

Nord Stream & South Stream – Comparability and Specifics



Gas Forum

Sofia, 23. September 2014

Oil & Gas Value Chain

Upstream

Downstream

Exploration / Development / Production



Transport



Storage / Trading





Nord Stream offshore

- Total Capex: €7.4 bn.
- First direct connection between European Gas market and world largest gas reserves in Western Siberia

Nord Stream onshore (OPAL/NEL)

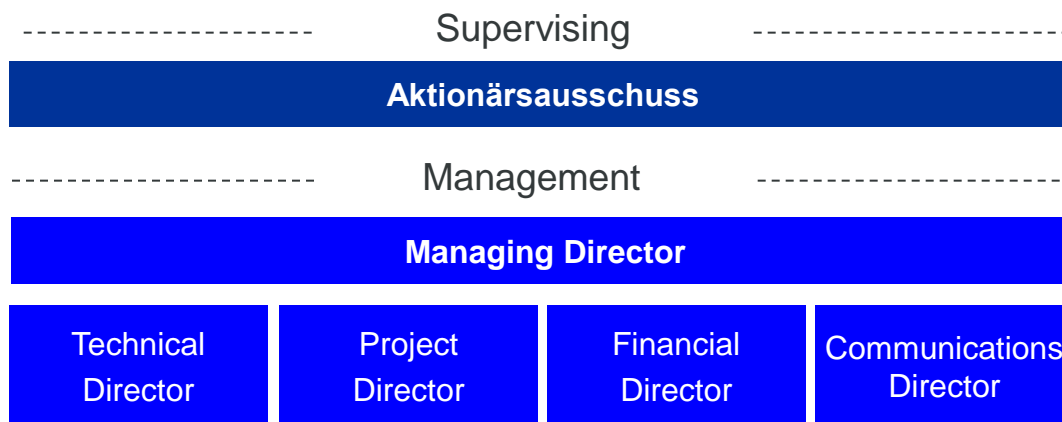
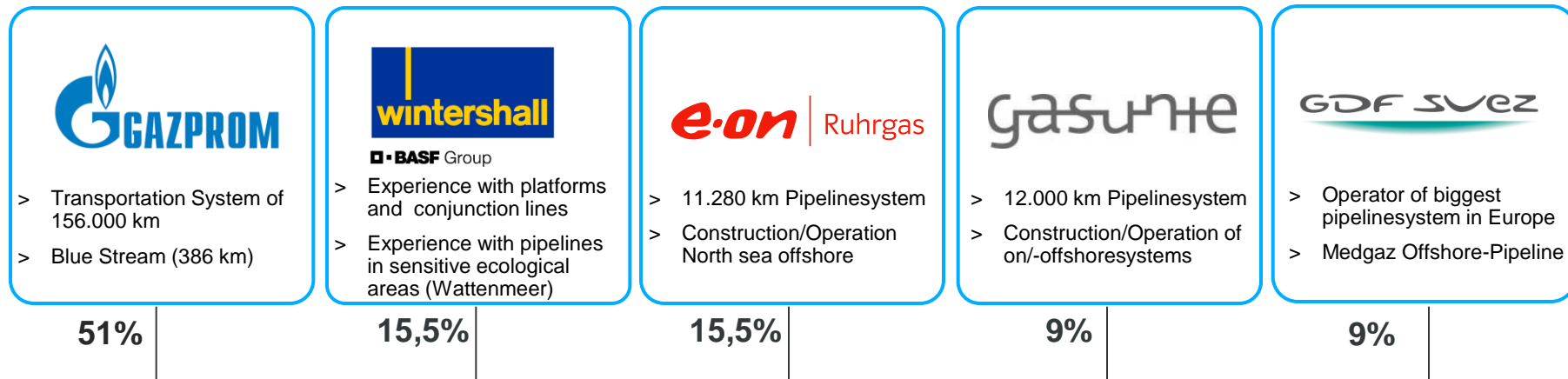
- Total Capex: ~€2.0 bn.
- New connection between Nord Stream and European grid via OPAL (operated since QIV/2011) and NEL (started up in QIV/2012)

