

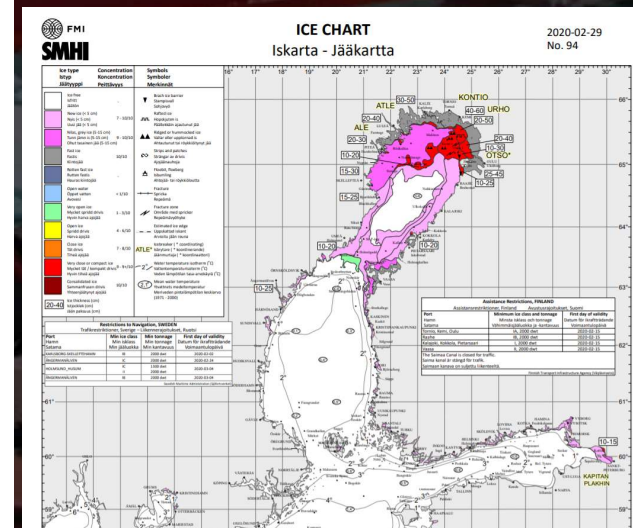


AKER ARCTIC TECHNOLOGY

Arctic Passion Seminar 2020

Reko-Antti Suojanen
CEO, Managing Director

Ice coverage in the Baltic

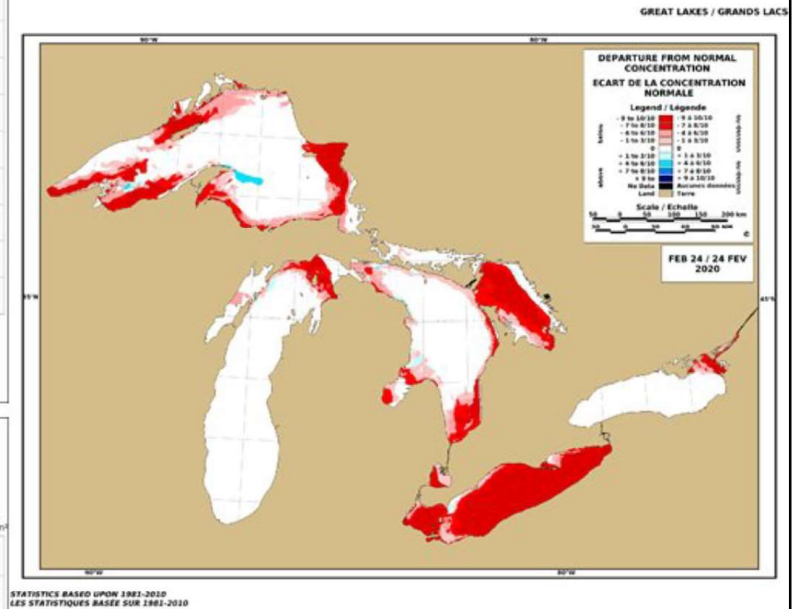
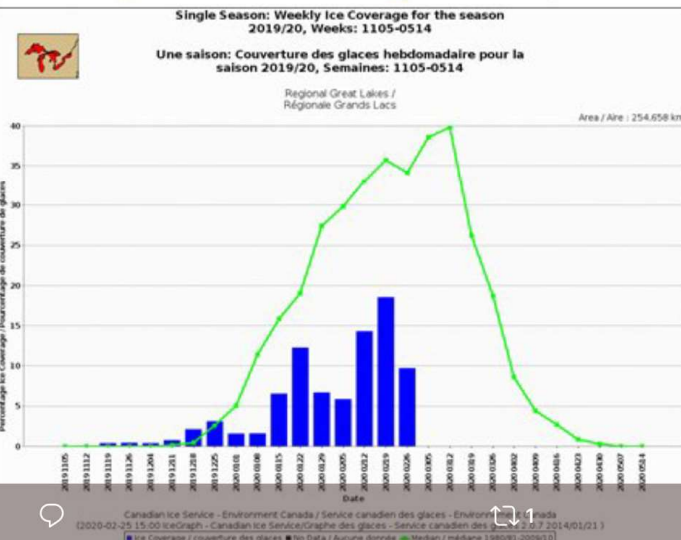
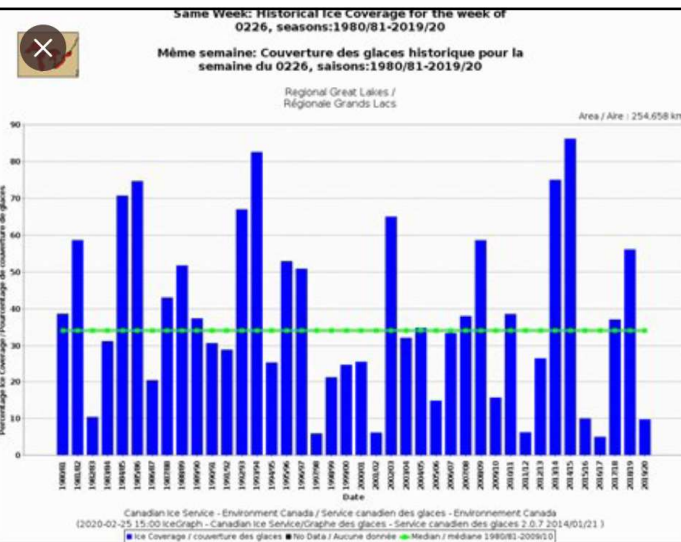


