

# The Arctic Shipping Era: Challenges and Responses of Busan Port

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Korea Maritime Institute / Kim Eunwoo

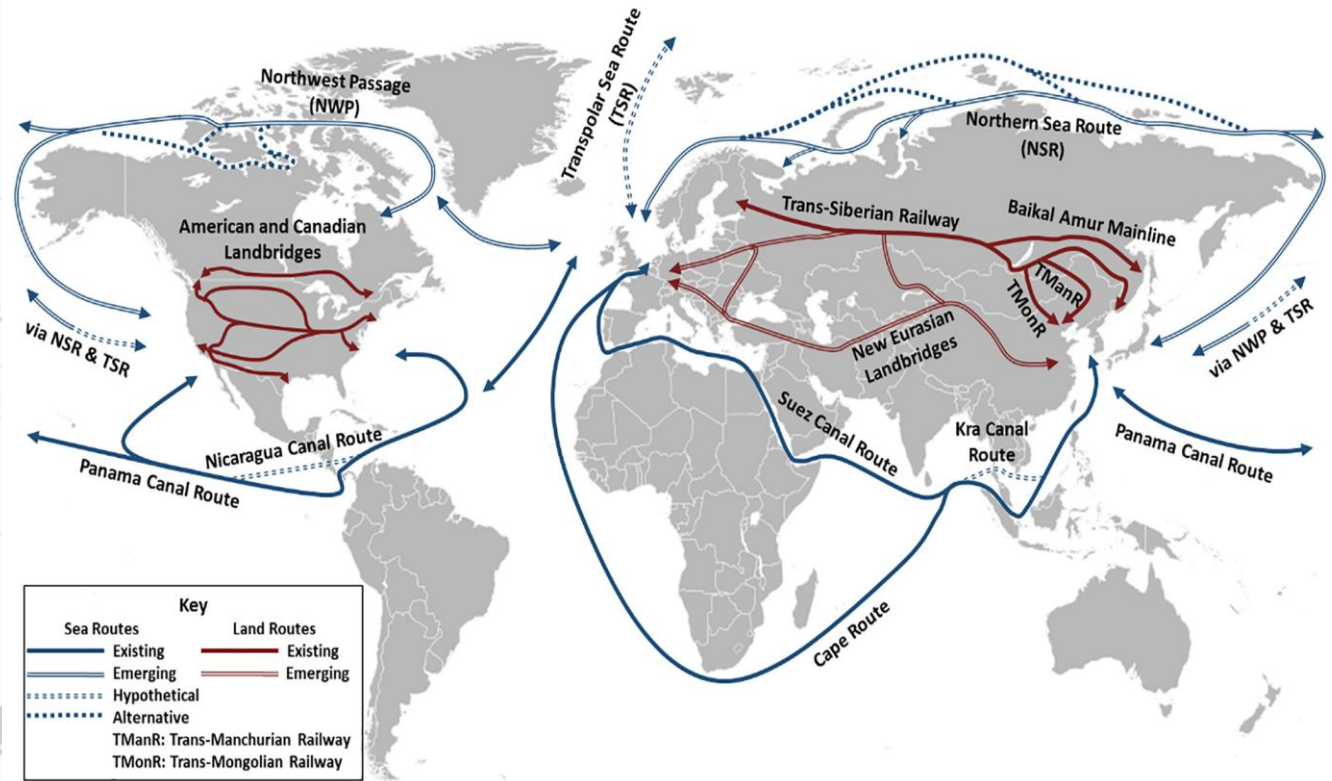
2025. 9. 23.(Tue.)

# Arctic Shipping Routes

## ☑ Major Routes



Source: The Economist[2024.1.18][검색일: 2025.7.11]



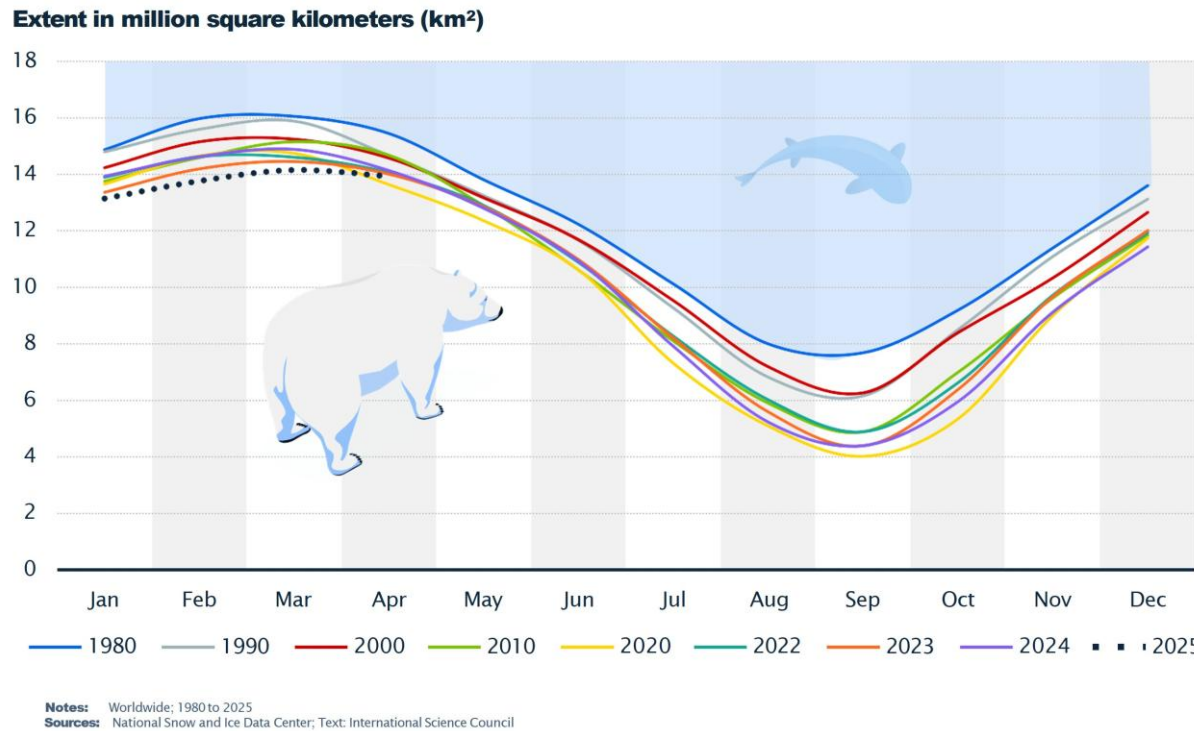
Source: Dimitrios Theocharis et. al, Arctic Shipping: A systematic literature review of comparative studies, Journal of Transport Geography, Volume 69, May 2018



