"Russia faces Arctic Ocean and no other nation needs icebreakers as much as we do. The nature shackled us in ice and the faster we drop these shackles, the sooner we let Russian power unfold".

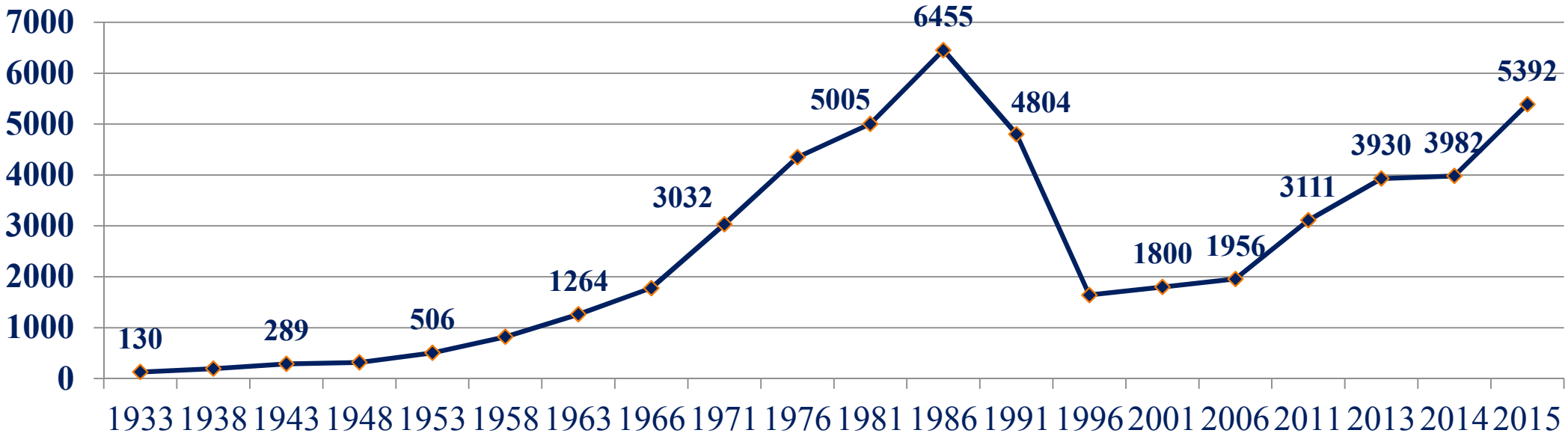
Vice-Admiral Stepan Makarov

Atomic Icebreakers Support for the Northern Sea Route

ROSATOMFLOT

A State Corporation Rosatom Enterprise

Northern Sea Route traffic in the period 1933-2014 (transits included)



3,98 mln. tons of cargo were transported via NSR in 2014 in total. Thus the general amount raised 2,7 times compared to 1998 when the traffic was at its lowest (1,46 mln. tons).

The total amount of NSR traffic in 2014 constitutes 60% of 1986 year volume when 6,46 mln. tons were shipped.

Suez Canal transit in 2014 was 963 mln. tons and 17 148 vessels.

Transit Voyages in 2010-2015

	2010	2011	2012	2013	2014	2015
Total Volume of Transit Cargo, t	**111 000**	**820 789**	**1 261 545**	**1 355 897**	**1 659 207 (gross tonnage)**	**292 084 (gross tonnage)**
Total Number of Transit Voyages	**4** (2 of them in ballast)	**34** (10 of them in ballast)	**46** (13 of them in ballast)	**71** (22 of them in ballast)	**129**	**27** (Sabetta excluded)

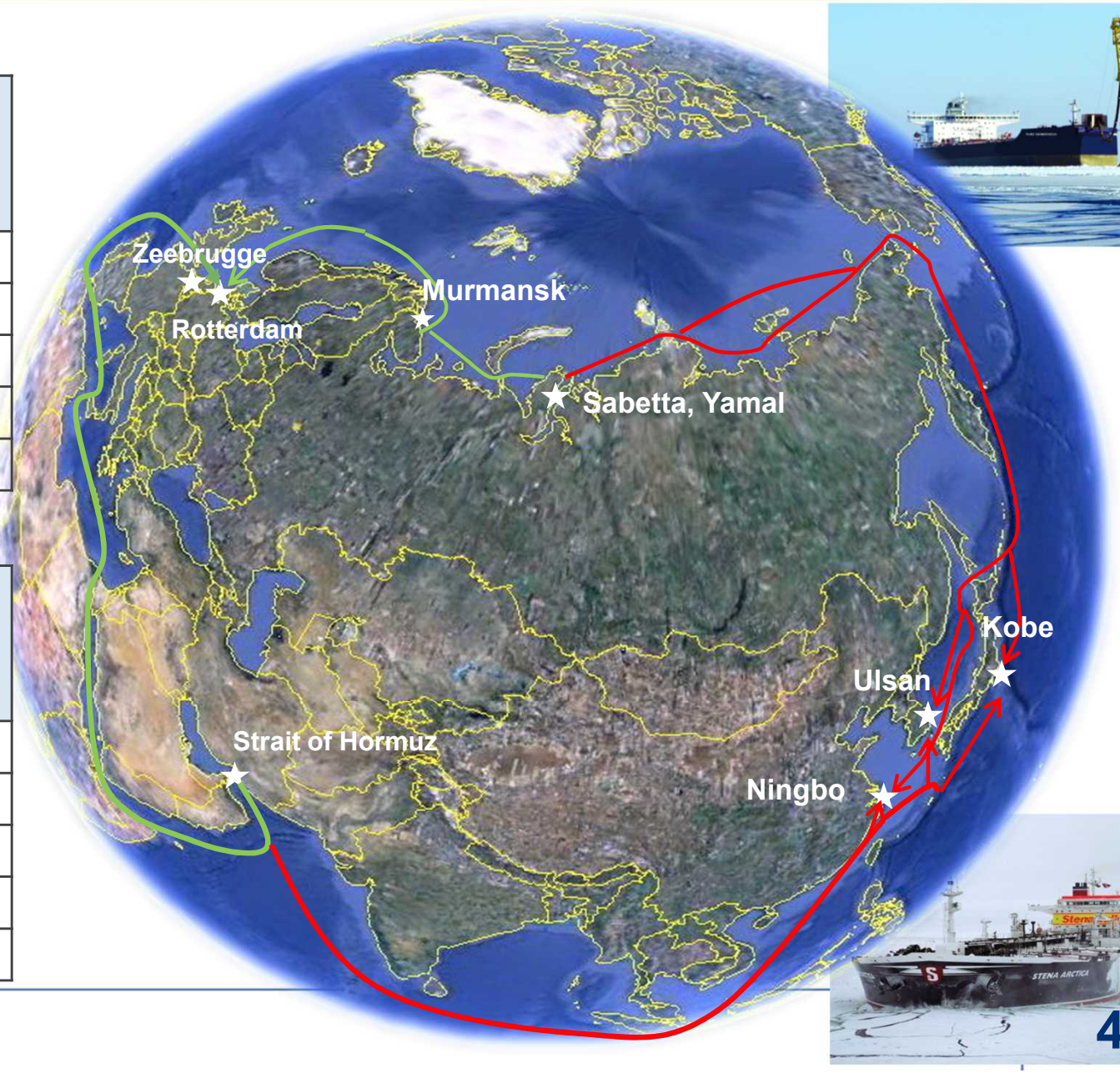
Hydrocarbons Exports to Asian and European Markets
comparison of hydrocarbons export from Yamal Peninsula and Persian Gulf

