

FACTS

NEWSLETTER ABOUT THE NATURAL GAS PIPELINE THROUGH THE BALTIC SEA

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The two lines of the Nord Stream Pipeline system reach land at Lubmin. At the landfall station, the natural gas is purified, measured, and if necessary adjusted to the proper temperature prior to transport.

Gas Transport Begins from the Lubmin Landfall Facility in Germany

The landfall facility is the logistical link between Nord Stream and the European gas grid

The landfall facility in Lubmin is a hub of sorts, the actual switching point of a cross-border project that will contribute to a secure supply of energy to Europe for decades. At the same time, the landfall facility is only a small part of the puzzle in the entire framework of the onward transport of the gas that flows through Nord Stream's twin pipeline system. Gas flow through Line 1 of the Nord Stream Pipeline system and its onward transport into the European gas grid began in November 2011. This milestone was celebrated on November 8 at an event held by Nord Stream at the Lubmin landfall facility. More than 400 guests attended.

The Gas Comes from Siberia

The Russian city of Novy Uren-goy is situated in Western Siberia, 2,500 kilometres from Moscow, and only 60 kilometres from the Arctic Circle. Some 74 percent of all Russian natural gas comes from this region – it is no wonder that the location is sometimes also called “Russia's unofficial gas capital.” Much of the natural gas that will flow through Nord Stream's twin pipe-

lines also comes from the region where the Yuzhno-Russkoye gas field is located. It is the biggest natural gas field developed in Russia to date. Nord Stream shareholders Gazprom, E.ON and Wintershall have a stake in this gas field, where reserves are estimated at 600 billion cubic metres (bcm). There is enough gas in this source alone to guarantee all Russian gas exports to Germany for the next six years. From 142 drill holes, spread around an area of 1,100 square kilometres, the lines lead to an ultra-modern preparation facility. A total of 75 million cubic metres is handled there daily. The raw gas is heated, stripped of water content, purified, re-cooled, compressed and then sent on its way through Gazprom's gas pipeline system. The natural gas flows 2,500 kilometres from West Siberia to Vyborg. There, in the landfall facility in Portovaya Bay, 1.5 kilometres from the Baltic Sea, the natural gas is fed from the Gryazovets-Vyborg pipeline into the Nord Stream Pipelines. As operator, Nord Stream provides transport capacities through its pipeline system. Nord Stream has entered

into a gas transportation agreement with OOO Gazprom Export to book up to 55 bcm capacity annually. The pipelines will transport gas from the entry point in Russia to the exit point in Germany, where the gas will be received by the connecting OPAL (Baltic Sea Pipeline Link) and NEL (North European Gas Pipeline) overland pipelines. In total, it takes the gas almost 10 days to make the journey from Siberia to Germany.

On the Way to Europe

At the OPAL and NEL receiving station, the incoming and outgoing gas streams are checked for quality, subjected to official measurement, and adjusted in terms of pressure and volume as well as temperature, before being transported further.

The OPAL pipeline links Nord Stream with existing European natural gas transport systems. In future, up to 35 bcm of gas will flow through the OPAL pipeline annually. This amount is enough to supply a third of Germany with natural gas for a year. The pipeline was completed in summer 2011, and runs south from Lubmin to Brandov, in the Czech Republic.

Along its 470-kilometre route, the pipeline runs through three German federal states, and crosses a total of 172 roads, four highways, 27 rail lines, and 39 bodies of water. Since the gas loses pressure over the long route, it is repressurised at a compressor station in Baruth, south of Berlin. The second pipeline that links the Nord Stream system with the European gas market is NEL. Construction of the pipeline began in spring 2011, with completion expected in autumn 2012. The NEL pipeline is 440 kilometres long, and runs westward across northern Germany from Lubmin to Rehden, in Lower Saxony. The pipeline has a capacity of over 20 bcm each year, which roughly corresponds to one-fifth of Germany's annual consumption. The gas from the OPAL and NEL pipelines will be transported onward to Belgium, Denmark, France, the Netherlands, and the UK, along with other countries.

