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BALTIC PIPE
BALTIC SEA - DENMARK

CONSTRUCTION PERMIT APPLICATION SUMMARY

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1. INTRODUCTION

1.1 About the Baltic Pipe project

The overall Baltic Pipe Project, promoted by GAZ-SYSTEM and Energinet, has the purpose of providing direct access for Denmark, Poland and other countries in the region to Norwegian gas.

The Baltic Pipe Project is a strategic gas infrastructure project with the goal of creating a new gas supply corridor in the European market. The Baltic Pipe project allows for import of Norwegian and Danish natural gas to Poland, and of natural gas and liquified natural gas (LNG) from Poland to Denmark. The main objectives of the Baltic Pipe Project include further strengthening of supply diversification, market integration, price convergence and security of supply primarily in Poland and Denmark and secondly in Sweden, Central and Eastern Europe (CEE) and the Baltic region.

Figure 1-1 The Baltic Pipe Project overview

Figure 1-1 above provides an overview of the five major components of the Baltic Pipe Project:

1. The North Sea offshore pipeline: An offshore pipeline between the Norwegian gas system in the North Sea and the Danish gas transmission system.
2. Enhancements in Denmark: Expansion of the existing Danish transmission system from West to East, including a section offshore in Lillebælt.
3. Compressor station in Denmark: Compressor station located in the eastern part of Zealand
4. The Baltic Sea offshore pipeline: The project outlined in the following.
5. Enhancements in Poland: Expansion of the Polish gas transmission system.

Energinet develops the Danish part of the project, consisting of offshore facilities in the North Sea, Lillebælt and onshore in Denmark (main components 1, 2 and 3). Gaz-System develops the pipeline in the Baltic Sea and expansions of the Polish gas grid (main components 4 and 5).

As the main components developed by both GAZ-SYSTEM and Energinet entails pipelines laid in Danish territorial waters, GAZ-SYSTEM and Energinet will each deliver a separate application according to the Danish Continental Shelf Act §3a for each their respective parts of the overall project.

The present document concerns the construction of the Baltic Sea offshore pipeline, i.e. item 4 in the above list and in Figure 1-1.

1.2 Legal basis

This document constitutes the application for approval of installation of the Baltic Pipe Offshore Pipeline with respect to the part extending from the Danish coast towards the Polish coast. The application concerns the part of this route extending through the Danish Territorial Waters (TW) and the Danish Exclusive Economic Zone (EEZ) as well as the Disputed Area between Denmark and Poland.

The application concerns a corridor width of 250 m. This application has been prepared in accordance with the following Danish legislation:

Consolidation Act No. 1189 of 21/09/2018 on the Continental Shelf and Certain Pipeline Installations in the Territorial Waters.

Executive Order No. 1520 of 15/12/2017 on Certain Pipeline Installations in the in the Territorial Waters and on the Continental Shelf.

Consolidated Act No. 1225 of 25/10/2018 on Environmental Impact Assessment of Plans and Programmes and of Specific Projects.

1.3 Applicant, shareholder and operator

The applicant is GAZ-SYSTEM S.A.

GAZ-SYSTEM S.A. is the sole owner of the gas transmission network through which it provides gaseous-fuel-transmission services within the territory of Poland. GAZ-SYSTEM S.A. is a joint-stock company with 100% Treasury shareholding.

The Company engages in the transmission activity on the basis of the gaseous-fuel-transmission concession. On 30 June 2004, the President of the Energy Regulatory Office granted a concession to GAZ-SYSTEM for the transmission of gaseous fuels in the period 2004-2014, and on 23 August 2010 he extended the Company's concession for the transmission of gas until 31 December 2030.

Energinet is an independent public enterprise owned by the Danish Ministry of Climate and Energy. Energinet operates and develop the transmission systems for electricity and natural gas in Denmark.

Energinet and Gaz-System have concluded a Construction Agreement, in which they divided the responsibility for specific main component of the Baltic Pipe. According to the Construction Agreement, Energinet will construct, own and operate Norwegian Tie-In, the expansion of the Danish transmission system and the Compressor Station, while Gaz-System will construct, own and operate the offshore interconnector between the Polish shore and the Danish shore on the island of Zealand, as well as the expansion of the Polish transmission system. Details of the division of ownership and operatorship can be found at: https://www.baltic-pipe.eu/the-project/.

Energinet will be responsible for the construction of the onshore project components in Denmark and the offshore components in the North Sea and Little Belt and will own and operate these components.

