



РОСАТОМ
ФЛОТ



Development of Atomic Icebreaking Fleet and Support for Arctic Projects

ROSATOMFLOT

Plans for Atomic Icebreaking Fleet Development

Taimyr Type

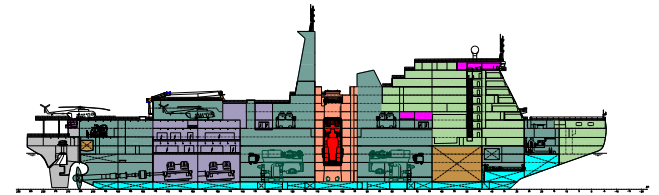


Arktika Type

Universal Atomic Icebreaker



Leader Atomic Icebreaker



Multifunctional Offshore Atomic Icebreaker



2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
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Technical parameters of atomic icebreakers

Parameters	Project 1052 (Arktika type)	Project 10580 (Taimyr type)	Project 22220 (UAI type)	Project 10510 (Leader type)	Project 10570 (Offshore type)
Status	Operating (Yamal, 50 Let Pobedy)	Operating (Taimyr, Vaygach)	Three icebreakers under construction	Technical design commenced in 2016	Conceptual design completed
Basic area of operations	Constant – Western part of Arctic; Summer-Autumn – Eastern part of Arctic	River estuaries and shallow sea waters	Constant – Western part of Arctic, shallow sea waters; Summer-Autumn – Eastern part of Arctic	Year round – all areas of Arctic, excluding shallow waters and estuaries of rivers	Arctic shelf and shallow sea waters
Scheduled operational time	1975 – 2040 (ib Arktika commissioned is 1975)	1989 - 2022	2019-2065 (with 4 th & 5 th included)	2026 - 2066	2026 - 2066
Length overall, m	148	150	173,3	209	152
Beam, m	30	29,2	34	47,5	31
Высота борта, м	17,2	15,2	15,2	18,9	15
Draught (max), m	11	8,1	10,5	13	8,5
Draught (min), m			8,5	11,5	
Water displacement, t	20 900	19 600	33 530	70 674	20 700
Propulsion power, kW	49 000	32 500	60 000	120 000	40 000

Universal Atomic Icebreaker is being built in Saint-Petersburg



Ib Arktika

39,26% completed

June 16, 2016 launched

December 2016 – reactor power plant

RITM200 is installed

Ib Sibir

20,59% completed

May 26, 2015 keel laid




Ib Ural

2,56% completed

July 25, 2016 keel laid

Med-term Operational Period of Atomic Icebreakers

Name	Commission	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Taimyr	1989	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow					
Vaygach	1990	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow			
Yamal	1992	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue			
50 Let Pobedy	2007	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue	Blue
Delivery of universal atomic icebreakers IB60												
Arktika	2018						Green	Green	Green	Green	Green	Green
Sibir	2020							Green	Green	Green	Green	Green
Ural	2021								Green	Green	Green	Green

-  - Linear icebreakers operational period
-  - Low-draught icebreakers operational period
-  - New universal icebreakers operational period

Port Fleet for Year-Round Navigation Purposes in Sabetta Port

The project objective is to render port fleet services to LNG tankers in harder ice conditions

Yamal LNG: 16,5 mln tons LNG/year in the period 2018-2040

LNG export: 15 LNG tankers of YamalMax type of 172 600 m3 capacity

Port calls/year at Sabetta: 220 = 1 tanker each 40 hours



The port fleet is built at Russian shipyards:

1. Ice class tug (mv PUR, commissioned April 13, 2016) ✓
2. Ice class tug (mv TAMBEY, commissioned May 26, 2016) ✓
3. Icebreaking tug (contract date: September 20, 2017)
4. Icebreaking tug (contract date: May 25, 2018)
5. Port icebreaker (mv OB, contract date: November 30, 2018)

Project cost:

205,51 mln \$ between 2015 – 2018 years.

