

# TurkStream Offshore Gas Pipeline Route

**31.5** billion m<sup>3</sup> transport capacity per year  
**2,200** metres maximum depth  
**2** offshore lines  
**930** km per line



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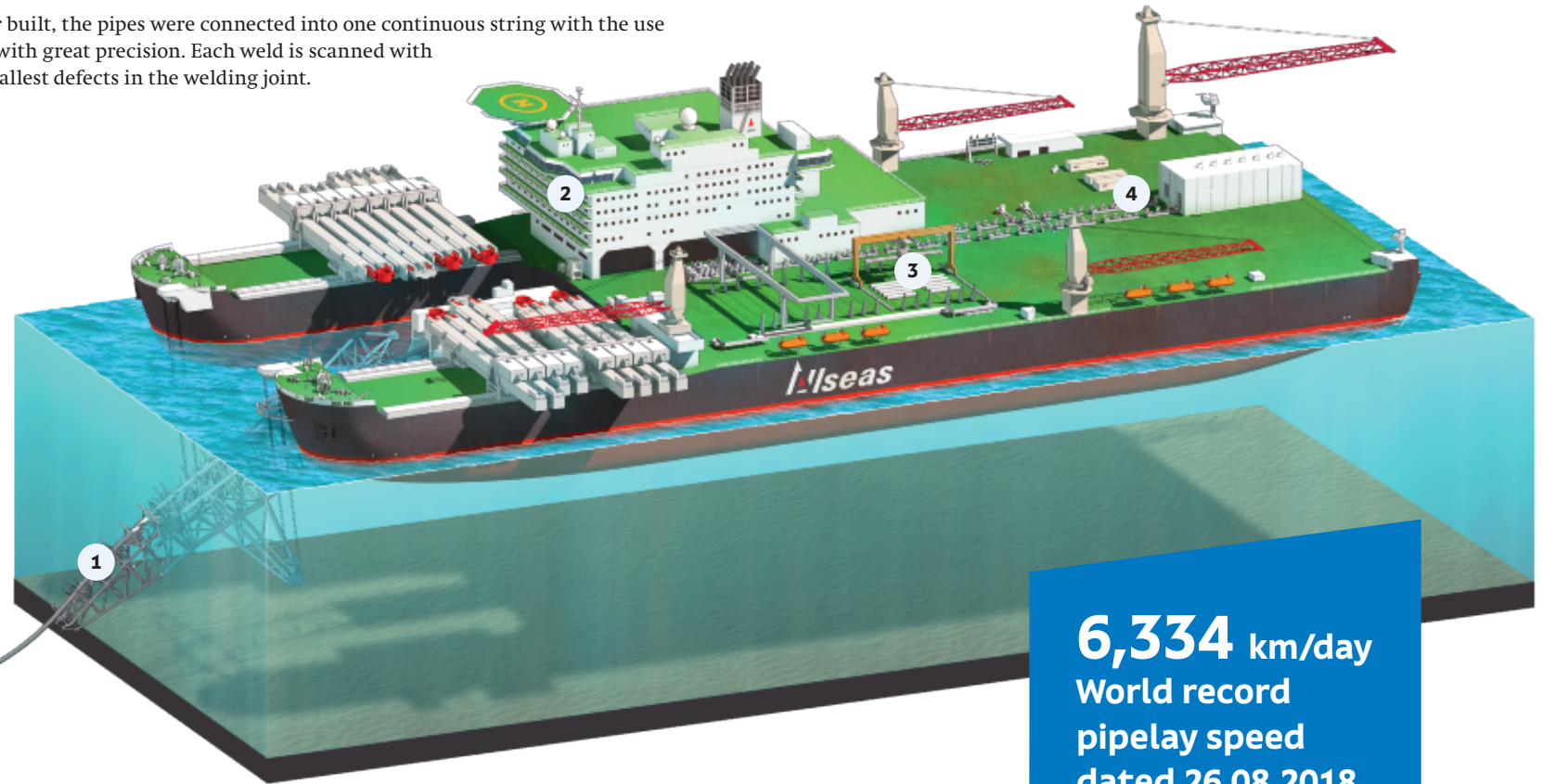


# Offshore Construction

On board of the largest construction vessel ever built, the pipes were connected into one continuous string with the use of a special machine that welds them together with great precision. Each weld is scanned with ultra-sound, which can help detect even the smallest defects in the welding joint.



