An MgB_2 superconducting cable for very high DC power transmission

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Abstract

Superconducting power cables represent a recent innovative development for high-capacity underground transmission. Their promise lies principally in their high efficiency associated with a small size and with potential advantages in terms of environmental impact. Within the BEST PATHS European project, the DEMO 5 demonstrator aims to illustrate the technological maturity of superconducting HVDC links for operation in the grid. At the same time, this demonstrator is also a first attempt to employ MgB_2 as a superconductor for HVDC cables. More concretely, DEMO 5 aims to develop a monopole superconducting cable designed to operate in helium gas at 10 kA and 320 kV, corresponding to a transferred power of up to 3.2 GW. The project is coordinated by leading cable manufacturer Nexans and encompasses expertise from transmission system operators, industry, and research organizations. Thus, in addition to the design, development, optimization, manufacturing and testing activities, special attention will be devoted to studying the integration of a superconducting link into the future transmission grid and to assessing the availability and economic viability of the system. An overview of the project will be presented at the meeting, including the main tasks and challenges ahead as well as preliminary results after one year of activity.