45,03 mln \$ - Rosatomflot internal funds

160,48 mln \$ - Debt financing

Contract period: 11.2014 – 12.2040

Additional employees: 120

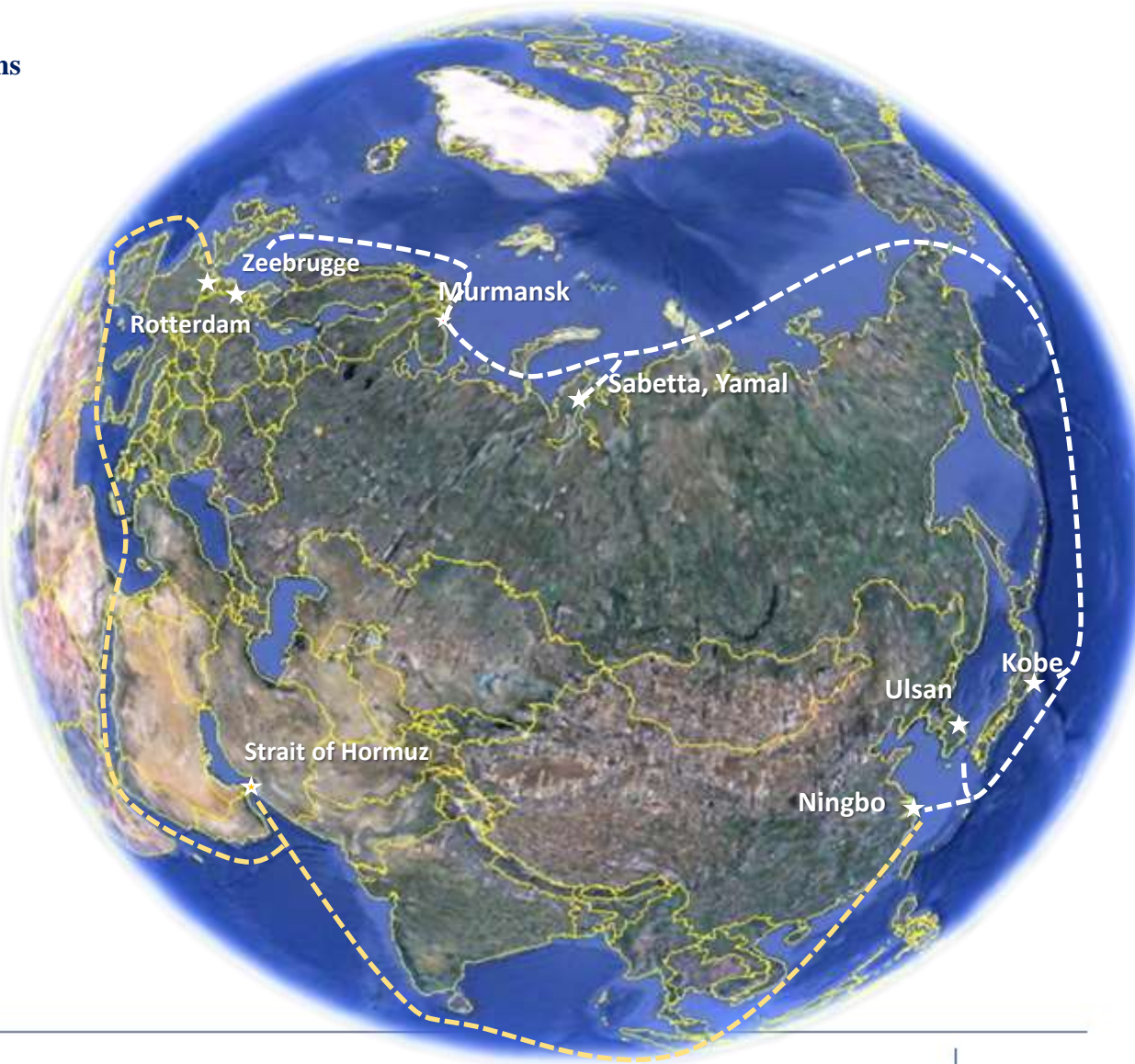
November 28, 2014 – the Contract for Port Fleet Services between Rosatomflot and Yamal LNG is signed