Construction of Nord Stream's Line 2 began in May 2011 and is progression on schedule. Line 2 will be operational in the fourth quarter of 2012.

Nord Stream Lubmin Landfall Facility

> **Offshore to onshore:** Nord Stream's twin offshore pipelines run through the Baltic Sea from Russia, and exit at the German mainland at the Lubmin landfall facility. Here, gas from Nord Stream is prepared and tested before being transported onward through the European pipeline grid.

The Lubmin landfall facility is the logistical link between the Nord Stream Pipeline system and the European long-distance gas network. Arriving from offshore in the Bay of Greifswald, Nord Stream's twin pipelines reach land near Lubmin's harbour area. The natural gas that is transported through Nord Stream starts its journey in Portovaya Bay, near Vyborg, Russia – some 1,224-kilometres away. When the gas reaches the landfall facility in Germany, it is cleaned of potential impurities in special filters, and heated to prevent condensation. At the landfall, the incoming and outgoing gas

streams are also checked for quality, subjected to official measurement, and adjusted in terms of pressure and volume, as well as temperature, before being transported further through the OPAL (Baltic Sea Pipeline Link) and NEL (North European Gas Pipeline) connecting pipelines. The 470 kilometre OPAL pipeline runs south from Lubmin to Brandov in the Czech Republic, while the 440 kilometre NEL pipeline runs westward across northern Germany to Rehden in Lower Saxony. Combined, the two pipelines will be capable of transporting about 55 billion cubic metres of gas to European users.



A PIG Traps

The integrity of the Nord Stream Pipeline is checked on a regular basis by what are known as intelligent PIGs (Pipeline Inspection Gauges). The PIGs are housed in traps and fed into the pipeline 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 pipeline due to external impacts after it has been commissioned.

B Double-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.

C Shut-Down Valves

The majority of the valves in service at the landfall facility are shut-down valves. They are employed for safety purposes. In an emergency, they immediately interrupt the flow of gas into or out of the pipelines. All the valves were developed especially for the Nord Stream project.

Pipeline Landfall

Nord Stream's twin pipelines reach the German mainland east of the harbour entrance in Lubmin. Close to the coast, the pipelines were laid in trenches and covered.



Main Components of the Landfall Facility

1 Nord Stream Pipelines

The twin pipelines of the Nord Stream Pipeline system travel 1,224 kilometres through the Baltic Sea before they reach land in Lubmin.

2 177.5 Bar at Landfall Area

In the first portion of the landfall area, the gas pressure is about 177.5 bar. In the subsequent measuring and control facilities, the pressure is about 100 bar.

3 Offshore 1 Preheater

The arriving gas is first filtered and then warmed to the temperature required for transport through NEL (North European Natural Gas Pipeline).

4 Offshore 2 Preheater

The arriving gas is filtered and warmed to the temperature required for transport through the OPAL (Baltic Sea Pipeline Link) connecting pipeline.

5 Relief Valve

If an operational malfunction should occur, gas will be released via the relief valve, which eases pressure on the entire Lubmin landfall facility.

6 Operations Buildings

In addition to the control systems, the landfall facility is also equipped with ancillary structures such as a workshop and operations building.

7 OPAL/NEL PIG Traps

The PIG (Pipeline Inspection Gauge) traps house the intelligent PIGs, which are sent through the pipelines for inspection as required.

8 Boiler Building

Gas temperature sinks when transported over long distances. Therefore, before it is transported further, it will be warmed to the requisite temperature in the boiler building.

9 OPAL Measurement

The gas streams are checked for quality, officially measured, and adjusted in terms of pressure and volume before transport by OPAL.