Remotely Operated Vehicles were used 24/7 for visual control of the pipe touchdown during construction



1. Pipeline stinger, which ensures efficient and safe pipeline installation
2. Accommodation for crew of 571
3. Cargo capacity to store up to 3000 pipes
4. Pipe conveyors transfer double-joint pipes to the removable bevelling station, from where they enter the main firing line underdeck

**6,334 km/day**  
World record  
pipelay speed  
dated 26.08.2018



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# Landfall Facilities: Russia



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# Receiving Terminal: Turkey

The receiving terminal in Turkey conducts quality control and official measurements to determine the quantity of gas that is received. Flow rate, pressure and temperature is adjusted according to the design requirements of the onshore lines. The receiving terminal can also receive PIGs, which inspect the pipelines from the inside.

1900 m

1. TurkStream Pipeline: the entire offshore pipeline is 930 km long, running from the Russian to the Turkish coast
2. Underground pipeline: on land the pipes are buried at least 1.5 meters underground
3. Receiving terminal: here the gas is prepared for further transport

Kıyıköy

Port



One of the onshore lines connects to the Turkish gas grid, while the other is directed to the Turkish-Bulgarian border.



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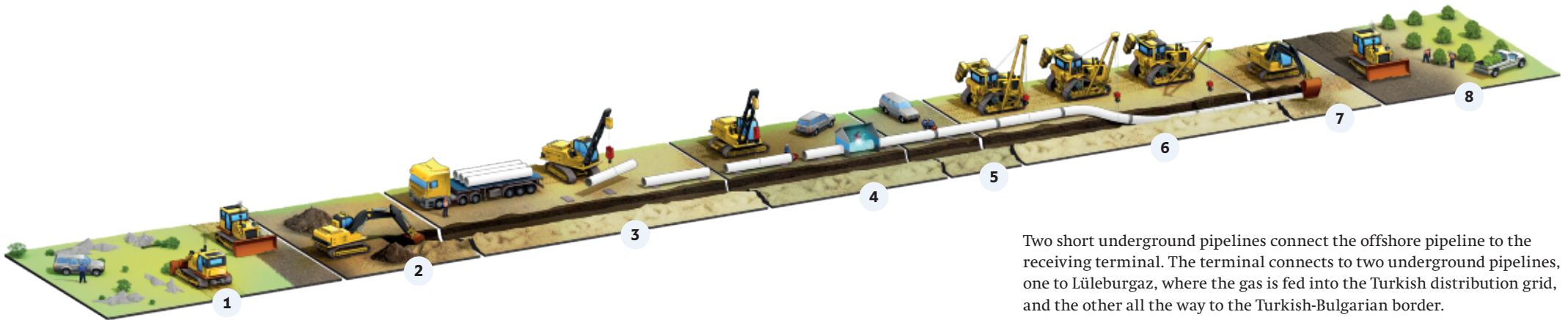


# Underground Connections

1. A strip of land 60-150 metres wide was temporarily cleared to serve as a construction corridor.
2. Trenches were dug at a depth of at least 1.5 metres
3. Individual pipes were laid out and bent into shape if needed
4. The pipes were welded together
5. All welds were inspected using ultra-sound
6. The pipe was lowered into the trench
7. The pipe was buried at a depth of at least 1.5 metres
8. The original top-soil was restored and vegetation was planted in the construction corridor



TurkStream voluntarily replants **5** trees for each tree that was cut in Turkey.



Two short underground pipelines connect the offshore pipeline to the receiving terminal. The terminal connects to two underground pipelines, one to Lüleburgaz, where the gas is fed into the Turkish distribution grid, and the other all the way to the Turkish-Bulgarian border.