Hydrocarbons Export to Asian & European Markets

Comparison of hydrocarbons export from Yamal Peninsula & Persian Gulf

Comparison of distance & time to transport hydrocarbons from Yamal Peninsula and Persian Gulf to Asian and European markets

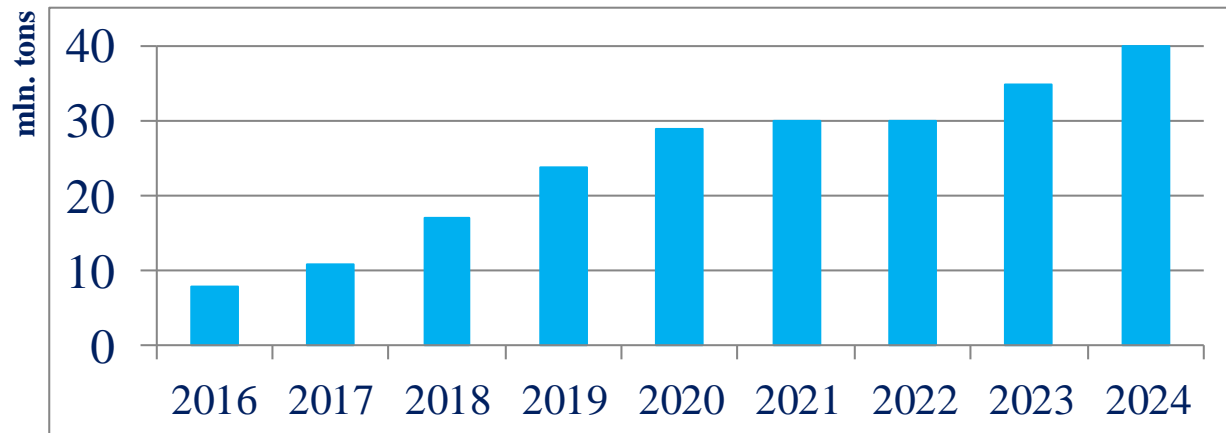
Port	Yamal Peninsula		Persian Gulf	
	D, miles	T, days	T, days	D, miles
Kobe	5250	14.6	17.2	6200
Ulsan	5860	16.3	17.0	6100
Ningbo	5930	16.5	15.6	5600
Rotterdam	2520	7.0	17.2	6200
Zeebrugge	2550	7.1	17.1	6150



