Nord Stream 2

Committed. Reliable. Safe.

A Natural Gas Pipeline Through the Baltic Sea

The Swedish Permitting Process

Securing Additional Gas Supplies to Europe

Nord Stream 2 will build on the successful experience of Nord Stream. The planned twin pipeline system will have the capacity to supply about 55 billion cubic metres of gas per year.

Nord Stream 2 will offer reliable, environmentally sound natural gas supplies to Europe over the coming decades. The twin pipeline system will stretch for some 1,200 kilometres across the Baltic Sea, from the Baltic coast in Russia to Germany's Baltic coast. Each line of the pipeline will have a design capacity of around 27.5 billion cubic metres (bcm) of gas per year.

The new pipelines will increase Europe's energy security by offering an additional transportation route to import natural gas and supplement declining European Union (EU) and Norwegian gas production.

Depending on the technology used, gas-fired power plants produce about 50 percent less CO_2 than coal-fired plants. The 55 bcm of gas that Nord Stream 2 will have the capacity to deliver could cut about 14 percent of the EU's total CO_2 emissions generated from power generation, if it were used in place of coal power generation.

Enabling a Climate-Friendly Energy Transition

The Nord Stream 2 pipeline system will be based on the strong track record of the Nord Stream pipelines, put in operation in 2011 and 2012. The existing pipeline system has proved to provide reliable, affordable and efficient gas deliveries, with a minimal impact on the environment in the Baltic Sea. With Nord Stream 2, the EU will have a reliable and direct access to the world's biggest gas reserves, located in Northern Russia.

Gas plays a vital role in Europe's energy mix, as one of the most flexible and reliable sources of energy. While the gas production of the EU is set to drop by about half by 2035, the EU's demand is simultaneously projected to remain stable. Europe will need additional gas imports to cover this resulting import gap. Nord Stream 2 will be able to deliver about a third of this resulting need, supplementing supply options from other market participants.

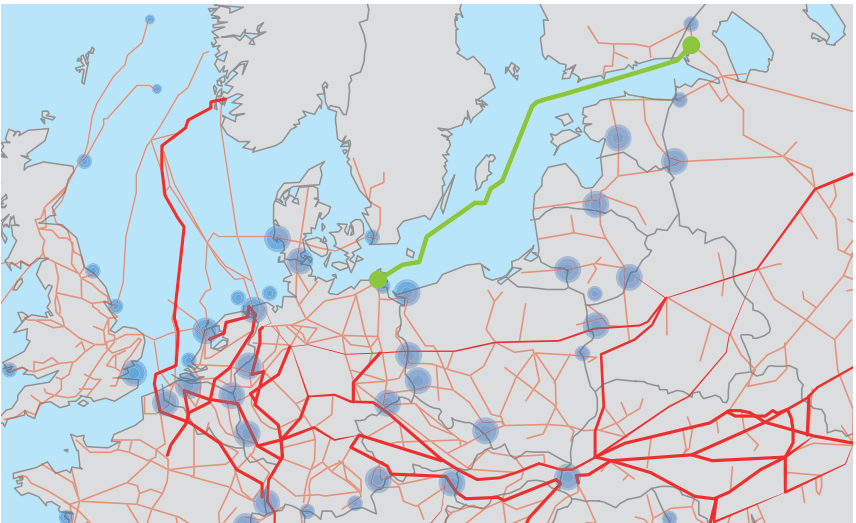
"Nord Stream 2 will provide a direct link between gas producers and consumers, as a privately financed project. The pipeline will have sufficient capacity to supply energy to 26 million households per year."

Additional Gas Supplies Stimulate Competition

Once the natural gas delivered by the pipeline system reaches Germany, it can – in the future – be transported anywhere within the EU's internal gas market, guided by price signals (see map below). This increased availability of gas will stimulate competition and inter-country connections, further improving the integration of the EU's internal energy market to the benefit of the consumer. Nord Stream 2 will make the EU's gas supply more robust and contribute to an improved security of supply across the region. The 55 bcm of gas that the pipeline system will have capacity to deliver is enough energy to supply 26 million households per year.

