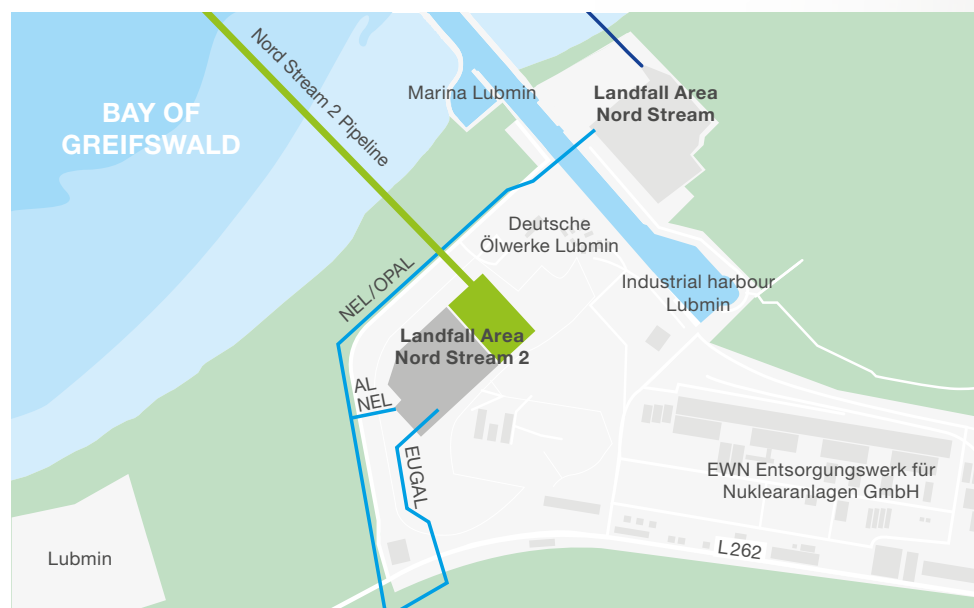


The Pipeline Inspection Gauge (PIG) receiving station is the Nord Stream 2 part of the landfall area in Lubmin on Germany's Baltic Sea coast. It is the logistical link between the Nord Stream 2 Pipeline and the European pipeline network. The six-hectare site contains all of the control equipment required for the safe operation of the pipeline system.