South Stream offshore

- Total Capex: ~€10.0 bn.
- Further possibility of supply diversification for the Southern European market growth
- Start-up: end 2015

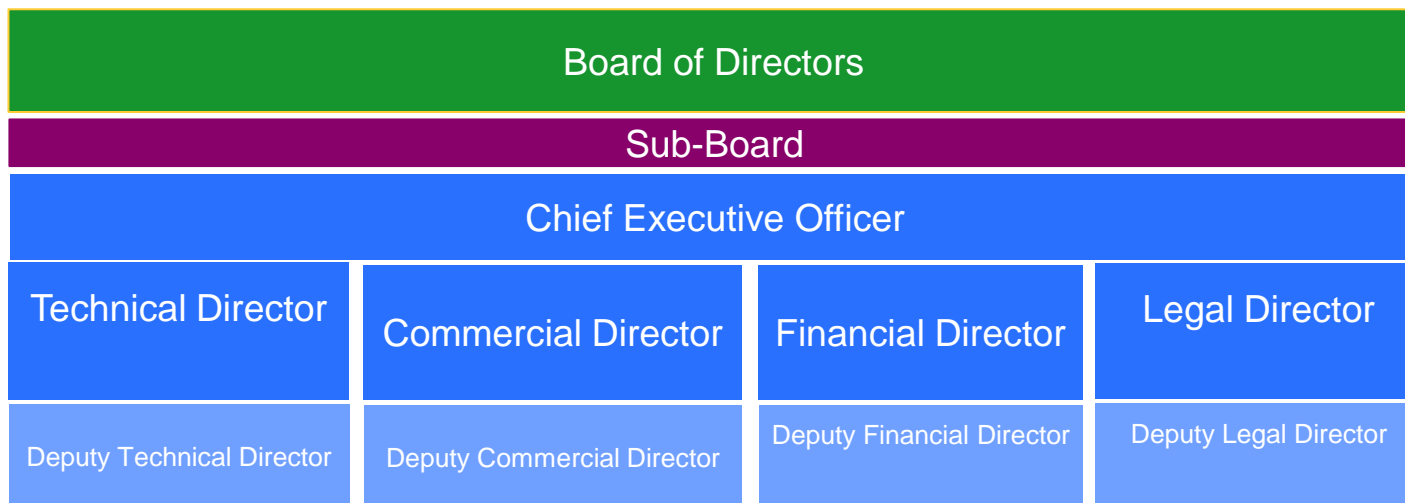
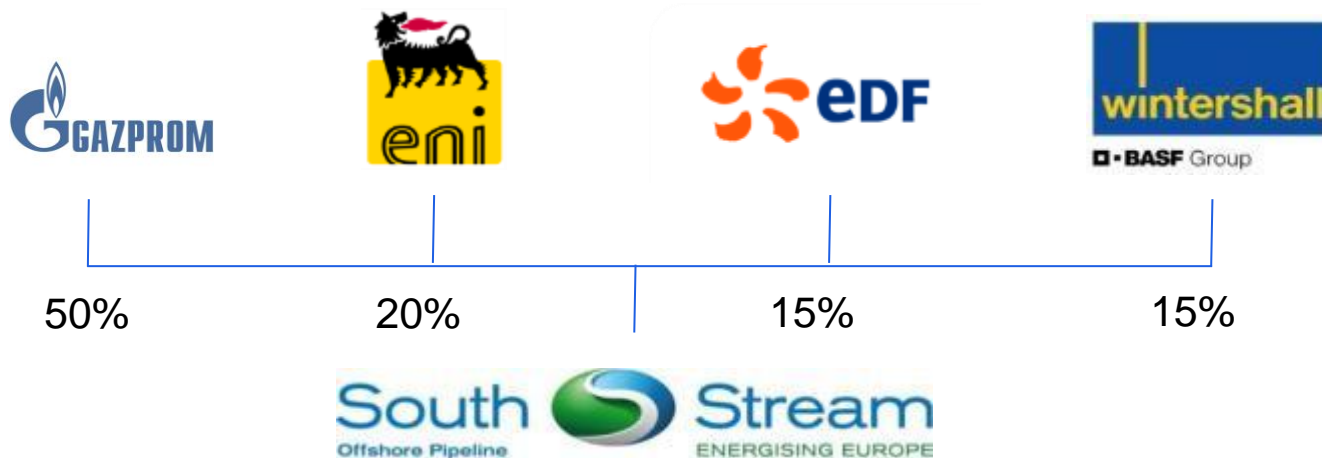
Nord Stream Offshore

