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ENSE3 1ère Année

Nord Stream

The new gas supply route for Europe

Russia Energy Strategy

Présentation Energies&Enjeux Décembre 2011

Nord Stream

- I General presentation
- II Technological features of the Nord stream
- III Geopolitical impacts

I. General Presentation of the Nord stream

- Geography

1224 kms long

- Two pipes :

Line	Begining of contruction	End of contruction	Begining of production
1	April 2010	June 2011	November 2011
2	May 2011	Third semester of 2012	Forth semester of 2012

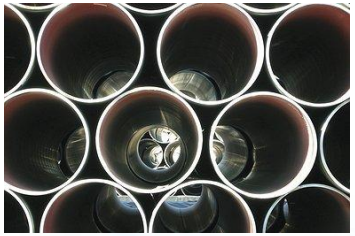
55 billion m^3 of gas year -> provide gas for 26 million households

Last at least 50 years

- Builder and operator :

-> Mainly Gazprom (51%)
-> GDF Suez (9%)
-> 3 German companies

- A lot of contractors …



- Money-wise :

Total investment : 7.4 billion euros

Zero = cost to European taxpayers !

100 million euros -> ecological surveys

- Financial interest:

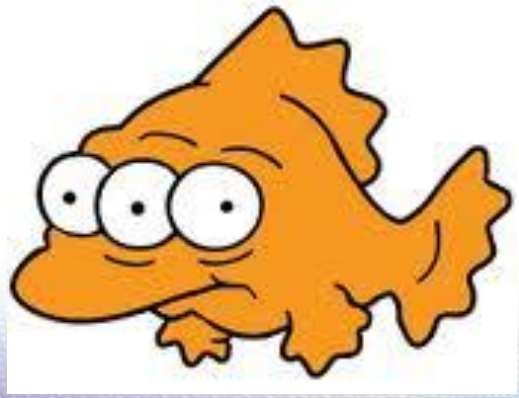
Less transit fees

Higer working pressure => fewer expensive midway compressor stations

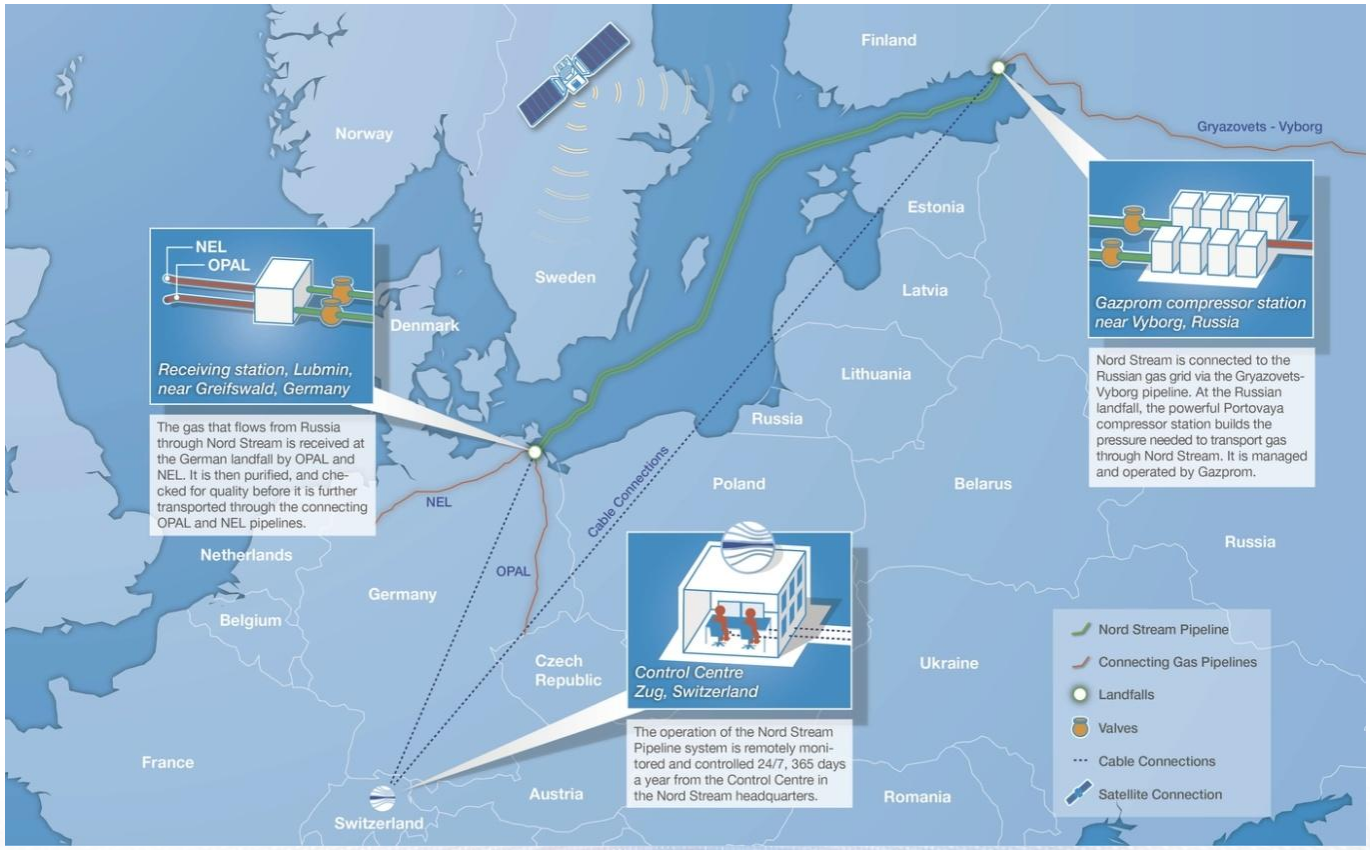
- Controversy

Energy dependance on Russia

Potential environmental damage

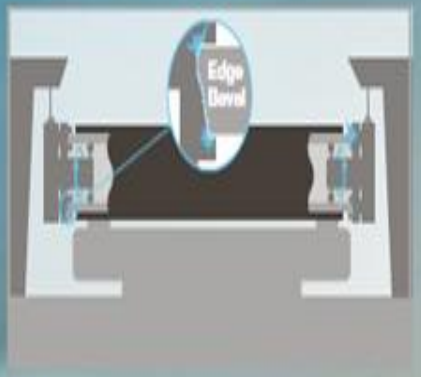


II. Technological features of the Nord Stream



Pipelaying Process

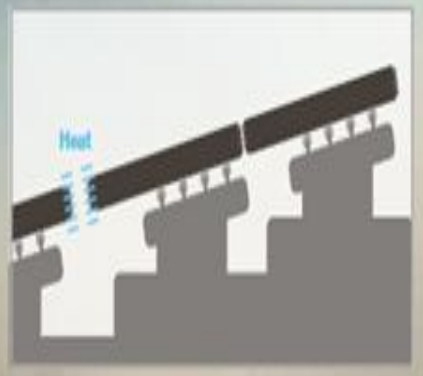
1 The pipes are unloaded from the pipe carrier vessels and stacked on the storage areas on each side of the laybarge. Pipes are delivered regularly to ensure that there are always enough supplies on board to maintain the 24-hour construction schedule.



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.

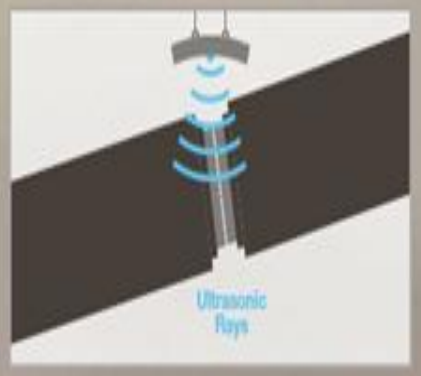
3 At the double-joint welding station, two bevelled, 12-metre pipe joints are aligned and welded together to create a double-joint segment measuring 24 metres. These double-joint sections will later be connected to the main pipe string.

