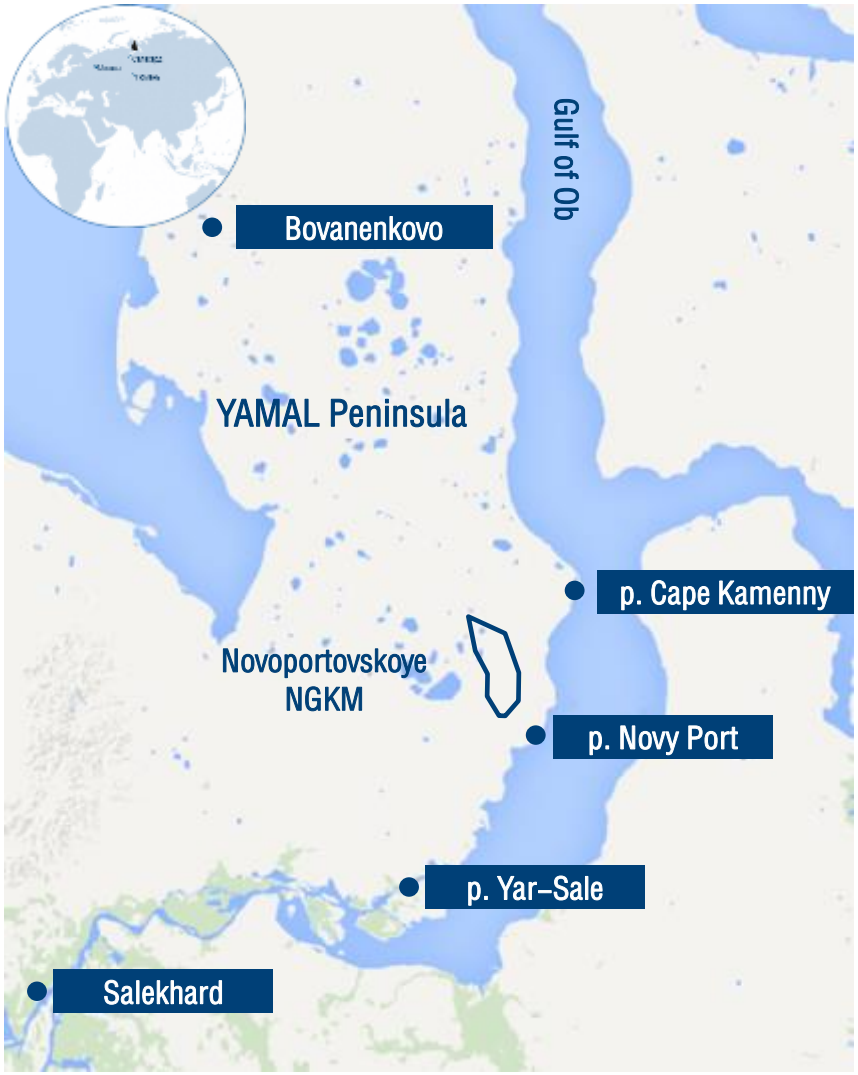
Novoportovskoye oil and gas condensate field – development strategy and transport logistics

Gazpromneft Yamal LLC
July 2017

Geography and history of field development



Geography and climate

Located on the Yamal Peninsula, Yamalo–Nenets Autonomous Okrug

License block size 659.6 km²

Nearest population centres:

- pos. Novy Port (20 km SE)
- pos. Cape Kamenny (89 km NE)
- Salekhard (293 km SW)

Northern climatic zone:

- winter – 60°C, summer +20°C
- 86 days of snowstorms per year
- 245 days undr snow cover

History of development

Stage I 1964–1970

- 31 exploratory wells drilled
- Reserves appraisal

Stage II 1979–1987

- 86 exploratory wells drilled
- Re–evaluation of reserves

Stage III 2000–2012
Gazprom Dobycha Nadym LLC

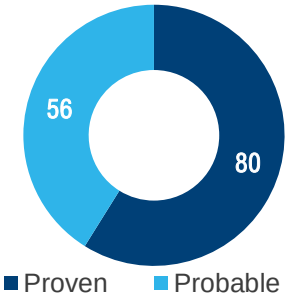
- Pilot production – 20 wells, 3D seismic
- Reserves appraisal and assessment of oil recovery

Stage IV from 2012
Gazpromneft Novy Port LLC

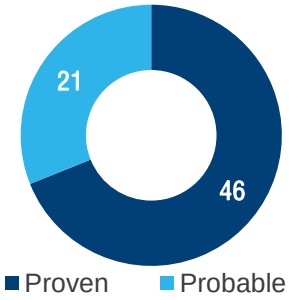
- Gazpromneft Novy Port LLC
- 42 production wells drilled
- Production development plan endorsed