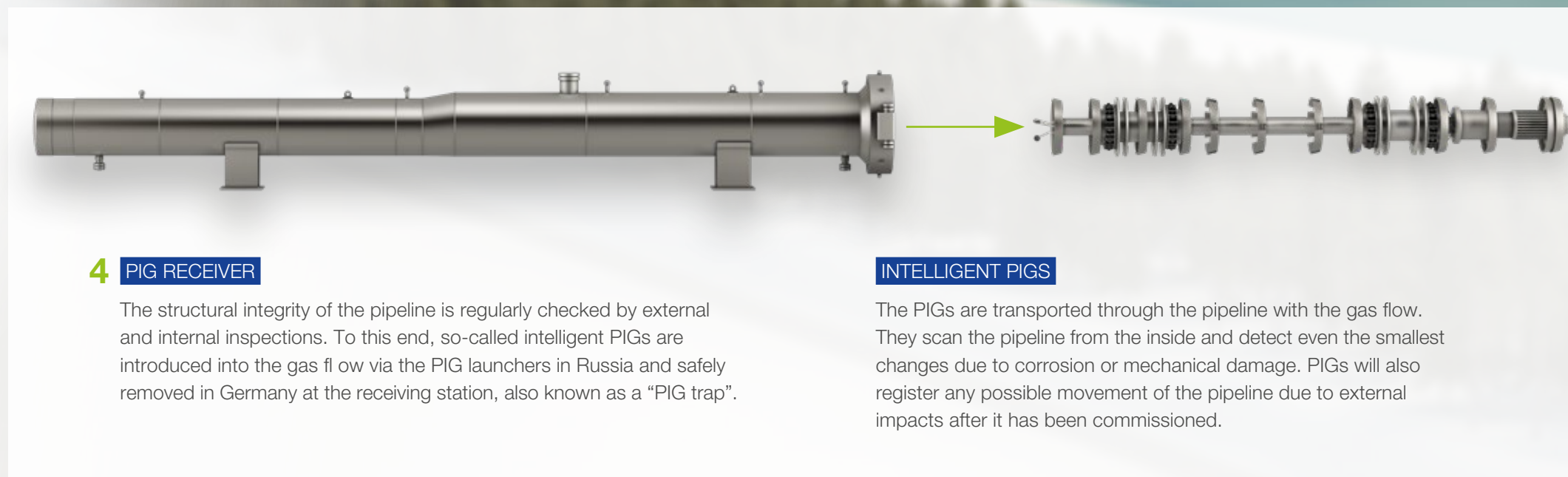


When the natural gas reaches Lubmin, it will have traveled a long way: 1,230 kilometres under the Baltic Sea from the Russian landfall at Narva Bay. In the Bay of Greifswald, the twin pipelines are laid approximately 1.5 metres below the seabed. About 350 metres from Lubmin beach, the pipelines enter two microtunnels that run all the way to the PIG receiving station. The microtunnels pass under the coastal area and the infrastructure just to the north of the landfall facilities. This includes a shallow water area, beach, dune, coastal forest, supply lines, a road and a railway track.

The onshore facilities of the landfall include service buildings, the important PIG receiving station and safety shut-down valves. In the event of a malfunction, valves reliably separate the offshore section of the pipeline from the station's land area.

From Nord Stream 2's PIG receiving station, natural gas will flow to the adjacent gas receiving station of network operator Gascade, and from there into the NEL (North European Gas Pipeline) and EUGAL (European Gas Link) onshore connecting pipelines.

When the Nord Stream 2 Pipeline is commissioned, gas transport through the pipeline system will be monitored and controlled 24 hours a day from the dispatching centre in Zug, Switzerland, where the project company is based. Data from the various sensors monitoring pressure, temperature, gas quality, gas flow and other factors will be forwarded to the control centre. In addition, control consoles will be installed in Lubmin to enable on-site operation of the pipeline components.



4 PIG RECEIVER

The structural integrity of the pipeline is regularly checked by external and internal inspections. To this end, so-called intelligent PIGs are introduced into the gas flow via the PIG launchers in Russia and safely removed in Germany at the receiving station, also known as a "PIG trap".