GAZ-SYSTEM S.A. will be responsible for the construction of the offshore pipeline between Denmark and Poland and the expansion of the Polish gas transmission system and will own and operate these components.

1.4 Applicant contact person

Wojciech Śpiewak – Baltic Pipe Project Director, Gas Transmission Operator GAZ-SYSTEM S.A., ul. Mszczonowska 4, 02-337 Warszawa, +48 22 220 18 00, fax: +48 22 220 16 06.

2. GENERAL OVERVIEW OF THE PIPELINE SYSTEM

2.1 Time line for planning/design, construction and operation

With respect to the Danish part of the project, the following timeline is expected (and is subject to changes as the detailed planning progresses):

Landfall site preparation:	Q4 2020;
Tunnelling:	Q1 – Q3 2021;
Seabed Intervention (pre-lay, post-lay):	Q3 2020 – Q2 2022;
Pipeline Installation:	Q3 2021 – Q2 2022;
Pre-commissioning:	Q2 2022;
Landfall site re-instatement:	Q3 2022 (after pre-commissioning).

2.2 Planned pipeline route

The planned Baltic Pipe pipeline route is shown as a solid black line in Figure 2-1. The Baltic Pipe pipeline passes through the exclusive economic zones (EEZ) of Denmark, Sweden, and Poland. The pipeline also passes through territorial waters (TW) in Denmark and Poland.