Hydrocarbons export from Yamal Peninsula to Asian and European markets

Port	Distance, nautical miles	Navigation period at the speed of 15 kn, days
Kobe	**5250**	**14.6**
Ulsan	**5860**	**16.3**
Ningbo	**5930**	**16.5**
Rotterdam	**2520**	**7.0**
Zeebrugge	**2550**	**7.1**

Hydrocarbons export from Persian Gulf to Asian and European markets

Port	Distance, nautical miles	Navigation period at the speed of 15 kn, days
Kobe	**6200**	**17.2**
Ulsan	**6100**	**17.0**
Ningbo	**5600**	**15.6**
Rotterdam	**6200**	**17.2**
Zeebrugge	**6150**	**17.1**



NSR Transit Cost Efficiency

Vessel type: tanker
Deadweight : 75 000 tons
Cargo: gascondensate
Ice class: 1A (Arc4)
Itinerary: Murmansk - Daesan

NSR fuel savings per voyage: **500 000 USD***

*The savings amount is provided by Marinvest

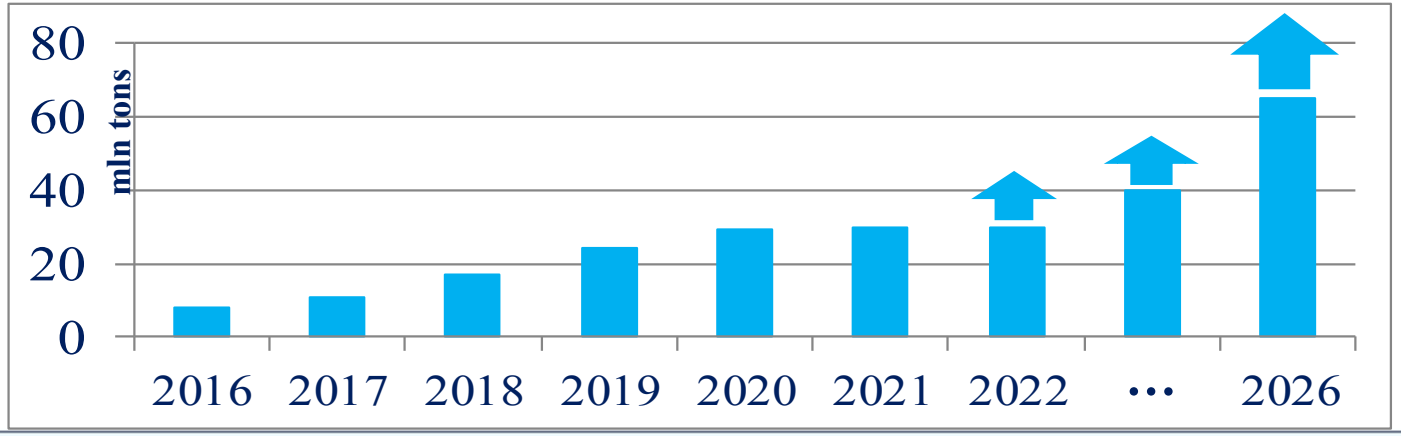
Vessel type: LNG tanker
Ice Class: 1A (Arc 4)
Cargo capacity: 150 000 m3
Ballast: Westbound 06-18.08.2013
Cargo: Eastbound 22.09-06.10.2013
Itinerary: Hammerfest – Yokohama
NSR roundtrip savings: **6 854 000 USD****

**The savings amount is provided by Centre for High North Logistics

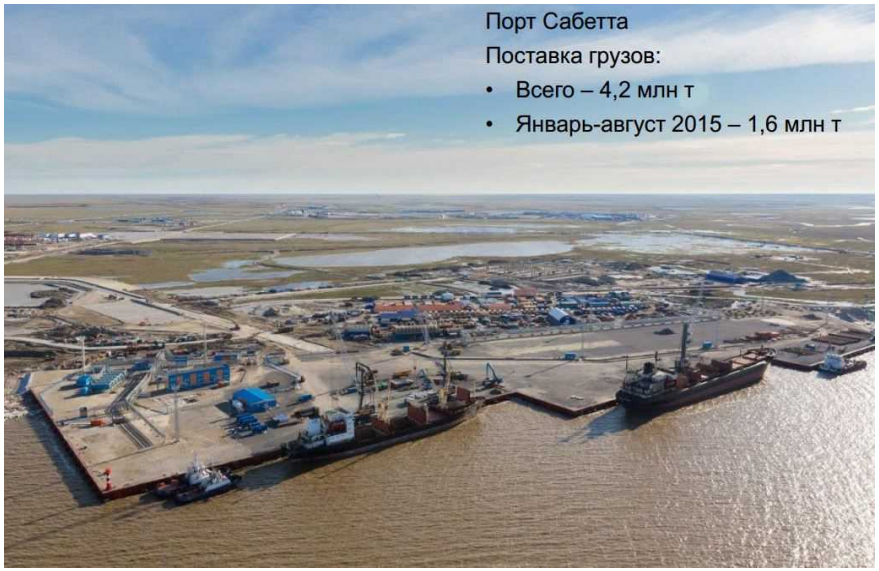
Arctic Projects with Rosatomflot Participation

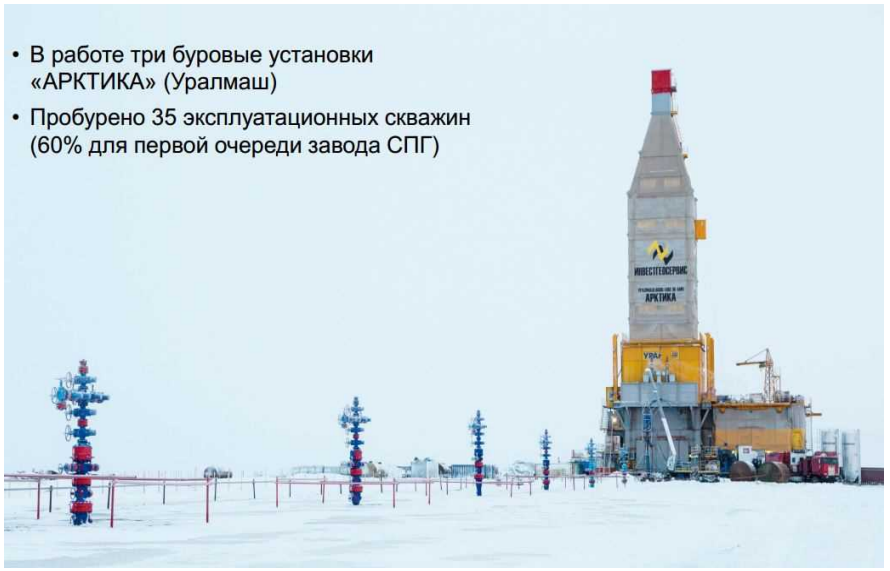
NSR cargo flow grows with the development of Arctic hydrocarbon projects

