

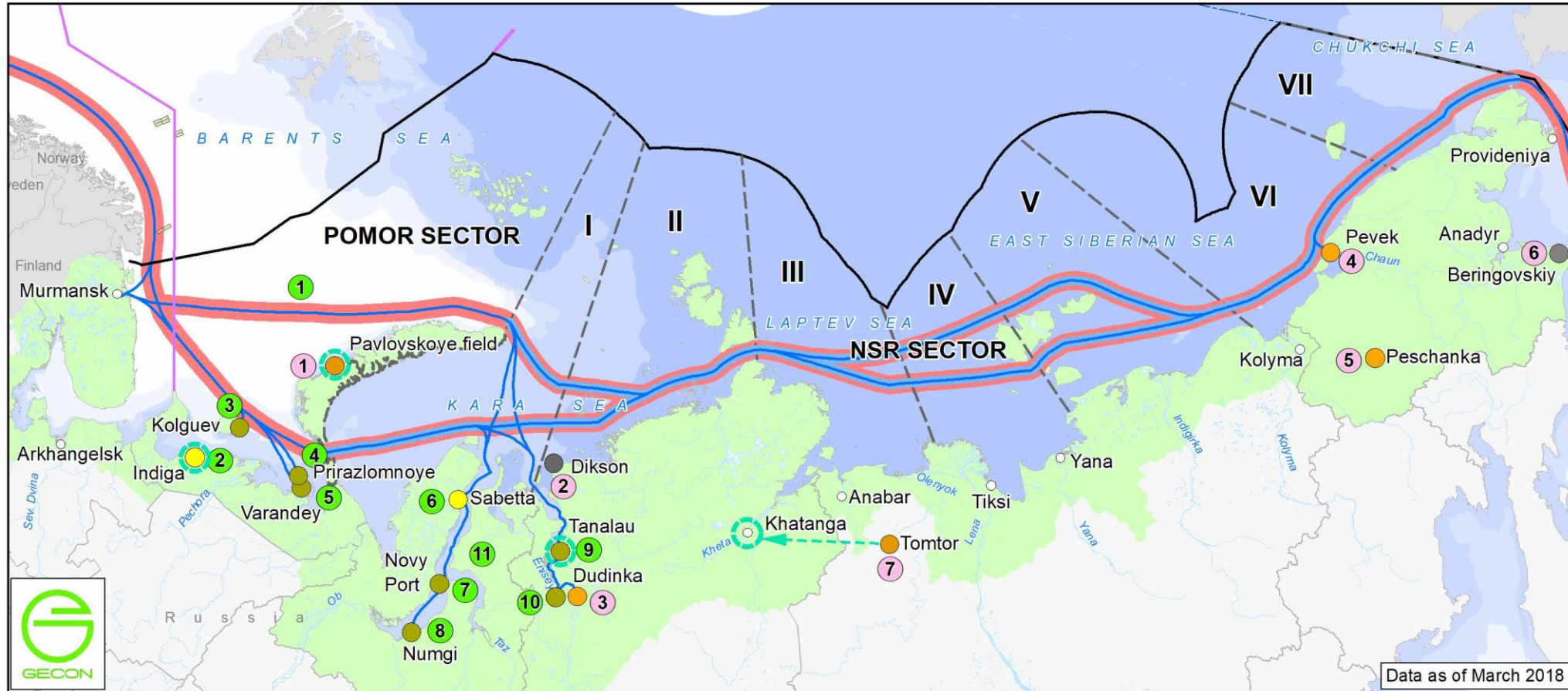
# **THE FORECAST OF FREIGHT TRAFFIC OF THE ARCTIC MINERAL RESOURCES IN THE WATER AREAS OF RUSSIA TILL 2030: THE NEED FOR THE CARGO AND PROVIDING VESSELS**

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**GECON**

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# 18 PROJECTS OF DEVELOPMENT OF MINERAL RESOURCES WITH THE MARITIME SCHEME OF TRANSPORTATION IN THE RUSSIAN ARCTIC