Reserves, 2 P, PRMS

Liquid hydrocarbons, mt

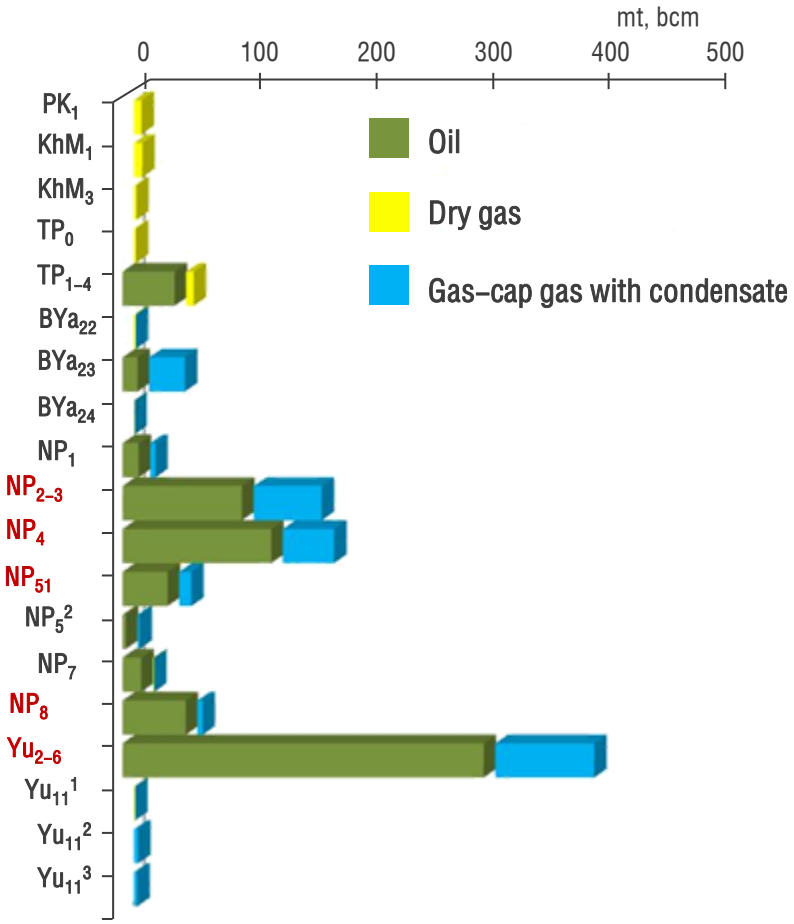


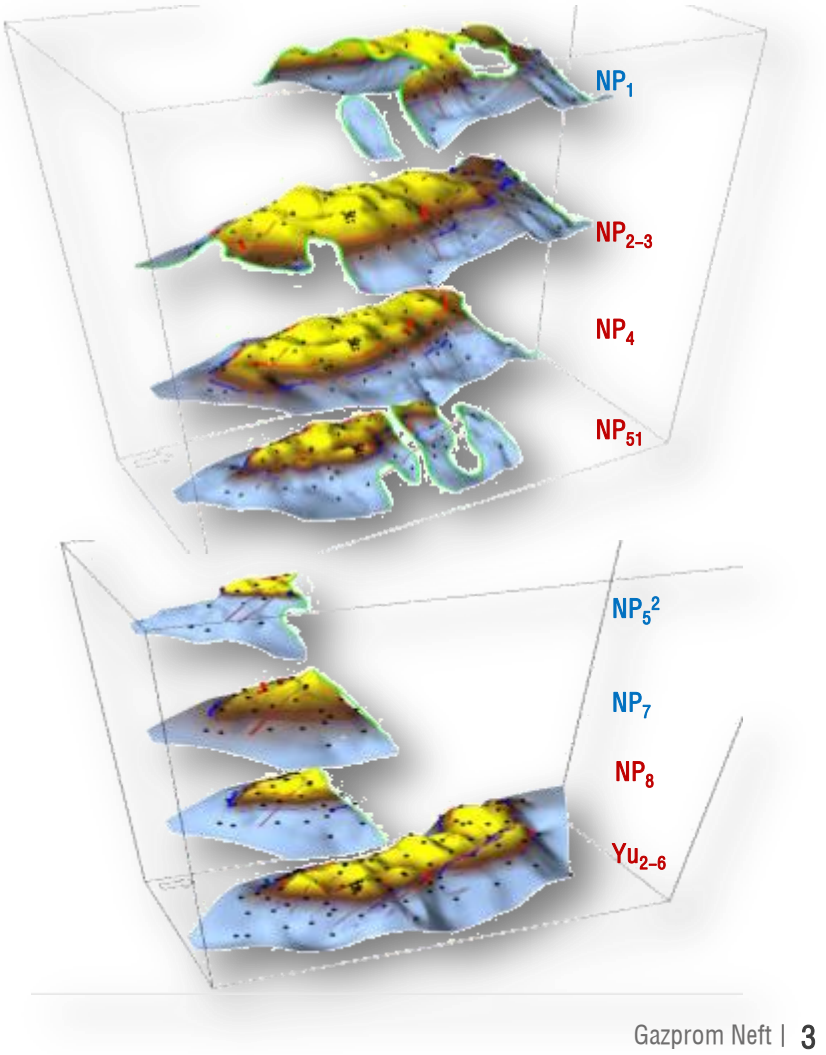
Gas, bcm



The complex geological structure of the Novoportovskoye field

90% of recoverable reserves are located in five strata





The Novoportovskoye field – winter 2012

Oil, gas and condensate transportation options

Oil

Pipeline to **Cape Kamenny** sea terminal and then on to **Murmansk** by sea transport

Pipeline to **Sabetta** sea terminal and then by sea transport to **Murmansk** for commercialisation

Pipeline to **Kharasavey** sea terminal and then by sea transport to **Murmansk** for commercialsation

Pipeline to sea terminal **near Baydaratskaya CS** and then by sea transport to **Murmansk** for commercialisation

Pipeline to **Usa OPS** for commercialisation

Pipeline to **Krasnoleninskaya OPS** for commercialisation

Pipeline to **Purpe OPS** for commercialisation

Pipeline to **Payuta rail station** and then by existing rail line Obskaya–Bovanenkovo for commercialisation

Pipeline to **Payuta rail station**, and then by rail line Obskaya–Bovanenkovo to **Kharasavey station**, then by sea transport to **Murmansk** for commercialisation

Rail transport to **Payuta station** and then by Obskaya–Bovanenkovo rail line for commercialisation

Integrated option – Cape Kamenny sea terminal and pipeline to Payuta rail station

Gas

Pipeline to **Baydaratskaya CS**

Pipeline to **Nydinskaya CS**

Pipeline to **Yamburgskaya CS** crossing Gulf of Ob near Cape Kamenny

Pipeline to **Yamburgskaya CS** crossing Gulf of Ob near pos. Novy Port

Condensate

Rail transport with oil to **Payuta station**
and then by Obskaya–Bovanenkovo rail line for commercialisation

Pipeline to **Payuta rail station** and then by existing rail line Obskaya–Bovanenkovo for commercialisation

Integrated transportation of condensate and oil for commercialisation

Transportation by existing pipeline (219) to Cape Kamenny with construction of oil shipment terminal