European Shareholders



A subsidiary of BASF – The Chemical Company

South Stream Offshore European Shareholders



A subsidiary of BASF – The Chemical Company

Nord Stream Offshore

- Two 1,220 km offshore pipelines with 48" (DN1200) crossing the Baltic sea.
 - 55 bcm capacity of the complete System
- Design pressure of up to 220 bar, Depth of 210 m
- No Riser platform or underwater valves!



South Stream Offshore

- Four 930 km offshore pipelines with 32" (DN800) crossing the Black sea.
 - 63 bcm capacity of the complete System
- Design pressure of up to 300 bar, Depth of 2200 m
- No Riser platform or underwater valves!
- Deep slopes

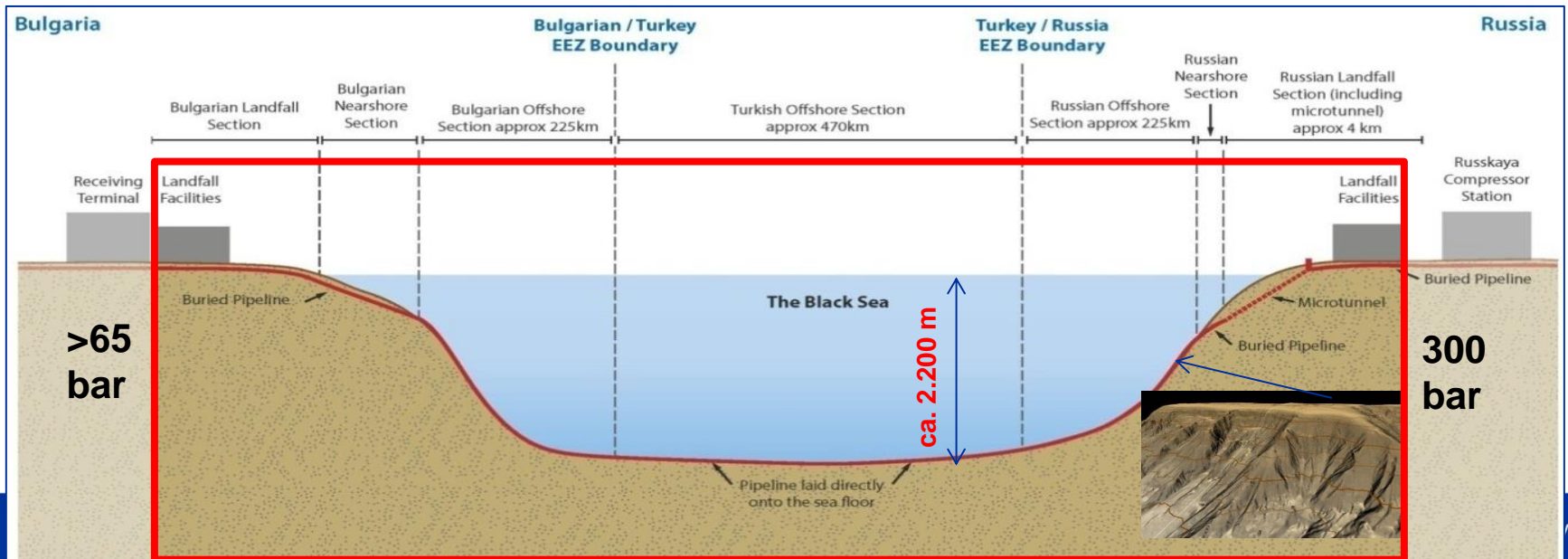


Nord Stream vs South Stream

Nord Stream