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CURRENT ICE CONDITIONS

Great Lakes

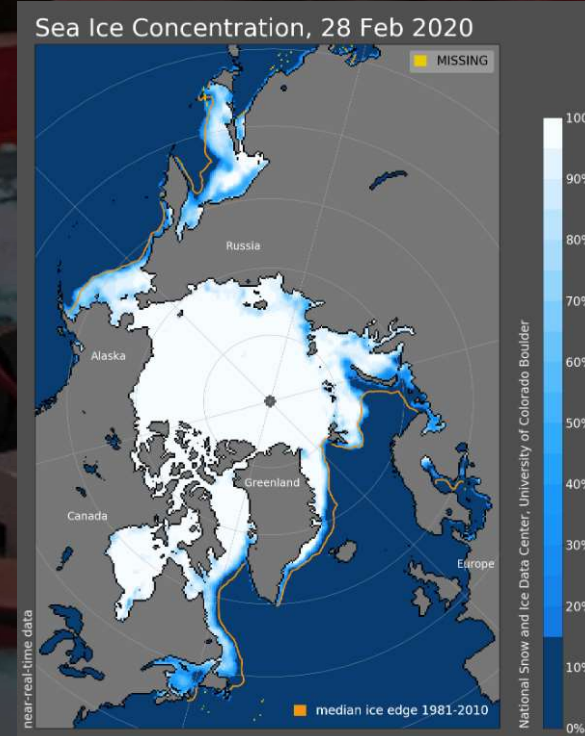
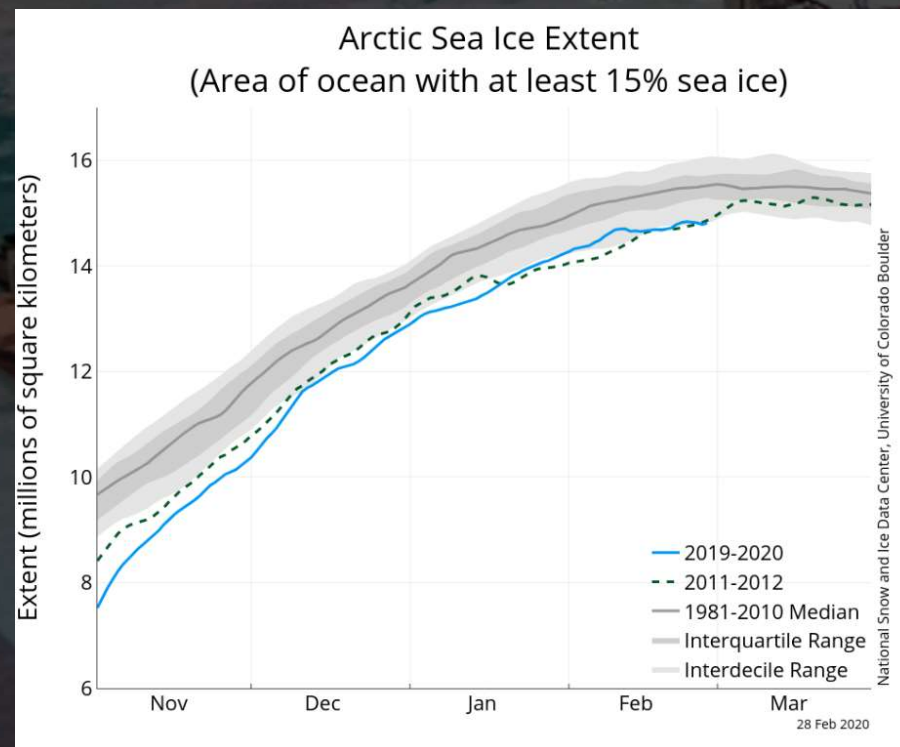
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CURRENT ICE CONDITIONS

