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M3Or4N-05: [Invited] Development and Impacts of a Superconducting Power Cable in a 110kV Distribution Network

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A sub-transmission technology using 2G HTS wires with high engineering current density is developed in the SuperLink project. The goal of the project is to supply a versatile and easy-to-install 110 kV power-link adapted to the conditions in city areas such as Munich, Germany. The realization of power links of 500 MW over 10-20 km lengths requires high performance in the AC loss of the HTS conductors, strong and compact cryogenic dielectrics and energy-efficient thermal insulation. This work presents the basic designs concepts of the SuperLink Cable as well as a deep investigation of its effects in the 110 kV network. Load flow calculations were performed considering the network operation under different load and feeding scenarios. In order to evaluate the results, the loading of the lines, as well as voltage stability and short circuit current levels were analyzed. It was found that the SuperLink cable contributes not only to the relief of overloaded cables but also to the overall decrease of the losses in the network.

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