South Stream



Technical Key Figures

South Stream, Nord Stream



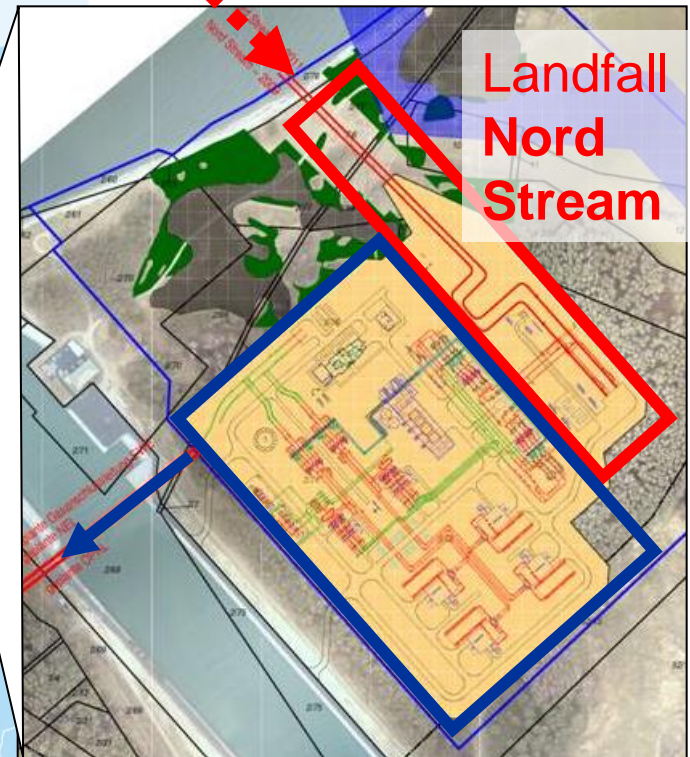
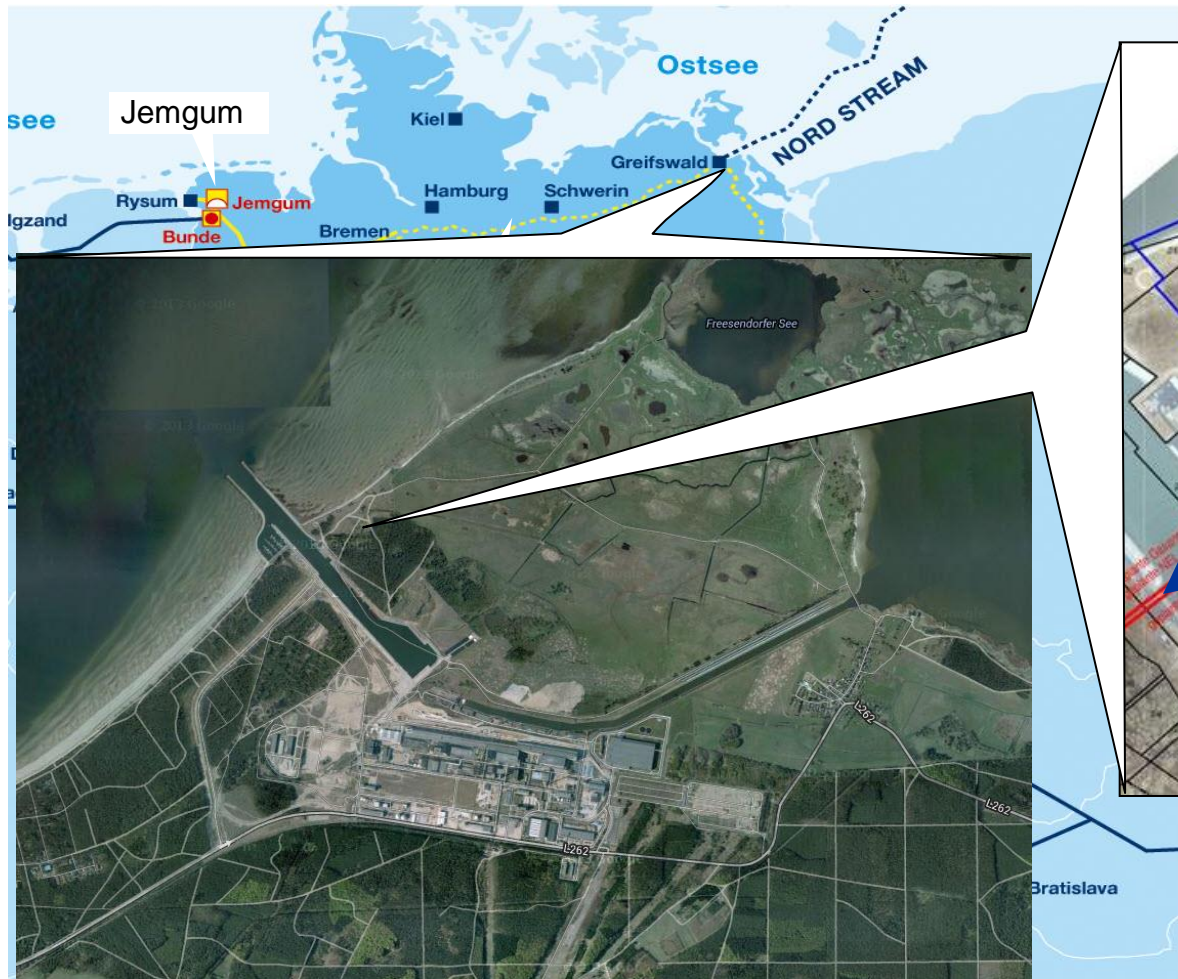
	South Stream Black Sea	Nord Stream Baltic Sea
Capacity (Bcm/a)	63 (4 lines)	55 (2 lines)
Length (km)	930	1.224
Max. Depth (m)	2.200	210
Diameter (Zoll)	32	48
Design Pressure (bar)	300	220
Wallthickness (mm)	39,0	26,8 – 41