Offshore Pipelines, the Best Way to Transport Gas

Offshore gas pipelines are ecologically the most sensible way to transport gas as no interim compressor stations are required compared to onshore pipelines, and no energy-intense liquefaction and regasification of the gas is necessary compared to liquefied natural gas (LNG). Gas delivered by pipelines compares well with LNG, both economically and ecologically, given the energy and effort used to liquefy, transport and re-gasify the LNG. Nord Stream 2 will be able to annually deliver the equivalent of the energy transported by up to 700 LNG tankers.



Physical European Gas Flows in 2016
Once the natural gas delivered by Nord Stream 2 reaches northern Germany, it can be transported onwards across Europe.
Source: OECD / IEA 2016

An Environmentally Sound Alternative to Coal and Nuclear Energy

As the EU is looking to cut its CO_2 emission by 40 percent by 2030 compared to 1990 levels, it must find economically viable solutions to achieve this emissions reduction target. To meet these goals, coal-fired power generation needs to be significantly reduced by 2030. The required decarbonisation of the energy sector is a major shift in most European countries. Their power utilities, heating sector, industries and transport sector need to find sustainable solutions. This process will be intensified by the phasing out of nuclear power in some major markets. The share of renewable energy sources is expected to more than double in the European energy mix in the coming two decades, triggering a greater need for reliable, complementary power generation with low carbon emissions. Gas-fired energy generation will play a key role in complementing the much favoured but intermittent, renewable energy sources, such as wind and solar energy. Replacing coal by gas is another cheap and fast way to meet the EU's CO_2 emission reduction targets.

"In 2015, the average utilization rate of the two operating Nord Stream pipelines reached 71 percent. In 2016, this figure is likely to be above 80 percent, barring unforeseen events."

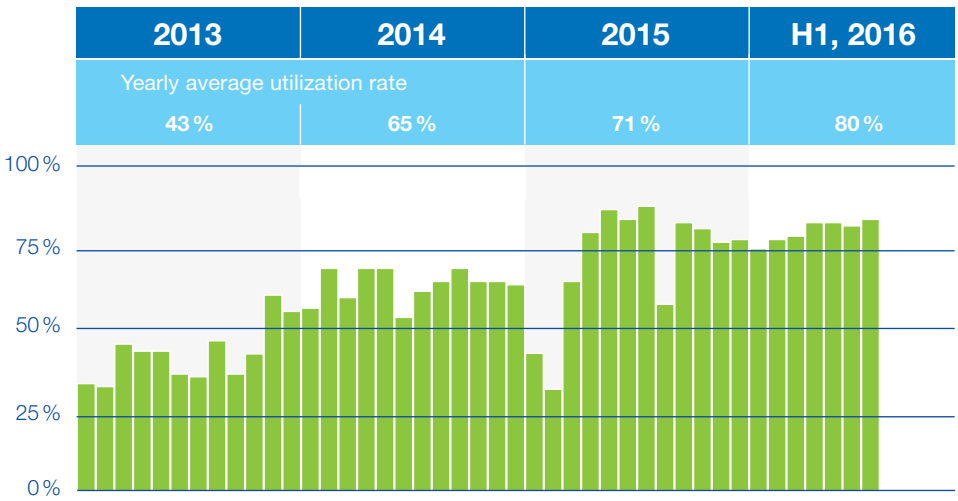
Gas, a Competitive and Highly Efficient Energy Source

Gas not only offers significant advantages for electricity production when compared to other fuels. Combined-cycle gas turbines (CCGT) can, for instance, reach a 60 percent efficiency, with the prospect of even higher efficiency in future plants, compared with an efficiency of 25 percent to 45 percent for coal. Gas is also easier and more affordable to store and transport than electricity, with much lower energy losses than electricity grids. Transporting energy through offshore gas pipelines can actually be up to 20 times cheaper than through offshore electricity lines. Highly efficiently produced gas and an improved price differential to coal, further drives demand for gas. Gas can actually compete with coal in well-supplied markets, and already does so in the United Kingdom. Natural gas is not only reliable. It is also a cost-efficient, competitive and sustainable way to contribute to reaching the EU's climate protection targets. Nord Stream 2 will clearly be part of the solution to secure Europe's future energy needs.

Utilization Rates of the Operating Nord Stream Pipelines

The utilisation rate of the two Nord Stream pipelines has steadily risen since they were put in operation in 2011 and 2012, exceeding 70 percent in 2015. So far in 2016, the pipeplines' utilization rate ranged between 75 and 84 percent.

