O&M and design challenges of floating wind farm power cables

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ABSTRACT

RTE is currently in charge of the connection of floating wind pilot projects to the onshore existing transmission network, which requires the implementation of dynamic cables capable of withstanding movements of the floating structure, swell and sea currents. Design, O&M challenges and future developments for these type of connections are presented in this article.

KEYWORDS

Floating wind farm, Dynamic cable, Marine growth, Strain monitoring, DSS, spare-parts.

CONTEXT

Today: connecting pilot floating wind

In 2015 the French State initiated a call for projects for four floating wind farm pilot projects: one in Atlantic Ocean and three in Mediterranean Sea. In 2016, the project developers were awarded.

RTE's mission is to connect these wind farms to the onshore electricity network, in order to transport the energy produced to the consumption areas. These pilot wind farm connections are a key step for RTE to validate the technical solutions that will be deployed on future commercial wind farms for which call for tenders are expected from 2021.

Located between 15 and 30 km from the coast, these four pilot wind farms of approximately 25 MW each, will be connected to the existing network by submarine and underground power cable over a total distance of 20 to 35 km and under a nominal voltage of 33 to 66 kV.

Commissioning is expected in 2021.

Tomorrow: towards mutualization of connection of commercial floating wind

Since the law of 30 December 2017, the French State has entrusted RTE with the financing and realization of the connection of the next commercial wind farms, including the offshore transformer substation.

This major regulatory change, inspired by the best standards in force in the North Sea, will enable RTE to fully participate in the success of French ambitions in the development of marine renewable energies.

This reform, by clarifying the role of RTE, will simplify the development of future projects and help reducing the time and cost of developing offshore wind farms. RTE will also be able to build hubs at sea, making it possible to pool the connection of several parks located in the same area. A particularly interesting solution for floating wind farms, entitled to move further away from the coast.

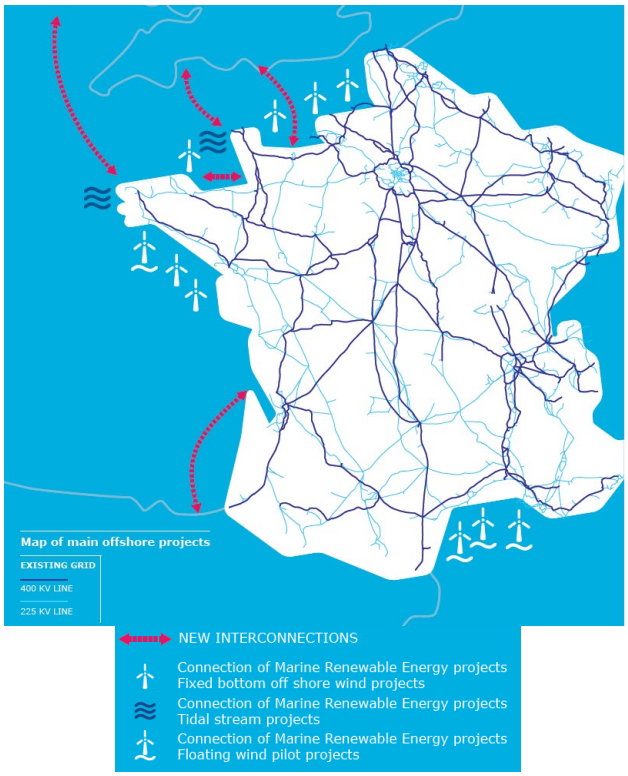

Fig. 1: Map of main RTE offshore projects including connection of four floating wind pilot projects

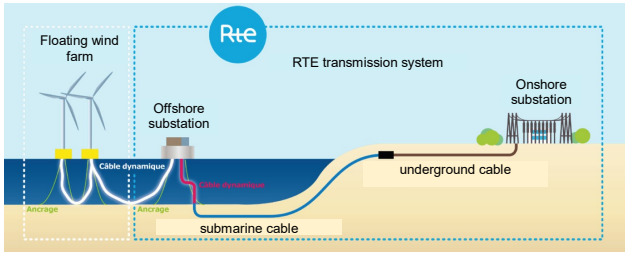

Fig. 2: Principle of connection for future commercial Floating wind

THE DYNAMIC CABLE

Cable connection to floating structures requires the development of dynamic cables capable of withstanding movements of the floating structure, swell and sea currents.

Design and O&M challenges for these specific type of cable connections are described and presented in the following sections.