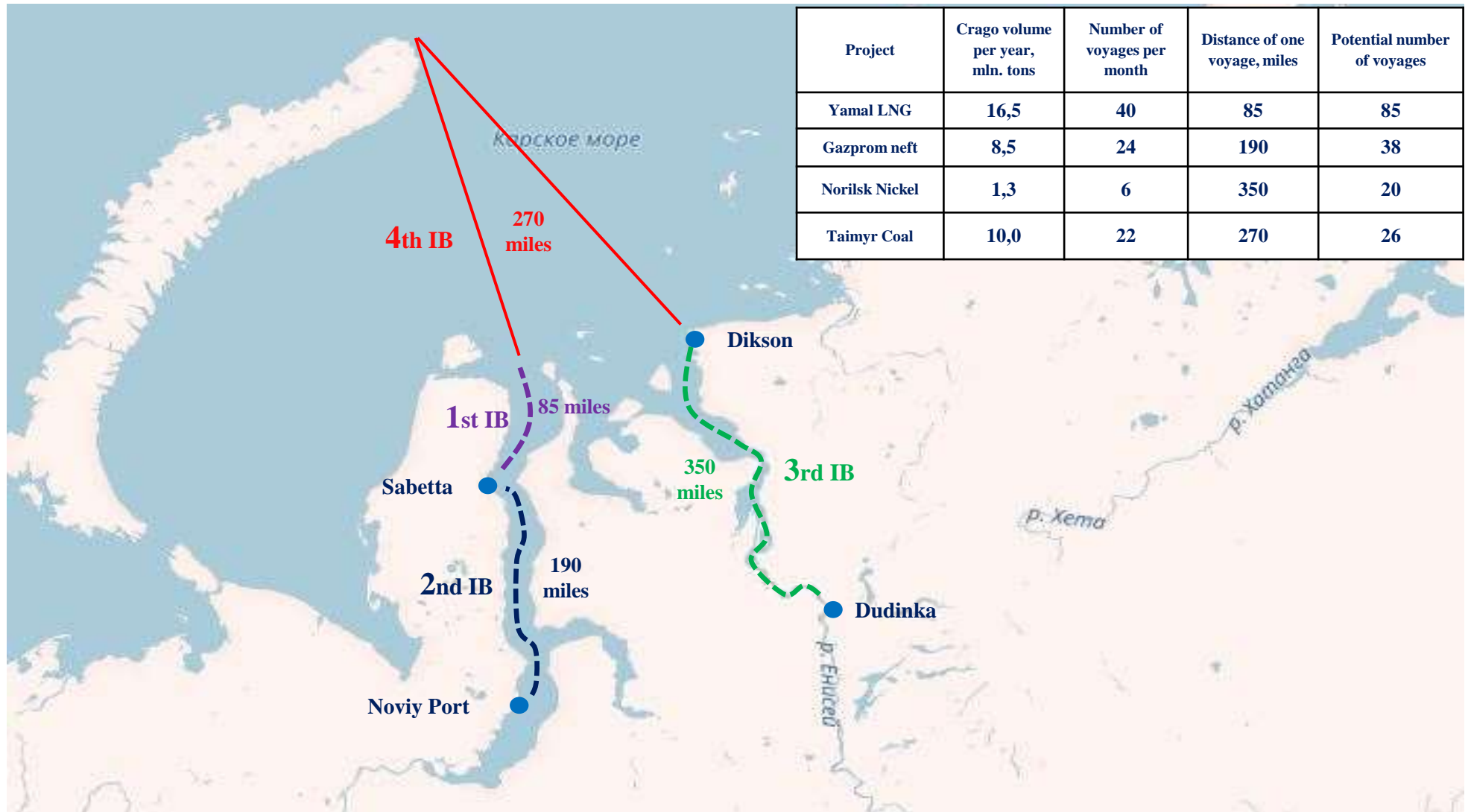
Arctic Projects with Rosatomflot Participation

Contracts Signed or in Finalization Stage

№	Project & Operator		Project Capacity per year	Life Span	Status
1	1.1	Yamal Trade LLC, LNG tankers	16,5 mln tons LNG	2014 – 2040	contract ✓
	1.2	Yamal LNG, Port Fleet			
2	Novoport Oil Deposit, Gazprom Neft		8,5 mln tons crude oil	2014 – 2017...40	Long-term contract is being finalized
3	Norilsk Nickel, p. Dudinka		1,3 mln tons nonferrous & precious metals	1975 – 2017...40	
4	Coal from Taimyr (VostokCoal)		10 mln tons coal	2017 – 2040	Commenced in 2017