Pipeline to Cape Kamenny with construction of oil shipment terminal

Pilot voyage of the Vaygach icebreaker

Objectives

- Check navigability of the Gulf of Ob during challenging ice conditions
- Confirm possibility of transporting oil from the Novoportovskoye field by sea

Climatic conditions of the Gulf of Ob

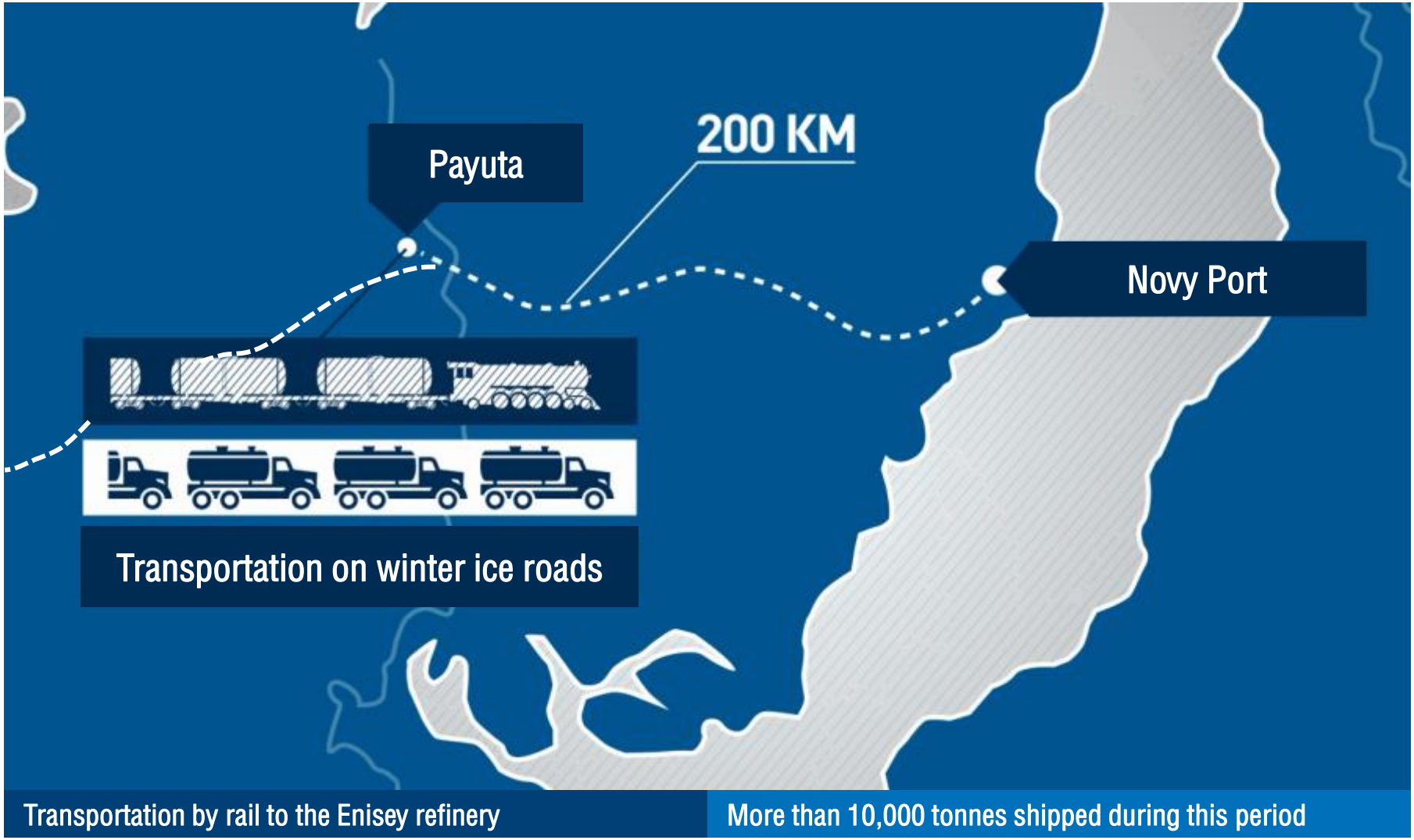
- **–25°C** February: absolute lowest **–56°C**
- Ice depth: Up to **2.35 m**
- Ice–free navigation: approx. **85 days per year**

Outcomes

- Goal achieved – the ice–breaker successfully traversed the challenging ice conditions of the Gulf of Ob*
- Possibility of organising oil transportation via the Gulf of Ob confirmed
- Specialists from the Krylov Shipbuilding Institute invited to take part in the voyage. Objectives: to research ice conditions in the Gulf of Ob
- First positive experience of working with Atomflot confirmed