Source: Nord Stream AG



The Company

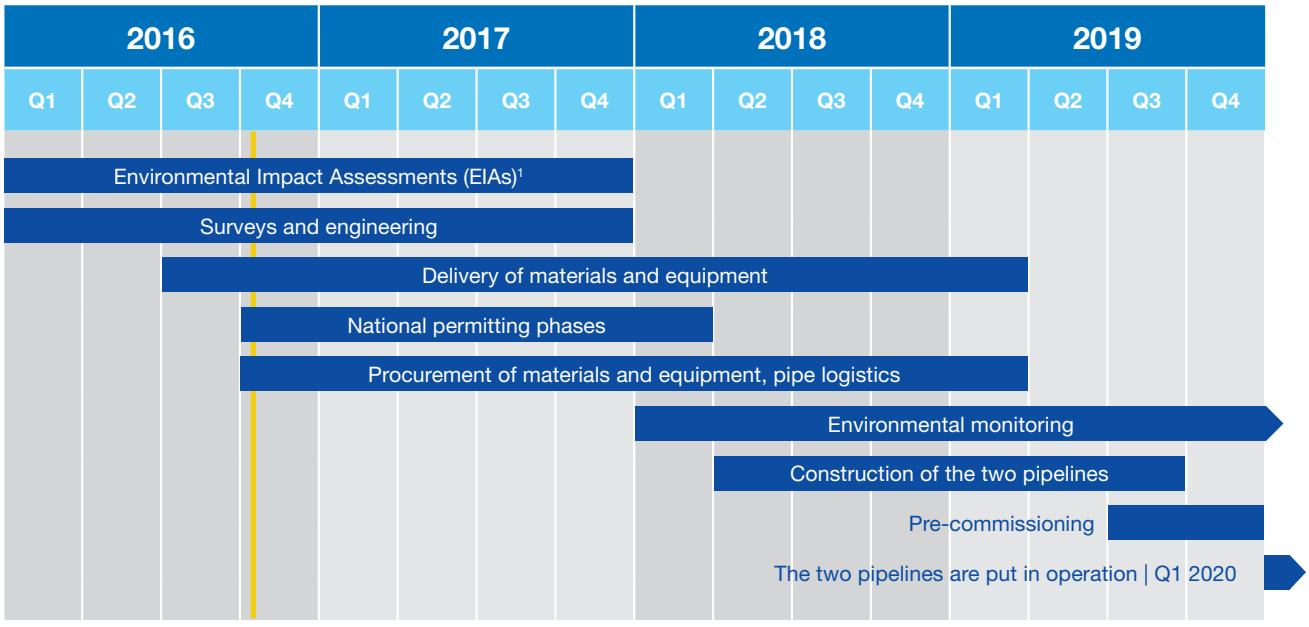
The project's developer, the project company Nord Stream 2 AG, is headquartered in Zug, Switzerland. The 8 billion euro infrastructure project is fully privately financed.

The planned pipeline project draws upon the permitting, survey and engineering work initiated by Nord Stream. Nord Stream 2 will to a large extent have a similar project organisation and logistics concept, building on Nord Stream's experience and knowledge. The project, run by a team composed of almost 200 experts from more than 20 nations, complies with applicable EU laws, national legislations and international conventions.

Entirely Privately Funded Project

Nord Stream 2 is a fully privately funded project, with estimated investment costs of around 8 billion euros, equivalent to approximately 76 billion SEK. The company has and will issue international tenders with regard to the pipes, pipe laying and logistics work, to ensure competition and economic pricing. All tenders are conducted in accordance with international practice, as well as the company's code of conduct and procurement guidelines.

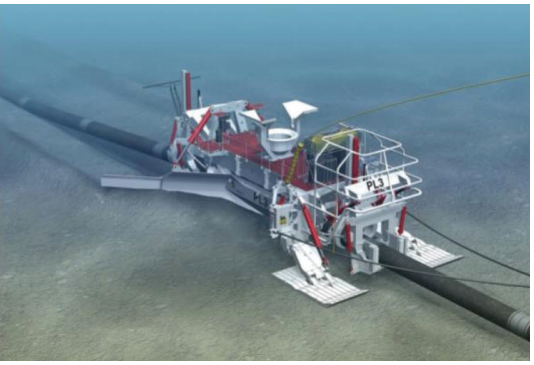
Projected General Timeline



1 National and international EIAs run in parallel

The Technology Behind the Pipeline

The Nord Stream 2 pipeline will be built of steel pipes that will be laid on the seabed of the Baltic Sea.