Data as of March 2018

<p><b>Projects with marine transportation</b></p>		<p>Arctic zone land territories</p> <p>NSR</p> <p>I - VII Icebreaking zones</p> <p>Polar Code area boundary</p> <p>sea transportation routes</p> <p>Northern Sea Transport Corridor</p>	<p>Terminals and Projects</p> <p>crude oil</p> <p>LNG</p> <p>ore</p> <p>coal</p> <p>planned</p>	<p>Open water in 2016 months a year</p> <p>all year</p> <p>9-11</p> <p>7-8</p> <p>3-6</p> <p>1-2</p>
<p><b>Hydrocarbons</b></p> <p>1. Shtokman and satellites</p> <p>2. Pechora LNG</p> <p>3. Kolguev</p> <p>4. Prirazlomnoye</p> <p>5. Varandey</p> <p>6. Yamal LNG</p>	<p><b>Ore and coal</b></p> <p>1. Pavlovskoye</p> <p>2. Lemberova River</p> <p>3. Norilsk</p> <p>4. Mayskoye</p> <p>5. Peschanka</p> <p>6. Fandushkinskoye and Amaam</p> <p>7. Tomtor</p>	<p>7. Novoportovskoye</p> <p>8. Sandibinskoye</p> <p>9. Tanalau</p> <p>10. Dudinka</p> <p>11. Arctic LNG</p>		

Ice cover is derived as a geometric computing (using ArcGIS) of the input daily sea ice edge data for the beginning of each month in 2016.  
Source: daily ice edge analysis product of the U.S. National Ice Center.

# OFFICIAL FORECAST OF THE FREIGHT TRAFFIC OF MINERAL RESOURCES ALONG NSR BY THE MINISTRY OF NATURAL RESOURCES



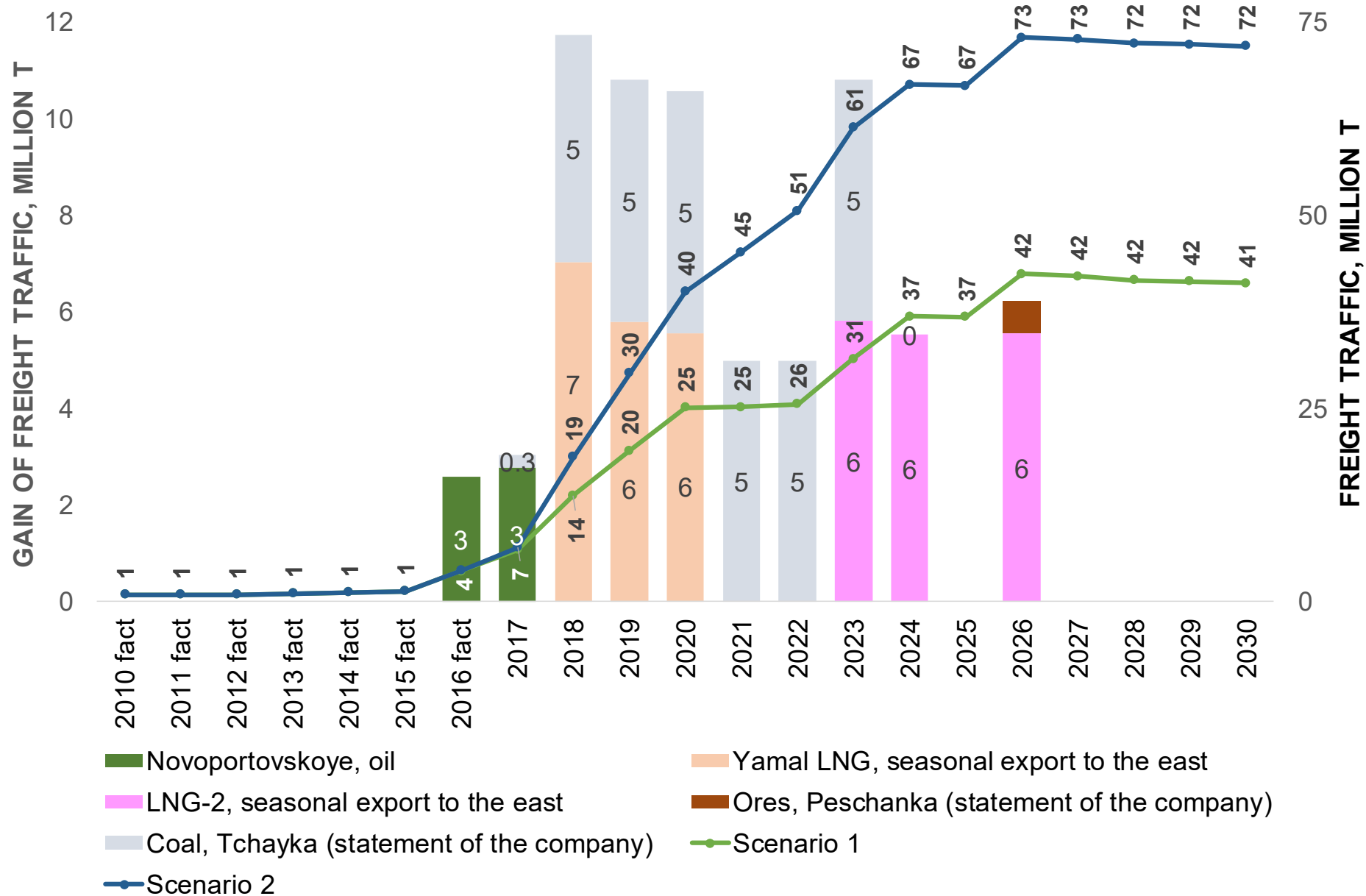
The preliminary option of the forecast has been considered at a meeting in August, 2017 of the working group "Ensuring ecological safety and rational use of natural resources" of the State commission for the development of the Arctic under the chairmanship of the Minister of Natural Resources and Environmental Protection of the Russian Federation S.E. Donskoy.