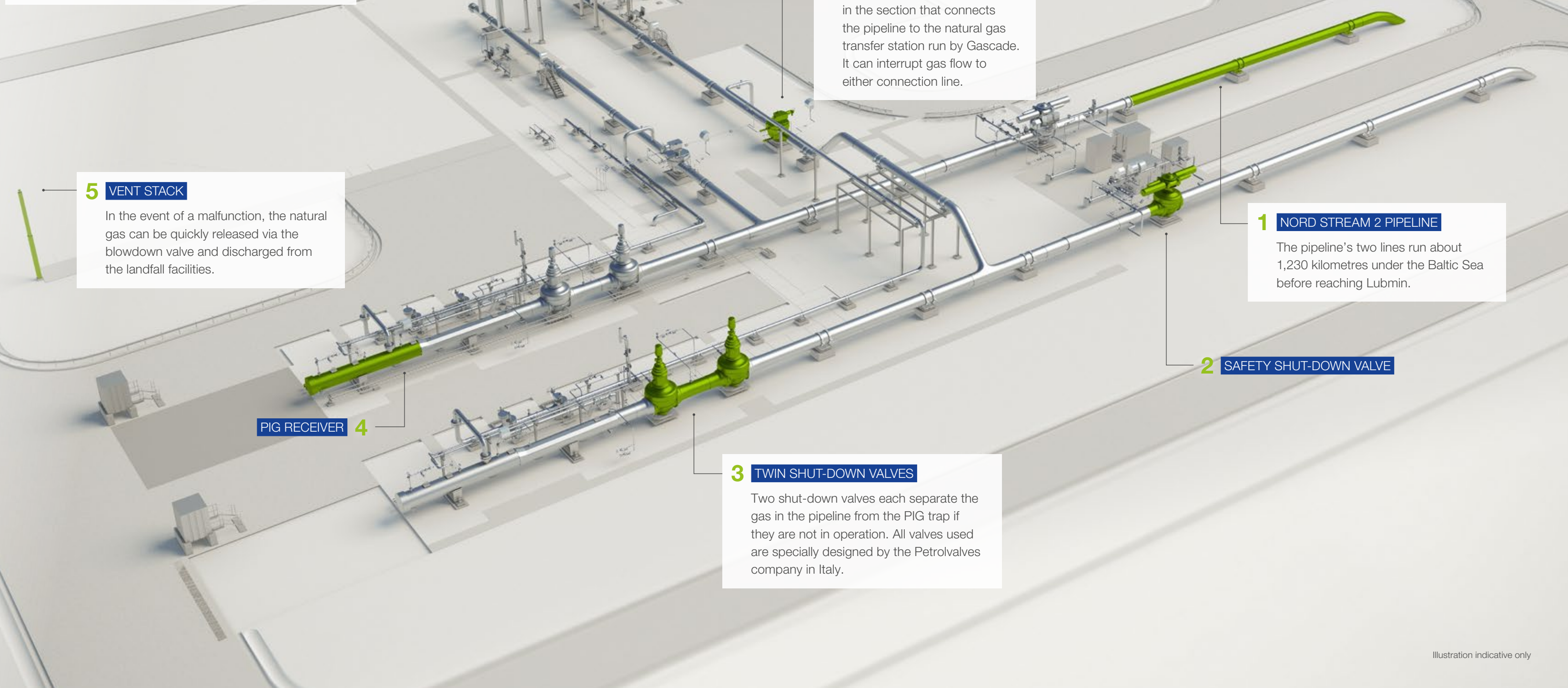
INTELLIGENT PIGS

The PIGs are transported through the pipeline with the gas flow. They scan the pipeline from the inside and detect even the smallest changes due to corrosion or mechanical damage. PIGs will also register any possible movement of the pipeline due to external impacts after it has been commissioned.



2 SAFETY SHUT-DOWN VALVE

The majority of the valves used are for safety purposes. In case of an emergency, they can immediately interrupt the gas flow in the pipeline.



7 OPERATING BUILDING

In addition to the control systems, the PIG receiving station is also equipped with secondary facilities such as a workshop and operating building.

6 SHUT-DOWN VALVE

This 38-inch valve is located in the section that connects the pipeline to the natural gas transfer station run by Gascade. It can interrupt gas flow to either connection line.

1 NORD STREAM 2 PIPELINE

The pipeline's two lines run about 1,230 kilometres under the Baltic Sea before reaching Lubmin.

2 SAFETY SHUT-DOWN VALVE

3 TWIN SHUT-DOWN VALVES

Two shut-down valves each separate the gas in the pipeline from the PIG trap if they are not in operation. All valves used are specially designed by the Petrolvalves company in Italy.

4 PIG RECEIVER

5 VENT STACK

In the event of a malfunction, the natural gas can be quickly released via the blowdown valve and discharged from the landfall facilities.

The GASCADE Gas Receiving station

More than 6.5 million cubic metres of natural gas can be processed per hour at the GASCADE natural gas receiving station in Lubmin. An impressive interaction between valves, filters, preheaters and control equipment ensures high-quality natural gas flows at the right pressure.