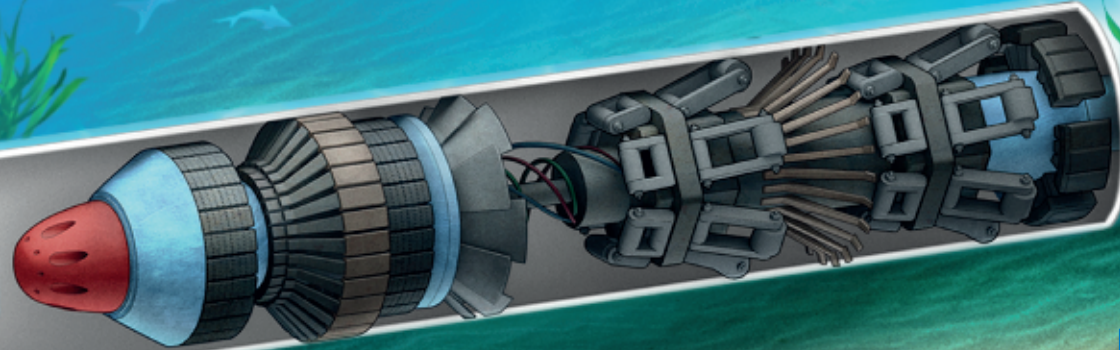


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# Secure energy for Turkey and Europe

TurkStream was constructed to be operational for at least 50 years. Therefore, the pipe will be inspected regularly from the inside and outside. Internal inspections are performed by running pipeline inspection gauges, or PIGs, through the pipelines. The PIGs will remove debris and measure the wall thickness of the pipe. The PIGs will enter the pipeline at the Russian landfall facilities and are propelled by the gas flow towards the landfall facilities near Kiyıköy. Because of the great depths, inspections from the outside are performed by remotely operated vehicles. They are able to make video footage of the pipeline.



**First PIGs successfully  
went through:**

**Line 1 - 17.05.2019**

**Line 2 - 8.06.2019**

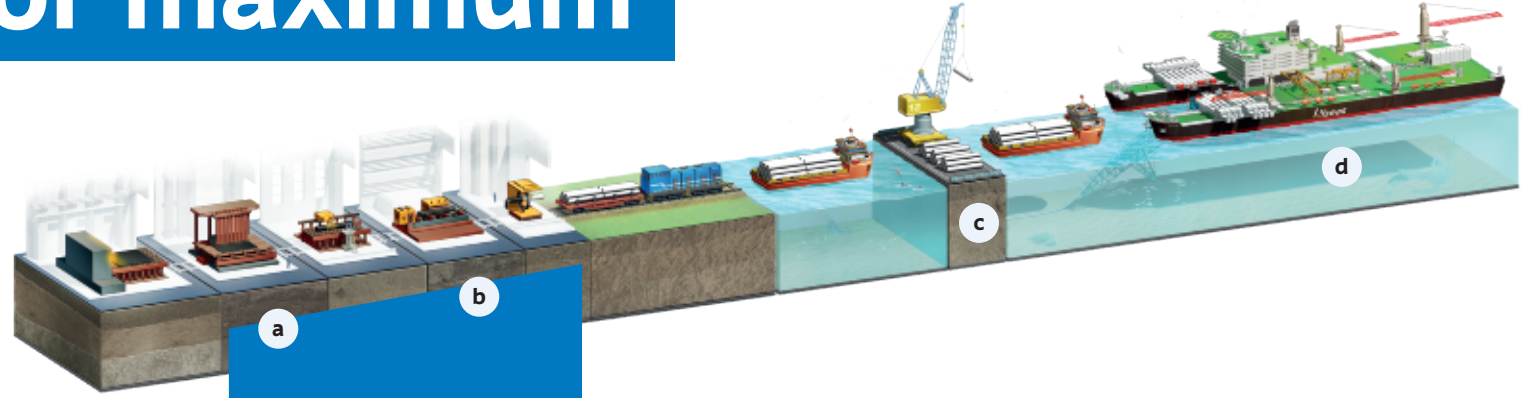


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# Designed for maximum Safety