Participants: representatives of the profile ministries and large oil/gas and mining companies (Lukoil, Novatek, Rosneft, Gazprom, Gazprom Neft, Norilsk Nickel and "The first mining company"), administrations of the regions, Administration of the Northern Sea Route, the scientific, consulting and nature protection organizations.

The forecast of freight traffic is executed according to two scenarios:

1. Scenario #1 (basic): the projects of development of fields approved by the Central Commission on coordination of engineering designs of development of fields of Rosnedra/Ministry of Natural Resources;
2. Scenario #2: assumes additional accounting of statements of the companies.

# THE MAIN SOURCES OF GROWTH OF FREIGHT TRAFFIC ALONG THE NORTHERN SEA ROUTE

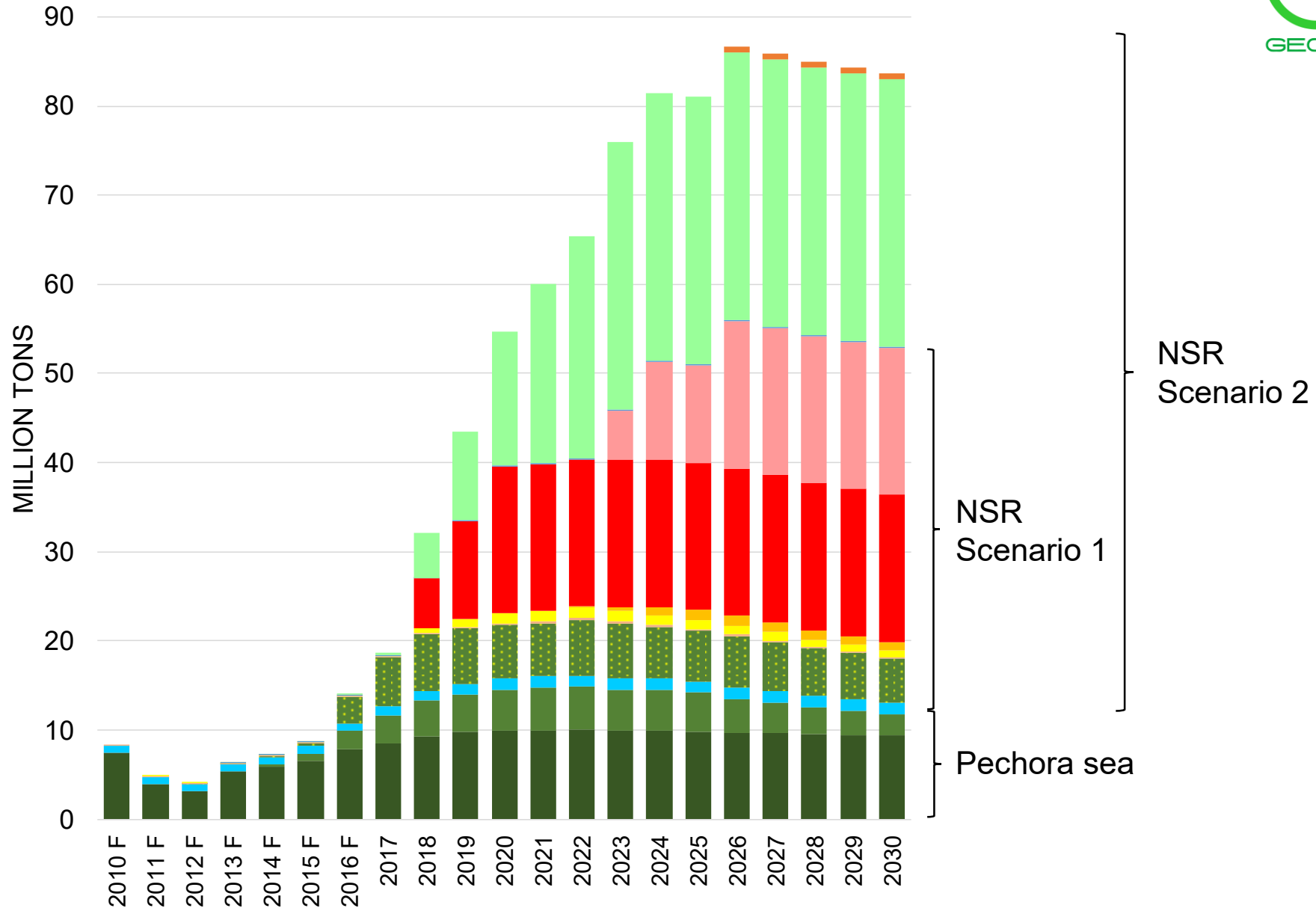


Data sources: MNR, companies; analysis of GECON

# FORECAST OF THE ARCTIC FREIGHT TRAFFIC OF MINERAL RESOURCES



- Ores, Peschanka (statement of the company)
- Coal, Tchayka (statement of the company)
- Ores, Mayskoye
- LNG, LNG-2
- LNG, Yamal LNG
- Condensate, LNG-2
- Condensate, Yamal LNG
- Condensate, Pelyatkino
- Oil&cond., Novy Port
- Ores, Norilsk
- Oil, Prirazlomnaya
- Oil, Varandey