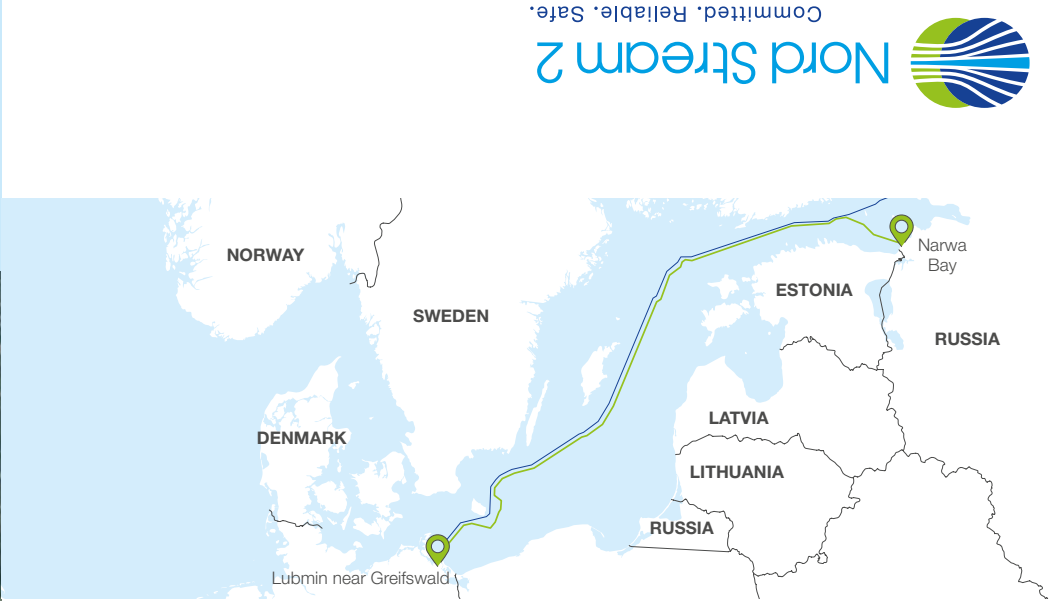
The PIG receiving station is the final component of the Nord Stream 2 Pipeline system. The neighbouring natural gas receiving station will prepare gas for further transport into the German and European gas distribution grid starting at the end of 2019. The station spans nearly 12 hectares and has additional safety valves, filters, preheaters and pressure-reduction equipment.

Both the pressure and the temperature of the gas fall during the lengthy transport to Lubmin but dust and drops of liquid must first be filtered out before it can be warmed by preheaters and a connected boiler plant. Heat exchangers then ensure that the gas meets the desired temperature, as it cools drastically when the pressure is later reduced for transfer into the European transmission system.

Precision-Controlled Gas
Two consecutive safety valves separate the landfall facilities from the station’s measuring and control areas. The incoming and outgoing gas streams are checked here for quality, measured for custody transfer and precision-controlled for pressure and volume before being transferred to the next pipelines.

Additional safety valves have been installed ahead of the EUGAL and NEL pipelines to protect them from pressures that exceed their maximum allowable level of about 100 bar.

Security
“Respect for security” is one of the three basic tenets of Nord Stream 2’s mission. This includes meeting the highest standards for safe, reliable operation. Natural gas sites are subject to strict safety regulations with constant checks for compliance. Gas transmission areas also have additional safety features and can be controlled manually and by remote control. Various detectors have been installed to identify any leaks or fires. Any time fire or gas alarms are made by two detectors in different zones within the landfall site, inlet equipment is automatically closed and the blowdown valve is opened. The local fire department as well as the respective control centre are notified any time a fire alarm is activated to ensure the quickest-possible response.



Project Overview

Nord Stream 2 is a pipeline planned to transport natural gas from Russia to European consumers.

The approximately 1,230-kilometre-long route through the Baltic Sea is the most efficient connection to Russia’s major gas reserves. Nord Stream 2 builds on the positive experience and technical concept of the existing Nord Stream Pipeline and basically follows the same route. The new pipeline will have an annual capacity of 55 billion cubic metres – enough to supply 26 million households – and will create a reliable supply of natural gas, which releases less carbon dioxide than coal in electricity generation.

This will help meet the European goal of an environmentally friendly energy mix and provide a flexible complement to fluctuating renewable sources like wind and solar.

The Nord Stream 2 AG project company is based in Zug, Switzerland, and is owned by PJSC Gazprom. The owner and financial investors of Nord Stream 2 – ENGIE, OMV, Shell, Uniper and Wintershall Dea – have unique experience in natural gas production as well as in the construction of transmission infrastructure and the safe and reliable transport of natural gas to European markets.

