German Corridor Project SuedOstLink – Challenges in Technology, Planning and Logistics

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ABSTRACT

The German HVDC Corridor Project SuedOstLink breaks new ground and has some unique features in several aspects: it is one of the world's longest HVDC underground connection, the operating voltage was never applied before to extruded HVDC cables, the innovative HPTE isolation material was never used before for HVDC cables, and the applied licensing process was newly introduced for infrastructure projects in Germany. This paper presents some challenges regarding technical, logistical, and planning aspects and gives some hints, how those challenges were overcome.

KEYWORDS

German corridor, HVDC, cable, logistics, planning, SuedOstLink, licensing

INTRODUCTION

SuedOstLink is one of the German HVDC corridor projects, designed to transmit electrical energy generated by regenerative sources in the North and East to the power consumption centres in the South of Germany. The transmission system operators mandated to design, procure, build, and operate are TenneT in the southern part and therefore in the federal state of Bavaria and 50hertz in the remaining parts.

Its nominal DC voltage is 525 kV and it is built in the area of TenneT's responsibility entirely with extruded underground cables. The nominal transmission power of an HVDC system is 2 GW. Meanwhile, the SuedOstLink project consists of two project parts (Project 5 and Project 5a) and consequently also of two HVDC systems. The two southern HVDC converters are located near the city of Landshut, close to the nuclear power plant "Isar" which last active block was shut down in April 2023. The northern converter for Project 5 is located close to the city of Magdeburg (Wolmirstedt), the converter for Project 5a even farther North, close to the Baltic Sea and in vicinity of the city of Schwerin (Klein Rogahn).

At the time of writing, SuedOstLink is in the final planning phase: before or during, depending on the route section, handing in the so-called plan approval documents. After plan approval, which is expected in 2024 the construction phase will begin and commissioning of the HVDC transmission system for Project 5 is planned end of 2027. Due to the needed additional transmission lines in the North of Germany, the commissioning for Project 5a is planned in 2030.

Fig. 1: Overview Map

TECHNICAL CHALLENGES

To transmit a maximum of 2 GW over such long distance it is beneficial to use a cable system at a higher operating voltage of 525 kV compared to what can be considered as state of the art for extruded cables and with a large copper conductor cross-section of 3000 mm^2. The grounding of the metallic screen will take place at the relevant joint bays via single wire bonding lead cables, which will be connected to link-boxes.

The overall length of the transmission lines is more than 530 km as well as more than 750 km for Project 5 and 5a respectively, as shown in Fig. 1. Project 5a runs in parallel in the southern route part and consists of an extension to the north which reaches close to the Baltic Sea. TenneT's responsibility to plan and build the cable system is limited to the southern part of the projects within the border limits of the state of Bavaria, as indicated with the dashed line in Fig. 1.

Each project consists of two 525 kV cable poles with positive and negative polarity (rigid bipole configuration)