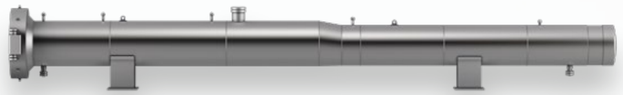
Nord Stream 2
Committed. Reliable. Safe.

Landfall Facilities in Russia

Service and Operational Zone:
> Operation building
> Workshop building
> Guard house
> Sewage pumping station
> Rainwater treatment facility
> Other facilities

INTELLIGENT PIGS

The integrity of the pipelines is checked regularly by what are known as intelligent PIGs (Pipeline Inspection Gauges). Transported through the pipeline with the gas flow, they scan from the inside and detect even the smallest changes due to corrosion or mechanical damage.



1 PIG LAUNCHER

A PIG launcher in Russia is used to send the intelligent PIGS into the pipelines. They are safely removed via the PIG receiver on the other side in Germany.

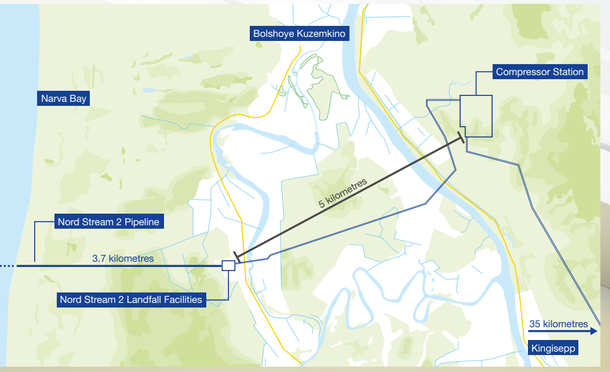
2 SHUT-DOWN VALVES

Shut-down valves are installed for safety purposes and can immediately stop the gas flow in case of emergency. They are also able to withstand the high pressure and temperature of gas, as well as being resistant to corrosion.

Nord Stream 2 is one of the longest offshore gas pipelines in the world. The twin 1,234-kilometre pipelines mostly follow the route of the existing Nord Stream pipeline in the Baltic Sea – from the Kingisepp District in Russia to Lubmin near Greifswald on Germany's northern coast. There the natural gas enters the EU internal energy market.

The starting point of the pipeline system is located on the coast of Narva Bay in the Kingisepp district of the Leningrad region. Gas that flows into it is fed through the Northern Corridor of Russia's Unified Gas Supply System (UGSS) to the Slavyanskaya compressor station, some five kilometres upstream from the landfall facilities. Here the gas is pressurised to a level that enables secure transportation without intermediate compressor stations along the route. The landfall is equipped with all systems necessary to monitor the parameters of incoming gas and ensure safe operation. The compressor station and the Nord Stream 2 pipeline are connected by four underground pipelines with a diameter of 800 millimetres, which are operated by Gazprom.

The pipeline system starts 3.7 kilometres away from the shore at the landfall facilities, which include Pipeline Inspection Gauge (PIG) launchers and shut-down valves.



PIG LAUNCHER 1

SHUT-DOWN VALVES 2

3 VENT STACKS

If an emergency or planned shutdown occurs, gas is released through the vent stacks.

8 ISOLATION JOINTS

Isolation joints are used to separate the electro-chemical corrosion protection systems from those of the upstream systems.

7 FILTERS

Gas purification filters ensure the removal of mechanical particles larger than five microns from the gas flow.

5 ANCHOR BLOCKS

Two concrete anchor blocks are buried nearby. These prevent movement of the pipelines resulting from longitudinal loads due to variations in gas temperature inside the pipelines.

6 TECHNICAL AND CONTROL BUILDINGS

This area includes an electrical building, emergency diesel power generator, analyser buildings, local control panel, step down transformer and other facilities.

4 ONSHORE PIPELINES

From the PIG trap area in Russia, gas is fed into the offshore twin pipelines, which are buried in a trench running 3.7 kilometres to the coastline.

Illustration indicative only

The Nord Stream 2 Pipeline in Russia

Nord Stream 2 is a modern, effective new gas pipeline through the Baltic Sea. This international infrastructure project connects the world's largest gas reserves in Russia with European consumers via an optimal, direct route.

