R&D innovates offshore: RTE supporting the expansion of offshore renewable energies

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**THE SEA: INNOVATION OPPORTUNITIES FOR RTE**

RTE is actively involved in monitoring and R&D on the subject of submarine connectors. More specifically, we apply the expertise we have acquired in the monitoring of onshore connectors to projects run by France Energie Marine, such as the STHYF project (stability of seabed cable stability) or the OMDYN2 project (behaviour and modelling of dynamic cables for the connection of floating wind turbines), involving many subject-matter experts.

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**TOMORROW: WORKING TOWARDS THE STANDARDISATION OF FUTURE POWER GRID CONNECTIONS**

Since the enactment of legislation on 30 December 2017, the State has commissioned RTE to finance and establish grid connections for future commercial generation facilities. These connections will also include substations located on offshore platforms.

Driven by the highest standards being applied in the North Sea, this major legislative change will ensure that RTE plays a pivotal role in achieving France’s ambition to become a key player in the offshore renewable energy sector.

By specifying RTE’s role, this reform will simplify the running of future projects and will help to reduce time frames and costs incurred by the development of offshore generation facilities. RTE will also be able to establish offshore hubs, making it possible to connect a number of generation facilities located in the same area. This is a particularly viable solution for floating wind farms – which are increasingly having to move further away from the coast – or for tidal power plants, given the particularities of the highly concentrated sites near to the coast.

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**CONNECTION DIAGRAM - INSTALLED WIND TURBINE**

FOR FURTHER INFORMATION: [rte.france](http://rte.france)  info@rte_france  [www.rte-france.com/en](http://www.rte-france.com/en)

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INFO

RTE is also involved in projects entailing the adaption of Oil & Gas methods (JIP Capability driven by Wood) to submarine connectors, as well as in ANR’s (Agence Nationale de la Recherche) EMODI project (offshore energy grids monitoring and diagnosis). In addition to these front-end activities, RTE shares good practices with its suppliers and peers in order to compile international guidelines and reference standards. As well as taking part in various working groups, RTE also runs a newly established Task Force (TF B1.63) on specifications and HVAC dynamic cables of more than 36 kV.
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RTE is getting ready to build tomorrow’s (sub)marine platforms

With a view to connecting future tidal (or floating) generation facilities, RTE is undertaking an R&D study to assess the feasibility of what would be the world’s very first high-capacity submarine substation.

The concepts being developed by RTE are based on a two-pronged approach: «integrated» and «modular». In both cases, these architectures comprise one «A» high-voltage busbar, one power transformer (sealed enclosure or submarine technology) and one «B» high-voltage gas-insulated substation. These modules would measure up to 30 m in length and 15 m in diameter with a weight of 6 000 tons.

Depending on the design concept, submarine connectors are also included in this study (dry-mate, wet-mate or penetrator).

RTE has also assessed the full cost (investment and operation) over a 25-year period, factoring in a degree of uncertainty that is consistent with an R&D phase.

Maintenance costs were estimated following a reliability study that identified major failures requiring the recovery of some or all modules in challenging but realistic outdoor conditions.

In addition to this innovative solution, RTE is also looking into «conventional» connection methods using floating platforms.

R&D survey on submarine platforms:
• 500-MW farm (two hundred and twenty-five 2 MW@33 kV turbines),
• onshore connection voltage of 225 kV or 90 kV,
• 95% capability factor over a 25-year period,
• no need for humans to perform underwater maintenance,
• significant wave height (8.5 m),
• installation depth of 50 m and current velocity of 3.5 m/s.

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