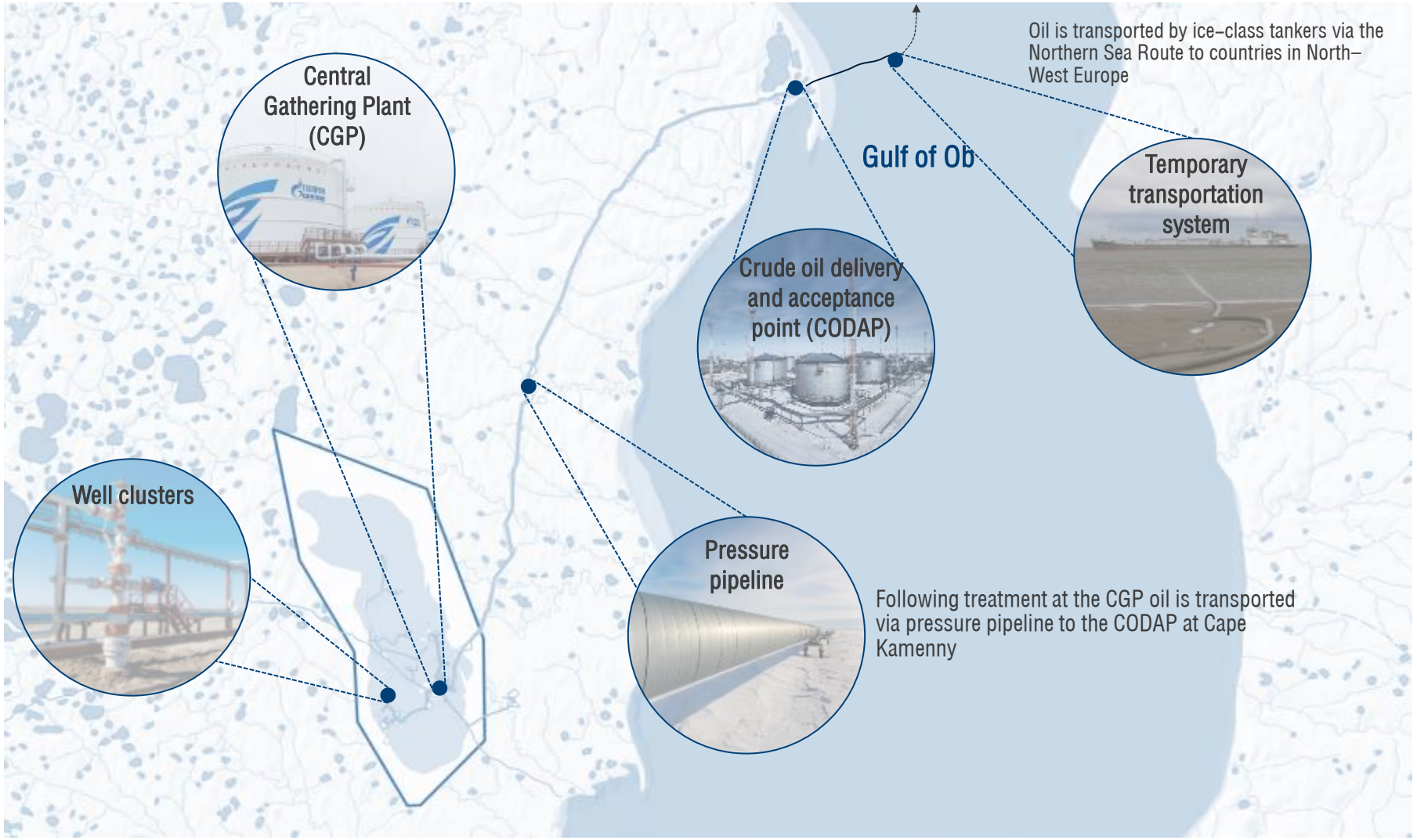
* Pilot voyage undertaken in 2011

First oil shipments by road – winter 2013

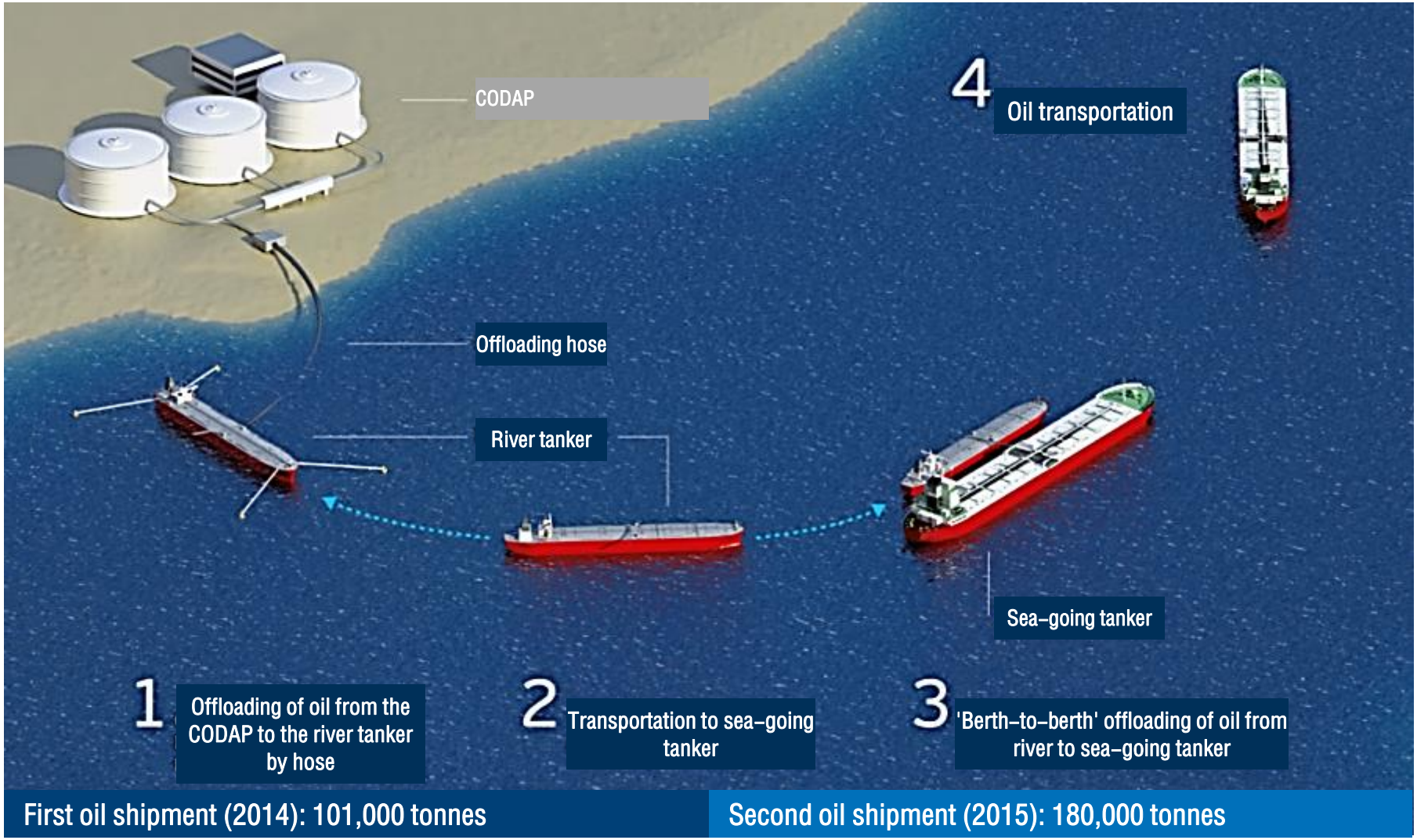


The Novoportovskoye field – winter 2013