№		Project & Operator	Project Capacity per year	Life Span	Status
1	1.1	Yamal Trade LLC, LNG tankers	17,6 mln tons LNG	2014 – 2040	contract
	1.2	Yamal LNG, Port Fleet			
2		Novoport Oil Deposit, GazpromNeft	8,5 mln tons crude oil	2014 – 2035	
3		Norilsk Nickel, p. Dudinka	1,3 mln tons nonferrous & precious metals	1975 - 2040	
4		Payaha Oil Deposit, Independent Oil and Gaz Co.	7,3 mln tons crude oil	2018 – 2030	feasibility study
5		Arctic LNG-2 (NOVATEK)	16,5 mln tons LNG	2022 - 2045	
6		Coal from Taymyr (VOSTOKcoal)	10 mln tons coal	2018 – 2035	
7		TRANSNEFT – Arctic	45 mln tons crude oil	2020 - 2040	



Yamal LNG Project Status*





Invested by shareholders: 12,6 bln USD

From National Welfare Fund: 2,3 bln USD

Export contracted for 20 years & more: 96%

*information is provided by Yamal LNG

Rosatomflot Sabetta Port Operations

December 2013 - November 2014 piloted:
Vessels: **34**
Cargo: **1,1 mln tons**

January – December 2015 piloted:
Vessels: **116**
Cargo: **1 227 503 tons**

Rosatomflot provides icebreaking assistance to Sabetta port navigation for the period November – June.
Three icebreakers are deployed for the operations:

- low-draught atomic icebreaker – Taimyr or Vaygach
- diesel icebreakers Thor and Saint-Petersburg employed from Rosmorport

Rosatomflot Sabetta Port Operations

LNG Factory Modules Delivery to Sabetta Port

Icebreaking Support on the Northern Sea Route is provided by atomic icebreaker Vaygach

The delivery is done with semi-submersible heavy lifters from Port of Batam, Indonesia to Sabetta Port:

Red Zed II: entered NSR - 14.09.2015
call at Sabetta - 23.09.2015

Red Zed I: entered NSR - 24.09.2015
call at Sabetta - 05.10.2015

Port Fleet for Year-Round Navigation Purposes in Sabetta Port

The project is aimed at rendering port fleet services to LNG tankers in harder ice conditions

Yamal LNG: 17,6 mln tons LNG/year in the period 2018-2040
LNG export: 16 LNG tankers of YamalMax type of 172 600 m3 capacity
Port calls/year at Sabetta: 240 = 1 tanker each 36 hours

The port fleet is built at Russian shipyards:

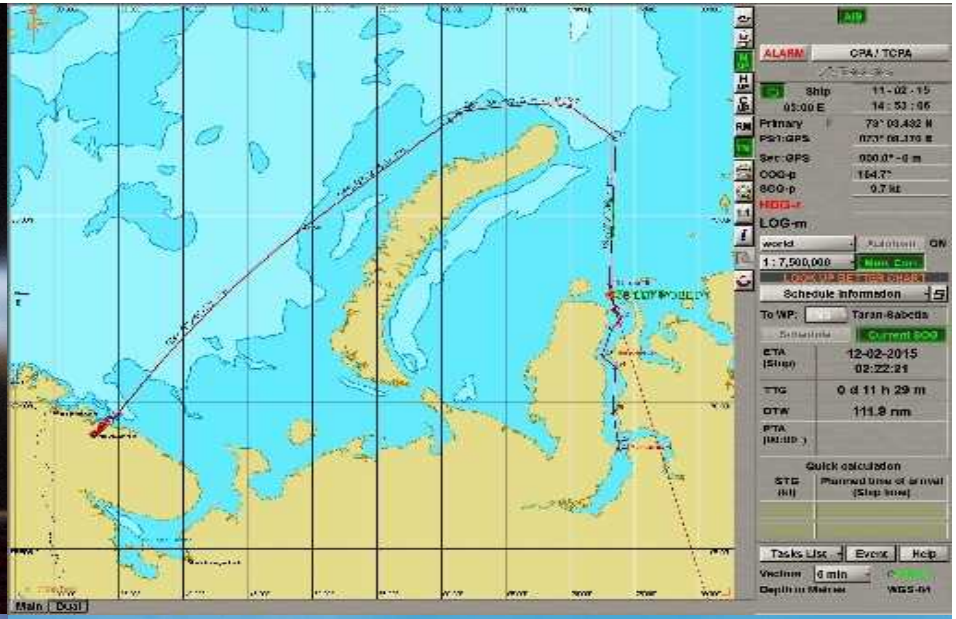
1. Icebreaking tug
2. Port icebreaker
3. Ice class tug
4. Ice class tug
5. Ice class tug

Project cost:
196,34 mln $ between 2015 – 2019 years.
62,17 mln $ - Rosatomflot internal funds
134,17 mln $ - Debt financing
Contractual period: 11.2014 – 12.2040
Additional employees: 120
Annual revenue: 34 675 000 $

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

First Winter Crude Oil Loading at Novy Port Oilfield Yamal-Nenets Autonomous Region

February 20, 2015



Rosatomflot Novy Port Operations

Rosatomflot provides icebreaking assistance to Novy Port crude oil export operations between **February – May**.