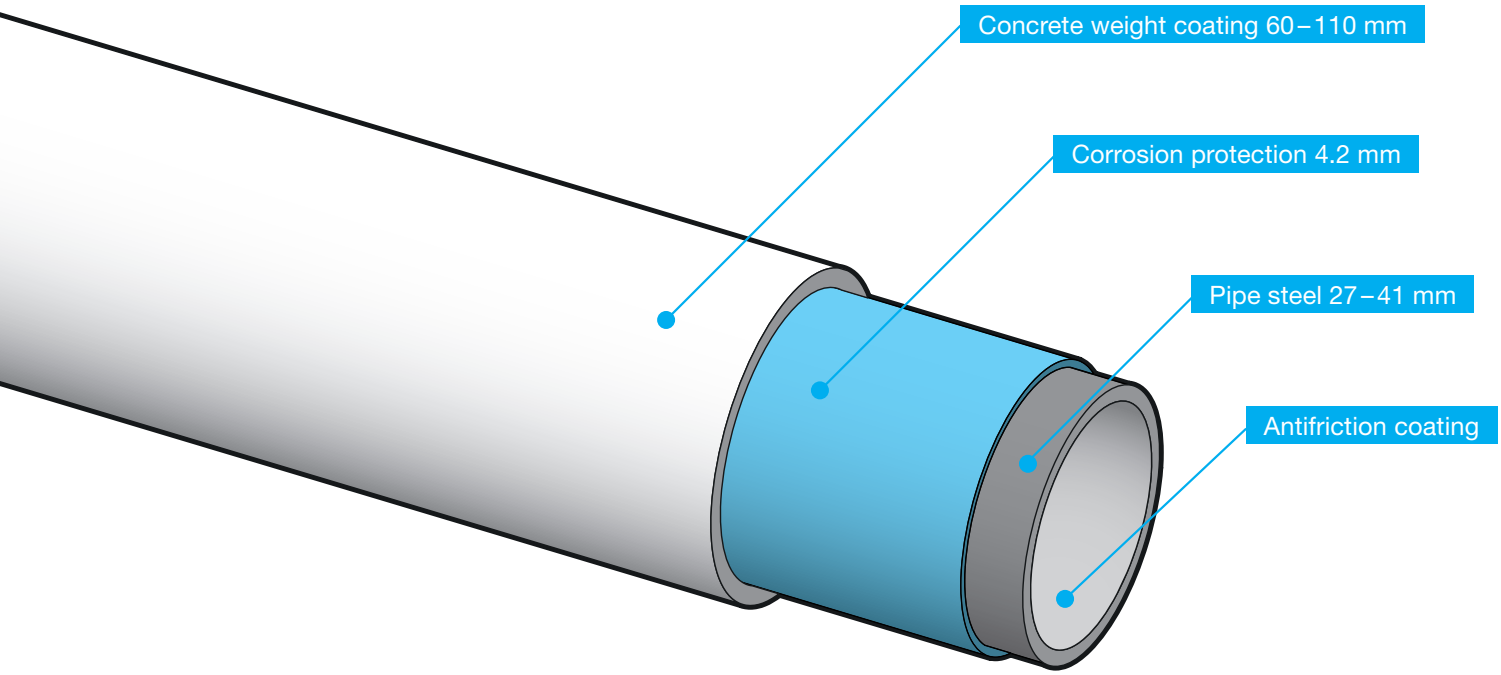
Trenching ploughs, like the one pictured above, are used to stabilise the pipelines on certain sections of the seabed after the pipe lay.