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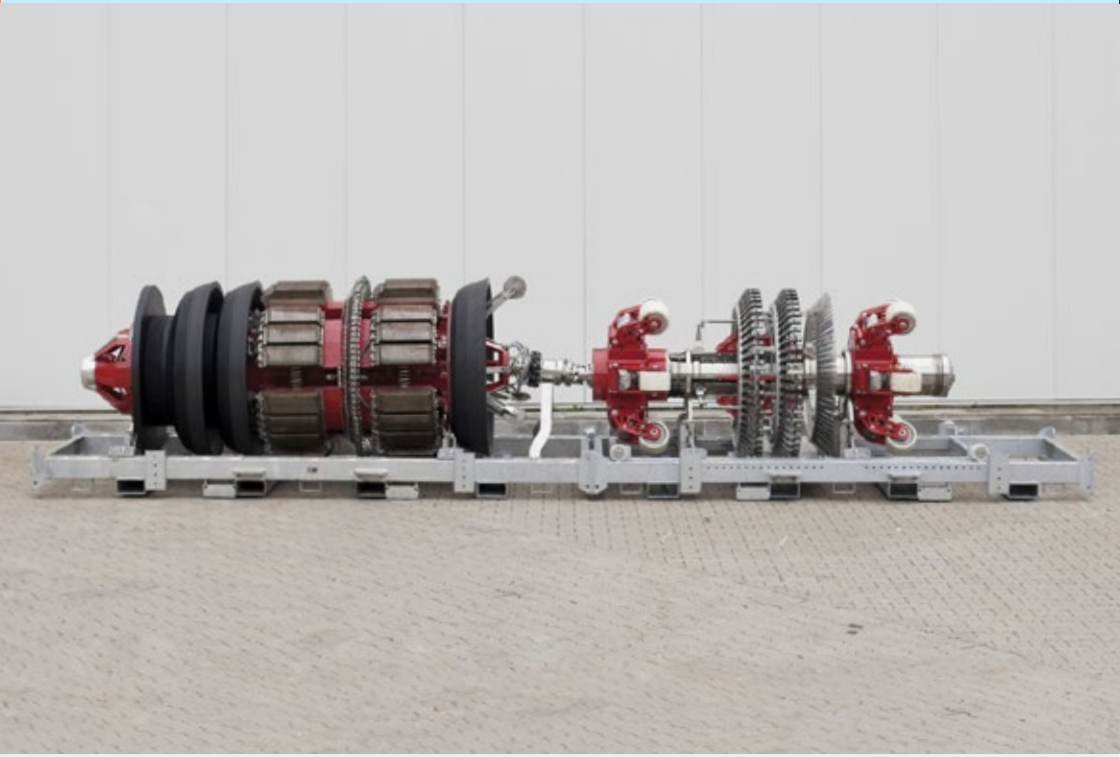
November 2019
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www.nord-stream2.com

PIGs Keep the Pipeline Clean and Safe

Internal inspection ensures the technical integrity of the pipeline.

Specially built inspection devices known as PIGs (Pipeline Inspection Gauges) regularly travel through the pipelines, driven by the flow of gas. The high-definition measuring devices can detect even the smallest changes in the pipeline and provide details to the operator about corrosion or mechanical faults. The pipeline’s geographic location is also measured to ensure the stability of the

pipeline on the seabed and that it hasn’t moved since it was laid. The PIG launcher at the Russian landfall inserts the PIGs. Gas is then compressed into the launcher and when the pressure behind the PIG exceeds the pressure in front of the device, the PIG begins to move through the pipeline. Both lines are inspected in a process known as “pigging”. The PIGs are easily retrieved and evaluated by specialists in Lubmin.



Microtunnels Minimise the Environmental Impact

Two 700-metre long microtunnels form the transition from land to water at the landfall.