10 OPAL and NEL Preheating

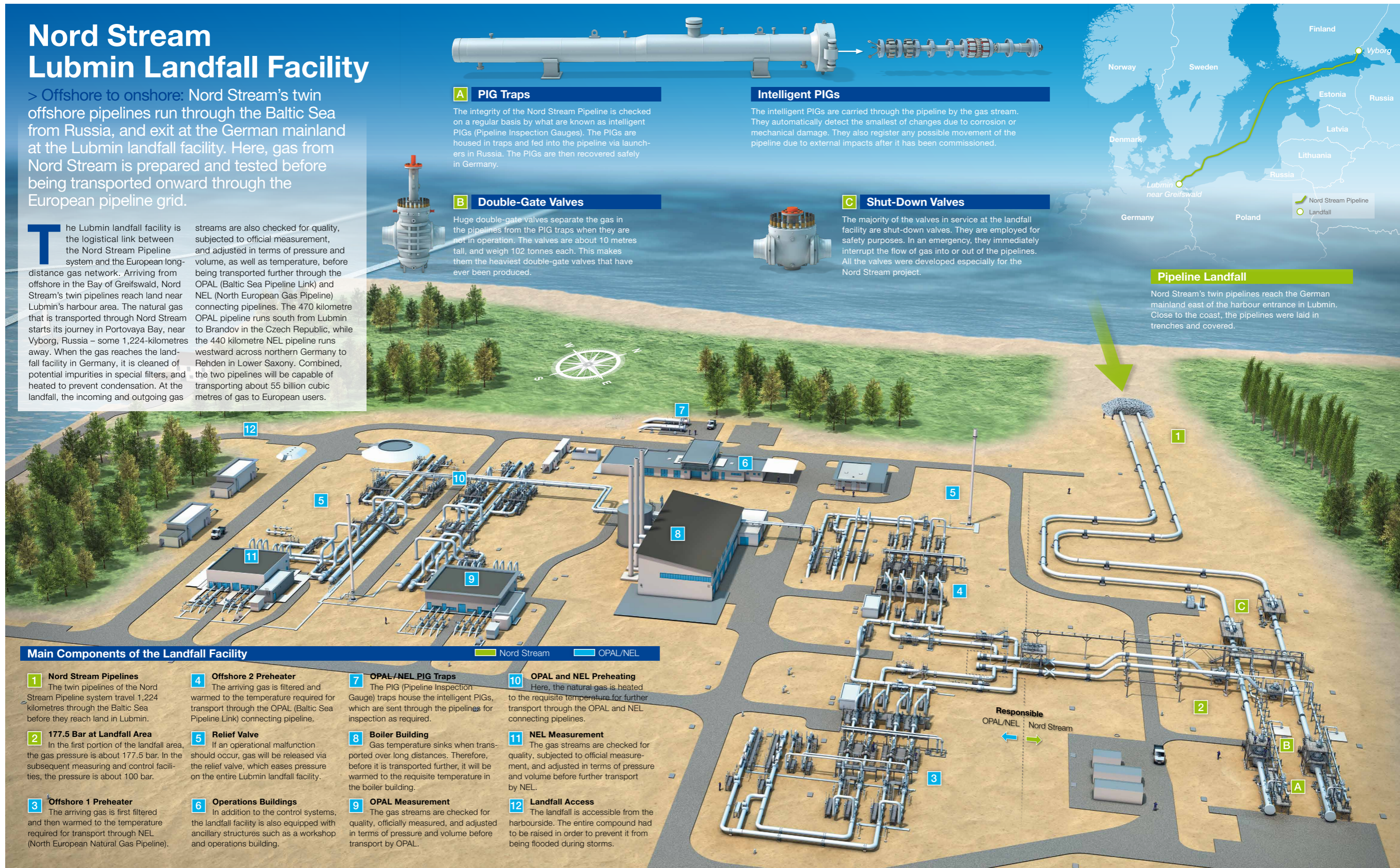
Here, the natural gas is heated to the requisite temperature for further transport through the OPAL and NEL connecting pipelines.