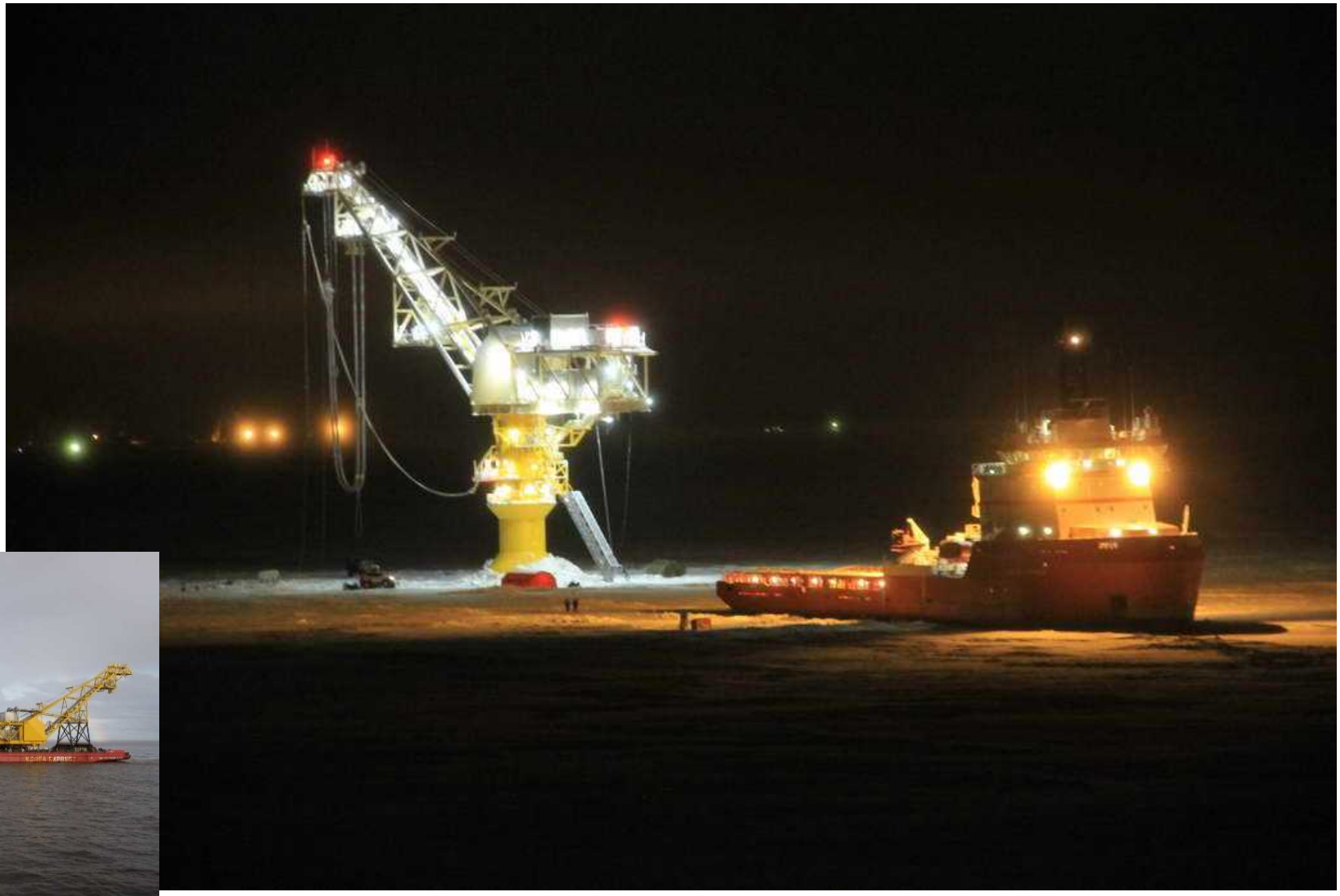
Vessel piloted in 2015:
2 tankers per month
7 tankers total
Each tanker was carrying **16 000 tons of crude oil**.

Schedule for 2016:
6 tankers per month between January and June

New tankers with **36 000 tons** deadweight & Arc7 ice class will be deployed in summer 2016.

Monthly export of crude oil will be ~ 700 000 tons per month.

Arctic terminal for year-round crude oil loading from Novy Port oilfield



Export of JSC Payakha products

Distances:

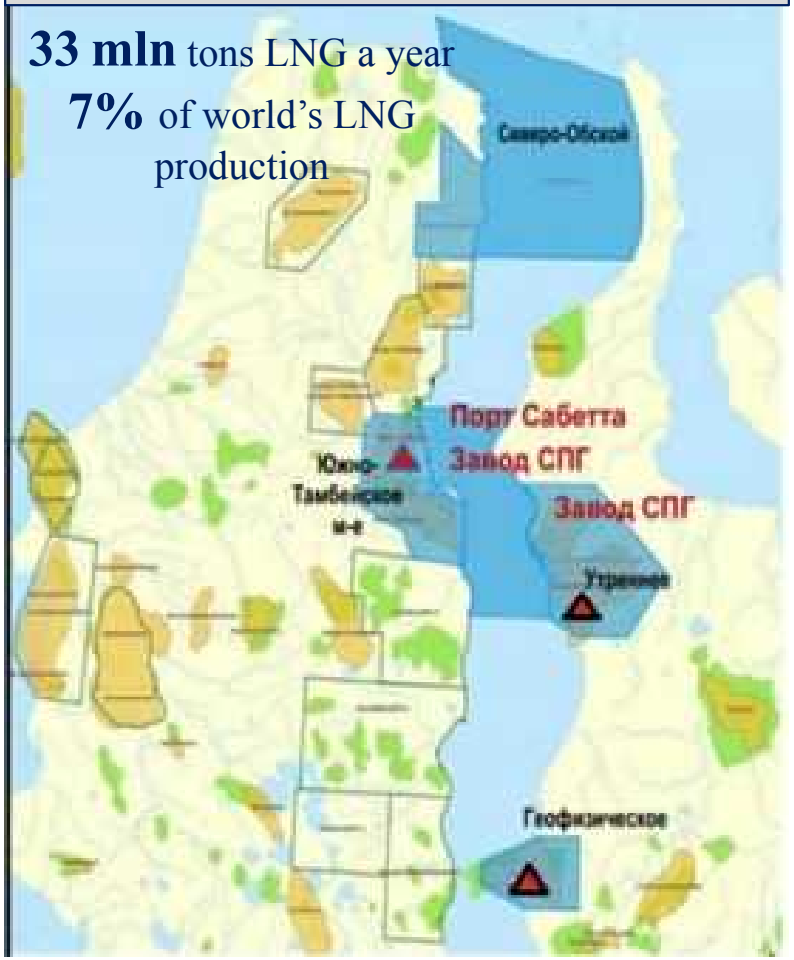
c. Tanalau -> Dikson – **216** nautical miles
c. Tanalau -> Murmansk – **1 234** nautical miles
c. Tanalau -> Rotterdam – **2 914** nautical miles

- JCS Independent Oil & Gas Company runs the investment project aimed at construction of sea Tanalau Oil Termial for year-round shipping of oil from Payakha oilfields. **The oil extraction and transportation project lifespan will be above 40 years.**
- A terminal with a designed capacity of 7,5 mln tons will be deployed 180 km north of Dudinka port on the right bank of Yenisey river around Tanalau cape.
- Terminal is scheduled to be commissioned in 3rd quarter of 2018.
- **4 to 8 Arc7 tankers with 40 000 t deadweight are planned for construction to transport oil.** Logistic scheme provides oil transportation from sea terminal Tanalau to port of Murmansk and Asian-Pacific Region countries.
- **Maximum transportation volume of 7,3 mln tons and 220 port calls are scheduled to be reached in 2024.**

	2018-2023	2024 – 2058
Oil production, thousand tons	**Launch of terminal and reaching designed capacity**	**7 300**

JSC NOVATEK
Complex Development Plan of Yamal and Gydan Facilities*

The General Chart of NOVATEK's licensed areas on Yamal & Gydan



By the Order of Russian Government #1713-p dd. 11.10.2010 & #2413-p dd. 19.12.2013 JSC NOVATEK was appointed the general executor of the Complex Development Plan of LNG Production on Yamal and Gydan Peninsulae.

Complex plan includes:

- construction of two LNG factories as part of **Yamal LNG** and **Arctic LNG-2** projects;
- production capacity up to **33 mln tons LNG per year;**
- **LNG-1** & **LNG-2** factories can provide up to 7% of world's LNG production;

LNG-1 Factory (Yamal LNG project, South-Tambey field)

- 16,5 mln tons per year
- launch in 2017, 2018, 2019
- construction and production of technological equipment is being done, 12 000 construction workers on site.