Infrastructure solutions during pilot development



Pro tem summer oil shipments – 2014



First oil shipment (2014): 101,000 tonnes

Second oil shipment (2015): 180,000 tonnes

Photo reportage – summer oil shipments, 2014

Pro tem winter shipments, 2015

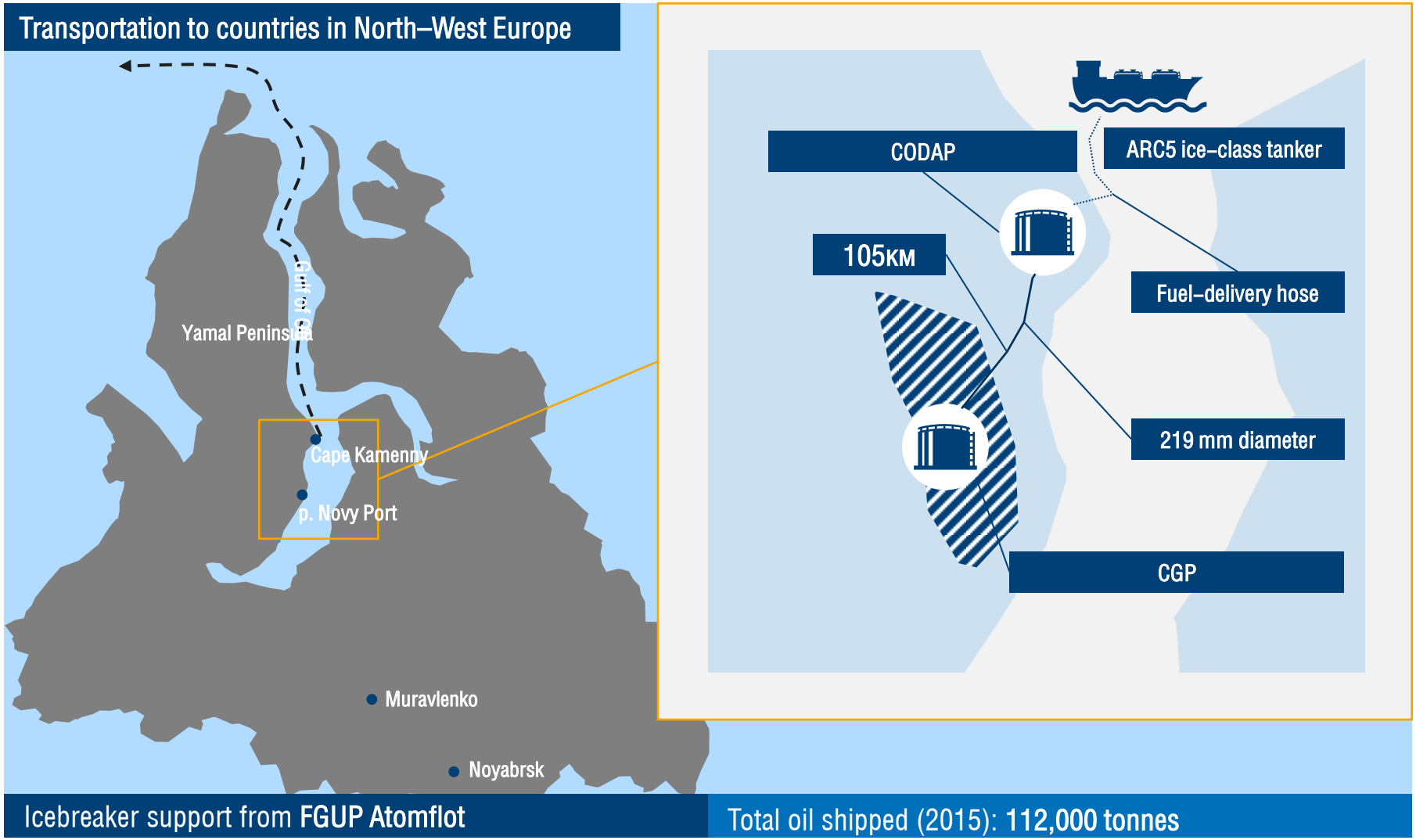
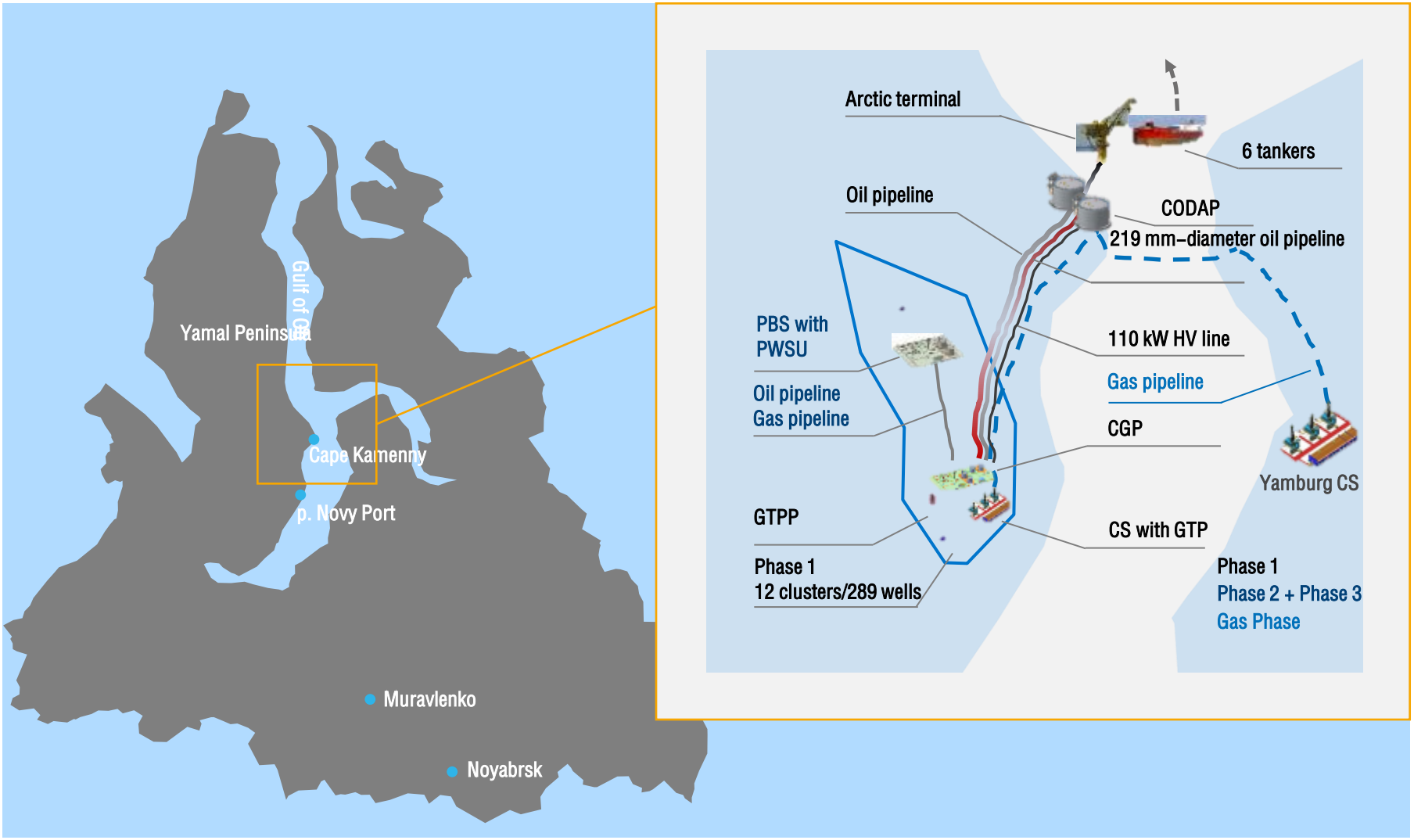
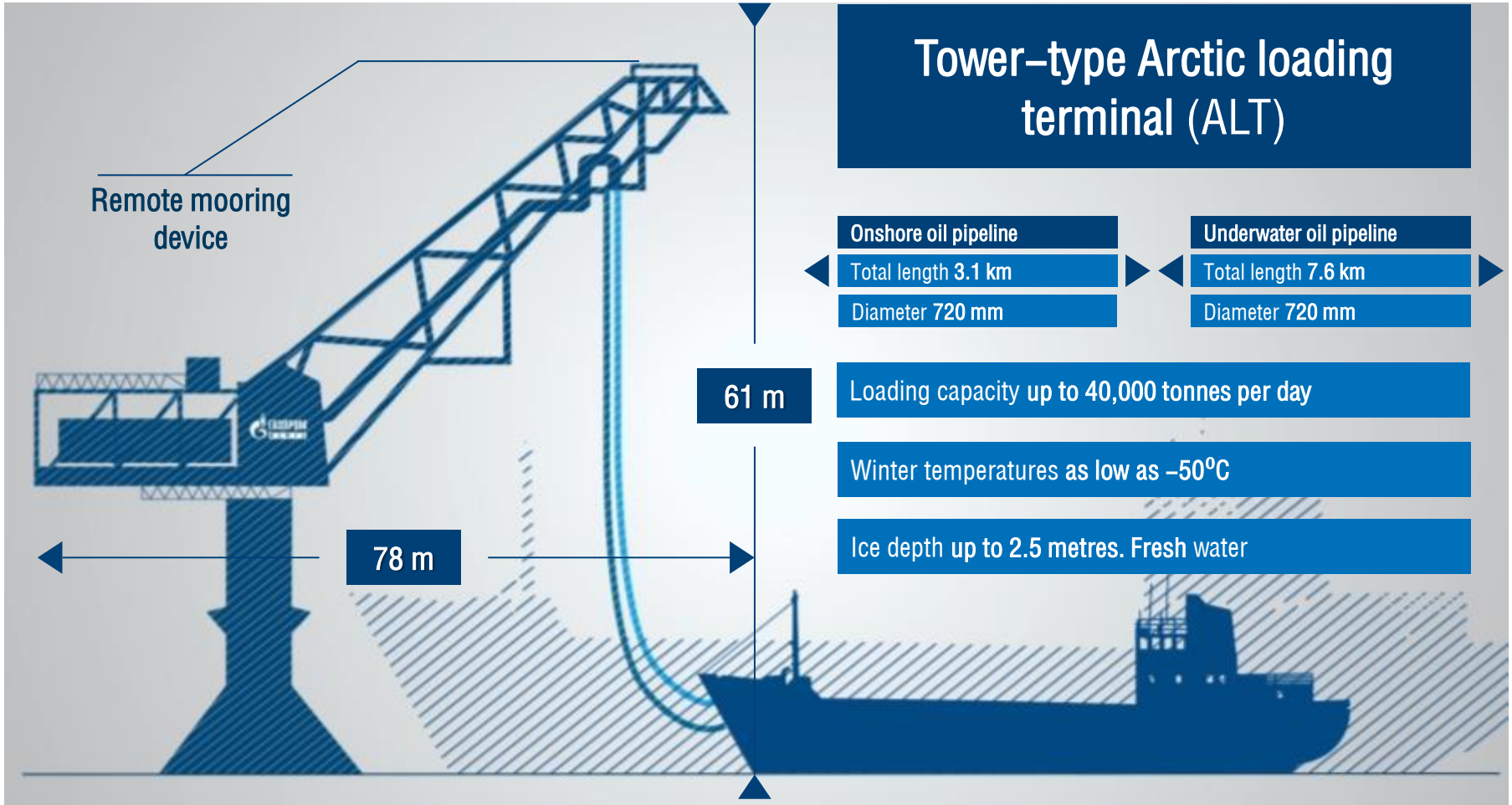