# Arctic Sea Ice Extent

## ☑ Diminishing Faster Than Expected

< Northern Hemisphere sea ice extent per month >



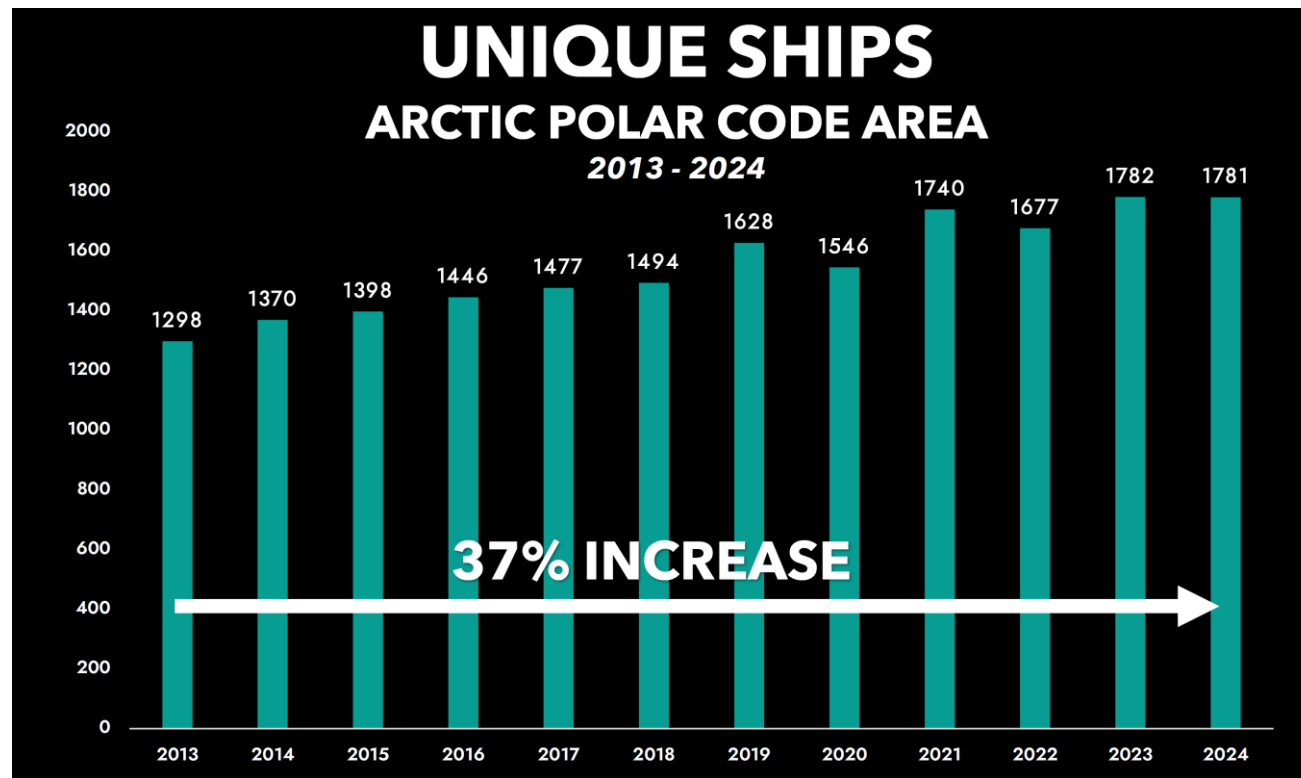
Source: German Ocean Foundation, *State of the oceans 2025*, Jul 10, 2025(Statista, 2025.6)