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

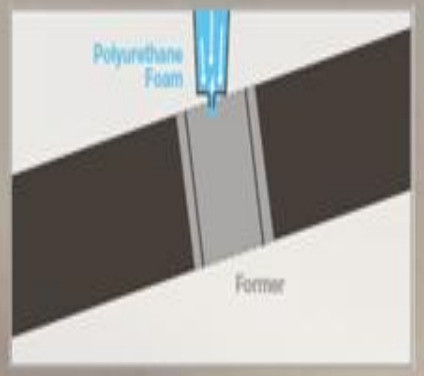


5 Following non-destructive testing, the double-joint is moved in a pipe elevator to the central assembly line, or "firing line". There, the insides are checked for debris. The ends of the double-joint are then pre-heated in preparation for welding onto the main pipe string.

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's and authority approved quality standards.

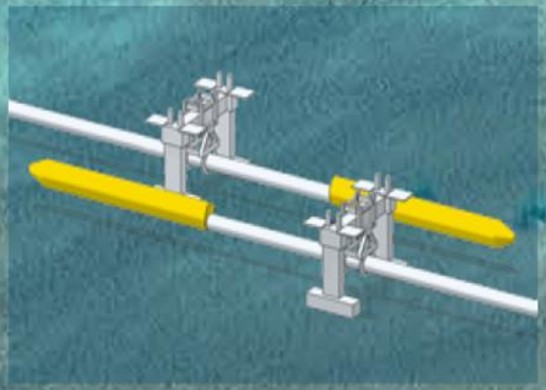


7 The weld of the double-joint that has been welded onto the main pipeline also undergoes ultrasonic testing at another non-destructive testing station. Any unacceptable flaws will be repaired, and the weld rescanned so that it meets international quality standards.



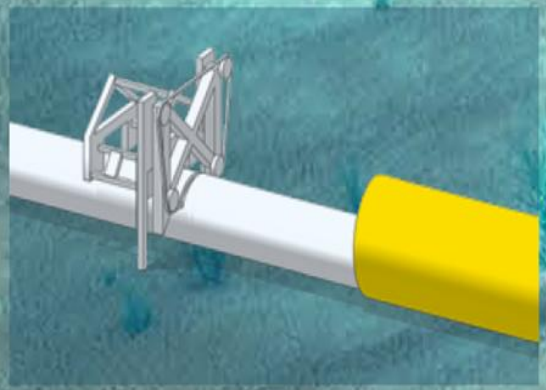
8 Once the weld is confirmed acceptable, a corrosion-resistant, heat-shrink sleeve is applied around its entire circumference. Then, polyurethane foam is poured into a mould surrounding the weld area. This foam hardens, providing further protection.

Tie-In Sequence



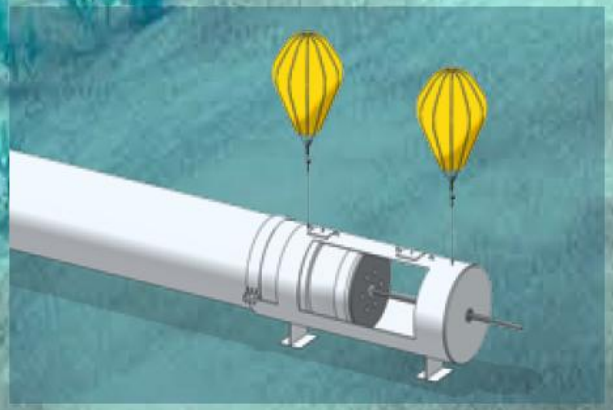
1. Performing "As-Found" Survey

Prior to sending the divers to the tie-in site, an as-found survey is performed to check that every-thing on the seabed is as it should be. For example, it confirms the exact position of the pipelines.



2. Cutting the Pipeline

The pipeline segments lay parallel to each other and overlap. Therefore, the ends of each segment must be cut before they can be lined up. A diamond wire cutter is used to cut through the high-tensile steel.