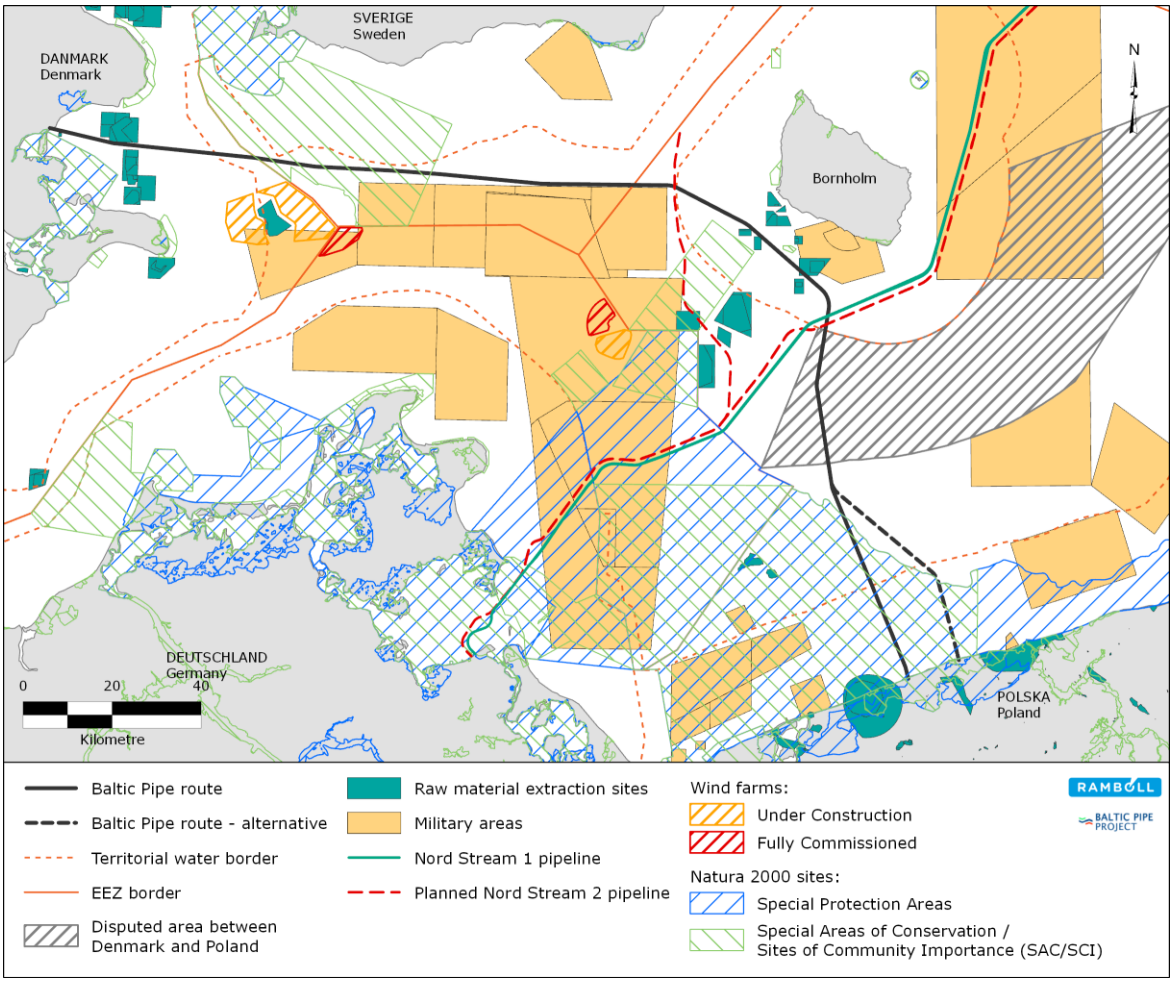

Figure 2-1 Pipeline Route

The selection of the preferred route between the appointed landfall locations has been based on investigations of several different route options. A detailed description and assessment of the different routes through Denmark is described in the Environmental Impact Assessment (EIA) for the project.

2.3 Pipeline design criteria

Selected design and operational data for the gas pipeline are listed in Table 2-1.

Table 2-1 Selected pipeline design and operational data

Data		Unit	Value
Pipe size		inch	36
Pipeline length		km	273.913
Line pipe material designation		-	DNVGL SAWL 450 DF
Pipeline ID		mm	872.8
Line pipe joint length		m	12.2
Min. design temperature		^{0}C	-2.7
Max. design temperature		^{0}C	50
Operating temperature		^{0}C	TBC
Gas flowrate		Nm^3/d	27.4 x 10^6
Design pressure		barg	120 @ MSL
Hydrotest pressure		barg	138.6 @ MSL
Max. operational pressure	Landfall DK Landfall PL	barg	117 84
Min. operational pressure	Landfall DK Landfall PL	barg	46 46
Minimum content density		kg/m^3	42.2

3. RISK ASSESSMENT

3.1 Risk assessment methodology

Design of the Baltic Pipe project has been carried out using the principle of reducing the risk to a level As Low As Reasonably Practicable (ALARP). The risk assessment criteria (RAC) established for the Baltic Pipe Offshore Pipeline are in line with the industry best practice based on previous experience from large offshore pipeline projects, as documented in the Design Safety Philosophy for the project.

3.2 Risks during the construction phase

As part of the detailed design of the pipeline system, a construction risk assessment (CRA) was prepared. During construction of the offshore Baltic Pipe pipeline, there will be an incremental increase in ship traffic in the project area, due to the presence of the work vessels. The main contribution to the incremental increase is by the pipe-lay and seabed interventions work vessels travelling along the pipeline route, and the pipe carrier vessels supplying the lay barge from one or more shore bases.

The risk of larger oil spills during the construction phase is related to the risk of third-party vessels colliding with one of the work vessels participating in the construction works. In addition to this, there is a risk of minor oil spill from e.g. bunkering operations. The likelihood of oil spills has been found to be very low due to the fact that the project does not introduce oil to the area, except for bunker oil on the vessels.

The risk to third-party personnel has been calculated using the same ship traffic data that were used for the oil spill frequency calculations. The risk to third-party personnel is well below the acceptance criteria, i.e. in the ALARP zone, where risks need to be reduced to a level as low as reasonably practicable.

3.3 Risks during the operations phase

During the operational phase, the hazards and risks relate to possible leaks of gas in the case of damage to the integrity of the pipeline system. A Quantitative Risk Assessment (QRA) has been undertaken in compliance with DNV, 2010 and DNV GL, 2017.

The risks during the operations phase are mainly related to interaction from anchors (emergency anchoring and unintentionally dragged anchors), sinking ships, ship groundings and dropped objects. The pipeline system has been designed in a way so that these risks have been are reduced to a level which is ALARP. This is done by the design of the pipeline itself and by protecting the pipeline additionally where required. The critical zones where extra protection is required are all related to areas where the pipeline route crosses ship traffic routes. The risk of gas leaks and they thereof following impacts on humans and the environment is, with the above mitigation measures, well below the applicable RAC.

4. PIPELINE CONSTRUCTION

4.1 Landfall construction

The landfall in Denmark is located south of Faxe Ladeplads in Faxe Bugt. The landfall is located at an agricultural field with a 15-17 m high cliff along the beach. Photos of the landfall location are shown in Figure 4-1. The pipeline will be tunnelled below the cliff to avoid excavating the cliff.

