



Most European offshore wind farms are currently installed within 20 km of the coast in shallow water depths up to 20m. The next generation will be developed at distances of 40 km in sea depths up to 80m. These new locations present technical challenges for engineering and the possibility of new synergies between all marine renewable energy resources including wave, tide and wind. The WetMate consortium delivered a prototype 33kV hybrid wet-mate connector with a connectivity monitoring system and future-proof features for higher voltage connector technologies.

This will lead to efficient power transmission, reduced installation and maintenance costs and precision remote monitoring that reduces routine maintenance and intervention by divers, benefitting health, safety and affordability.

The operational requirements for the WetMate connector have been quantified. It is concluded that the nominal current carrying capability of the mating construction is to be increased from 500A to 650A at 33kV.

A variety of candidate insulating and conducting materials for use within the WetMate connector were evaluated to determine the electrical properties of the insulators. The conclusion was that to ensure the health of the insulation system, it will be a requirement to include a moisture level monitoring system, to ensure a low content of water in the apparatus during operation.

A new strategy for environmental monitoring and wireless communications has been considered and a health monitoring system has been developed in a very low power form maximising the chances of being able to both scavenge sufficient power from the electric field and as such simplify the installation without impacting on the end users cable, maintaining the pass through ideal of the connector.

A prototype connector has been manufactured to prove it's mating and demating capabilities and a standalone flushing rig to mimic the design in the final connector has also been designed, built and tested.

Laboratory tests suitable for high voltage test of the connector in dry condition were carried out. The occurrence of PD just above nominal voltage means that high voltage withstand tests at slight or high over voltages at this time are not recommended. After modifications in design or mating procedure the connector should be PD free.

Two different environmental monitoring and wireless communications have been developed and one has been tested with the communication web platform whilst the other has been tested underwater to prove that the communication is possible at depths of 50 metres.

A number of dissemination activities have been completed by the partners and an exploitation plan and agreement formulated has been accepted by the SME partners.

The project partners in this exciting collaborative project are:

HydroBond Engineering Limited (SME - Coordinator)

Telephone: +44 1224 822996

Website: <http://www.hydrogroupplc.com/>

Contact Person: Doug Whyte dwhyte@hydrogroup.plc.uk

Nordic Seal AS

Website: www.nordicseal.com

Telephone: +47 33140570

Contact Person: Per Stokkan, ps@nordicseal.com

Fortis Mechanical Design Ltd

Telephone: +44 1229 716689

Website: www.remote-technology.co.uk

Contact Person: Darren Ball, darren.ball@fortis-design.co.uk

Marine Signals

Telephone: +34 (928) 454 953

Website: www.marinesignal.com

Contact Person: paco@marinesignal.com

The UK Intelligent Systems Research Institute Ltd

Telephone: +44 1664 501 50

Website: www.uk-isri.org

Contact Person: David Cartlidge, david.cartlidge@uk-isri.com

Technical University of Denmark

Telephone: +45 45 25 35 15

Website: www.dtu.dk

Contact Person: Joachim Holboell, jh@elektro.dtu.dk