OFFICIAL FORECAST OF THE ARCTIC FREIGHT TRAFFIC BY MINISTRY OF NATURAL RESOURCES

NSR Scenario 2

NSR Scenario 1

Pechora sea

# FORECAST OF NEED FOR NEW CARGO ARCTIC VESSELS CONSTRUCTION

Region	Project	Navigation	Cargo	Freight Maximum Volume	Shipowner / Operator	Number of vessels	Dead-weight, tt	Ice class RMRS	Construction for Arctic LNG 2	
Pechora Sea	Peschanoozerskoye	seasonal	crude oil	0,2	freight	2*	36, 37	Arc4		
	Varandey	year-round		10 (assessment)	Sovcomflot	3	73	Arc6(4)		
	Prirazlomnoye			4.8		2	70	Arc6		
Kara Sea	Ob Bay	year-round	crude oil and condensate	6.3	freight	3+1	41	Arc7		
					Gazpromneft Shipping	2**	20	Arc 4(5)		
			Yamal LNG	LNG	16,5	Sovcomflot	1	97	Arc7	15+
						Mitsui OSK Lines (MOL) 50%; COSCO 50%	3			
						Teekay LNG Partners 50%; China LNG Shipping (CLNG) 50%	1 + 5			
	Dynagas 49%; Sinotrans 25,5%; China LNG Shipping (CLNG) 25,5%	2 + 3								