11 NEL Measurement

The gas streams are checked for quality, subjected to official measurement, and adjusted in terms of pressure and volume before further transport by NEL.

12 Landfall Access

The landfall is accessible from the harbour side. The entire compound had to be raised in order to prevent it from being flooded during storms.



IN BRIEF

REPRICING AGREED UPON

Nord Stream agreed repricing arrangements in October with its relationship banks for the 3.9 billion euro Phase I project finance facilities. Nord Stream undertook this exercise in order to bring Phase I pricing into line with the pricing it achieved for the 2.5 billion euros raised for the Phase II facilities which were closed earlier this year. Phase I funding had originally been signed in March 2010.

Commenting on the success of the repricing process, Nord Stream Financial Director Paul Corcoran said: "We are delighted once again to receive such strong support from the banks who recognise the sound commercial structure of this project, its long term stability, as well as the strength and quality of shareholder backing from some of Europe's top energy companies."

This amendment will harmonise the pricing between the two financings phases. Given the excellent construction progress, the risk profile of Phase I is significantly reduced. Nord Stream will amend the interest margins of the Commercial, Hermes and UFK (untied loan guarantee of the German Government) tranches, but will not change the pricing of the SACE (Italian Government-guaranteed) tranche.

> www.nord-stream.com

Monitoring Results Published

Nord Stream released its 2010 national monitoring results



Equipment used to collect water samples is retrieved from the Baltic Sea.

Nord Stream is conducting the most comprehensive environmental research of the Baltic Sea's flora and fauna. From 2010 to 2016, the company plans to invest more than 40 million euros into its national environmental monitoring programmes to monitor any impact of the construction

and operation of the pipelines to date. Nord Stream has taken the initiative to provide a compilation of the national monitoring results from Russia, Finland, Sweden, Denmark and Germany. The report, which was published in late October, contains results from 1,000 survey locations along the entire pipeline route. The main

conclusion of the environmental monitoring conducted in 2010 is that the construction of the gas pipeline has been found to exert no significant impact on the environment. The calculations and models in Nord Stream's environmental impact assessments (EIAs) have thus proven accurate, and it is estimated that the environmental impact so far has been in line with the EIAs or smaller than anticipated. The data are analysed in internationally recognised laboratories, such as ALS Scandinavia and Verifin in Finland. The results are reported to the national environmental authorities of the countries whose waters the pipelines pass.

Last Pipes Leave EUROPIPE

EUROPIPE delivered the final pipes for the Nord Stream project

About 200,000 form Nord Stream's twin pipelines. The primary manufacturer of the pipes for the project is EUROPIPE GmbH based in Mülheim an der Ruhr, Germany. From April 2008 through September 2011, the company delivered 150,000 pipes for the project. Each pipe, made from high-tensile steel, weighs more than 10 tonnes and is about 12 metres long. In total, 1.6 million tonnes of steel were used by EUROPIPE to manufacture the pipes. On October 13, the last train laden with 100 pipes left the EUROPIPE factory. The pipes



The last pipe on its way to Mukran.

were transported to Sassnitz Harbour in Mukran on the Island of Rügen and to Kotka, Finland where they will receive a coating of concrete at the EUPEC PipeCoatings factories. Once coated, the pipes have doubled in weight, which provides added stability on the seabed. The

coated pipes are then shipped to interim marshalling yards. From Mukran, the pipes will be trans-shipped to Slite and Karlskrona, Sweden. From Kotka, they will go either to the Castoro Sei laybarge directly or to Hanko. In spring 2012, the final coated pipes will be trans-shipped to the Castoro Sei for the completion of Line 2. Five marshalling yards were used for the Nord Stream project, each strategically located less than 100 nautical miles from the route. Nord Stream received the German logistics award in 2010 for its green logistics concept.

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