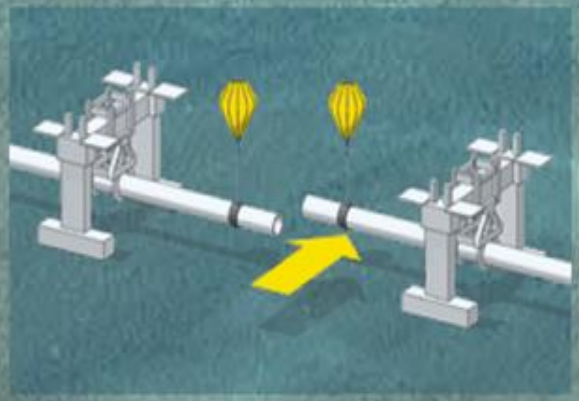


3. Installing the Welding Plug

A welding plug is inserted into each end of the pipeline segments. The plugs are inflated for a perfect seal to separate the water in the pipeline segments from the dry welding area of the habitat.

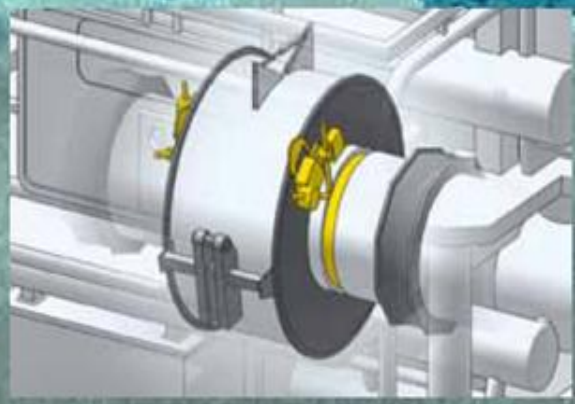
4. Making the Final Cut and Bevelling

Using a bevelling machine, the pipeline ends are given a smooth finish to prepare them for welding within the habitat. The surfaces are measured to ensure they meet exact specifications.



5. Lifting and Shifting

Three pipe handling frames (PHFs) will be used to lift and shift the pipeline ends. The frames are needed to lift the pipeline segments and line them up before the welding can start.



6. Welding the Segments

The pipeline segments are welded together inside the welding habitat. All welding operations are controlled from the dive support vessel. The weld is inspected using ultrasonic testing.

Suction pumps

Hoses filling the pipeline with water

PIG reciever for
Pipeline section 2

PIGS 2,3&4

Untreated seawater

PIG 1 being launched

Flooding, Cleaning and Gauging PIG
The PIGs, or pipeline inspection gauges, travel through the
pipeline checking its roundness and dimensions. This is
done with thin aluminum gauge plates. If the plates remain
undamaged, the pipeline's integrity is confirmed. As the
PIGs travel through the pipeline, they also clean it.