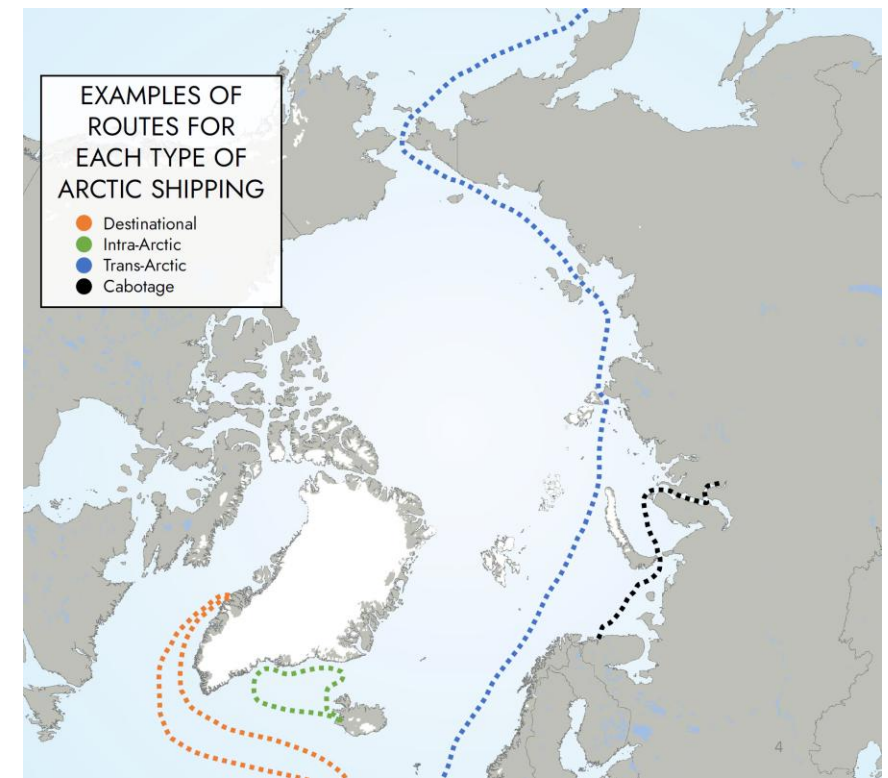
Source: The Economist(2025.8.12)(검색일: 2025.9.14)

# Ships in the Artic

## ☑ Increase in Number of Ships

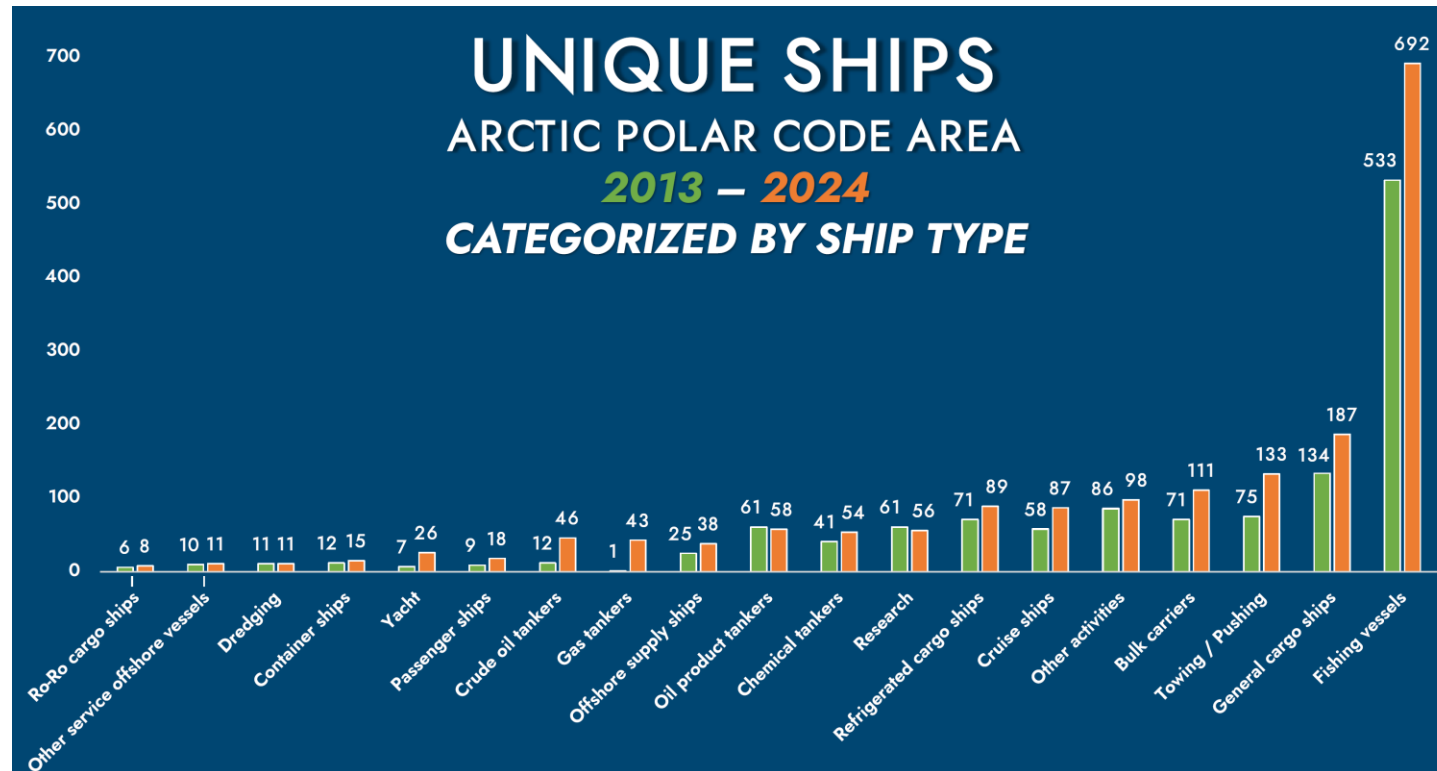


Note: Unique ship refers to each ship only counted once, although many ships enter the area multiple times each year  
Source: PAME, The increase in Arctic Shipping: 2013-2024[2025.1.28][검색일: 2025.7.15]