	Blue Stream Black Sea	South Stream Black Sea	Nord Stream Baltic Sea
Capacity (Bcm/a)	16 (2 lines)	63 (4 lines)	55 (2 lines)
Length (km)	390	930	1.224
Max. Depth (m)	2.150	2.200	210
Diameter (Zoll)	24	32	48
Design Pressure (bar)	250	300	220
Wallthickness (mm)	31,8	39,0	26,8 – 41



Nord Stream Offshore Landfall Germany

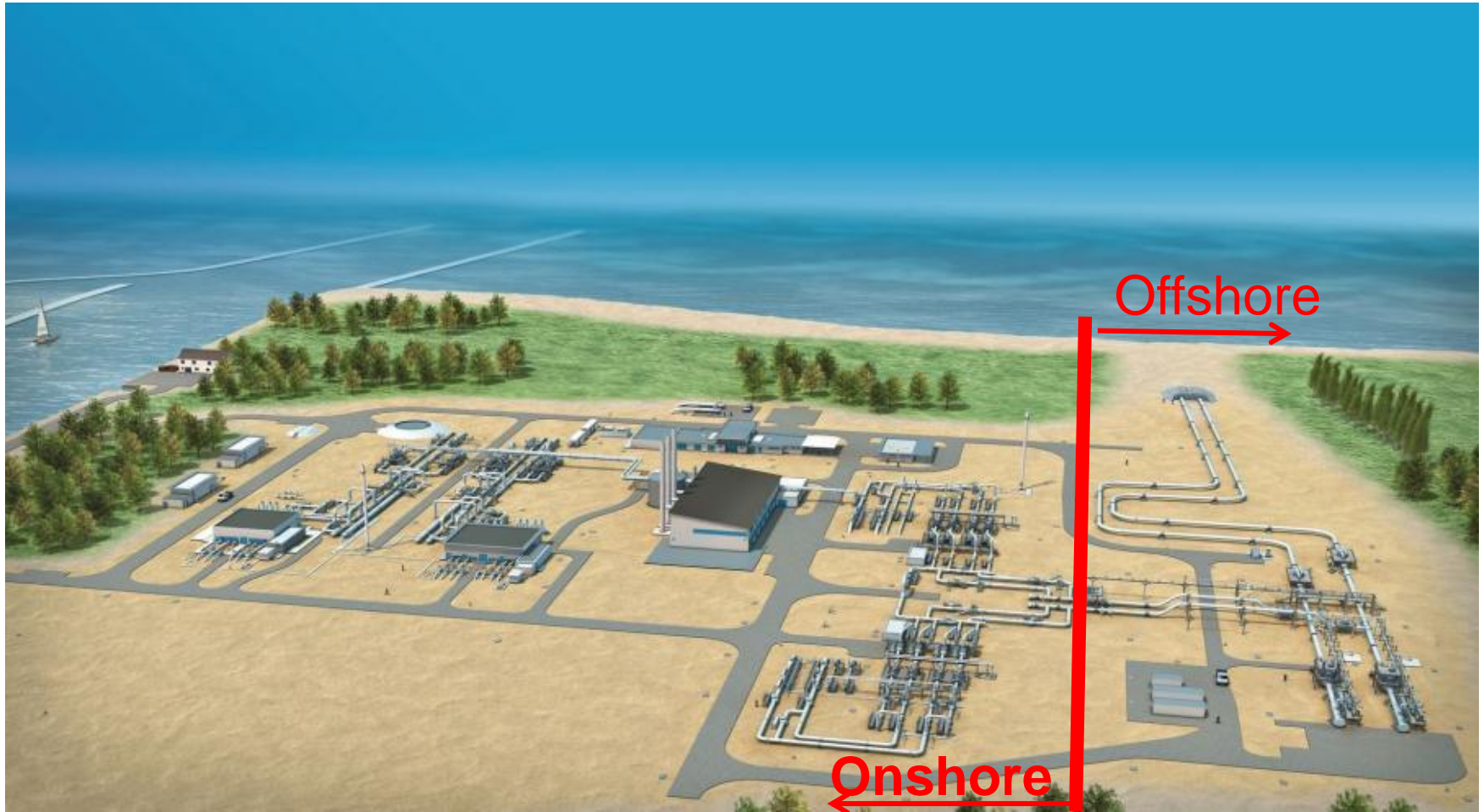


Landfall
Nord
Stream

**Onshore Receiving
Terminal Greifswald**

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Nord Stream Landfall Germany Greifswald



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South Stream Landfall Bulgaria Varna