Figure 4-1 Danish landfall location, views from south and from the beach.

4.2 Offshore construction

4.2.1 Pipe-lay

Pipe-lay will take place using a S-lay vessel, with a typical configuration being presented in Figure 4-2.

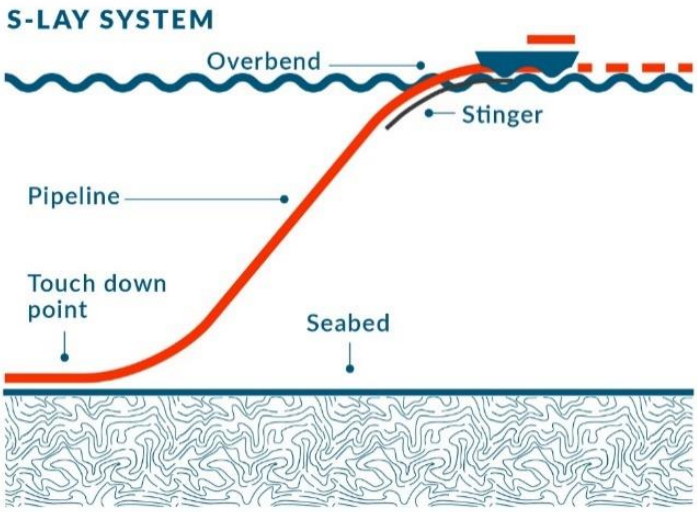

Figure 4-2 A typical pipeline installation by S-lay vessel.

Onboard the lay vessel, the coated pipe joints are welded onto the pipeline, which leaves the vessel via the stinger from where it follows an S-curve to touchdown on the seabed. Pipe sections of 12.2 m each will be provided from shore by a pipe supply vessel.

4.2.2 Seabed interventions and crossing of existing infrastructure

Seabed interventions are planned at some sections of the pipeline route to ensure stability and protect the integrity of the pipeline. Seabed interventions works will include trenching at landfalls (see Figure 4-3), trenching and/or rock installation for protecting the pipeline where crossing shipping lanes and for ensuring stability at exposed areas, and rock/concrete mattress installation for protecting existing pipelines and cables.

Figure 4-3 Typical backhoe dredge for trenching in shallow water.

Where the pipeline crosses the Nord Stream pipelines (the existing and the planned), concrete mattresses and rock fill be used as protection. Where the pipeline crosses existing cables, separation will be provided using concrete mattresses. Crossing design will be formally agreed with the individual pipeline and cable owners.

4.2.3 Pre-commissioning and commissioning

Before commissioning of the pipeline, pre-commissioning (hydrotesting) will be conducted for confirming the integrity of the pipeline system. The hydrotesting includes filling the pipeline with water (treated with oxygen scavenger but not with biocide) from Faxe Bugt, pressure testing and subsequent discharge of the treated pressure test water in Faxe Bugt.

After pre-commissioning, the pipeline will be filled with dry air. To prevent a mixture of air and dry gas immediately before injection, the pipeline will be filled with nitrogen (an inert gas), which will work as a buffer between the air and the gas. When adequate separation has been provided by nitrogen, the natural gas is introduced from one end (Danish compressor station). At the opposite end, the air and nitrogen will be discharged through an air silencer or flare, until gas content/traces are detected (Polish receiving terminal).

4.2.4 Operation

The expected pipeline life is 50 years. During that period, constant supervision of the gas transfer as well as scheduled and unscheduled checks and works related to maintenance will be carried out.

During the pipeline operation, technical operations will be conducted with the purpose of ensuring the integrity of the pipeline, and in particular maintaining the proper pressure and securing the infrastructure.

5. HSE MANAGEMENT SYSTEM

5.1.1 HSE management system for the project

The Project has adopted OHSAS 18001 Occupational Health and Safety Management System and ISO 14001 Environmental Management System as the basis for the management of Occupational Health Safety and Environmental in projects.

The Project HSE Plan identifies the necessary Project health, safety and environmental related processes and activities, extending throughout the design activities, procurement, manufacture, construction, installation and commissioning phases.

Complementary to this plan will be the Contractors' health, safety and environmental management plans, which will demonstrate the details of how the Contractors will meet the requirements outlined in this document, and specifically detailed in their respective contracts. Contractors will be required to produce their own HSE Plans prior to the commencement of any worksite activities