

# FACTS

NEWSLETTER ABOUT THE NATURAL GAS PIPELINES THROUGH THE BALTIC SEA ISSUE 24/NOVEMBER 2012



Representatives from the Nord Stream shareholder consortium, along with high-ranking personalities from politics attended inauguration of Line 2.

## The Nord Stream Pipeline System Is Fully Operational: Line 2 Commissioned October 8

Together the twin pipelines provide Europe with up to 55 billion cubic metres of gas a year

In the presence of a number of representatives from the Nord Stream shareholder consortium, along with high-ranking personalities from the world of politics and business, the announcement was made that gas is now flowing through the second of the twin pipelines at an opening ceremony held on October 8, 2012, at Portovaya Bay, Russia near the starting point of the pipelines on the Baltic coast. Line 1 went into operation in November 2011 during an internationally broadcast ceremony held in Lubmin, Germany, where the twin pipelines reach the European mainland.

### We Deliver

In his address during the event, Gerhard Schröder, Chairman of the Nord Stream Shareholders' Committee and Former Chancellor of the Federal Republic of Germany said: "We have realised an international infrastructure project of outstanding technical difficulty,

and done so within the ambitious timeframe and the budget framework. Today we can proudly say: 'We Deliver.'"

### Praise for the Pipelines

At the event, Sergei Ivanov, Chief of Staff of the Russian Presidential Executive Office said Nord Stream represents a big step for all of Europe, made possible as a result of mutual trust and consideration. He also stated that combined efforts and resources make it possible to carry out even the most complex international projects.

The inauguration of Line 2 was also praised by several heads of state, including Russian President Vladimir Putin, German Chancellor Angela Merkel, Dutch Prime Minister Mark Rutte and French President François Hollande. In a video message, President Putin said, "Nord Stream will meet Europe's growing demand for energy resources. Gas will be supplied

directly by the shortest route, linking the major Russian gas reserves to European markets and smoothly. We can guarantee this."

Angela Merkel, Chancellor of Germany said: "Nord Stream has strikingly shown that the state and the private sector can form a constructive and productive unit across several national borders. We can be proud of this truly European collaboration."

### Europe Needs Natural Gas

The importance of the use of natural gas in coming years was underscored by both the French and Dutch heads of state in their video messages. "I believe in natural gas. It has an important role to play in meeting the energy and environmental challenges that we all face," said President Hollande. Prime Minister Rutte said, "It's hard to overstate the importance of the Nord Stream project. The Inter-

national Energy Agency calls this 'the Golden Age of Gas.' And with good reason. Natural gas is relatively cheap and much cleaner than other fossil fuels. As we seek large-scale renewable energy solutions, natural gas remains the transition fuel of choice."

At the event, Alexei Miller, Deputy Chairman of the Board of Directors and Chairman of the Management Committee, OAO Gazprom explained that Gazprom made great efforts to develop the Russian gas transmission system that will securely deliver gas into the Nord Stream pipeline system.

Miller also mentioned the potential expansion of Nord Stream. "Today Nord Stream shareholders considered a preliminary feasibility study for the third and fourth legs, their construction was recognised as economically expedient and technically possible."

# Nord Stream Portovaya Landfall Facility

> Onshore to offshore: Nord Stream's twin pipelines start on the Russian shore and go offshore in Portovaya Bay to transport gas through the Baltic Sea to the German coast. Gas entering the offshore pipelines is already pressurised to the required level and prepared for transportation at the Compressor Station Portovaya.

The Portovaya landfall facility is the logistical link between the Unified Gas Supply System of Russia and the Nord Stream offshore pipeline system. From here, natural gas starts its journey through the Baltic Sea and exits some 1,224 kilometres away at the Lubmin landfall facility in Germany where it will be transported onward through the European pipeline grid after undergoing further preparations and testing. The gas that is fed into the Nord Stream system stems from the Gryazovets-Vyborg onshore

pipeline built and operated by Gazprom. The 917 kilometre pipeline runs through the Vologda and Leningrad regions and is capable of transporting 55 billion cubic metres of gas to fill the Nord Stream Pipeline. Before the gas reaches the landfall facility in Russia, it is cleaned of solid particles, stripped of water content and measured at Gazprom's Compressor Station Portovaya. The Nord Stream landfall facility is equipped with all systems necessary to monitor parameters of incoming gas and ensure safe operation.