	Sandibinskoye	seasonal	crude oil	1,2	Dynacom	4	90	Arc4	11	
					freight	2	85			
	Enisey	year-round	ore concentrate	0.35	Dynacom	1	19	Arc7	2	
					freight	2**	43			
					freight	2**	16, 47			Arc4
Barents Sea	Pavlovskoye	year-round	ore concentrate	0.7	Noriisk Nikel	1	19	Arc7		
					Noriisk	5	18	Arc7		
					Chaika	10	75	Arc7		
E.Sib. Sea	Pechanka	?	ore concentrate	0.7	freight	?	?	?		
	Mayskoye	seasonal	ore concentrate	0.1	SASCO+	3*	8 - 9	Arc4		

\* the chartered vessels in navigation of 2016

\*\* the chartered vessels in navigation of 2017

3 current construction

THIS IS NOT THE END

# THREE COLORS OF THE PROSPECTS OF THE PROJECTS

The forecast of freight traffic of mineral resources includes two groups of projects:

1. approved by the state,
2. and the statements of the companies.

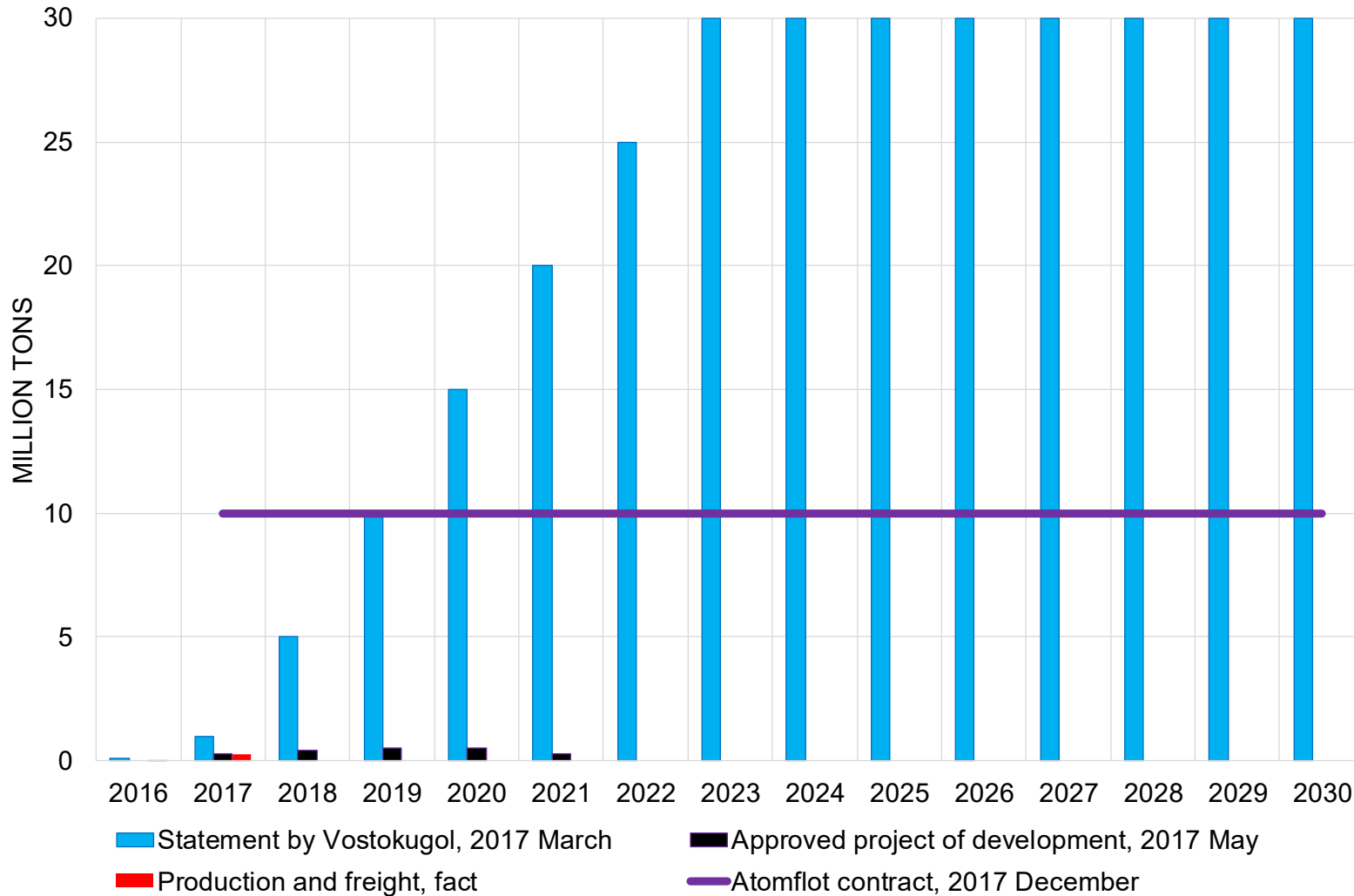
On the basis of what criteria it is possible to evaluate presentability of statements of the companies?