State-of-the-Art Technical Design

The two parallel pipelines will require approximately 100,000 steel pipes each. Each coated steel pipe will have a length of 12.2 m with a variable outer diameter of approximately 1,300 mm and weigh up to 24 tonnes. The pipes will be protected by an anticorrosion coating and concrete weight coating (see picture below). The inner diameter of the pipes will be kept constant at 1,153 mm throughout the entire length of the pipelines to facilitate inspection and maintenance operations. The pipes will be welded together during the laying process. This welding and pipe laying process will be carried out by specialised vessels, which will require logistical support from Baltic coast ports for concrete weight coating and interim pipe storage. During the construction phase some intervention work, such as rock placement or trenching, will be required to stabilise it on some sections of the seabed (see adjacent picture).

Independent Certification of the Technical Design

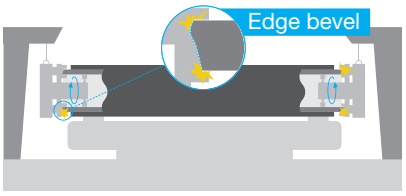
The pipeline system's technical design, construction and operation will draw on the extensive experience acquired through the already operating Nord Stream twin pipeline system. An independent certification body, Norway's DNV GL, will witness, audit, participate in, and certify the technical design and implementation of the pipes.



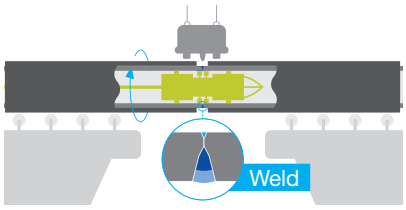
The Pipelaying Process

The construction of the Nord Stream 2 pipelines will be carried out around the clock.

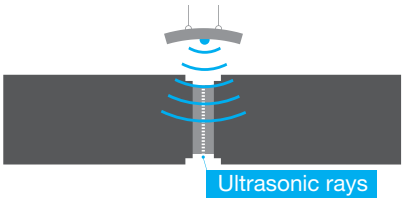
1 The pipes are unloaded from the pipe carrier vessels and stacked on each side of the laybarge. Pipes deliveries occur regularly to ensure that there are always enough supplies on board to maintain the 24-hour construction schedule.



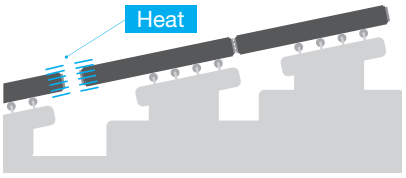
2 To prepare the pipes for welding, the ends are bevelled to make them exactly the right shape to be fitted together. The inside of the pipe is then cleaned using compressed air before it is conveyed to the double-joint welding station.



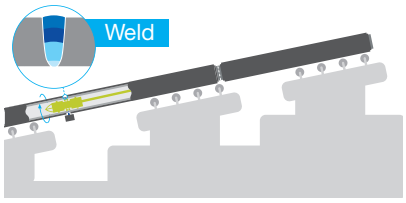
3 Here, 12-metre pipe joints are aligned and welded together to create a double-joint segment measuring 24 metres. These sections will later be connected to the main pipe string.



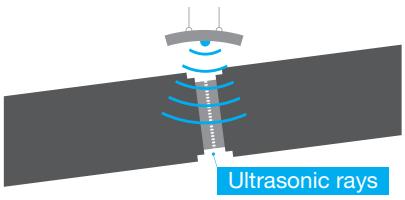
4 The double-joint is moved to a non-destructive testing station where every millimetre of the weld undergoes automatic ultrasonic testing (AUT) to detect any unacceptable flaws. If required, the defect will be repaired and the weld rescanned to meet international standards.



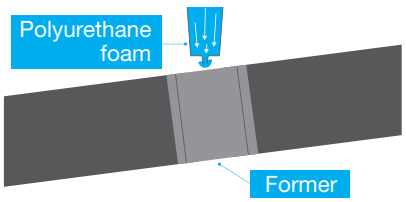
5 Following AUT, the double-joint is moved in a pipe elevator to the central assembly line. There, the insides are checked for debris. The ends of the double-joint are then welded onto the main pipe string.