## 1 PIG Traps

The internal integrity of the Nord Stream Pipelines is checked periodically by intelligent PIGs (Pipeline Inspection Gauges). The PIGs are housed in traps and fed into the pipelines via launchers in Russia. The PIGs are then recovered safely in Germany.

## Intelligent PIGs

The intelligent PIGs are carried through the pipeline by the gas stream. They automatically detect the smallest of changes due to corrosion or mechanical damage. They also register any possible movement of the pipelines due to external impacts.



## 2 Double Expanding Gate Valves

Huge double-gate valves separate the gas in the pipelines from the PIG traps when they are not in operation. The valves are about 10 metres tall, and weigh 102 tonnes each. This makes them the heaviest double-gate valves that have ever been produced.



## 3 Shut-Down Valves

These valves are employed for safety. In an emergency, the valves immediately interrupt the flow of gas into or out of the pipelines. They are equipped with actuators which enable them to shut down within a minute. They were developed especially for the Nord Stream project.

## 4 Vent Stacks

If an emergency or planned shutdown should occur, gas will be released via the vent stacks.

## 5 Offshore Portion of Pipelines

From the landfall facility, gas is fed into the Nord Stream pipelines, which are buried in a trench running 1.1 kilometres down to the coastline.

## 6 Anchor Blocks

Two concrete anchor blocks are buried nearby. They are necessary to avoid loads from the expansion movement resulting from temperature fluctuations.

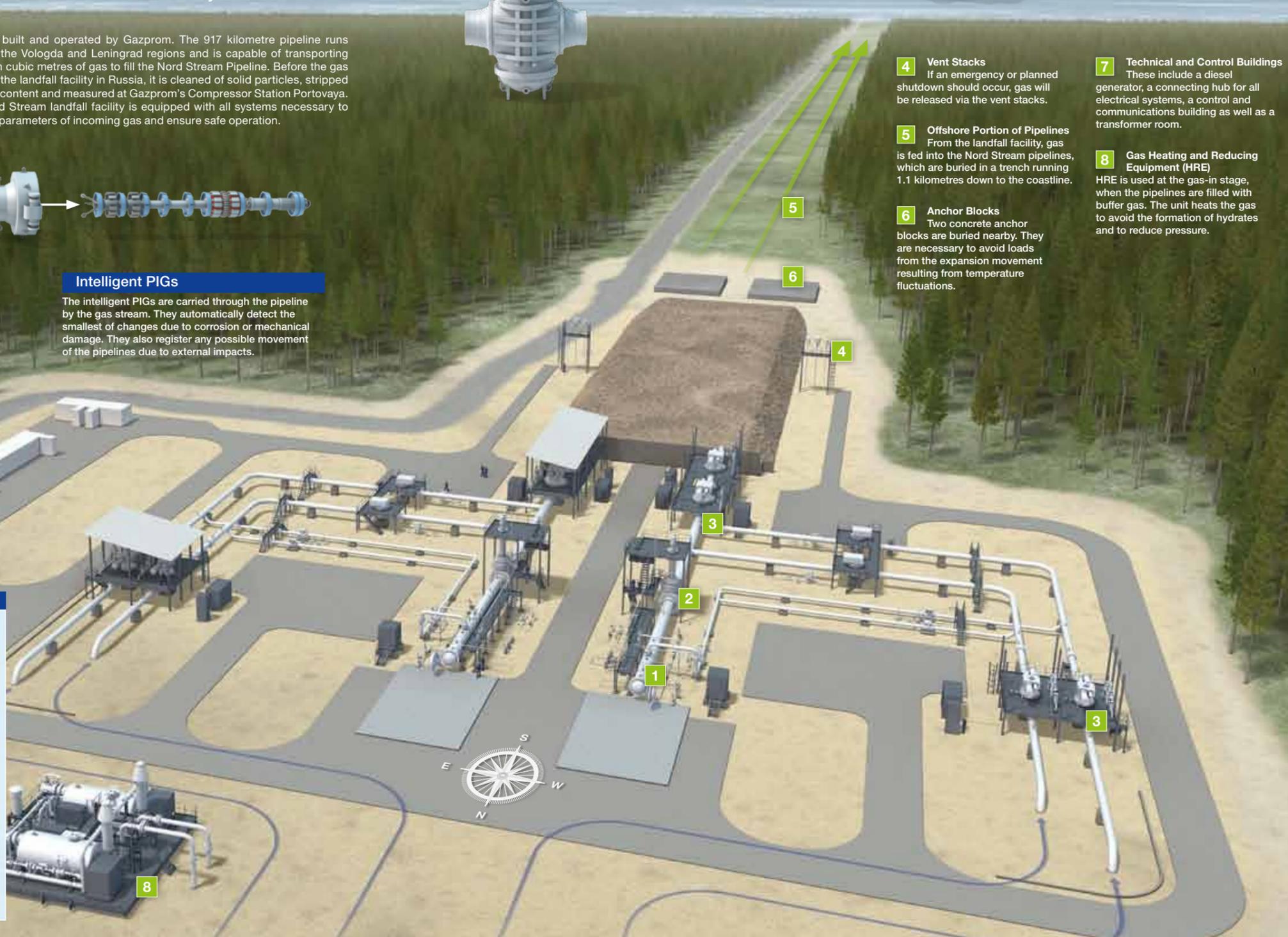
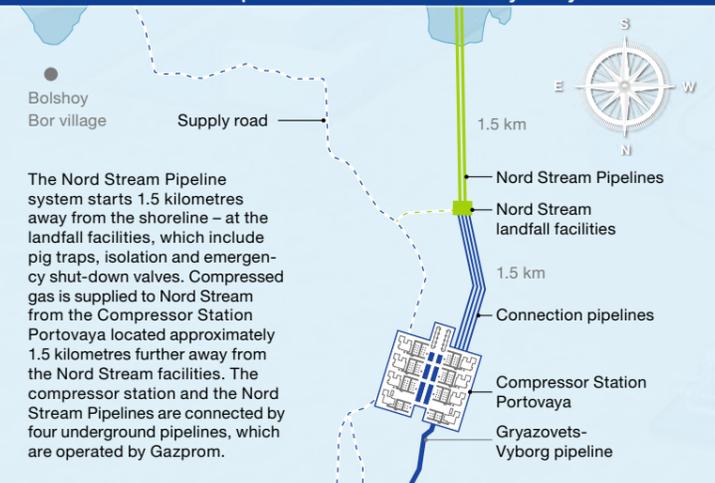
## 7 Technical and Control Buildings