Aker Arctic

Arctic



IMO TARGETS AND REGULATIONS

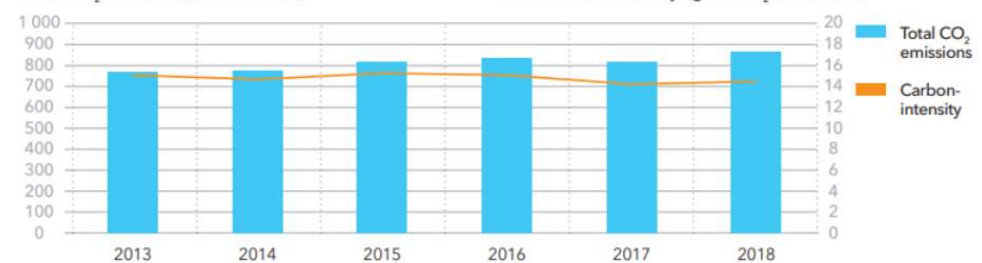
Strategy on reduction of GHG emissions from ships

- Reduce CO₂ emissions 40% by 2030
- Reduce CO₂ emissions 70% by 2050
- Reduce total GHG emissions by at least 50% by 2050
- MARPOL Annex VI states 0.50% sulphur limit for fuel oil became effective on 1 January 2020.

Trend in world fleet CO₂ emissions

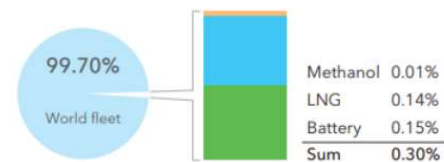
Units: CO₂ emissions (million tonnes)

Units: Carbon-intensity (gram CO₂/tonne-mile)