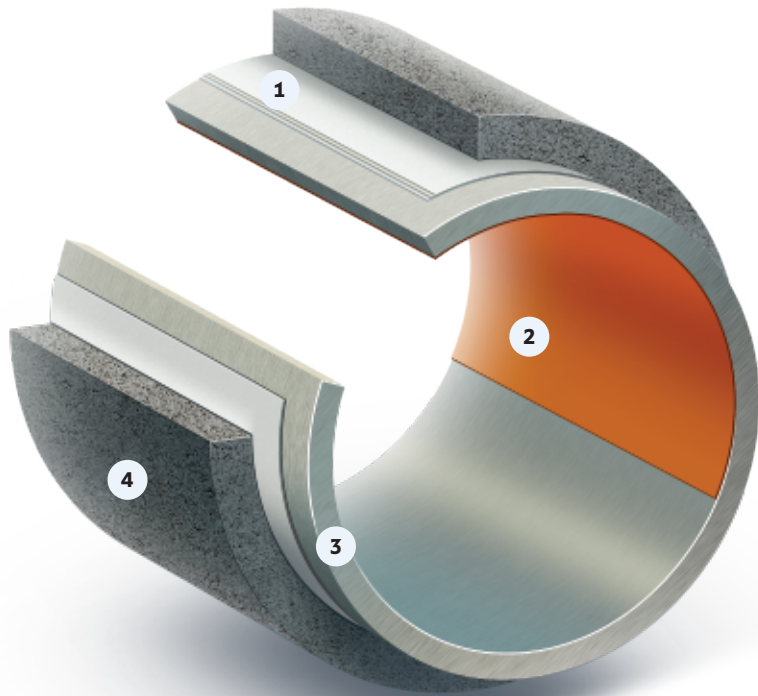


More than  
**150 000**  
pipes in total  
were used for  
construction

Each of the two offshore pipelines was made up of thousands of individual pipe joints of 12 metres in length and 9 tonnes weight. The pipes are designed and manufactured especially for safe use in the deep seas.

Steel pipes were produced in special mills<sup>a</sup> and checked thoroughly during production. They were inspected with x-ray and ultra-sound<sup>b</sup> and tested from the inside with water at high pressure. Finally, an independent inspector verified the quality of each pipe before it left the factory floor. The individual pipes were then brought to storage yards<sup>c</sup> on the Black Sea coast by rail and boat.

Onboard the vessel<sup>d</sup>, the pipes were welded onto the main string with high-precision equipment. Afterwards, each weld was tested and then coated, before the pipe string was lowered into the water.



1. External coating of three-layer polypropylene against corrosion
2. Internal epoxy coating against friction
3. Steel pipe wall 39 mm
4. Pipes laid in shallow waters are coated with 5 to 8 centimetres of concrete for additional stability



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# Environmental Impact and Cultural Heritage

1. Juniper trees are among the endemic species of the Russian landfall area. In order to preserve them, over 200 trees were carefully removed and relocated to another location.
2. Due to low levels of oxygen, artifacts found at the bottom of the Black Sea are often well preserved. An ancient amphora was discovered in Russia and carefully recovered for further study and preservation.
3. Several independent fisheries studies by academic experts showed that the offshore pipeline is unlikely to impact fish migrations or fish populations.
4. Ecologists have carefully moved Nikolsky Tortoises from the construction site. A special fence was installed to ensure that they could safely leave the area, but could not return.



Over **800** animals were relocated from our construction site in Turkey



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# How Much is 31.5 bcm of Gas?

## Energy production



**126 000**

Wind turbines



**36**

Nuclear power  
units

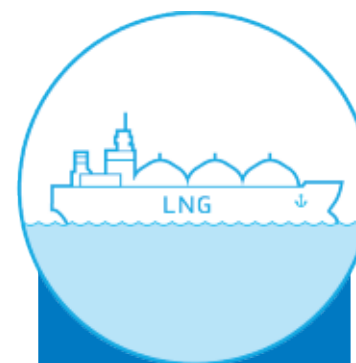
## Energy demand



**15 mln**

Households

## Transportation



**370**

LNG tankers



**80**

Oil tankers



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