Photo reportage – winter oil shipments, 2015

Layout of production facilities at the Novoportovskoye oil and gas condensate field under full production



Year–round Arctic loading terminal



2016: Test oil offloading

July 2016: Specialist tankers ready

Photo reportage – installation of the Arctic terminal, September 2015

Tanker fleet and icebreaking support vessels

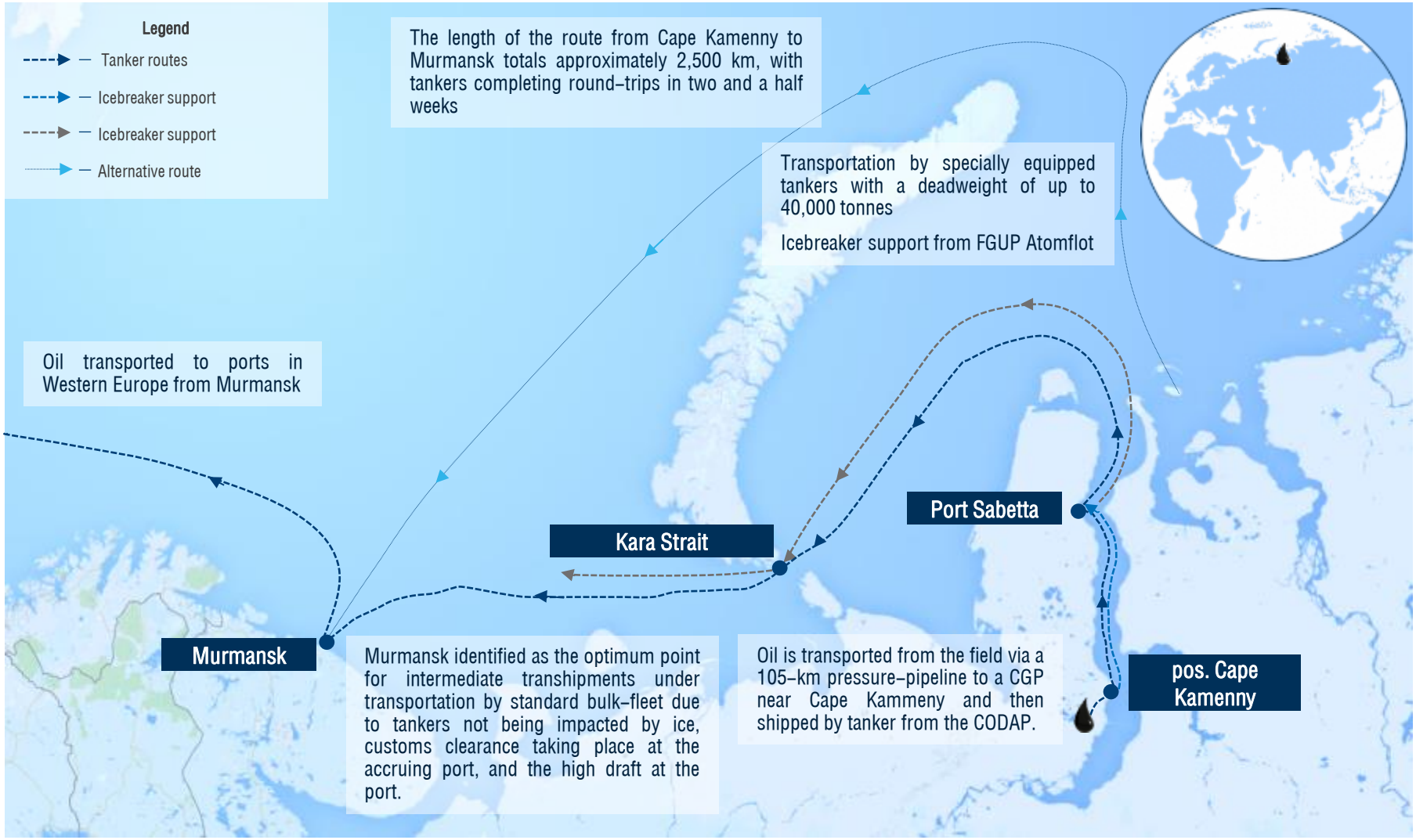
Tanker fleet

Tanker type:	**Arctic Shuttle Tanker**
RMRS class:	**Arc 7**
Deadweight:	**42,000 tonnes**
Maximum draught:	**9.5 metres**
Main–engine capacity:	**2x11000 kW**