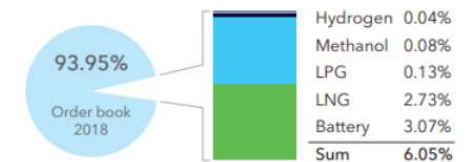


Alternative fuel uptake (percentage of ships)*

Ships in operation



Ships on order

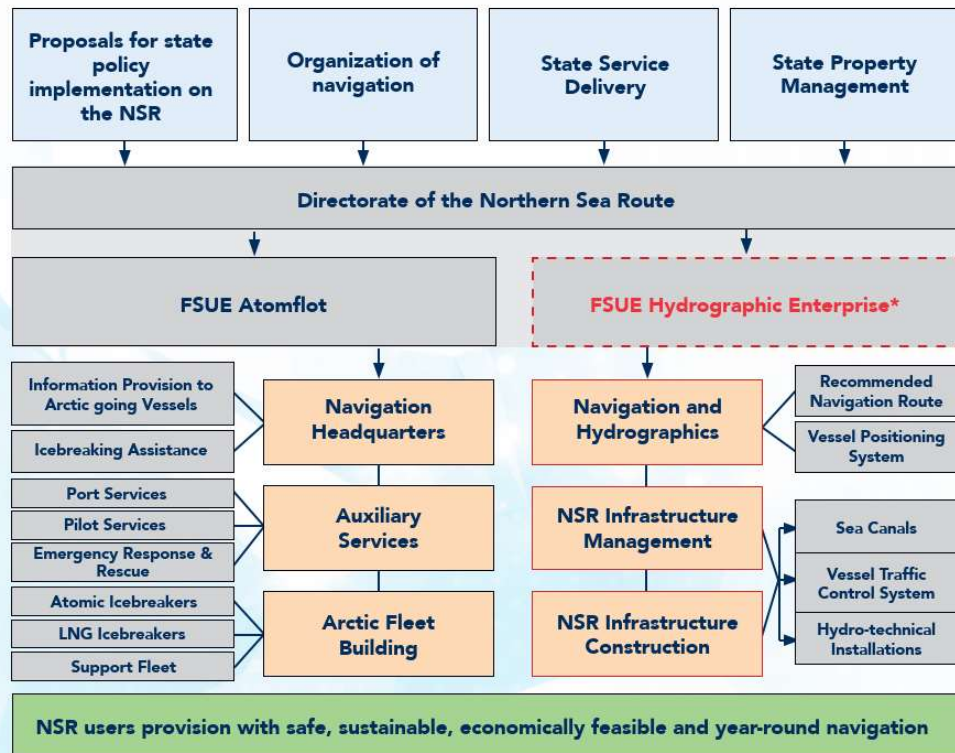


*Source: DNV GL's Alternative Fuels Insight (AFI) portal, <https://www.dnvgl.com/services/alternative-fuels-insight-128171>

REGIME FOR NORTHERN SEA ROUTE

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Since December 2018 Rosatom was awarded to responsibility for NSR development and changes from NSRA are taking place.



