

May 16 2019

Sumitomo Electric Industries, Ltd.

Sumitomo Electric Completes HVDC Cable Projects in Europe & Japan

Sumitomo Electric Industries, Ltd. is pleased to announce the completion of two high-voltage direct current (HVDC) interconnector cable projects using crosslinked polyethylene (XLPE) insulated cables:

- **400-kV NEMO Link connecting the United Kingdom and Belgium, contracted with NEMO Link Limited through J-Power Systems Corporation,*¹ a subsidiary of Sumitomo Electric.**
- **250-kV Hokuto-Imabetsu HVDC Link connecting Hokkaido and Honshu, contracted with Hokkaido Electric Power Company (HEPCO).**

With the increasing capacity of renewable energy sources and the necessity of long-distance power interconnectors for efficient use of such renewable energy between countries and regions, HVDC cable technology, which is suitable for long-distance power transmission, has been gaining significant attention in international markets.

In support of this trend, Sumitomo Electric has recently completed the construction of a 400-kV HVDC XLPE cable system, the highest voltage in the world for an HVDC-XLPE cable system, for NEMO Link, which connects the UK and Belgium.

Sumitomo Electric has also completed construction of the Hokuto-Imabetsu HVDC Link with 250-kV HVDC XLPE cable, which will increase transmission capacity between Honshu (Japan's main island) and Hokkaido (Japan's northern island) along with the existing circuit for the Hokkaido-Honshu DC Interconnector that commenced commercial operation in 2012. The route length of this HVDC cable system is the longest in the world for an inter-strait tunnel.

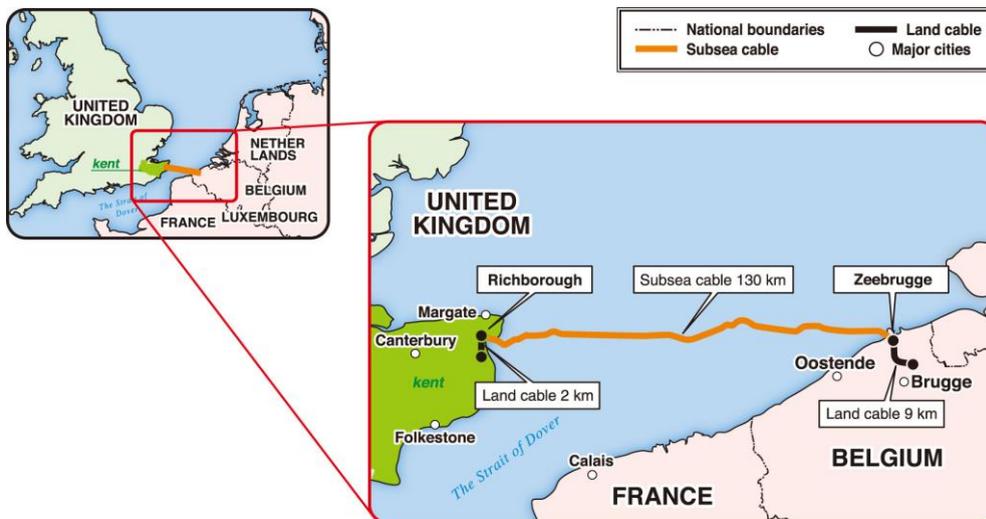
In addition to these recently-completed HVDC projects,

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Sumitomo Electric is currently constructing the first HVDC cable system in India. Sumitomo Electric will continue its endeavour to lead the global market by utilizing the Company's state-of-the-art HVDC cable technologies and experience in large-scale projects.

Construction of 400-kV HVDC XLPE cable system connecting the UK and Belgium

In Europe, with the aim of achieving efficient use of energy and security of energy supply, electricity interconnectors connecting countries are playing significant roles. NEMO Link, a joint venture between National Grid in the UK and ELIA in Belgium, initiated a project to connect Kent in the UK and Zeebrugge in Belgium with an HVDC cable system. Sumitomo Electric secured an Engineering, Procurement and Construction (EPC) contract for the interconnector project in June 2015.



▲ Construction route of HVDC Subsea Interconnector Cable

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This project was the first in the world to adopt 400-kV DC XLPE insulated cable.*² Production and installation of the cable system was completed in December 2018, and since the end of January 2019 the system has been in commercial operation. In April 2019, Sumitomo Electric announced that all necessary procedures toward completion of the project have finished. The commencement of operation of the system marks the successful installation of the world's first 400-kV HVDC XLPE cable system.