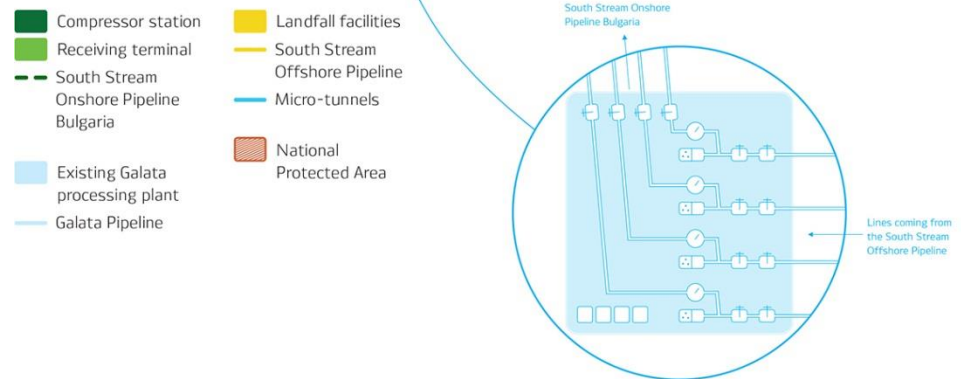
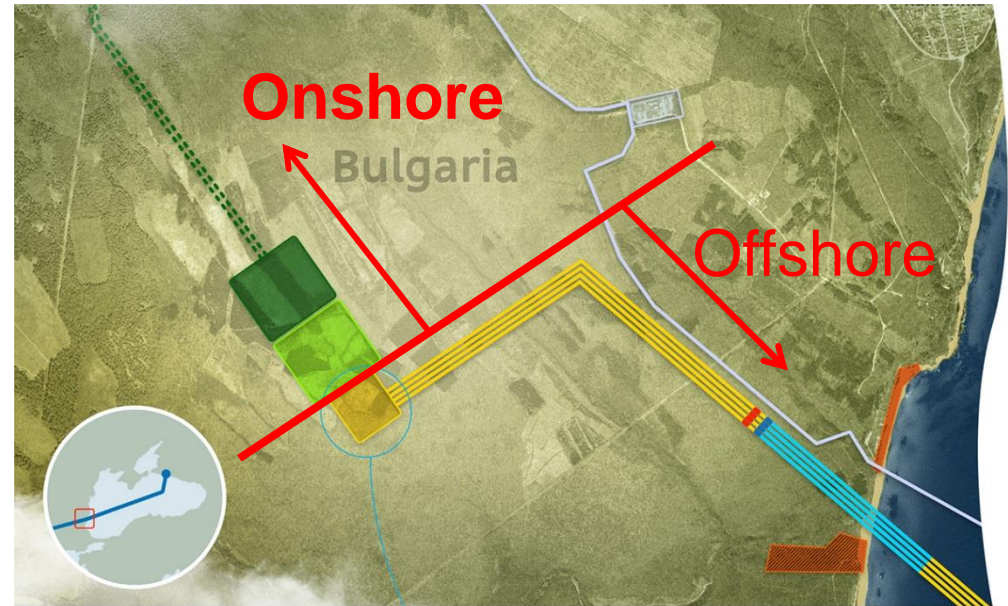
Landfall Bulgaria

- More complex location
- No direct crossing of the beach
- Distance from beach ~ 2 km
- Construction of landfall in compliance of international DNV – F101 / 301 code.
- tight X65-Steel used