LNG-2 Factory (project Arctic LNG-2, Utrennee & Geophizicheskoye fields)

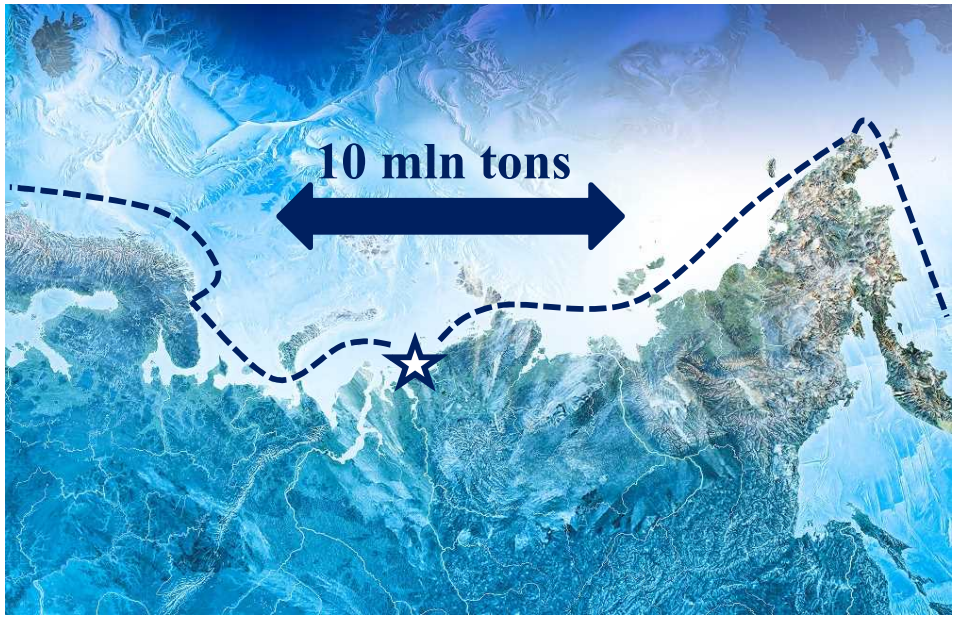
- 16,5 mln tons LNG per year
- launch in 2022, 2023, 2024.

Arctic LNG-2 concept project deploys LNG factories upon reinforced concrete bed of gravitation type placed at sea in the Obskaya Bay, which will require the use of a large shipyard to construct heavy sea platforms and technological modules of upper structures.

*data is provided by JSC NOVATEK

VOSTOKcoal

The construction concept of deep water loading complex to export coal from Taymyr Peninsula



Capacity: **5 – 10 mln tons coal / year**

Area: **sea port Dikson**

Lifespan: **2018 – 2035 +…**

The types of seagoing vessels intended for coal shipping

Vessel type	Deadweight, t	Length, m	Breadth, m	Draught, m
Nordic Bothnia type bulker	**43 700**	**190,50**	**30,50**	**11,52**
Bulker 30 000 t	**33 000**	**184,00**	**27,00**	**11,00**
Grumant type bulker	**23 645**	**180,00**	**22,86**	**9,91**
Mikhail Strekalovskiy type bulker	**19 200**	**162,10**	**22,86**	**9,88**

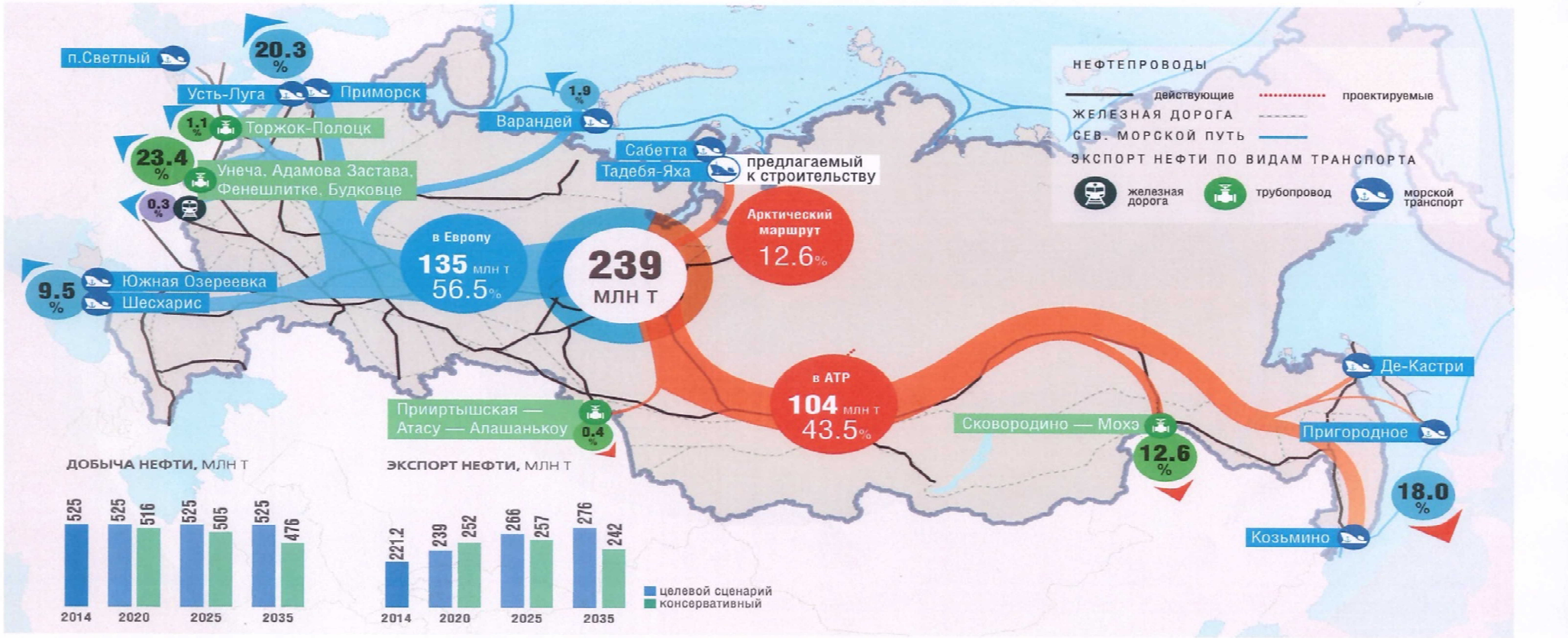
Transneft pipelines
& Rosatomflot concept of maritime segment of crude oil transportation