These include a diesel generator, a connecting hub for all electrical systems, a control and communications building as well as a transformer room.

## 8 Gas Heating and Reducing Equipment (HRE)

HRE is used at the gas-in stage, when the pipelines are filled with buffer gas. The unit heats the gas to avoid the formation of hydrates and to reduce pressure.

### Nord Stream and Gazprom Facilities in Portovaya Bay





1 and 2) A gas-pumping unit, or compressor, powered by a Rolls Royce motor. 3) The gas treatment facility in the foreground, and the eight compressor units in the background. 4 and 5) The GTU removes condensate from the gas that arrives from the Gryazovets - Vyborg trunkline.

## A Look at the Compressor Station Portovaya

Gazprom's gas transmission facility at the Baltic Coast prepares gas for Nord Stream

**B**efore gas from the northern Russian gas fields can flow through the Russian Unified Gas Supply System (UGSS) into Nord Stream's twin pipelines, it is treated at Gazprom's Portovaya gas treatment unit (GTU). The facility is located at the Compressor Station Portovaya near Vyborg in Russia. The GTU of the Compressor Station Portovaya removes condensate or gas hydrates, which occur under certain pressure and temperature conditions. The unit is designed to dehydrate up to

170 million cubic meters of natural gas daily. Following treatment, gas flows into the compressor area. The powerful Compressor Station Portovaya, which is made up of eight gas-pumping units, pressurises the natural gas to the required level for transport through the Nord Stream Pipelines without interim compression. Six of the gas-pumping units have a 52 megawatt capacity and two of the units have a 27 megawatt capacity. The 52 megawatt units at the facility are a first in the operation history

of the UGSS. After the gas is compressed, it is subjected to fiscal measurement in the gas metering station to confirm the contractually agreed flow rate and quality as well as system pressure and temperature before it is fed into the Nord Stream Pipelines. "Now we are bringing Portovaya to its full capacity, and it is becoming the most powerful compressor station in the world," said Alexey Miller, Chairman of the Management Committee, OAO Gazprom on October 8 at the Line 2 commissioning ceremony.



A view of three of the eight gas-pumping units that make up the Compressor Station Portovaya.

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