MINERAL RESERVES'S SECURITY OF EXPECTED PRODUCTION LEVELS			READINESS OF TRANSPORT INFRASTRUCTURE
Statements of the companies	evaluated resource base	doesn't provide expected volumes of production	operating
			under construction
			projected
			stated
			not certain
	provide expected volumes of production	operating	
		under construction	
		projected	
		stated	
		not certain	
Projects of development approved by the state			operating
			under construction
			projected
			stated
			not certain





# VOSTOKUGOL: COAL TERMINAL AND FREIGHTED VESSELS - ARE NOT ENOUGH

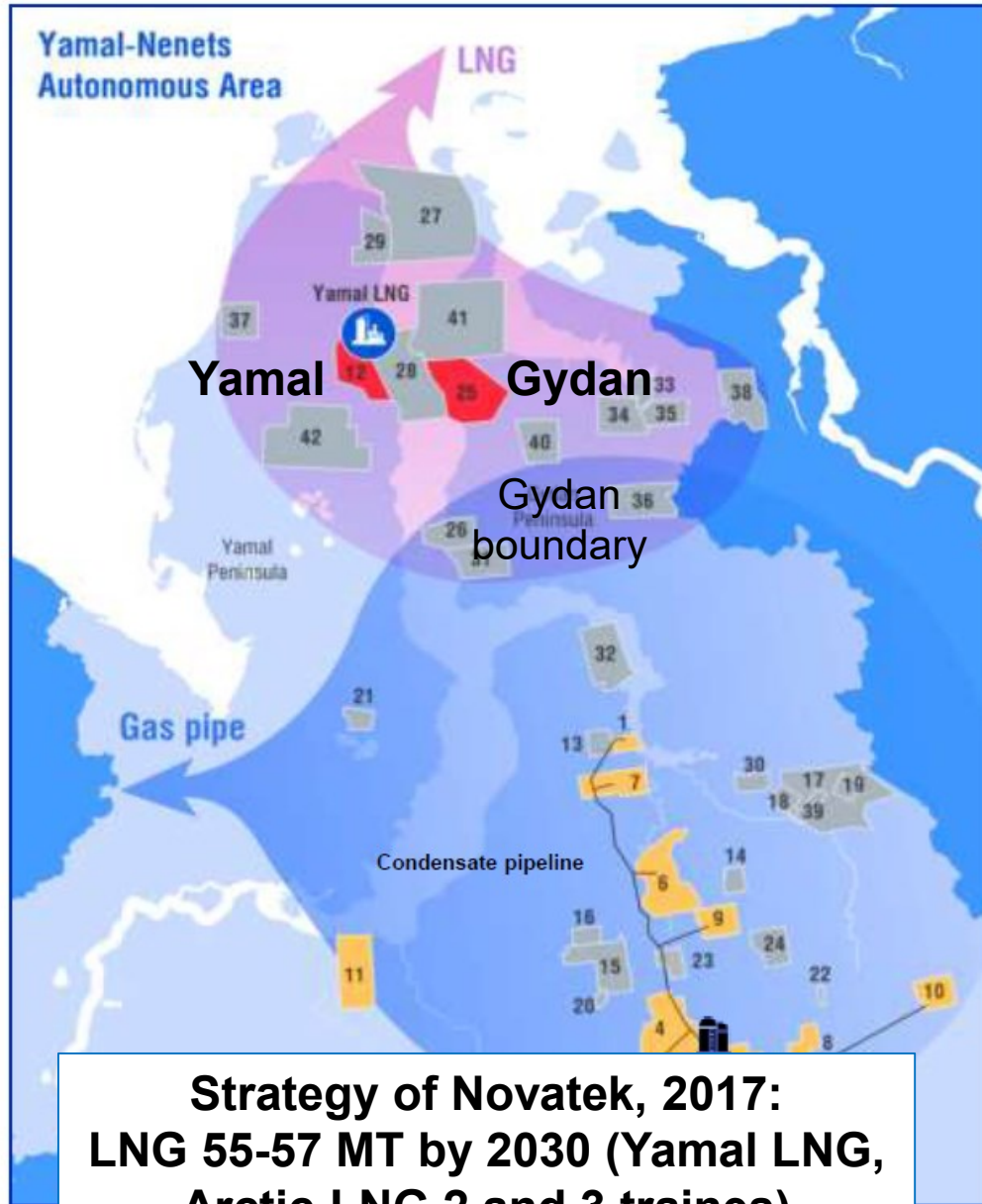