# Ships in the Arctic

## ☑ Growth in Multi-Purpose Activities

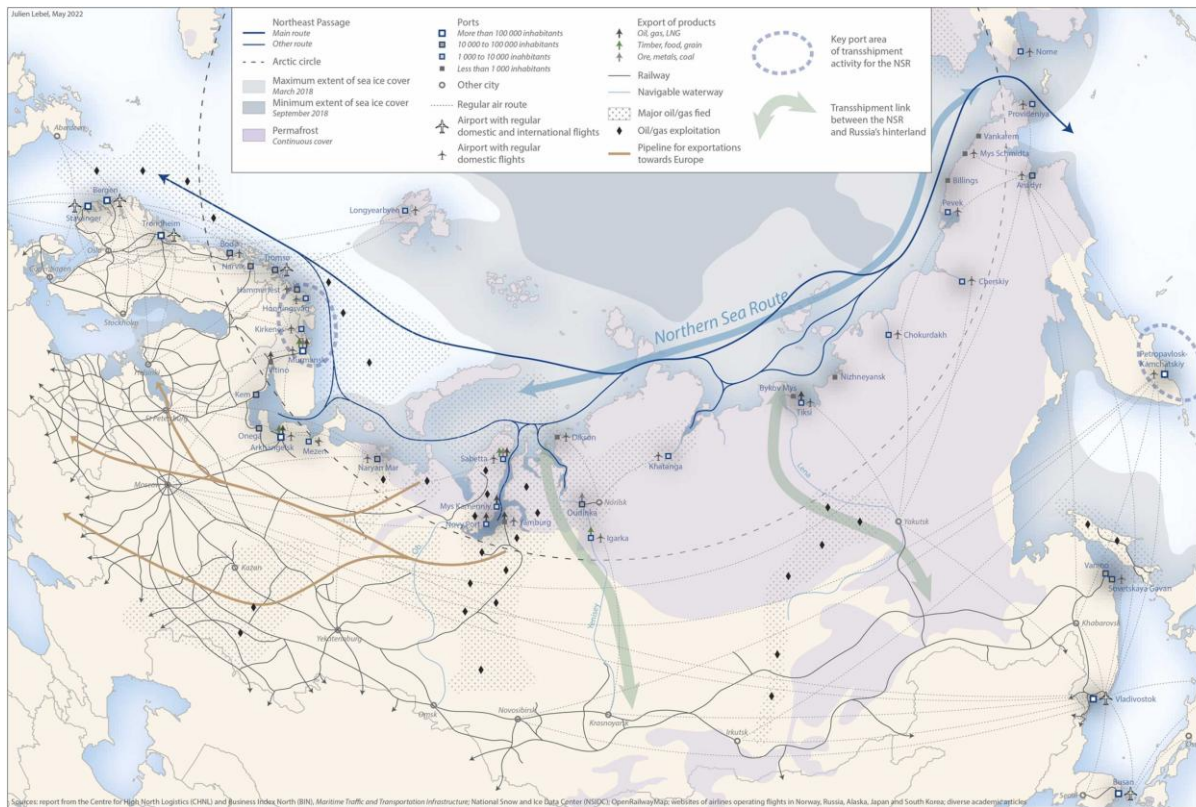


Note: Unique ship refers to each ship only counted once, although many ships enter the area multiple times each year  
Source: PAME, The increase in Arctic Shipping: 2013-2024(2025.1.28)[검색일: 2025.7.15]

