suez Canal, thus making transportation quicker and cheaper. However, existing icebreakers, which might be needed the whole year around, can not offer a 50-metre corridor.

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This limits the maximum size of vessel beams and, as a result, maximum vessel deadweight to only 4,000 TEU. New type of icebreakers with its first project "Leader" is currently in design stage. "Leader" will provide a 50-metre corridor and will allow vessels with up to 12,000 TEU deadweight. At the same time the leading shipping companies operate fleets using extra-large vessels with over 20,000 TEU deadweight on the competing route via the Suez Canal.

This leaves very little room for price competition even during the summer navigation period.

The second and third most important factors that influence the choice of transportation route, reliability and time, are interconnected. Cargo owners expect an exact delivery time and reliable schedules in order to organize their global logistics chains. Even several days of delay can lead to losses.

Unpredictable weather with severe winds and icebergs can cause significant delays and jeopardize well-planned logistics. Because the austere conditions and unpredictable weather in the NSR area would get in the way of timetables, the short summer navigation period cannot accommodate year-round shipping.

CMA CGM Group, MSC and Nike have announced that they are not interested in using the NSR due to its impact on the region's environment. As the industry fights for margins in anticipation of IMO 2020 restrictions on sulphur emissions, the development of the NSR may require extensive public sponsorship but with no guarantee that transit cargo flows can be captured from the well-established routes currently in use.



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