The tunnels were built in the second quarter of 2018 and start before the PIG receiver. They then cross underneath the northern infrastructure (train tracks, street and supply lines) as well as the coastal forest, dunes and beach and end about 350 metres from the beach. Both lines were pulled from the offshore into the tunnels up to the PIG receiver in the summer of 2018.

lines as well as two parallel, 21-kilometre trenches for each line. Once the pipeline was laid, the trenches were refilled and the surface layer restored using material that had previously been removed. This accelerates regeneration and ensures that the length and location of the work is limited, reducing the impact as much as possible.

Prior to offshore pipeline construction, trenches for both lines had to be prepared. Overall, a 28-kilometre trench had to be readied in German coastal waters for both

All work is and will be subject to comprehensive environmental monitoring to ensure that none of the limits highlighted in the permitting process, such as water turbidity and noise, are exceeded.



A Hub on the German Coast

The Lubmin 2 landfall facility is the logistical connection between the Nord Stream 2 Pipeline system and the European distribution grid. The site is comprised of the pipeline’s PIG receiver and GASCADE’s natural gas receiving station. Gas from Siberia is processed before it is fed into the connected EUGAL and NEL pipelines and transported to European consumers.

The Lubmin 2 landfall facility is a kind of hub for this multi-national project that will contribute to the safe supply of energy to Europe for decades to come. At the same time, the landfall is just one small part of a major project. Where does the gas come from and where is it going?

Gas from the World’s Largest Source ...
Nord Stream 2 will transport natural gas extracted from the new Bovanenkovo gasfield on Siberia’s Yamal Peninsula. The field has reserves of 4.9 trillion cubic metres, more than double that of Europe’s proven reserves (1.9 trillion). Both lines of the Nord Stream 2 Pipeline connect to the Russian grid, bringing natural gas from the world’s biggest source to the European distribution network – gas needs just 13 days to travel from northern Siberia to Germany.

On the Yamal Peninsula, raw gas is warmed and filtered and water is removed before it is again cooled, compressed and fed into the Gazprom network. It travels to the Kingisepp district in Russia’s Leningrad region where Nord Stream 2 connects to the Russian gas network near Narva Bay. Gazprom’s Slavyanskaya compressor station increases the pressure of the gas to 220 bar and then feeds it into Nord Stream 2, where it can cover the 1,230 kilometres without the support of another compressor station.

... Into the European Distribution Network
The gas loses pressure during the journey and, during normal operation, has dropped to about 100 bar when it arrives at the German landfall (near Greifswald). The landfall facilities are the pipeline’s logistical connection to the European distribution network.

The entry area is the so-called PIG receiving station (see other side). The on-land facilities on the land include an operating building, the PIG trap and the key safety shut-down valves. If necessary, these valves reliably isolate the station from the offshore portion of the pipeline. Gas flows from here into GASCADE’s neighbouring natural gas receiving station where it is filtered, heated, checked for quality and measured for custody transfer. The pressure of the gas is also lowered before it is fed into the connecting distribution networks EUGAL (European Gas Pipeline Link) and NEL (Northern European Natural Gas Pipeline).

The new EUGAL pipeline is being built to enable the Nord Stream 2 pipeline to supply Germany and Europe with an increased and reliable supply of natural gas. It will stretch about 480 kilometres from the Baltic Sea through the states of Mecklenberg Western-Pomerania and Brandenburg to southern Saxony on the border with the Czech Republic. The pipeline will be able to transport gas southward from Lubmin beginning at the end of 2019 with a total annual transport capacity of 55 billion cubic metres.

Completion in 2019
The 440-kilometre NEL has been in operation since October 2012 and runs from the Lubmin landfall site of the Nord Stream Pipeline, which has been in operation since 2011, westerly past Schwerin, Hamburg and Bremen into Rehden in the state of Lower Saxony. It has an annual total capacity of about 21.8 billion cubic metres. An inter-connection makes it possible to transport up to 3.5 billion cubic metres annually of Nord Stream 2 gas further west – enough to supply 26 million households.

Nord Stream 2 will help offset an expected 50-percent decrease in domestic European natural gas production over the next 20 years.