## Federal Agency for Mineral Resources, as on January 23, 2018:

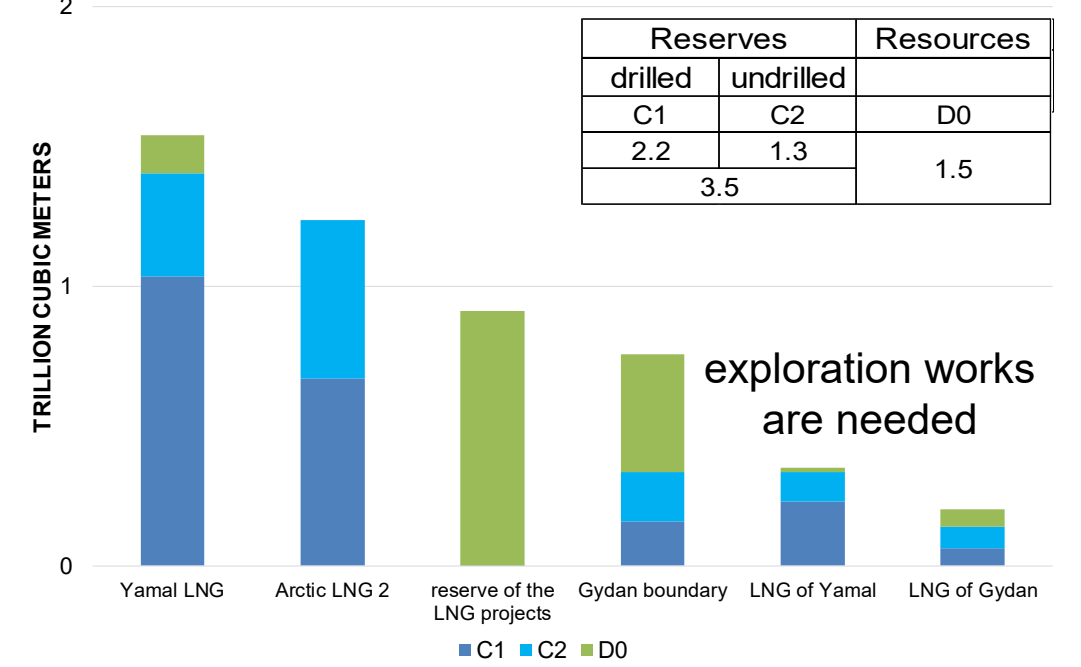
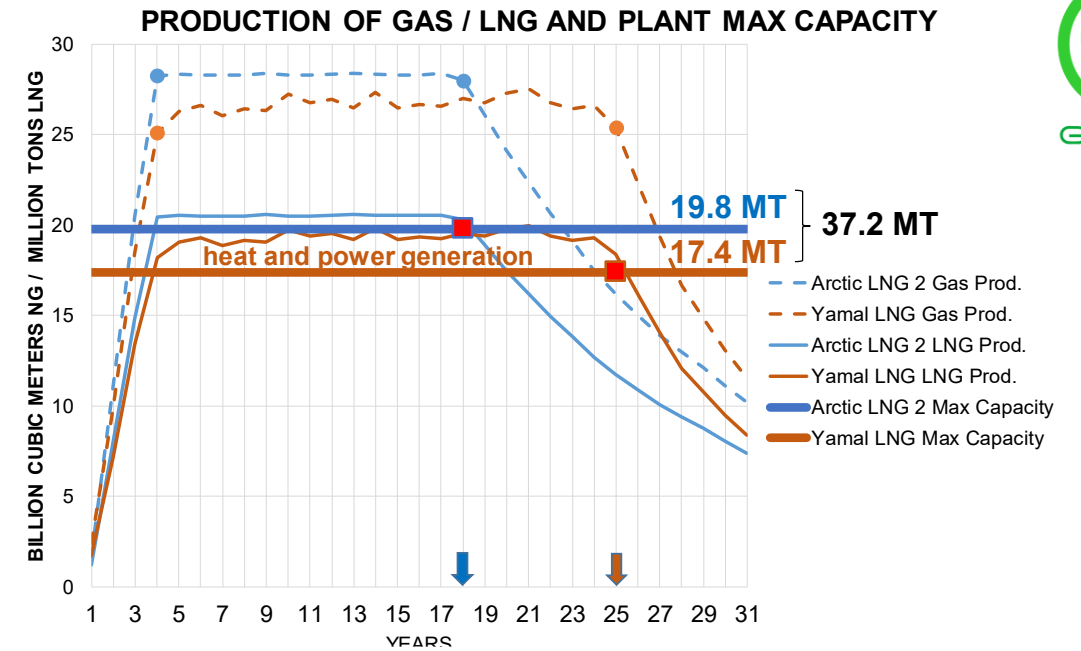
1. To forbid coal exploration and production since August 11, 2017;
2. No later than December 1, 2018 to approve the project of work on an exploration;
3. No later than June 01, 2022 to approve the engineering design of mining;
4. To bring the field into development no later than June 03, 2024

Bulkers of the partner Nordic Bulk Carriers: 6 Panamax DWT 76 TT and 2 Handymax DWT 44 TT 1A (Arc 4) ice class (shipping on NSR only in easy ice conditions under conducting of the icebreaker).

# YAMAL LNG, ARCTIC LNG 2, ETC.



**Strategy of Novatek, 2017:  
LNG 55-57 MT by 2030 (Yamal LNG,  
Arctic LNG 2 and 3 trains)**



Data source: Rosnedra, NOVATEK; analysis of GECON

## CONCLUSION

When determining need for the cargo and providing vessels (including icebreaking providing) it is necessary to consider:

- source of the forecast of freight traffic of the project: the approved plan or the statement of the company;
- sufficiency of reserves for ensuring production levels;
- security of the project with vessels of the corresponding ice classes.

Condition of relevance of assessment is monitoring of development of the project.

**Thank you for attention!**

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