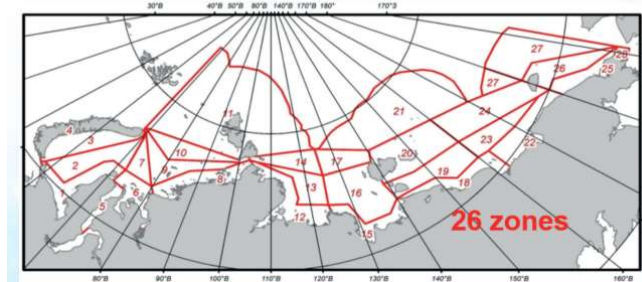
NSR organizational chart

Function

Instrument

Task

Goal

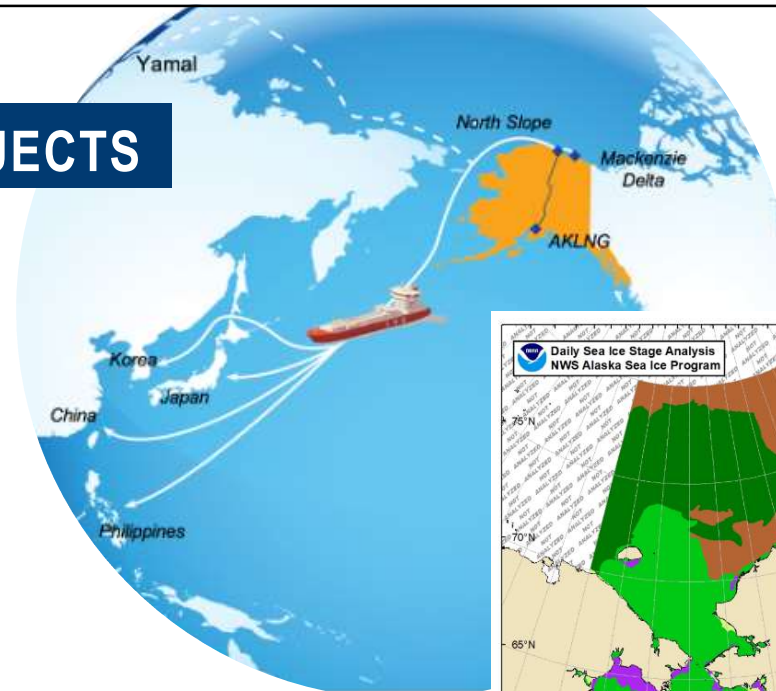


Currently, there are seven zones defined according to specific ice conditions. In the future, the number of zones will increase to 26, each with its own type of ice conditions and limitations for passage.

ARCTIC DEVELOPMENT PROJECTS

Qilak LNG

- LNG liquefaction and export from the North Slope of Alaska.
- Anticipated production 4 mtpa at first stage.
- Project calls for liquefaction facilities and LNG Carriers for the arctic conditions.
- Qilak LNG and Exxon-Mobil Alaska Production Inc. signed MOU for the gas supply to Qilak LNG.
- 2020 extensive feasibility study is carried out.



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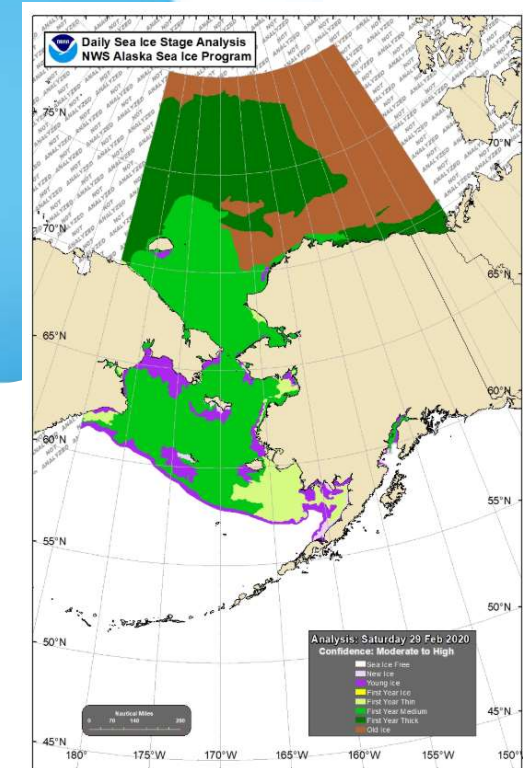


Image and data courtesy of
Qilak LNG.

ARCTIC DEVELOPMENT PROJECTS

Yamal LNG and Arctic LNG2

- LNG export from Sabetta is in full production
- 15 Arc7 LNG Carriers built by DSME are in operation
- Operators are SCF, Teekay, MOL, Dynagas
- New project Arctic LNG2 is under construction