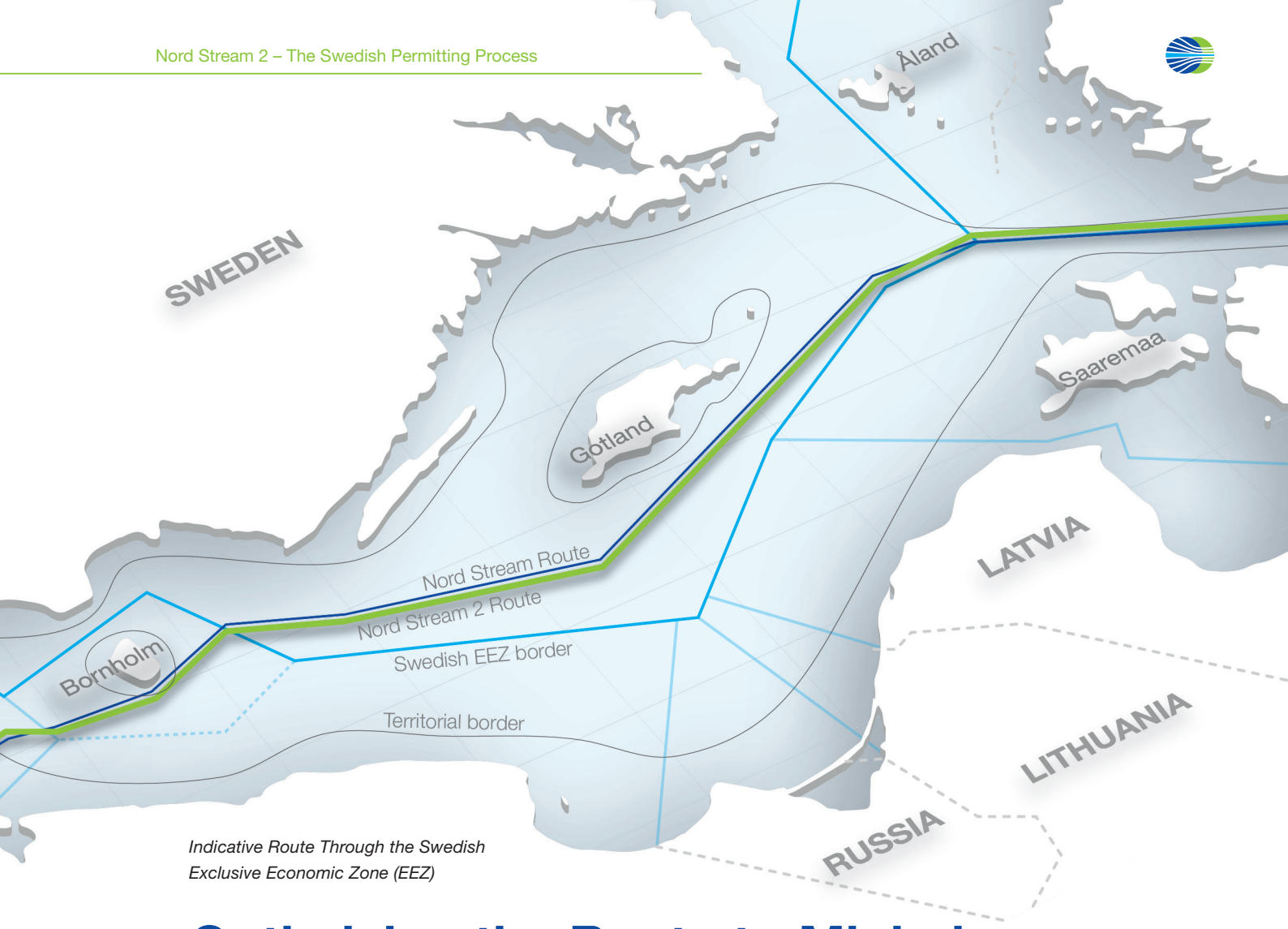
6 The prepared double-joints are now joined to the end of the pipeline in a semi-automatic welding process. Qualified welders oversee each of the steps to ensure that welding procedures meet Nord Stream 2's and authority approved quality standards.



7 The weld between the double-joint and the main pipeline also undergoes ultrasonic testing. Any unacceptable flaws will be repaired, and the weld rescanned so that it meets international standards.



8 Once the weld is confirmed acceptable, a corrosion resistant, heat-shrink sleeve is applied around its entire circumference. Then, polyurethane foam is poured into a mould surrounding the weld area. This foam hardens, providing further protection.