Project outline

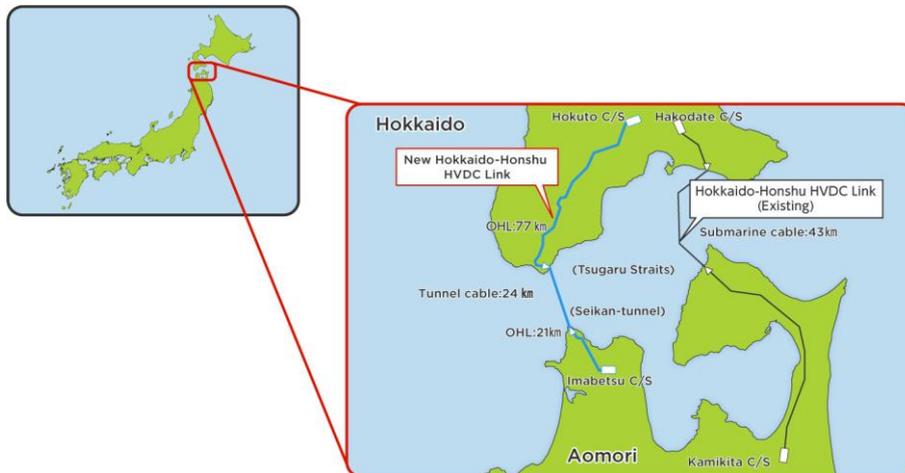
Transmission capacity	1,000 MW
Total route extension	141.5 km (submarine: 130 km, land: 11.5 km)
Type of transmission line	Cable (no OHL)
AC-DC conversion	Voltage-sourced convertor (VSC)
<i>Pole structure</i>	Symmetrical monopole

*1 J-Power Systems Corporation is a subsidiary of Sumitomo Electric. It transferred the transmission cable and conductor business to Sumitomo Electric in 2016. All new contracts since then have been directly handled and executed as Sumitomo Electric.

*2 XLPE stands for crosslinked polyethylene. Conventionally, mass impregnated cables using highly viscous insulation oil have been utilized for HVDC projects. In recent years, XLPE insulated cables have been commonly adopted due to their high allowable operating temperature and growing environmental concerns. Until the completion of this project, the maximum voltage for commercially used HVDC XLPE insulated cables was 320 kV.

Installation of the 250-kV HVDC XLPE cable system for a new Hokuto-Imabetsu HVDC Link

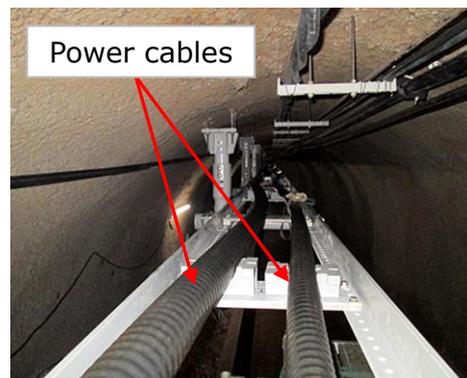
To secure a stable power supply between Hokkaido and Honshu, HEPCO has constructed the new Hokuto-Imabetsu HVDC Link (300 MW), connecting Hokuto Converter Station in Hokkaido and Imabetsu Converter Station in Honshu, in addition to the existing Hokkaido-Honshu Interconnection Line. The commercial operation started on March 28, 2019, increasing the total transmission capacity between Hokkaido and Honshu from 600 MW to 900 MW.



▲ Construction site of the Hokuto-Imabetsu HVDC power trunk line

This interconnector features voltage-sourced converters (VSC) and cable installation in the Seikan Tunnel (a subsea railway tunnel). Among 122 km of overall transmission line, Sumitomo Electric supplied and installed about 24 km of 250-kV HVDC XLPE cables, which were connected to the overhead transmission lines that were also supplied by the Company at both onshore ends.

Although there were challenging situations during cable installation inside the subsea tunnel, Sumitomo Electric delivered the system on time. This HVDC cable system is the longest in the world for a strait tunnel. For the HVDC link, Sumitomo Electric also supplied 98 km of overhead conductors and provided technical



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support for the overall transmission line installation.

Project outline

Transmission capacity	300 MW
Route extension	122 km (24 km in subsea tunnel, 98 km outside of tunnel)
Installation route	In the Seikan Tunnel
AC-DC conversion	Voltage-sourced convertor (VSC)
Pole structure	Asymmetric monopole

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■ Reference

Sumitomo Electric's Website

<https://sumitomoelectric.com/>