Winter route
Russia to China – 53 days

Summer route (NSR)
Russia to China – 18 days

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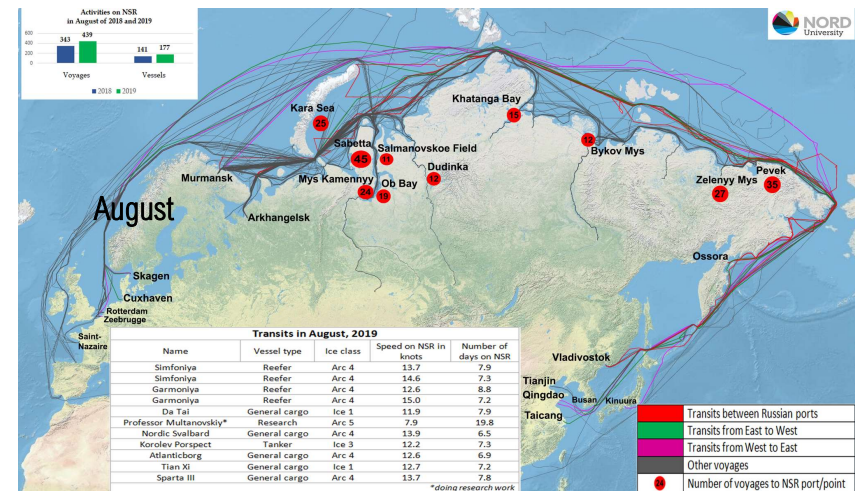
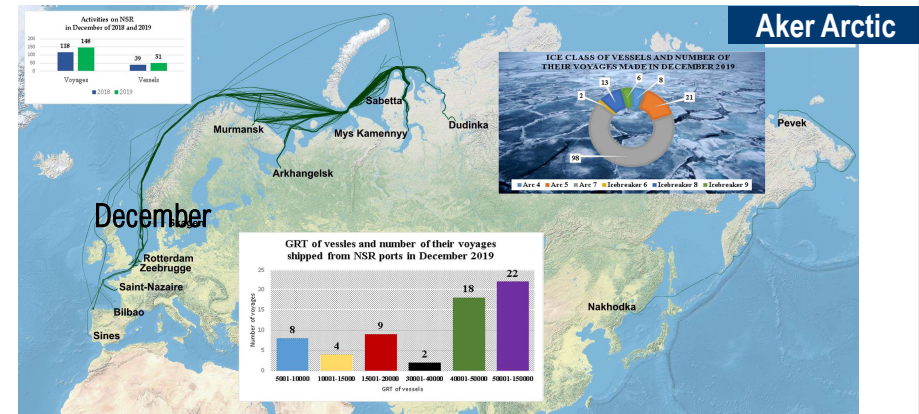
ARCTIC LNG 2

19.8
mtpa is ALNG2 capacity

Image and data courtesy of Yamal LNG and Novatek.

ARCTIC DEVELOPMENT PROJECTS

- Gasprom Neft Ob-Bay oil exports
- Norilsk Nickel export
- Baffinland Iron Ore project (6 mtpa)



NSR Information Office

LATEST DELIVERED ICEBREAKERS

Aker Arctic



Icebreaker
Polaris
Arctia
Arctech Helsinki Shipyard



Icebreaker
Ilya Muromets
Admiralty Shipyard

Icebreaker
Novorossiysk
Rosmorport
Vyborg Shipyard



Icebreakers
Alexander Sannikov
Andrey Vilkitsky
GPN, Vyborg Shipyard



Research IB
Xue Long 2
PRIC
Jiangan Shipyard
Ice trials 12/2019



Icebreaker **Ob**
Atomflot
Vyborg Shipyard
Delivered
Ice trials in 2020

2016

2016

2018

2018

2018

2019

2019

ICEBREAKERS UNDER CONSTRUCTION

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Icebreaker Victor Chernomyrdin
Rosmorport LK-25
Baltic Shipyard



NIB Arktika
NIB Sibir
NIB Ural
LK-60
Baltic Shipyard

PSC USCG Icebreaker
VT Halter



*Artistic rendering
courtesy of VT Halter
Marine*

2020

2021

2022

2024

OTHER ICEBREAKING SHIPS UNDER CONSTRUCTION

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Cruise IB for
Ponant
Le Commandant Charcot
Delivery 2021



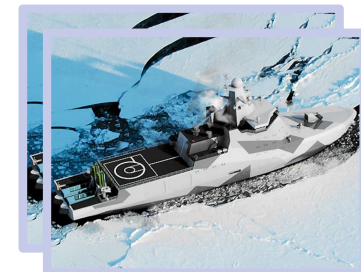
Harry DeWolf-class
Arctic offshore patrol
vessels (AOPS) 6