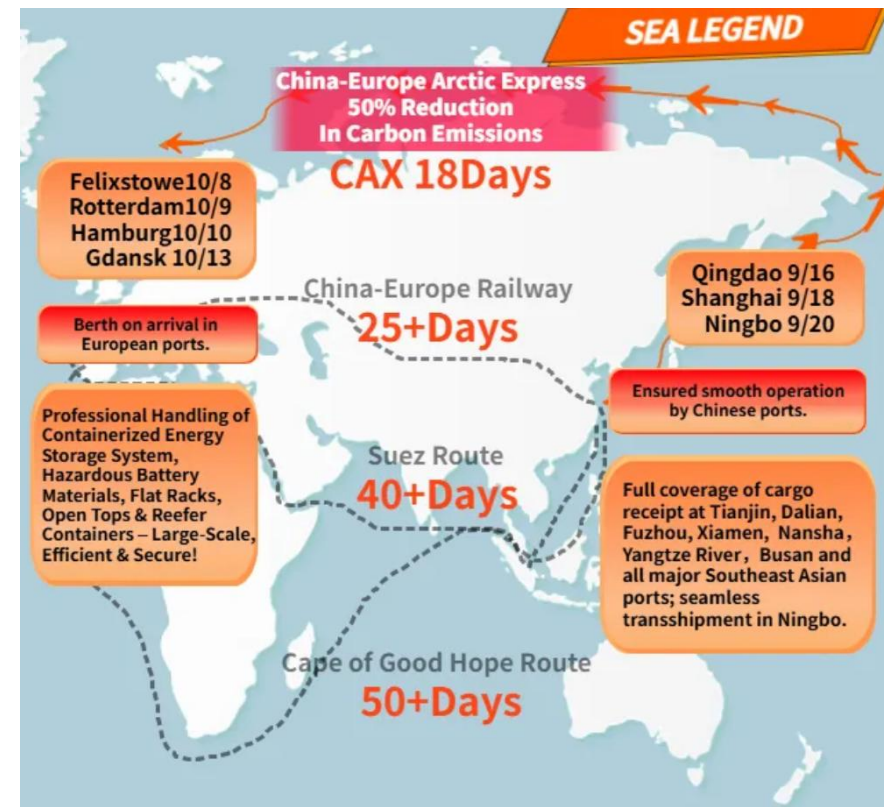


# Northern Sea Route(NSR)

## ☑ Direct Shortcut Between Asia and Europe



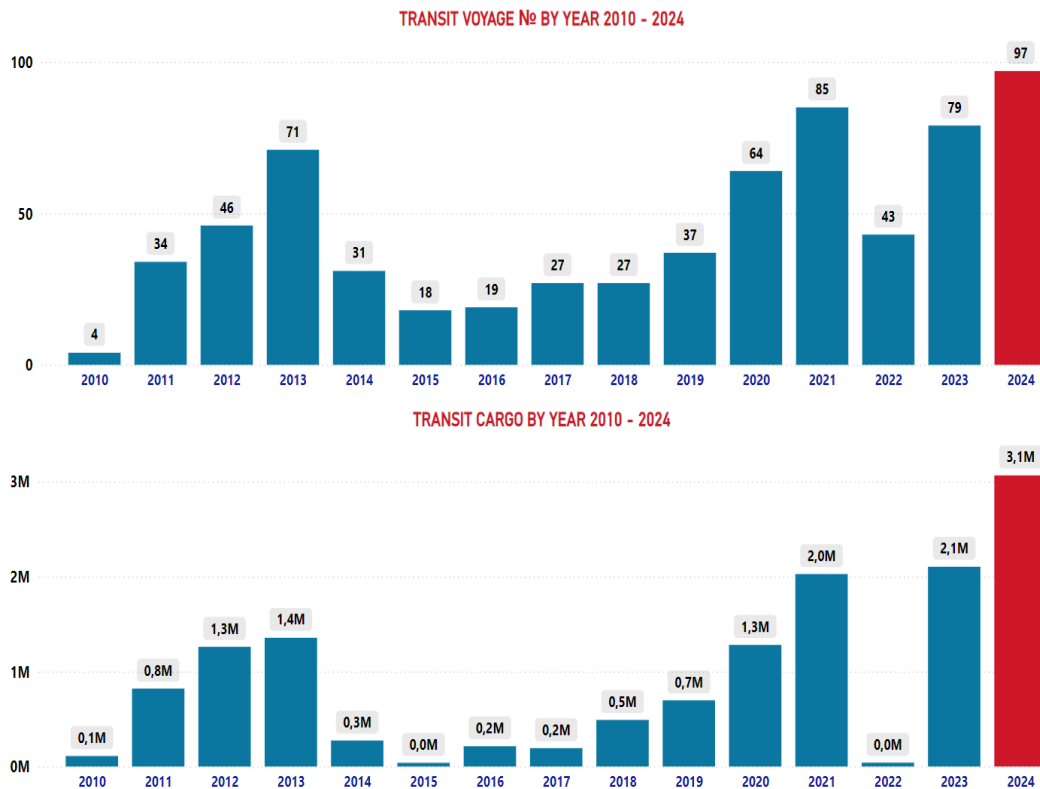
Source : Roberto Rivas Hermann et. al, Arctic transshipment hub planning along the Northern Sea Route: A systematic literature review and policy implications of Arctic port infrastructure, Marine Policy, Volume 145, November 2022.



Source : 中国航务周刊(2025.7.28.) (검색일: 2025.8.25.)

# Transit Traffic of NSR

## ✓ Growth in Both Vessel Traffic and Cargo Volume

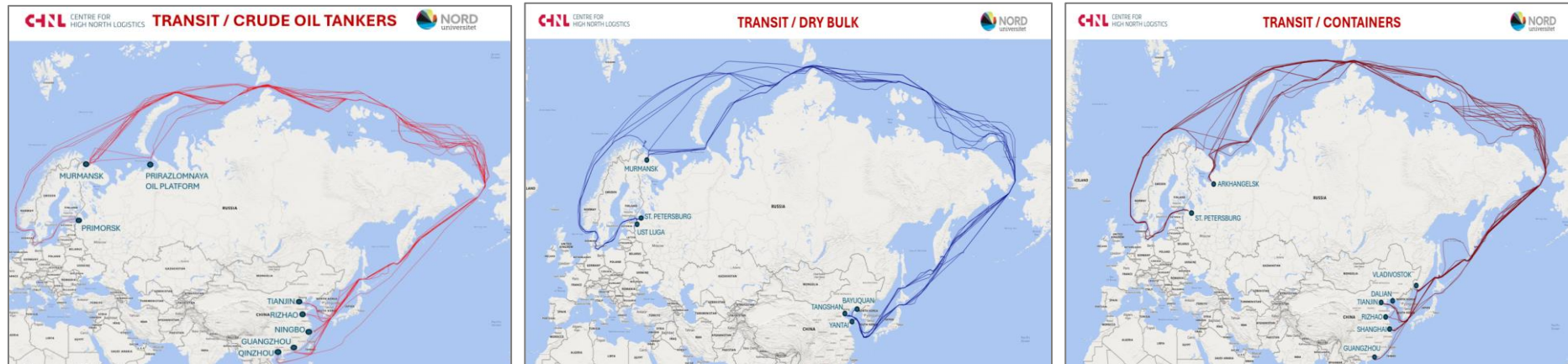


Source: Centre for High North Logistics, Main Results of NSR Transit Navigation in 2024[2024.11.28](검색일: 2025.7.11)