In Russia, the Nord Stream 2 Pipeline crosses about 3.7 kilometres of the southern part of the Kurgalsky nature reserve. In view of the protected status of the area, we are fully aware of our responsibility towards this sensitive habitat.

The project has been implemented in line with applicable national laws and international standards, including the International Finance Corporation Performance Standards on Environmental and Social Sustainability (IFC PS).

Nord Stream 2 builds on the successful construction and operation of the Nord Stream gas pipeline (2011 to present). It was recognised as a benchmark project in terms of compliance – even during construction – for following stringent industrial and environmental safety standards as well as for its public affairs and stakeholder engagement.

Innovative Construction Method

Specially designed trench boxes were used to maintain the walls of the trenches needed to lay the pipeline. When compared with the traditional approach, this reduced the width of the construction corridor by 50 percent and excavation volume by 70 percent.

The onshore linear section was built using the innovative open trench construction method that relies on trench boxes, which were developed by leading engineering companies specifically for crossing the sensitive Kurgalsky reserve. In total, more than 1,000 trench boxes were installed for the construction of the 3.7 kilometre onshore section of the pipeline in 2018 and 2019.

Both pipelines were welded and pulled into the trenches using a powerful winch with a capacity of up to 800 tonnes, installed approximately in the middle of the onshore section. One section of each pipeline was pulled from a pipe-welding station located on the PIG trap area while the other was pulled from a pipelaying vessel anchored off the coast.

In 2019, both segments were welded together in the vicinity of the winch. The trench boxes were then removed and the trenches were backfilled with the extracted soil as well as the upper, fertile layer of soil and peat.

Nord Stream 2
Committed. Reliable. Safe.

Facts and Figures

The gas pipeline with a length of **1,234** kilometres passes from Russia to Germany through the Baltic Sea.

1,234 km

Two pipelines with a constant inner diameter of **1,153 millimetres** (48 inches) and wall thicknesses up to **41 mm**.

ø 1,153 mm
up to 41 mm

Onshore construction affected approximately **0.1** percent of the territory of the Kurgalsky reserve.

Nord Stream 2 has a telescopic design and consists of three sections that accommodate different levels of pressure as it drops on the way from Russia to Germany.

The pipeline's capacity is **55** billion cubic meters a year.

The pipeline system is remotely monitored **24** hours per day, **365** days per year.

Through the use of trench boxes, the width of the trench and the construction corridor were reduced by **50 percent**.

Nord Stream 2 AG

Head Office
Baarerstrasse 52
6300 Zug, Switzerland
T +41 41 414 54 54
F +41 41 414 54 55
info@nord-stream2.com

Kingisepp Branch
188475 Bolshoe Kuzemkino
Leningrad Region, Russia
T +7 812 331 16 71
F +7 812 331 16 70
info@nord-stream2.com

November 2021

vk.com/nordstream2
www.nord-stream2.com

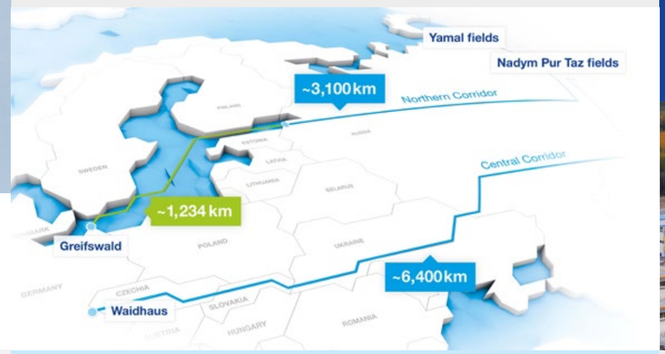
MIX
Paper from responsible sources
FSC® C104247

The Northern Corridor

The northern corridor of the Unified Gas Supply System (UGSS) of Russia is becoming a key gas transportation route for gas supplies to Russian consumers and for export to European countries. It consists of high-tech gas pipelines from Yamal to the Baltic Sea. Nord Stream 2 is a logical continuation of the northern corridor.

The gas pipelines Bovanenkovo-Ukhta and Bovanenkovo-Ukhta-2, run by PAO Gazprom, form the basis of the Northern Gas Corridor and are primarily intended for transporting gas from the Bovanenkovo gas condensate field located on the western part of the Yamal Peninsula. Initial gas reserves of the Bovanenkovo field are estimated at 4.9 trillion cubic metres.