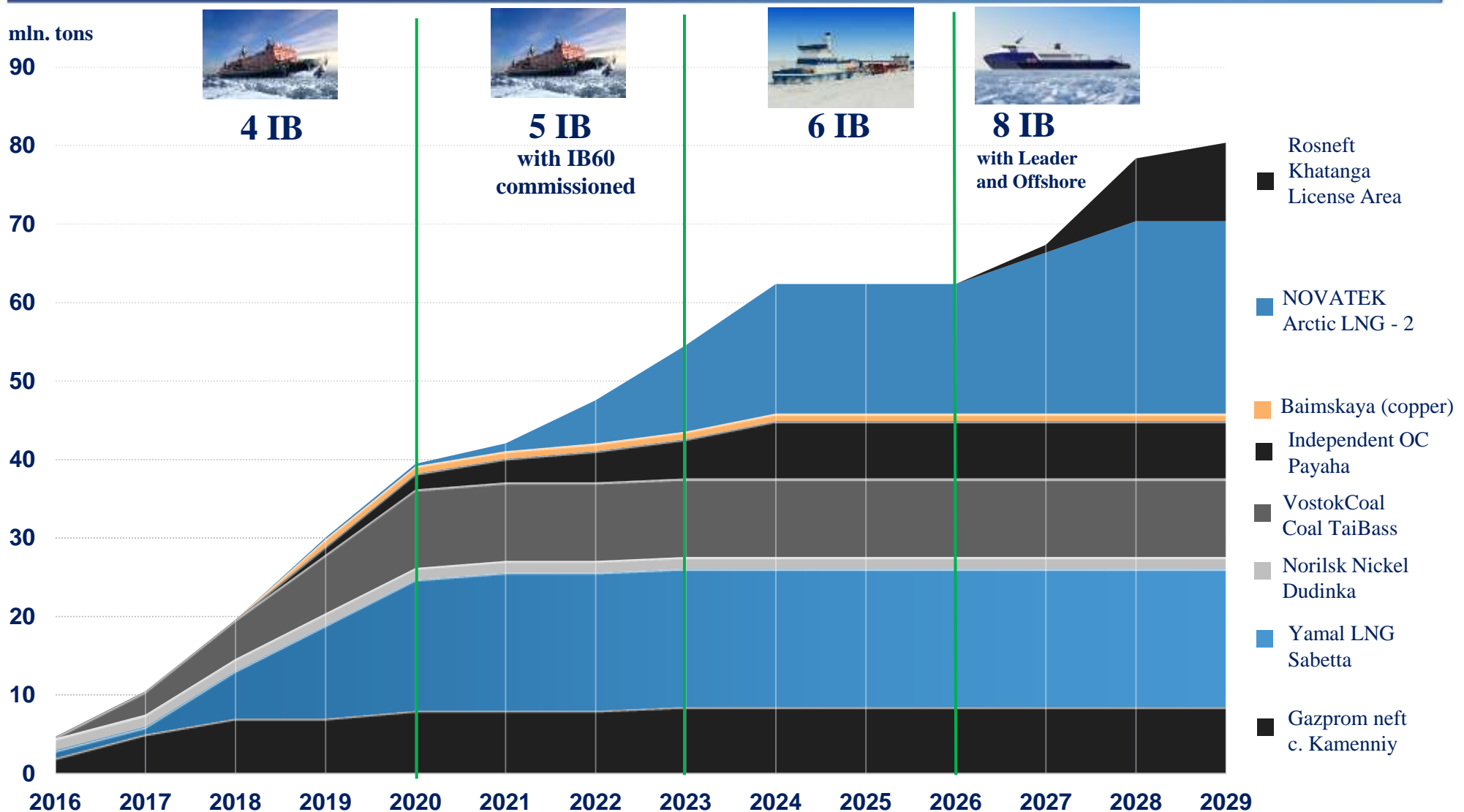


Atomic Icebreaker Required to Support Active Arctic Projects

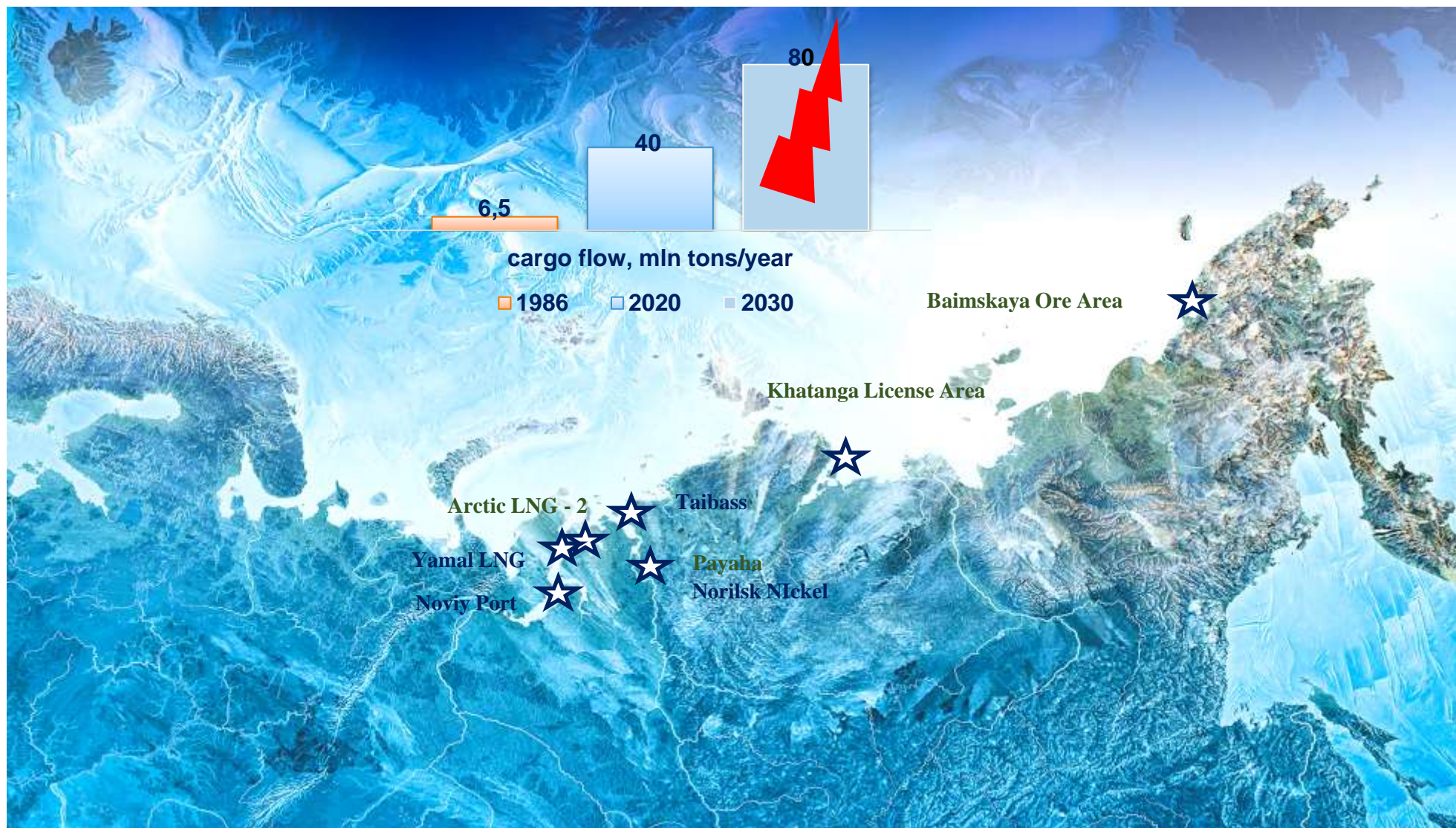


Project	Cargo volume per year, mln. tons	Number of voyages per month	Distance of one voyage, miles	Potential number of voyages
Yamal LNG	16,5	40	85	85
Gazprom neft	8,5	24	190	38
Norilsk Nickel	1,3	6	350	20
Taimyr Coal	10,0	22	270	26

