Longer lasting power cables make for greener wind power

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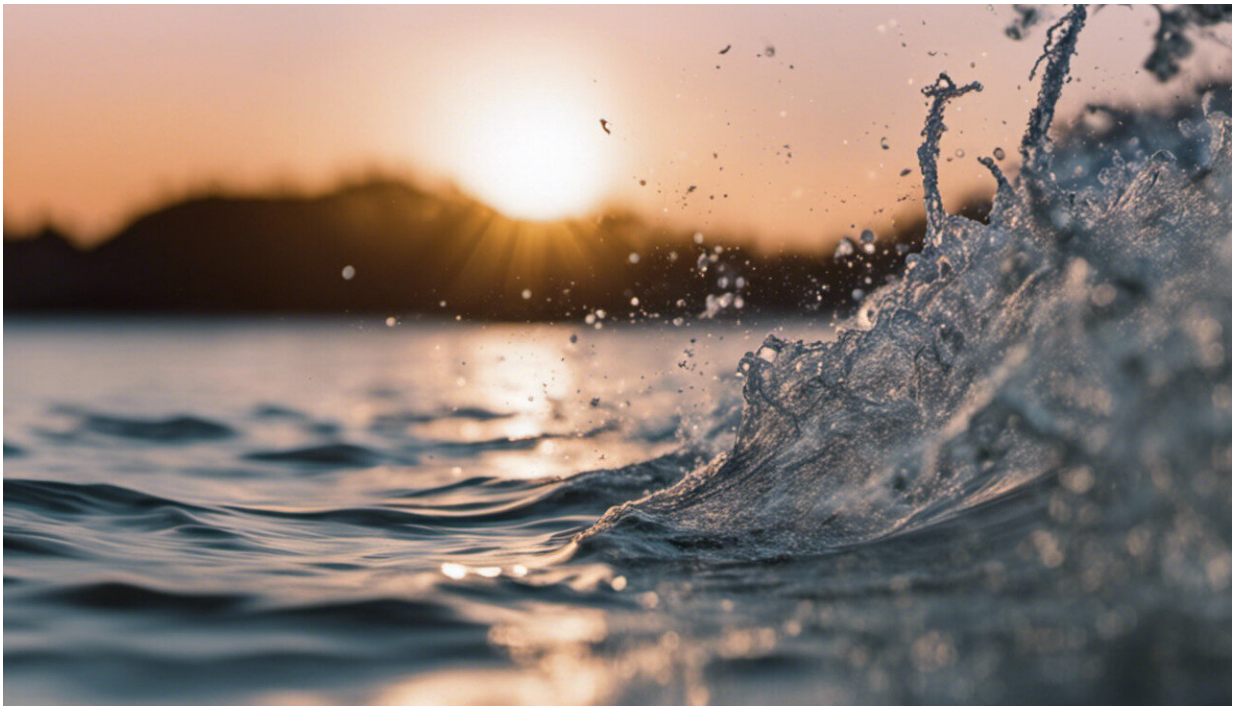

Credit: AI-generated image (disclaimer)

Dynamic cable testing conducted as part of the EU-funded MARINET2 project has yielded promising results for extending the fatigue life of cables used in future floating offshore wind applications. The tests showed that the addition of a device known as a bend stiffener helps power cables survive 3.7 times as many cycles and makes them 72.5

percent stiffer than the power cable alone.

Bend stiffeners are employed in fixed and floating offshore wind farms to protect flexible pipes and subsea cables from overbending. The elastomeric material from which they are manufactured makes them suited to the constant wave- and current-induced motion of dynamic installations. Thanks to their conical shape, bend stiffeners—as their name suggests—gradually increase the overall stiffness of a pipe or cable , preventing overbending at the termination point.

The testing took place at MARINET2 project partner University of Exeter, United Kingdom. The dynamic cable used was designed and manufactured by Hellenic Cables and the bend stiffener by British company CRP Subsea Ltd. The power cable was tested with and without the bend stiffener to compare performance and fatigue.

The performance characterisation testing involved bending the cable to a 3.7 degree angle at the headstock while holding a constant force of 40, 60 and 80 kilonewtons (kN) at the tailstock over a 10-second cycle period. During the fatigue testing, the cable was bent to 4° while holding a constant force of 80 kN. The cycle period was steadily decreased from 10 seconds to 1 second to minimize the overall test duration. George Georgallis, head of Cable Engineering at Hellenic Cables, described the fatigue test results for the power cable coupled with the bend stiffener as "very encouraging" in a news item posted on the "Ocean News & Technology' website.

The benefits of the bend stiffener

"These results are encouraging but expected and explain why the use of a CRP Subsea Bend Stiffener in such a system is critical," observed Principal Design Engineer John Duggan of CRP Subsea. "The CRP Subsea Bend Stiffener material has undergone an extensive and rigorous

material qualification. This along with the comprehensive design methodology, manufacturing, and quality systems have been fully reviewed and approved by Lloyds Register. Our Bend Stiffener is designed to maintain a cable or flexible pipe above a given minimum bend radius in a dynamic application. This, in turn, increases the life of the product by protecting it against damage and fatigue, which can result due to over bending."

Leading ocean energy and technology researcher Prof. Lars Johanning of the University of Exeter spoke about the project's contribution to environmental protection and the economy: "Floating offshore wind power will be a vital component in achieving global Net Zero targets. It will also have a profound effect on the economy in Europe and globally, creating new jobs in the supply chain and providing a key component for the post-pandemic green recovery. We are extremely excited working with innovative companies in the development of subsystems for the floating offshore industry." MARINET2 (Marine Renewable Infrastructure Network for Enhancing Technologies 2) ends in December 2021.

More information: MARINET2 project website: www.marinet2.eu/

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