



World's Longest XLPE Subsea Power Link Sweden/Lithuania

Project Overview

AP Sensing's fiber optic sensing technology was selected to monitor and protect the world's longest XLPE subsea power link, the NordBalt Link. Our reliable and robust Distributed Temperature Sensing (DTS) system for power cable monitoring is monitoring parts of the link, which has a total length of 450 km. The cable link was produced by ABB Karlskrona and comprises of a 400 km submarine route. The 300 kV DC subsea cable will connect to deliver power from Sweden to Lithuania with a total capacity of 700 MW, providing a significant portion of the Lithuanian population with energy.

Due to the economic and political importance of the project for both Northern Europe and the Baltic states, reliability and security were the key criteria for the selection of a fiber optic-based DTS solution for the power network operators Svenska Kraftnät and Litgrid.

Solution

Three DTS units were installed to monitor the NordBalt Link, one each in Klaipeda, Lithuania, and Nybro, Sweden with rack cabinet integration, and the third in Arby, Sweden as a remote DTS system in a compact wall mountable housing for minimal equipment installation footprint in the substation. All

systems utilize single-mode fibers that were previously integrated in the offshore power cables. For the onshore power cable, external telecommunication fiber optic cable is utilized to monitor the condition of the buried power cable. The Lithuanian and Swedish site installations work independently and separately, without the transfer of data from one site to the other.



Background

- Nord Balt Link: 450 km subsea power cable connecting Sweden and Lithuania
- Delivers 700 MW, supplying much of Lithuania's energy
- Reliability and security were key for operators Svenska Kraftnät and Litgrid



Solution & Benefits

- 3 DTS units monitor land and subsea cables independently
- SmartVision enables real-time monitoring and predictive maintenance
- Ensures stable, secure energy delivery in tough conditions



Figure 1: Power Link connecting Lithuania and Sweden

Installation

For the installation at the Swedish site, one 20 km DTS unit with one channel is in use within the main ca 15-minute measurement time. The measurement fiber between Nybro and Arby has been terminated in the middle so that measurements from both sides can take place. In addition, the second channel of the interrogator unit located in Arby, which is measuring towards the sea, has been terminated approximately 5 km into the sea.

At the Lithuanian site, one 30 km unit with one channel installed within a rack is in use. The DTS unit monitors both land and sea cables. The fiber was terminated 15 km behind the beach joint at the Curonian Spit.

SmartVision

AP Sensing's software SmartVision is ideal for the requirements of this project. It provides multiple operators at multiple locations with a graphic overview of all temperature and information for the power infrastructure in real time.

Both partners have independently working SmartVision systems and can define alarm zones and alarm levels individually. SmartVision's Graphical User Interface (GUI) is intuitive and historical data is saved and used for preventive maintenance.

Conclusion

The NordBalt Link project demonstrates how AP Sensing's advanced fiber optic sensing solutions provide reliable and robust monitoring for critical infrastructure under challenging conditions. By ensuring precise temperature monitoring and offering real-time insights through SmartVision software, our systems enhance operational safety, enable predictive maintenance, and support the seamless delivery of energy between Sweden and Lithuania. This collaboration underscores the value of fiber optic technology in securing the stability and efficiency of vital power networks on a global scale.



Figure 2: Power Installation of the DTS system at the Lithuanian site