Indicative Route Through the Swedish Exclusive Economic Zone (EEZ)

Optimising the Route to Minimise Environmental Impact

The proposed route chosen for Nord Stream 2 has been carefully selected to have no significant or long term environmental impact.

The twin pipelines will stretch for approximately 510 kilometres in the Swedish Exclusive Economic Zone and run broadly parallel to the existing Nord Stream pipelines. Specific technical, socioeconomic and enviromental constraints were considered during the preparatory work carried out before choosing the route for Nord Stream 2. Assessed environmental criteria related to the potential impact of the pipelines' installation and operation on the environment of the Baltic Sea, including protected and environmentally sensitive areas.

"The twin pipeline will stretch for approximately 510 kilometres in the Swedish Exclusive Economic Zone."

Technical, Socioeconomic Aspects Thoroughly Considered

Technical considerations related to the pipeline's design concept such as its components and installation methods. Other considerations included the water depth for the best pipeline stability, the distance to and crossing of shipping lanes, cables and pipelines, as well as seabed roughness. With regard to socioeconomic criteria, the aim was to minimize restrictions on marine users, such as those working in the shipping and fishing sectors, military practice areas and recreation areas. The existence of munitions and cultural heritage sites such as ship wrecks along the route has also been thoroughly surveyed.

Sediment samples are collected along the route of the pipeline and analysed for contaminants.

Minimal Environmental Impact on the Baltic Sea

Basing itself on the experience of the Nord Stream project, the planned pipelines are assessed to have a negligible environmental impact on the Baltic Sea. The comprehensive Environmental Study and investigations carried out prior to the filing of the permit application, show that the Nord Stream 2 project will have no or a negligible impact on the water quality, seabed sediment, fish, birds, marine mammals, existing infrastructure and cultural heritage, to name just a couple of the assessed aspects. With the mitigation measures proposed, the overall impact on birds, harbour porpoise, grey seal and the two Natura 2000 sites Hoburgs Bank and Northern Midsjö Bank potentially affected by the project, are estimated to be negligible.

No Unforeseen Environmental Impacts From the Existing Pipelines

The results from the first Nord Stream project's environmental and social monitoring programme carried out between 2010 and 2014 demonstrated that the pipeline construction did not cause any unforeseen environmental impact. They also confirmed the positive trend in environmental recovery after construction. All monitoring results have confirmed that construction-related impacts were minor, locally limited and predominantly short term. These data and the experience gained will help to ensure that Nord Stream 2 meets the same stringent international standards and can be built and operated without any adverse effects on the environment. Careful surveying of existing risk areas for munition and cultural heritage along the proposed route has already been carried out.

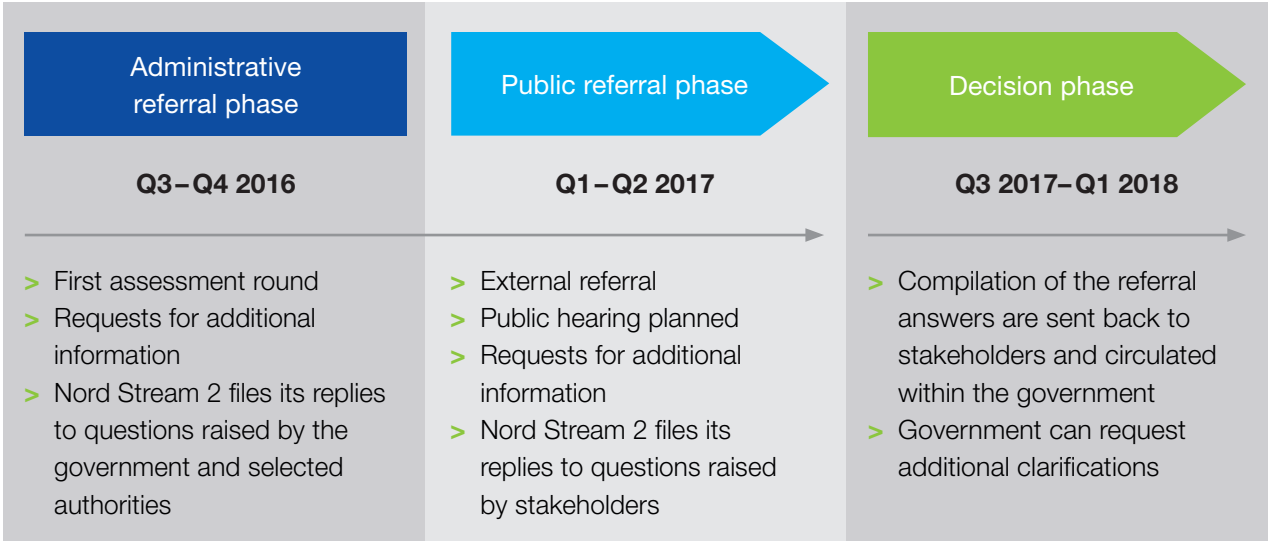
Environmental Monitoring During Construction and Operation