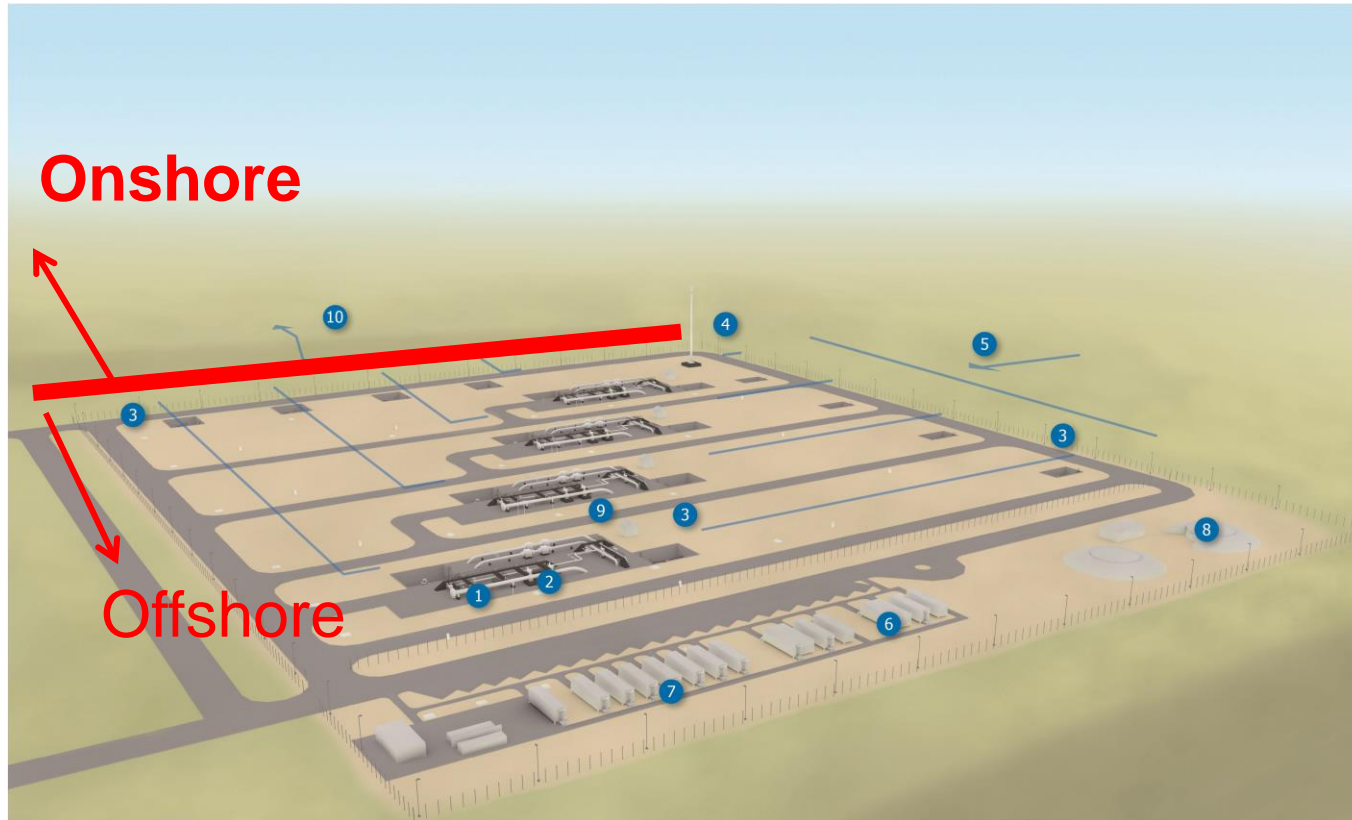
Clear split between

Offshore system (South Stream Transport BV) and

Onshore Operator (South Stream Bulgaria).



South Stream Landfall Facilities



- | | | |
|--------------------|-----------------------------------|----------------------------|
| ① PIG trap | ⑤ Pipelines coming from Black Sea | ⑧ Fire fighting equipment |
| ② PIG trap valves | ⑥ Maintenance and staff buildings | ⑨ Operational Metering |
| ③ Shut-down valves | ⑦ Technical and control buildings | ⑩ Onshore pipelines of SSB |
| ④ Vent stack | | |

Comparison

South Stream - Nord Stream



	South Stream Black Sea	Nord Stream Baltic Sea
Shareholder	European Partners	European Partners
Purpose/Aim	Security of supply	Security of supply
Technical concept	63 bcm / 4 lines	55 bcm / 2 lines
Specifics	Deep sloops; up to -2200m	Sensitive areas; up to -210 m
HSSE requirements	high	high
Technical standard	DNV F 101 / 301	DNV F 101 / 301
Landfall concept	similar	similar



South Stream Offshore Conclusions



- Nord Stream as well South Stream are European projects.
- Both systems support the security of supply for Europe
- South Stream as well Nord Stream are comparable challenging projects on high technical as well ecological and HSSE standards, even if some challenges are on complete different matters.
- Nord Stream and South Stream have comparable landfall solutions and a clear split between Offshore system and Onshore system.



... but competition has already started!