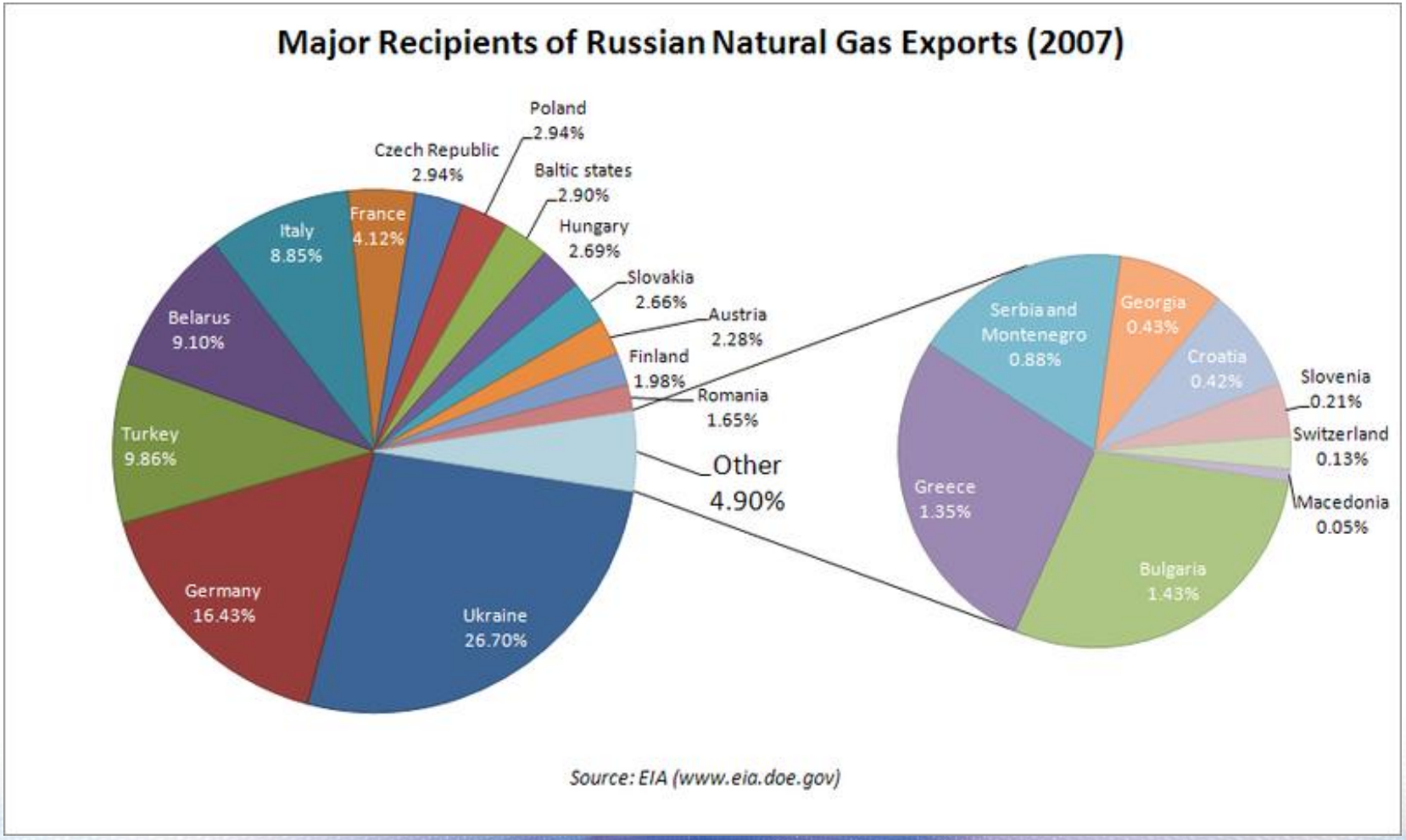
Flooding and Pressurising
Before pressure testing can take place, the pipeline sections
must be filled with water. The PIGs in the train will ensure
that the section is completely filled with water and that there
are no pockets of air. In a next step, the water is pressurised
by pumps on the Far Samson.

III. Geopolitical impacts of the Nord Stream

Nord Stream: A Long-Term Solution for Europe's Energy Security

- Russia supplies **42%** of EU gas imports
- The growing demand in Energy
- Long term project (**50 years**)

Why natural gas flows have to be safe?



Russia's strategy of diversion *in gas*

Nord stream: **to divert the existing flows away from transit states**

Strategy *in gas* targets only **Ukraine** (<= Gas disputes from 2005 to 2009)

2030: the length of trunk pipelines will increase by 30-35,000 km (Russian Energy Strategy)

New 'Northern' corridor

Is there also a diversification component?

Pipelines to Europe receive more attention than pipelines to China

Russia strategy in energy

Become fully self-sufficient in export energy infrastructure

Emerge as an LNG player of global significance

Become an 'energy bridge' between Europe and Asia

Russia aims :

- new markets **and** operational flexibility
- leverage over transit states
- strategic manoeuvring space in negotiations with Europe

Thank you for your attention

Nord Stream
The new gas supply route for Europe

Questions

Sources

- International Energy Agency
- *"Energy and geopolitics: How do we strengthen Europe's energy security?"* Dr. Nazrin Mehdiyeva
- *"Energy Strategy of Russia for the period up to 2030"* Ministry of Energy of the Russian Federation
- *www.nord-stream.com* Nordstream official site
- Wikipédia