IBSV 10022 (4)
Rosneft
Zvezda Shipyard



Sir David Attenborough
Nuyina
Antarctica 1

Ivan Papanin
(Project 23550)
two patrol
navy icebreakers



2020

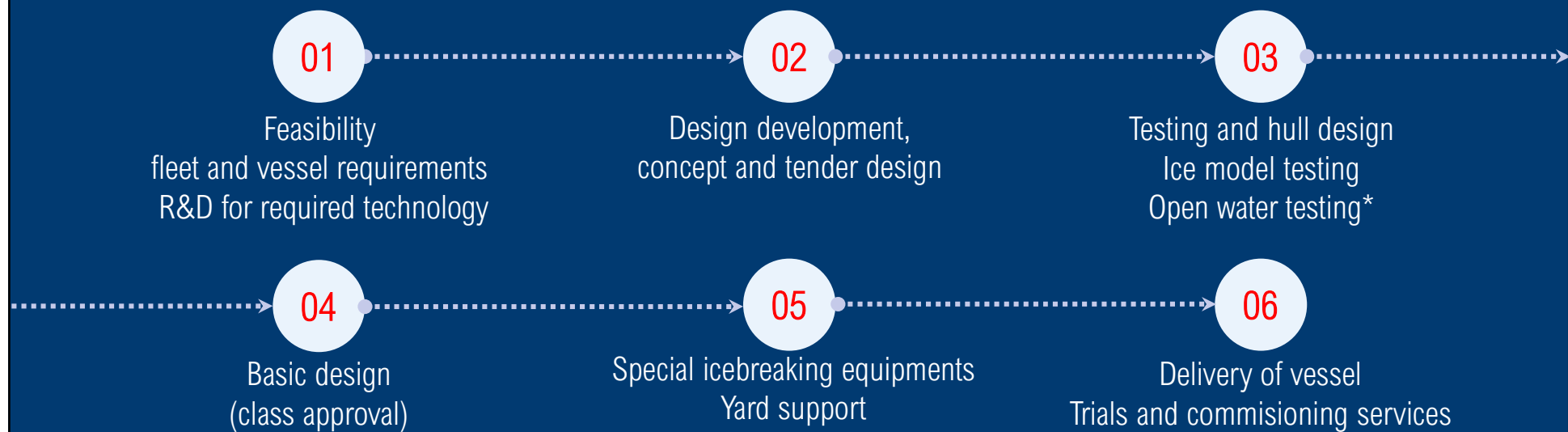
2021

2022

AKER ARCTIC COMPREHENSIVE PARTNER

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From early stage planning to delivery of the ships.



RESEARCH IB XUE LONG 2

Aker Arctic



PROPULSION LINE DESIGN AND DELIVERY FOR SQUADRON 2020

Aker Arctic

Project for new Finnish Navy corvettes.

RMC was contracted 2019 to built 4 vessels.

Aker Arctic's role

- Development of hull and propulsion
- Complete propulsion line design and delivery
- Sets for all Finnish Navy corvettes
- Installation supervision and commissioning



Photo courtesy of Finnish Defence Forces

LNG FUELLED ICEBREAKERS

LNG fuel is new one of the option for heavy icebreakers
Supplementing also nuclear powered fleet of icebreakers

- First LNG icebreaker Polaris 400 m³
- Ponant Cruiser Icebreaker 4500 m³ (GTT)
- Aker ARC 123 8 000 m³ (type C)
- Aker ARC 143 10 000 m³ (GTT)



Aker ARC 143



Aker ARC 123

Aker Arctic

France's GTT to supply LNG
tanks for Ponant Icebreaker
Le Commandant Charcot



* Illustration purposes only (image courtesy of GTT)

Aker Arctic

The Ice Technology Partner

thank you

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