# Features of Cargo Transport via NSR

## ☑ Energy Route(Russia to China), Two-Way Container Transport



Source: Centre for High North Logistics, Main Results of NSR Transit Navigation in 2024[2024.11.28](검색일: 2025.7.11)

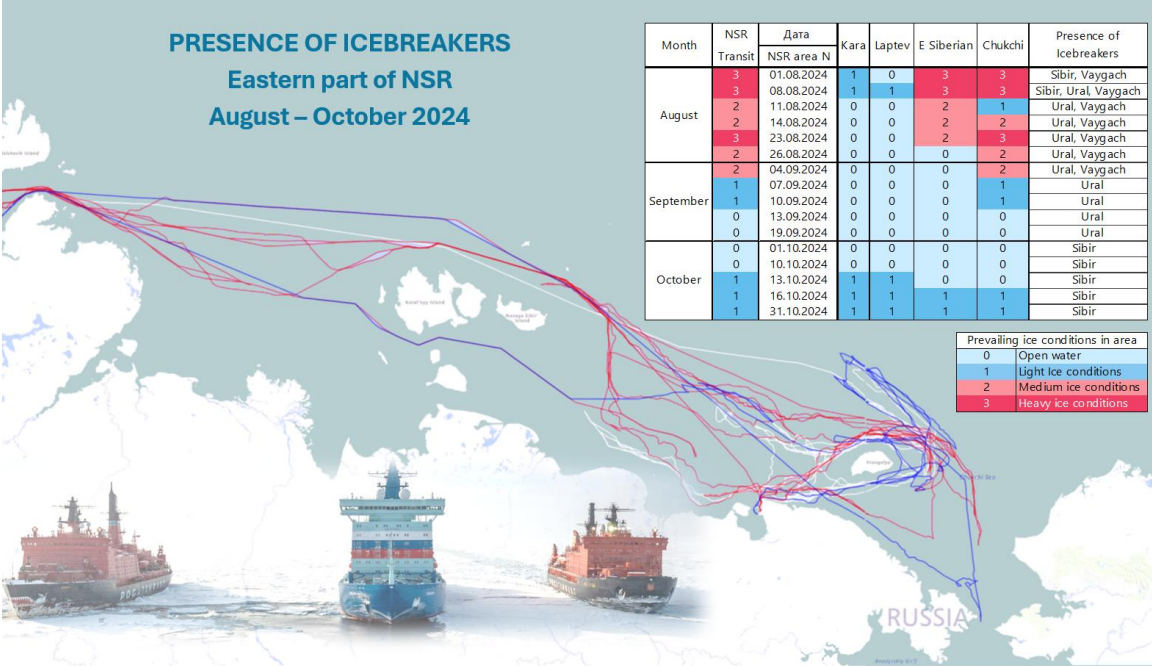


Source: Centre for High North Logistics, Overview of Transit voyages along the Northern Sea Route as of August 31, 2025, [2025.9.1](검색일: 2025.9.12)

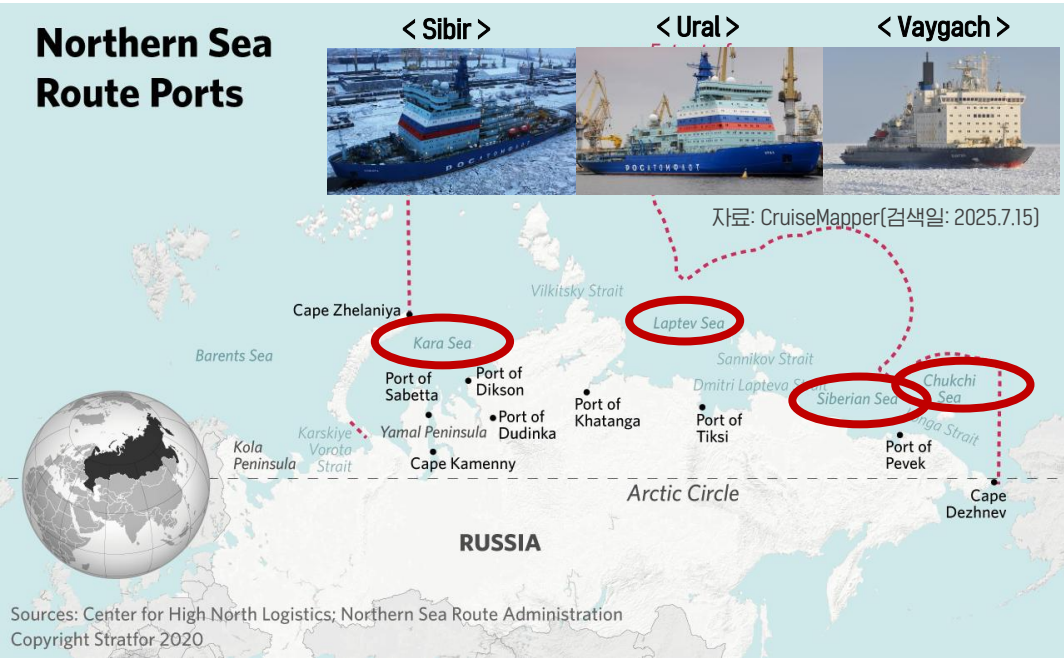


# Ice Conditions of NSR

## ☑ Key Factor in Transit Navigation



Source: Centre for High North Logistics, Main Results of NSR Transit Navigation in 2024(2024.11.28)(검색일: 2025.7.11)



Sources: RANE, Russia's Emerging Arctic Maritime Frontier & CruiseMapper(검색일: 2025.7.15)