The Nord Stream 2 Pipeline is supplied via the Northern Corridor from the Unified gas supply system (UGSS). Due to centralised management, large branching and the presence of parallel transportation routes, the UGSS has a significant margin of reliability and is able to ensure uninterrupted gas supplies even at peak seasonal loads. The Central Corridor requires fewer compressor stations along its route, which makes it significantly more efficient and environmentally friendly.



Minimising Impact on the Kurgalsky Reserve

Environmental monitoring data has confirmed that construction in Russia was environmentally responsible. The innovative construction method affected no more than 0.1 percent of the territory in the Kurgalsky reserve.

In recognition of the protected status of the Kurgalsky reserve, as well as in response to feedback received during public consultations on the EIA report, Nord Stream 2 developed and implemented its special construction solution specifically for crossing the Kurgalsky reserve. This technical solution was a key measure for significantly reducing environmental impacts during construction.

In the most sensitive habitats (coastal forests), construction was performed within a corridor with a width of only 30 metres. This is the narrowest corridor feasible for the construction of a pipeline of such capacity.

Upon completion of construction, the entire area was reinstated. A 30-metre-wide corridor above the pipeline, or only 0.111 square kilometres, is maintained free of trees and naturally vegetated.

From the very beginning of the preparatory work, monitoring was conducted by specialised contractors and independent consultants, including leading scientific institutions and laboratories. The monitoring results were generally in line with or below the assessed impacts in national environmental impact assessments (EIAs) and confirmed that all the impacts were temporary and local in nature.

The Slavyanskaya Compressor Station

To ensure the supply of gas to the Nord Stream 2 gas pipeline, Gazprom is developing the gas transmission capacities of the UGSS in the North-West region in the section from Gryazovets to the Slavyanskaya compressor station.

The Slavyanskaya station ensures gas supplies to the EU without intermediate compression. Gas is transported along the entire 1,234 km distance because of the 220 bar pressure at the inlet of the gas pipeline at Gazprom's Slavyanskaya compressor station, located 5 km from the starting point of Nord Stream 2.

The Slavyanskaya compressor station is designed to compress and transport natural gas through the Nord Stream 2 offshore pipeline. At the compressor station, the gas is conditioned to the required specifications and then compressed at the necessary pressure. Gas pressure and flow rate is controlled in the compressor station control room. After compression, the gas is conveyed to the coolers, where it is chilled to the required operating temperature. Before being fed into the Nord Stream 2 Pipeline, the gas enters the fiscal metering station to confirm the contractually agreed flow rate and quality as well as system pressure and temperature.

At the other end of the pipelines in Germany, the receiving terminal serves to adjust the flow rate and pressure coming from Nord Stream 2 in accordance with the operating design conditions of EUGAL and NEL pipelines, through which gas is transported further.

Safe Operation of the Pipeline

The starting section of the Nord Stream 2 Pipeline in Russia is very important for the safe operation of the entire gas transportation system.

Onshore facilities in Narva Bay are a logistical point between the Unified Gas Supply System of Russia and the Nord Stream 2 offshore gas pipeline. To transport gas over more than 1,234 kilometres, a powerful compressor station is needed to create pressure of up to 220 bar. From here, gas is transported through the Baltic Sea to the German coast near the city of Greifswald. From there, after additional preparation and analysis, it is transported further through the European gas distribution network.

Prior to supplying Nord Stream 2, the gas is cleaned of mechanical impurities, dried, and submitted to commercial control at the Slavyanskaya compressor station. The onshore gas pipeline facilities are equipped with all the necessary systems for monitoring the parameters of the incoming gas to ensure the safe operation of the gas transmission system. These include PIG launchers, which are used for the internal inspection of the gas pipeline, the emergency shutdown system, and anchor blocks, which are designed to compensate for the force arising on the offshore section of the gas pipeline because of changes in temperature during operation. Telemetry and automation systems are also installed on the site and guarantee the safe operation of equipment and the entire infrastructure.

All parameters from the landfall facilities are sent in real time to the control center in Zug, Switzerland, where operators monitor gas pipeline operations around the clock, seven days a week. The main control room is in permanent contact with the landfalls in Russia and Germany. In case of unforeseen situations, the operators are able to operate the shutdown valves remotely.