Creation of Arctic Maritime Route of Transneft*

Crude Oil Export Directions

2020

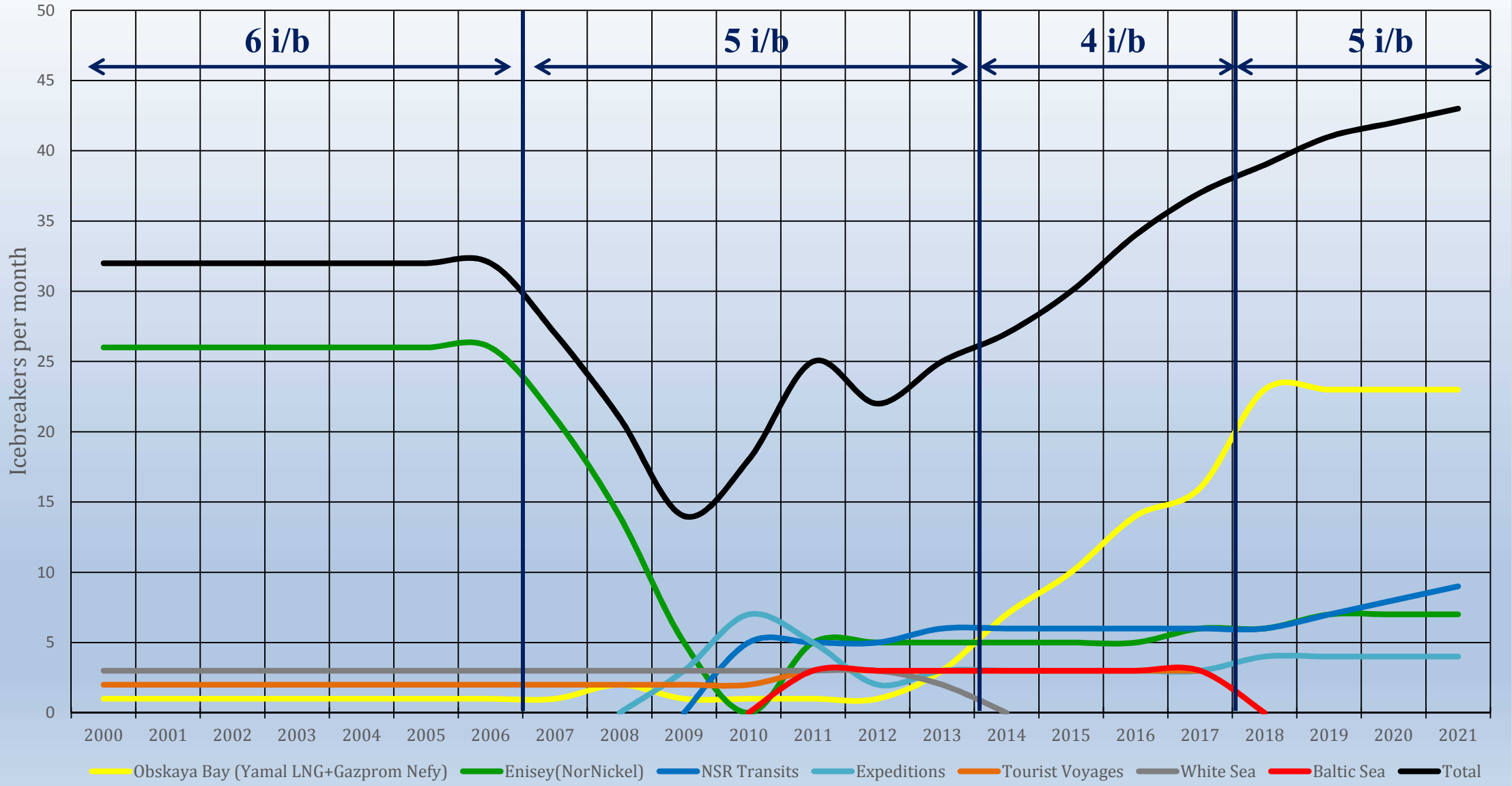
Creation of Arctic Maritime Route



Создание Арктического маршрута «Пурпе — Обская губа — Северный морской путь» позволяет в среднесрочной перспективе перераспределить экспортные потоки нефти с западного на восточное направление. Увеличение поставок нефти на азиатские рынки до 100 млн. т в год обеспечивает сокращение объемов ее экспорта в западном направлении на 31–35 млн. т (с 73% до 56%) и, соответственно, снижает зависимость России от высококонкурентного европейского потребительского рынка.

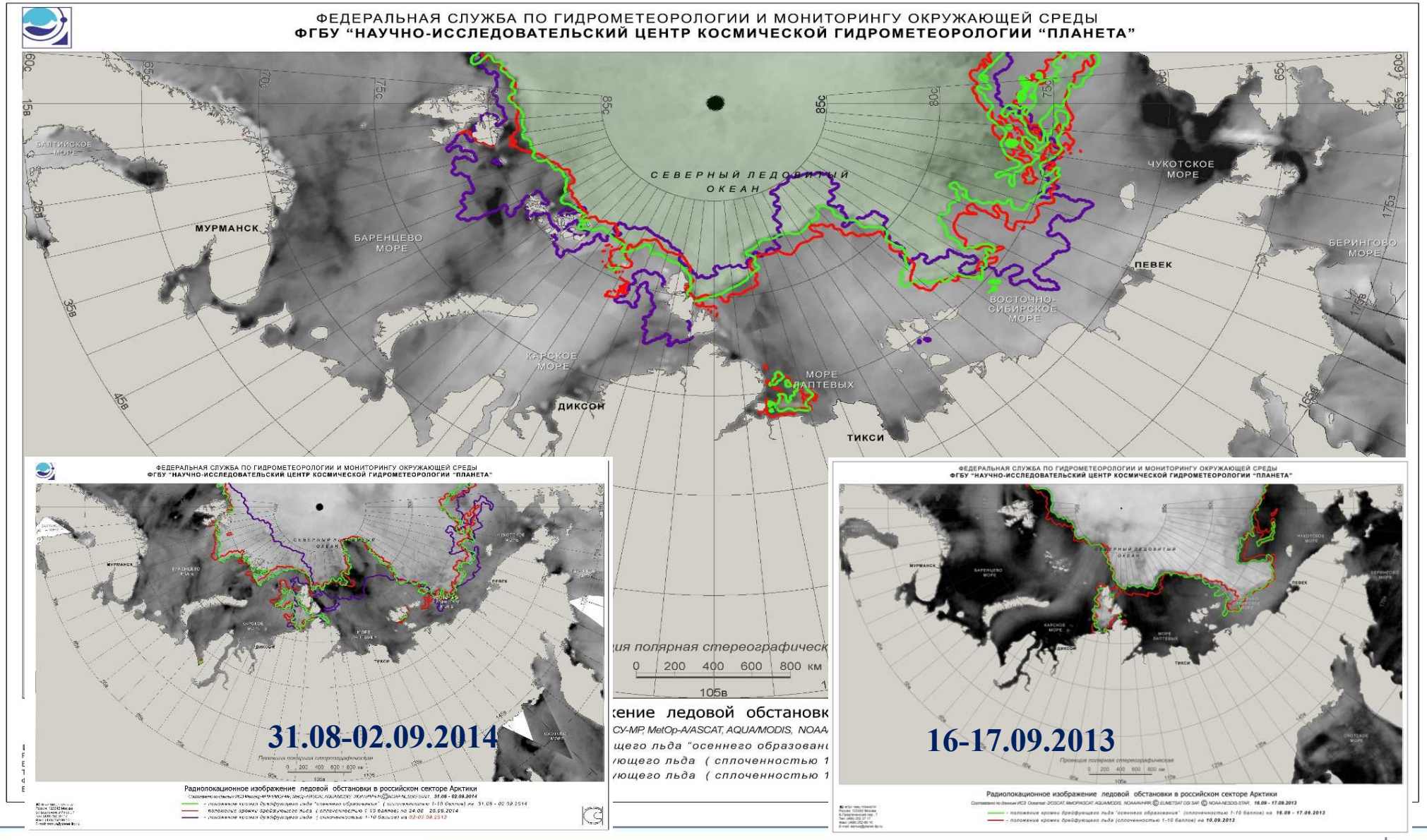
*based on the data prepared by the Government of Yamal-Nenets Autonomous region dd. 02.03.2015