# Key Considerations

## ☑ HFO banned(as of 1 Jul. 2024)

ANNEX	
AMENDMENTS TO MARPOL ANNEX I	
(Prohibition on the use and carriage for use as fuel of heavy fuel oil by ships in Arctic waters)	
1	The title of chapter 9 is amended as follows: "Chapter 9 – Special requirements for the use or carriage of oils in polar waters"
2	A new regulation 43A is added in chapter 9 after existing regulation 43, as follows:  "Regulation 43A Special requirements for the use and carriage of oils as fuel in Arctic waters  1 With the exception of ships engaged in securing the safety of ships or in search and rescue operations, and ships dedicated to oil spill preparedness and response, the use and carriage of oils listed in regulation 43.1.2 of this Annex as fuel by ships shall be prohibited in Arctic waters, as defined in regulation 46.2 of this Annex, on or after 1 July 2024.

## ☑ Icebreakers and Ice-Class Vessels



Source: 극지연구소 [검색일: 2025.9.12]



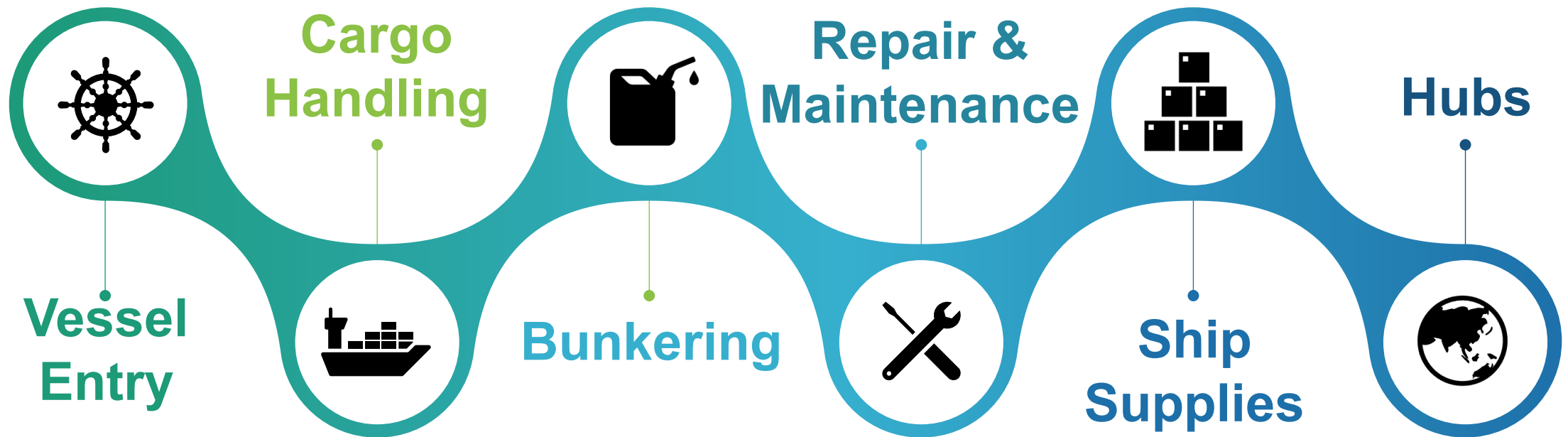
Source: gCaptain[2018.4.23][검색일: 2025.9.12]

## ☑ Cargo Demand

## ☑ Feasibility of Commercial Navigation

# Way Forward

## ☑ Integrated Port Service Capability

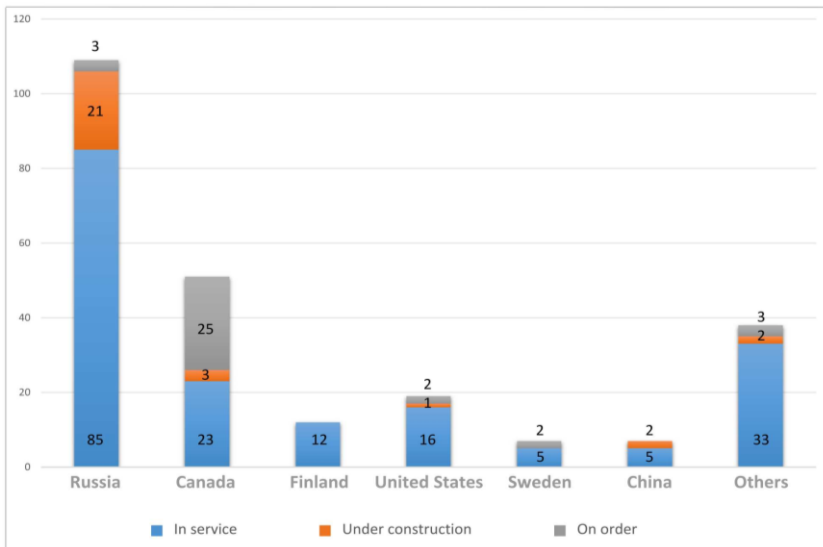




# Way Forward

## ☑ Dedicated Space and Facilities for Icebreakers

[ World Icebreakers ]



Note: As of 1 January 2024  
Source: Aker Arctic[2024.3.18](검색일: 2025.9.2)

[ Dedicated Terminal(Shanghai) ]



Source : people.cn[2022.4.27] (검색일: 2025.9.2)

