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HTS cables today.

Until today more than 24 significant projects of High Temperature Superconductors (HTS) cables have been already carried out in less than 20 years (20 AC and 4 DC) with the contributions of at least 6 cable companies or cable developers around the world

The technology is now out of the research fields and become industrial and mature. Beside the already installed, some ongoing projects have started in the last years and will be soon in exploitation in the grid. Some examples of new references can be found below:

1. Yongin : MV HTS cable system transmitting 50 MVA completed in 2020 (Korea).
2. Chicago : MV HTS cable system transmitting 62 MVA commissioned in 2021 (USA).
3. SuperLink : HV HTS cable system transmitting 500 MVA with long term test to be finished in 2023 (Germany).
4. Shanghai : MV HTS cable system transmitting 135 MVA installed in 2021 (China).
5. SuperRail : DC HTS cable system transmitting to be installed in Paris in 2023 (France).

HTS DC cables specificities

DC HTS cable can transmit huge power with reduced environmental impacts that will contribute to reach the reduction of CO₂ emission both from its production and from its operation.

- Reduced raw material needs (especially copper and aluminium)
- Very reduced losses
- No EMF and no thermal impact

HTS cables need a very limited civil works or space footprint that makes such technology desirable to energize urban areas or for very long transcontinental links

Cigré TBs on DC HTS cable systems:

TB 229 and TB 538 brochures published in 2003 and 2013 have been necessary to pave the way for the deployment of AC HTS cable. they have been followed by the IEC standard 63075 released in 2019 that is used today.

General interest of grid operators for DC system has increased during the last years and a special attention was carried out on HTS DC systems due to significant savings of the transmission system CAPEX and OPEX (contribution 1181 of CIGRE Symposium in Ljubljana in 2021).



Recently, TBs on DC systems have brought the community to a higher level of maturity, the combination of experience acquired on DC and HTS cables will reduce the effort to finalize a TB for DC HTS cables.

A CIGRE working group is a pre-requisite to agree upon the qualification tests for DC HTS cable systems to prepare in an acceptable time frame the standards, at the initiative of the TC90 and TC20, that will give grid operators confidence of this solution.