Main consumers of atomic icebreaking fleet services in 2000-2021

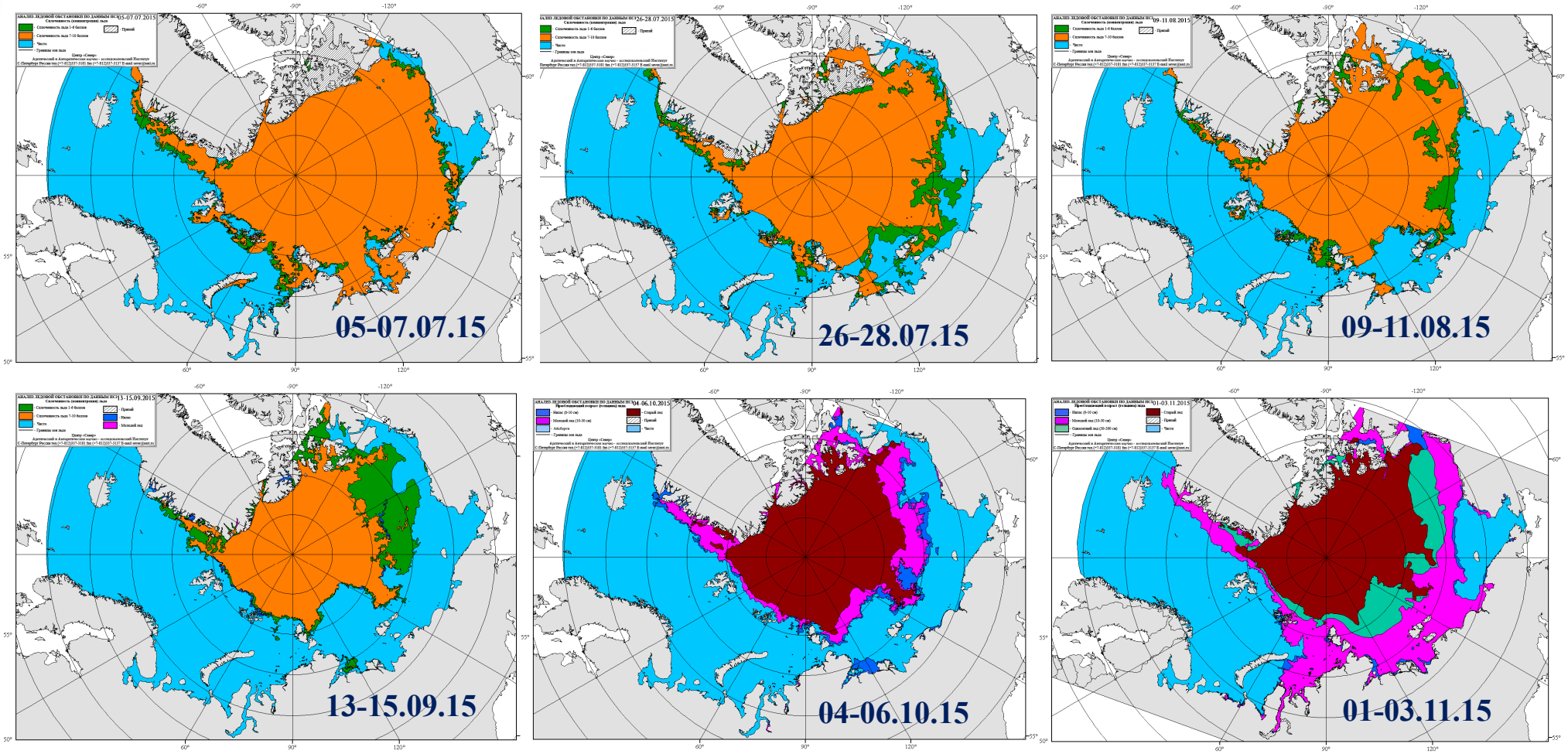


Ice Conditions in the Russian Arctic

Satellite Image of Ice Conditions in the Russian sector of Arctic dd. 13.09 – 15.09.2015



Ice Conditions by Periods



	Ice Concentration 1-6 points		Ice Concentration 7-10 points
	Extra Young Ice		Old Ice
	Young Ice (0-30 cm)		Fast Ice
	One-Year Ice (30-200 cm)		Clear Water
	Ice Area Border according to TV/IR/microwave		

Atomic Icebreaking Fleet

Atomic icebreakers of "Arktika" type:
Propulsion Capacity – 54 MW
Water displacement – 23000 t
Draught – 11,0 m
Icebreaking capability – 2,25 m

Fleet:
i/b "Sovetsky Soyuz" – **29.12.1989**
i/b "Yamal" – **28.10.1992**
i/b "50 Let Pobedy" – **23.03.2007**

Atomic Icebreakers of "Taimyr" type:
Propulsion capacity – 35 MW
Water displacement 21000 t
Draught – 8,1 m
Icebreaking Capability – 1,7 m

Fleet:
i/b "Taimyr" – **30.06.1989**
i/b "Yaygach" – **25.07.1990**

Universal Atomic Icebreaker Project 22220 (IB60)
Propulsion Capacity– 60 MW
Water displacement 33530 / 25 540 t
Draught – 10,5 / 8,5 m
Icebreaking capability – 2,9 м

Fleet:
1st IB60 – **31.12.2017**
2nd IB60 – **25.12.2019**
3rd IB60 – **25.12.2020**

Atomic Leader-Icebreaker 10510 Project

The project is developed by JSC CCB Iceberg*

Icebreaker objectives: year-round icebreaking pilotage of heavy tonnage vessels (deadweight above 100 000 t and breadth above 50 m) along the whole distance of the Northern Sea Route with economically effective speed (~10 knots) in 2 m thick ice.

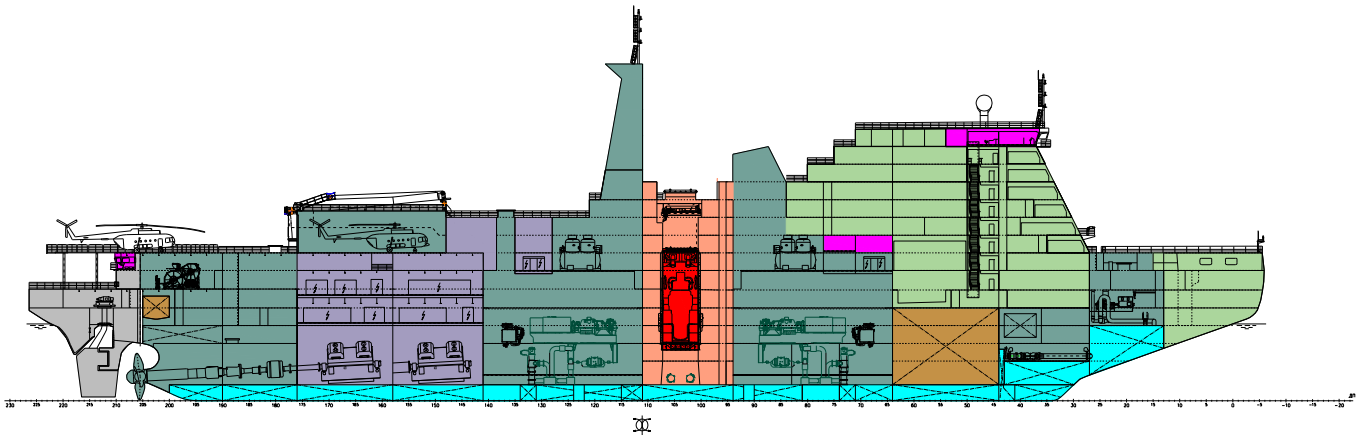
Area of operations: Western and Eastern parts of the Arctic year-round.

