

## Strengthening Future Electricity Grid of the Netherlands by Integration of HTS Transmission Cables

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**Abstract** - The electricity grid of the Netherlands is changing. There is a call of society to use more underground cables, less overhead lines (OHL) and to reduce magnetic emissions. At the same time, parts of the future transmission grid need strengthening depending on the electricity demand in the coming decades [1]. Novel high temperature superconductor (HTS) AC transmission cables can play a role in strengthening the grid. The advantages as compared to alternatives, are: economic, underground, higher power capacity, lower losses, reduced magnetic field emissions in (existing) OHL, compact: less occupation of land and less permits needed, a possibility to keep 380 kV voltage level in the grid for as long as needed. The main obstacles are: the relatively high price of HTS tapes and insufficient maturity of the HTS cable technology. In the paper we focus on a 34 km long connection in the transmission grid (to be strengthened in three of the four of TenneT scenarios [1]), present the network study results, derive the requirements for corresponding HTS transmission cable system and compare HTS system to the alternatives (OHLs and XLPE cables).

**Keywords** - Electricity grid, AC transmission cable, HTS cable