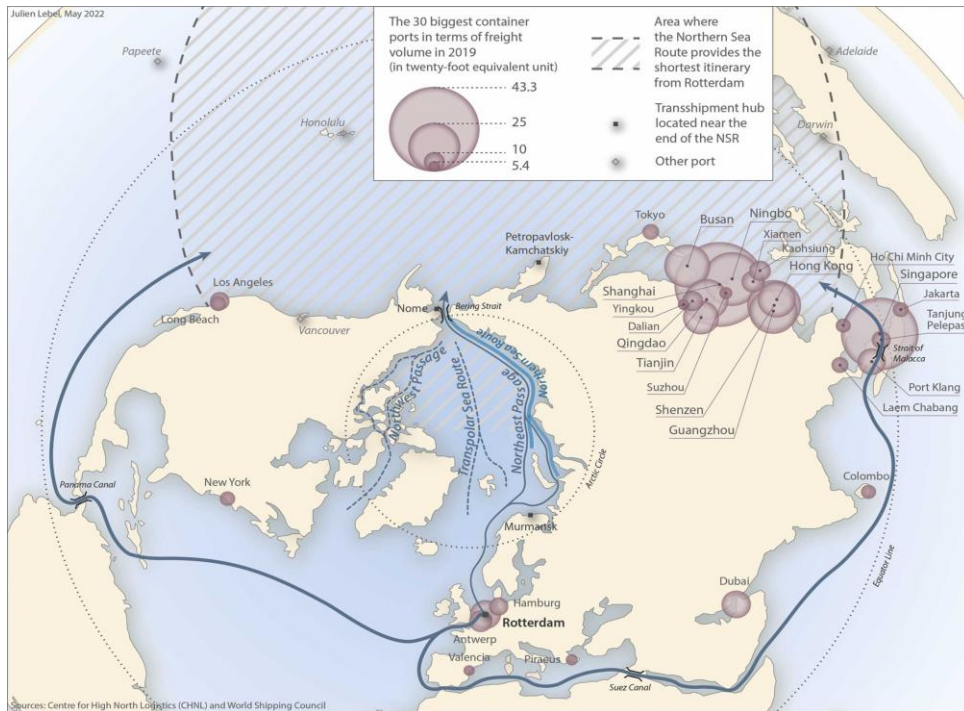
[ Dedicated Terminal(Hobart) ]



Source : Tasmanian Times[2024.10.16] (검색일: 2025.9.2)

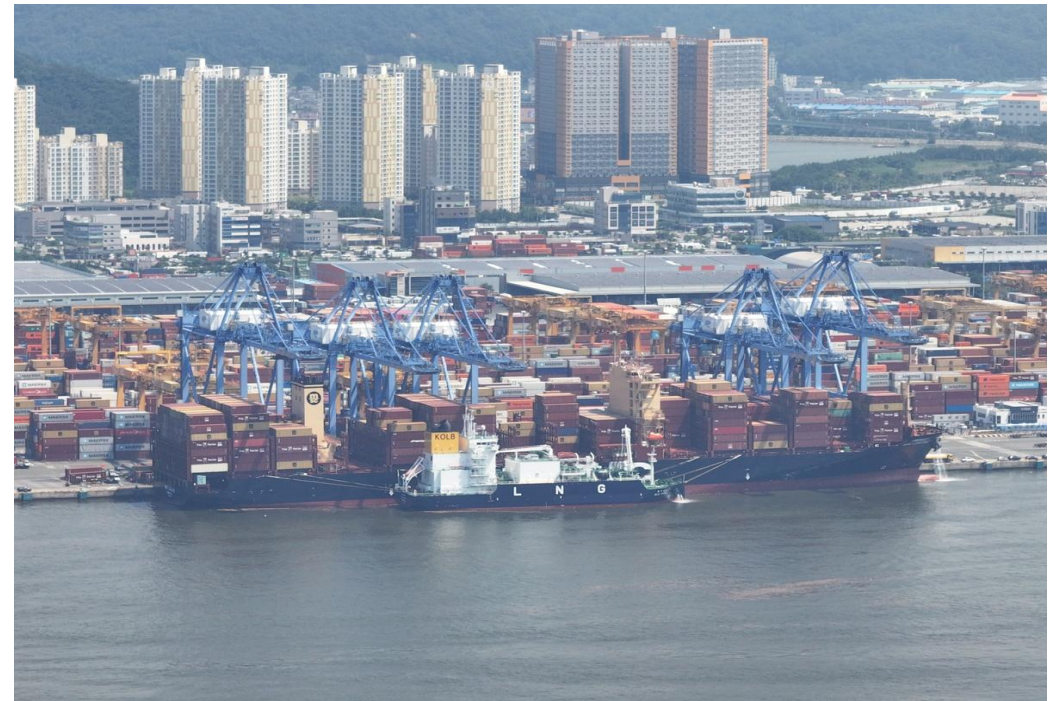
# Way Forward

## ☑ T/S Competitiveness



Source : Roberto Rivas Hermann et. al, Arctic transshipment hub planning along the Northern Sea Route: A systematic literature review and policy implications of Arctic port infrastructure, Marine Policy, Volume 145, November 2022.

## ☑ Reliable Bunkering SC



Source : 머니투데이(2025.7.24) (검색일: 2025.9.2)



# Way Forward

## ☑ Building Repair/MRO Clusters



Note: U.S. Coast Guard photo/Matthew S. Masaschi  
Source: Military.com[2018.4.16][검색일: 2025.9.14]



Source: BJFEZ[2024][검색일: 2025.9.14]



# Way Forward

☑ More Items, Smarter Supply

☑ Overseas Hubs & Incentives

Busan Port Facilities Management Center



Source : BPA

# Shaping Today, Leading Tomorrow

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