All materials and basic equipment to construct the icebreaker can be provided **by Russian companies**.

The project provides **unification of basic and auxiliary equipment** with the universal icebreakers 22220 currently under construction.

Project status: the concept design will be completed in 2015. The technical design development must be commenced in 2016 to commission the icebreaker in 2024.

Development period of the technical design – 2 years.



Principal dimension:

• length, m	209,6
• breadth, m	47,7
• draught, m	12,0
• displacement, t	69 500
• power, MW	120

Icebreaking capability

- 4,1 m with the speed 1,5-2 knots
- 2,1 m with the speed 10 knots

Breadth of canal laid – 50-51 m

* Information is provided by JSC CCB Iceberg

Multipurpose Atomic Icebreaker 10570 Project

The project is developed by JSC CCB Iceberg*

Icebreaker objectives:

- icebreaking pilotage of vessels in shallow waters of the Arctic shelf;
- ice safety and assistance in supplying drilling platforms;
- rescue operations in ice conditions and clear water;
- additional tasks based on the chosen arrangement of the special equipment.

Icebreaking capability	2,3-2,4 m at 1,5-2 knots
Principal dimensions:	
Length overall, m	152
Breadth overall, m	31
Draught, m	8,5
Displacement, t	20 700
Power, MW	40
Vessel autonomy:	
- food supply	6 months
- navigation area	Unlimited

One reactor charge is enough for **5-7 years** of icebreaker operation.

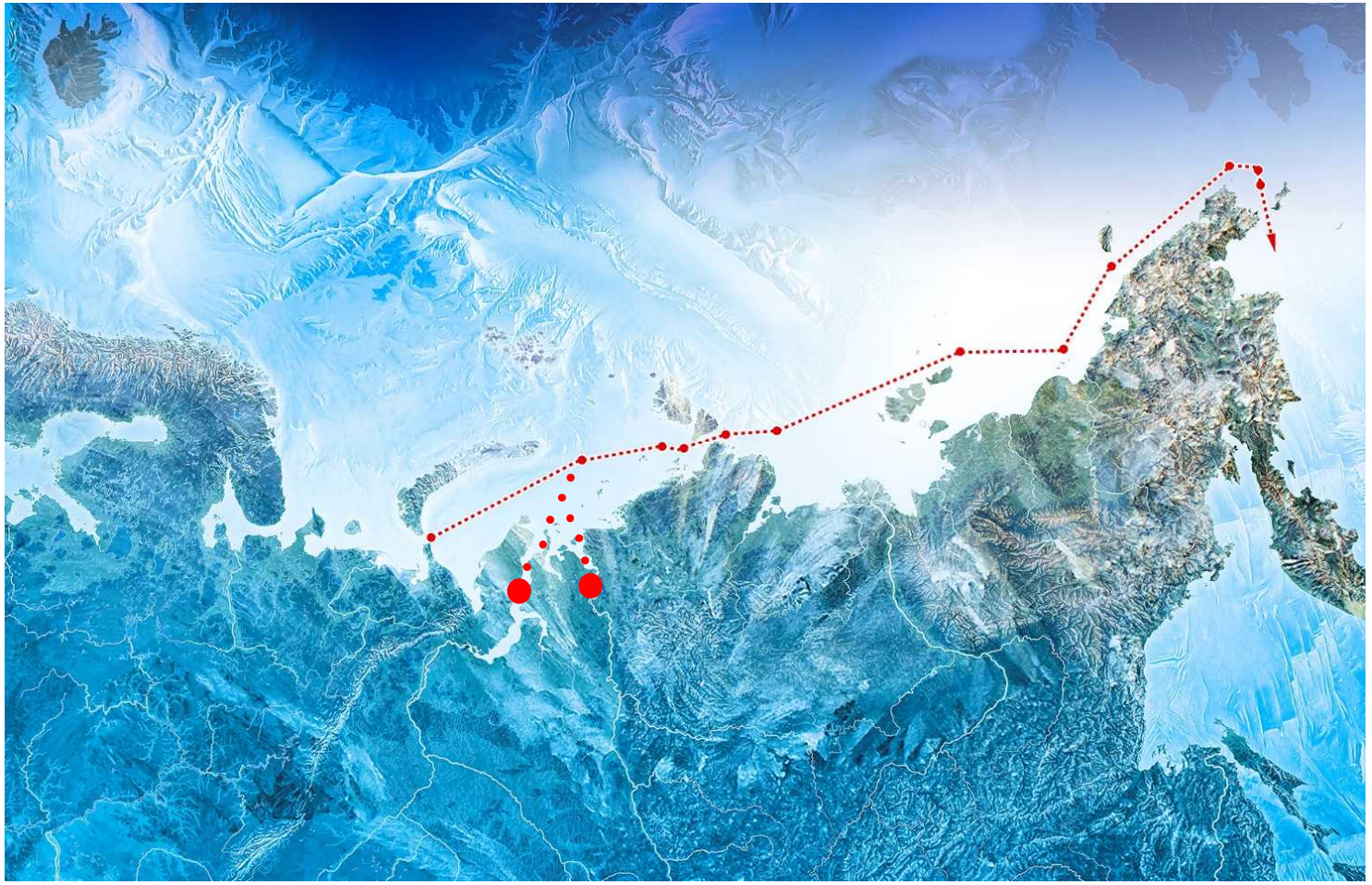
All materials and basic equipment to construct the icebreaker can be provided **by Russian companies**. The icebreaker can be built **by a Russian shipbuilding yard**.

The project provides **unification of basic and auxiliary equipment** with the universal icebreakers 22220 currently under construction.

Project status: Draft design will be completed in 2015. Technical design development must be commenced in 2016 to commission the icebreaker in 2022. Technical design development period – **1,5 years**.

Russian power will be growing with Siberia and Northern Ocean. Among other things, the Northern Ocean is a vast area where Russian glory may rise combined with unprecedented benefit through invention of East-Northern navigation.

Mikhail Lomonosov



With the deployment of universal atomic icebreakers Project 22220 the main task of Rosatomflot will be the provision of year-round navigation on the Northern Sea Route to ensure sustainable export of hydrocarbon products to the Asian-Pacific markets.

Thank you for attention!