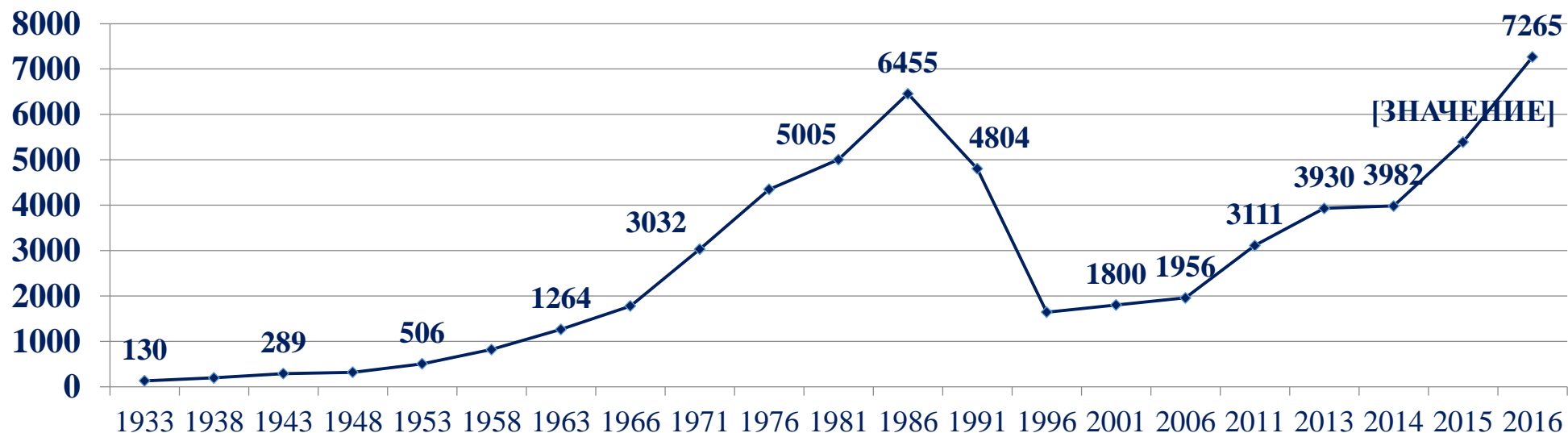
Increase in Atomic Icebreakers Demand According to the Scheduled Arctic Projects



Arctic Projects with Rosatomflot participation: Current and Future



Northern Sea Route traffic in the period 1933-2016 (transits included)



6,8 mln. tons of cargo were transported via NSR in 2016 in total. Thus the general amount increased 4,7 times compared to 1998 when the traffic was at its lowest (1,46 mln. tons).

The total amount of NSR traffic in 2016 constitutes 103% of 1987 year volume when 6,58 mln. tons were shipped.

Suez Canal transit in 2015 was 998,7 mln. tons (+3,7%) and 17 483 vessels (+2,0%).

Vessels under atomic icebreakers pilotage on the NSR in 2016:

Sabetta port (Yamal LNG contract):
201 pilotages;

Cape Kamennyi (Gazprom neft contract):
96 pilotages (tankers carrying crude oil from Noviy Port oil field);

Yenisei River (Norilsk Nickel contract):
133 days of service;

Taimyr Coal from Chaika coal field (operated by VostokCoal):
mv Tiksi with 11 000 tons of coal was piloted by atomic icebreaker in December 2016

Ib 50 Let Pobedy performed super late transit voyage in the period December 21, 2016 – January 03, 2017 westbound with mv Audax, mv Arktika-1 and mt Shturman Ovtsyn.

	2014	2015	2016
Total gross tonnage, gt	1 659 207	2 042 522	5 288 284
Total number vessels piloted	129	195	410

NSR Transit 2016

mv Gretke Oldendorff Ice2
76 175 tons of coal
Raahe – Vancouver
August 03-28, 2016 (*11 days idle waiting for the appropriate ice conditions*)



mv Georg Oldendorff Ice2
78 347 tons of coal
Raahe – Vancouver
August 30 – September 09, 2016

Icebreaking assistance to LNG construction block carriers



17 module carriers with icebreaking support in 2016

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Export of Coal from Taimyr Peninsula

2 handymax type vessels per month till June 2017



MV Nordic Bothnia (1A, 43900 tons deadweight) is loading coal at Chayka Peninsula
February 15 – 28, 2017

Icebreaking assistance is done by ib Vaygach



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Thank you
for your attention!