

# Project SEASNAKE will Introduce new Solutions for MV Cables

NKT technology for the ocean energy industry is essential in the transmission of high-quality power with minimal loss. The 24-month SEASNAKE project will address ocean energy affordability, survivability, reliability and installation of Medium Voltage cable systems through simulation, testing and demonstration which aims to reduce capital and installation costs by up to 20%.

SEASNAKE is being funded by Swedish Energy Agency (SWEA), Sustainable Energy Authority Of Ireland (SEAI), Fundação para a Ciência e a Tecnologia (FCT) and Région de Pays de la Loire, Agence de Pays de la Loire (PDL) with co-funding from the OCEANERA-NET COFUND (via the European Commission under Horizon 2020).

An ocean energy array of 100 MW is likely to have several hundreds of units in operation. Collecting the electricity produced in hubs and substations requires a huge amount of array cables and subsequently on higher voltage levels export cables. This is necessary to ensure that as little energy as possible is lost during transmission over long distances to feed green energy to the grid. All the electricity converted by each unit will be transmitted to the hub/substation via medium voltage cables that are exposed to constant loads and risk and present a highly critical component. The effects of maintaining cables of over hundred units in a single array will be a challenge both in terms of material cost and maintenance logistics, impacting the LCoE (Levelized Costs of Energy) severely. Marine growth has a direct impact on the loads that the cable and accessories are exposed to. By introducing an environmental friendly coatings based on I-Tech's biocide, the anti-fouling solution represents the second huge step change in innovation provided by the SEASNAKE project.

As all other industrial sectors, bringing down the LCoE in the ocean energy sector requires teamwork. Innovations and finding the mutual benefits and strengths is key to accelerate the transition to a climate-neutral, green, competitive and inclusive economy, says Johannes Hüffmeier, Project manager at RISE. By bringing together a strong supply chain across Europe, the SEASNAKE project aims to reduce the weight of the cable by introducing a new type of armouring, allowing the cable to move with a high frequency avoiding fatigue damages and still remain functional over a long period of time. The cable will have a smaller diameter than a steel armoured cable, making it possible to save material. It will be lighter and more flexible and thereby easier to install, as well as having a long lifetime even if connected to objects moving with the same frequency as waves on the sea, typically 5,5 million cycles per year.



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The transnational cooperation between France, Sweden, Ireland and Portugal will explore the R&D fundamentals for dynamic cable designs, anti-fouling, test methods and O&M procedures, encouraging exchanges of best practices and lessons learned from established industries:

**Expertise in marine renewable energy** – CorPower, Waves4Power, Seapower and Ocean Harvesting are well established companies in the wave energy sector dating back more than two decades. They bring a deep understanding of challenges faced by wave energy developers to reduce the overall cost of LCOE.

**Cable manufacturer** – NKT has a long track record of installation of offshore cables for the wind sector in Europe and is according to market figures the third largest cable manufacturer and supplier.

**Biofouling expertise** – I-tech is the owner of an approved biocide developed for antifouling purposes and will contribute with their experiences and knowledge to the project. The biocide will be imbedded in a protection layer provided by MWA Coatings. Both I-tech and MWA will cooperate closely with RISE with experience from both LEAF project and Oceanic project will provide expertise support on how to setup tests and as third party validate the results.

**Operation & Maintenance expertise** – Wave Venture is a leading provider of specialised services to the offshore industry. Wave Venture TE software provides combined engineering and financial analysis of installations, operations and maintenance and farm lifecycle analysis.

**Test infrastructure and test expertise** – The cables will be tested at NKT (Sweden), University Gustave Eiffel (IFSTTAR, France) for mechanical properties and in sea to validate biofouling properties at WavEC test site in Portugal and by RISE in Sweden. The infrastructure is well established, and the competences are complementary within the consortia.

**Simulation expertise** – Both Chalmers and Ocean Harvesting will support the project with simulations of the dynamic behaviour of the cable. Chalmers will have the advantage to continue to develop and validate their numerical models and codes for cable mechanics simulations and structural integrity analyses of a variety of power cables.

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