During the construction and operation of the Nord Stream 2 pipeline system, a monitoring programme will be set up to verify the performed assessments. This programme will be set up based on the experiences gained from the Nord Stream project, performed surveys and assessments, and after consultations with the relevant authorities.

Construction Plan in the Swedish EEZ

Nord Stream 2 currently plans to have multiple vessels working on the installation of the pipeline system at various places along the Baltic Sea simultaneously. Within the Swedish EEZ, the construction is scheduled to start during the course of 2018 and be completed during 2019. Nord Stream 2 will finalise the detailed construction plan in consultation with the Swedish authorities in the coming months. Two Swedish ports – Karlshamn in Blekinge and Slite on Gotland – are planned to be used as temporary pipe storage sites.

Permitting Process and Decision Phases 2016–2018



The Swedish Permitting Process in a Nutshell

The national permitting processes for the construction of gas pipelines vary in each of the five countries where Nord Stream 2 will be constructed. In Sweden, the process starts at the Ministry of Enterprise and Innovation.

In order to lay pipelines on the continental shelf outside of Swedish national territory, a permit is required according to the Swedish Continental Shelf Act (SFS 1966:314). The act implements parts of the United Nations Convention on the Law of the Sea (UNCLOS), and specifically the right for all to lay cables and pipelines on the continental shelves outside coastal states' territories.

"The application initially goes through a so-called administrative referral round."

Nord Stream 2 filed its permit application to the Swedish government, more precisely to the Ministry of Enterprise and Innovation, in charge of the dossier on September 16, 2016. The filed application contains the formal legal application, a comprehensive environmental study, a detailed technical description, an atlas, as well as several appendices with detailed background reports. The information disclosed in these documents contains detailed project information focusing on the construction of the twin pipeline system in the Swedish Exclusive Economic Zone.

Nord Stream 2's application will initially most likely go through a so-called administrative referral round, where the Ministry of Enterprise and Innovation and a number of selected authorities assess the completeness of the application. These authorities are likely to include the Swedish Environmental Protection

"The Swedish and international public consultation phases are planned to be launched simultaneously in early 2017 and run until early summer 2017. During this consultation stakeholders are able to provide their views on the project."

Agency, the Swedish Agency for Marine and Water Management, the Swedish Transport Agency, the Geological Survey of Sweden, the Swedish Maritime Administration and the Swedish Coast Guard. They will comment on the planned pipeline system, request clarifications and perhaps ask for additional information. Nord Stream 2 will throughout the remainder of the year respond to these queries and provide additional information, if required.

The Swedish and International Public Consultation Phase

The Swedish public consultation phase is planned to be launched in early 2017. The international public consultation phase, also known as the Espoo consultation process, is planned to be launched simultaneously and run in parallel to the Swedish one. Both these processes are open to all interested stakeholders. They range from non-governmental organisations (NGO), fishermen and authorities to municipalities located along the Baltic Sea. The two consultation phases are both planned to run until early summer 2017. During this period, anyone has the opportunity to comment or raise their concerns about the planned pipeline. A public hearing, where Nord Stream 2 representatives will present the project, and where the audience will be able to raise their questions is also planned during the consultation process.

Decision Phase

The Swedish government will start to prepare its decision once it concludes that Nord Stream 2 has replied to the questions raised and submitted any requested additional information needed. The government's permit decision is expected late 2017 or early 2018. Russia, Finland, Denmark and Germany – the four other countries through which the pipeline system will be constructed – are expected to issue their permit decisions during the same time period as in Sweden.

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