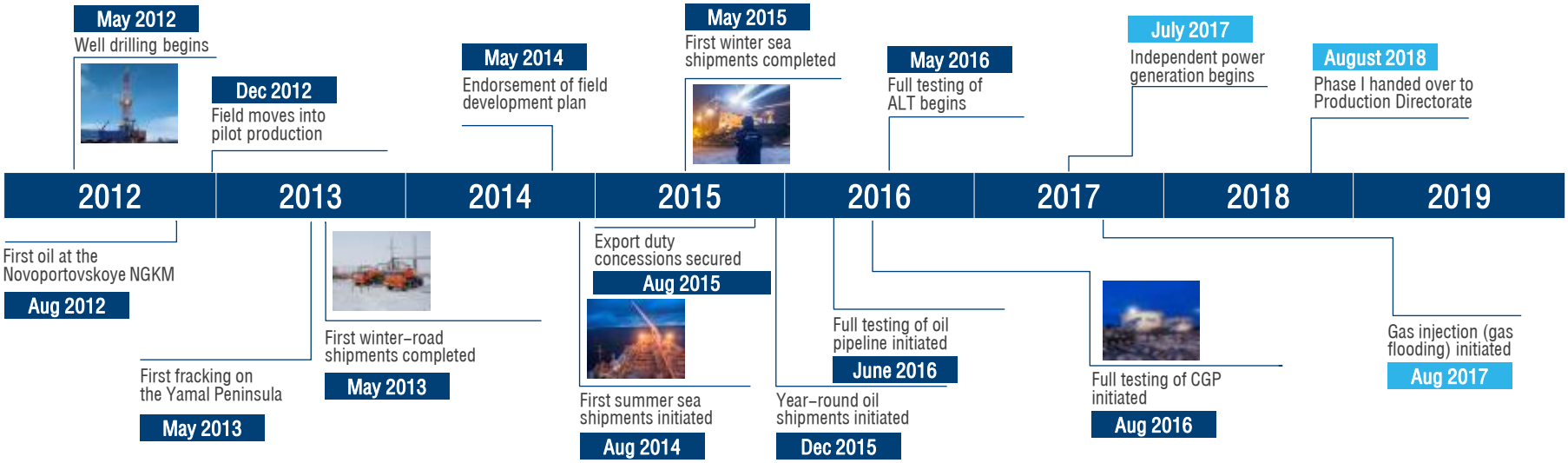
Icebreaking support vessels

Designer/developer:	**Aker Arctic**
Ice class:	**Icebreaker8**
Navigation area:	**unlimited**
Maximum draught:	**up to 8 metres**
Main–engine capacity:	**at least 22 MW**

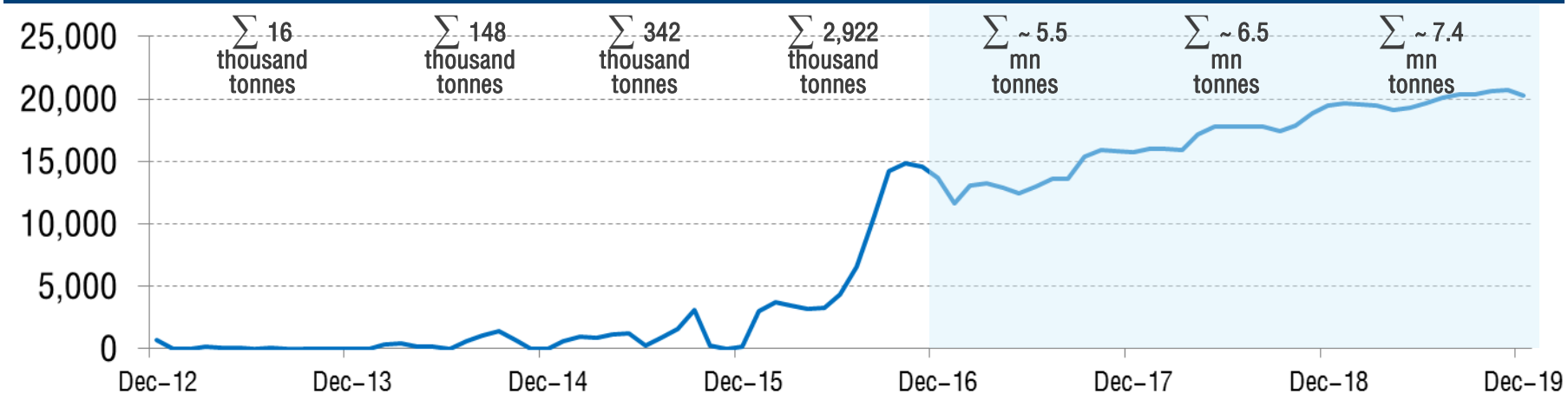
Oil transportation



Oil production over the course of the project



Oil production, t/d



Restoration of aquatic biological resources

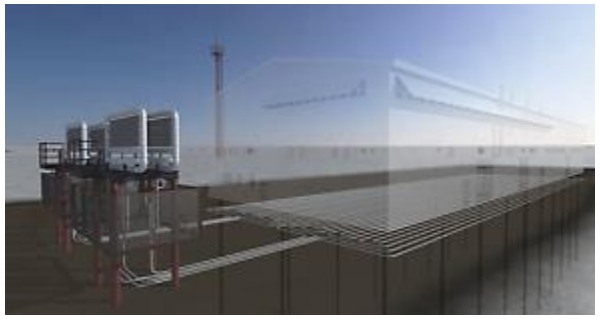
Appropriate restoration of aquatic biological resources – in the order of 20 million muksun (white fish) fry or the equivalent – undertaken throughout the development of the Novoportovskoye oil and gas condensate field.

In 2015 3.6 million muksun fry and 270,000 peled fry (both fish of the salmon family) released into the Ob River and the Ob–Irtysh basin.

Technical and design solutions for environmental protection

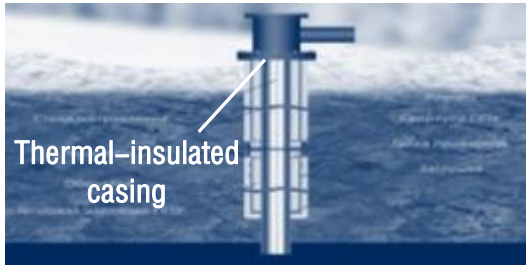
Thermal–insulated casings

Temperature stabilization of permafrost soil



Above–ground laying of oil pipelines

Applying environmentally–friendly technologies in the permafrost conditions and fragile ecosystem of Yamal



- Use of natural–flow horizontal pipeline systems (“GET”)
- Thermo–regulators used
- Overground pipeline laying
- Construction of overland throughways for deer migrations
- Leak–detection systems used
- Skin–effect heat tracing systems used

Objectives

- Fully test and ensure the load–bearing capacity of building and equipment foundations
- Localise the thermal impacts of buildings and facilities to avoid impacting the permafrost
- Significant improvements to pressure–pipeline reliability and safety
- Significant reductions in manmade pipeline impacts on the environment
- Avoid permafrost thaw around well heads

Minimising environmental impacts. Achieving targets – of at least 95% – in associated petroleum gas (APG) utilisation.

Construction of the largest GTPP on the Yamal Peninsula with capacity of 96 MW (scaleable up to 144 MW). **Independent generation to commence 2Q2017**

Construction of unique gas compressor station and processing plant for immediate re–injection of APG, with capacity of up to 7.4 bcm/y.
Gas re–injection to start 2Q2017

Drilling and installation of well clusters (3) for **APG reinjection**