

Design studies for French submarine links

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RTE will develop in the next years several submarine links, HVAC and HVDC:

- Already two calls for tender have been launched by the French energy regulation commission to develop the offshore wind farms along the French coast. RTE is responsible for the building, operation and maintenance of the HVAC export cables (6 power plants of 500 MW each are to be connected between 2018 and 2023).
- A new interconnection with England is foreseen to be built by 2020, this interconnection will be an HVDC link
- An HVDC link in south-east of France is foreseen to be built by 2021, this national connection will run along the Mediterranean coast by the sea.

Further projects of submarine links are listed in the 10-year development plan of RTE.

RTE is carrying out design studies in order to define the best technico-economical features of these future links (AC or DC, number of links, voltage level, current rating, etc.). Design criteria are numerous and this paper focuses especially on:

- The design criteria in regards to the state-of-the-art of submarine cables technologies,
- The design criteria at the landfall part, which is the thermal bottleneck of the submarine.

Regarding the first bullet, technico-economical studies have been conducted to define the technological choice of each submarine link, taking into account the state-of-the-art of the HVAC and HVDC submarine cable technologies. The present paper explains the different results obtained.

RTE has performed many engineering studies for these links and some studies are still on-going. For the landfall part, the paper describes the main issues and how RTE imagines handling those regarding thermal aspects and installation:

- Feasibility of the installation in trench or HDD
- Fault containment
- Pulling efforts
- Thermal resistivity of soil
- Burial depth
- Cable characteristics and calculation methods
- Correlation with electro-technical studies (reactive power management for HVAC links for instance)