

## Innovation in floating substructures of high-performance concrete will accelerate the offshore clean energy transition

**PRESS RELEASE:** The WECHULL+ project (Sustainable Concrete Material Leading to Improved Substructures for Offshore Renewable Energy Technologies) is pleased to announce it has been approved by the Clean Energy Transition Partnership (CETP) program, an initiative that will establish industry best practice in new, sustainable, circular and reliable concrete material that is suitable for floating substructures in the offshore renewable energy sector through user cases in wave energy and floating solar. The WECHULL+ project is a 3-year project that brings together a strong value chain with eight partners from five European countries (Sweden, Poland, Netherlands, Spain and Ireland).

Concrete is inexpensive, resistant to marine environment and easy and fast to fabricate on-site (casting), in comparison to manufacturing of traditional steel structures. Concrete is the most used material in the world after water and is also a material with a mature value chain enabling local production worldwide. This is a particular advantage for Offshore Renewable Energy (ORE) installations, often planned in specific sites due to favourable ocean conditions, far from the main supply chains, or being close to islands without connections to the continental energy network. WECHULL+ objectives and activities are based upon excellent results and proof-of-concept from the previous WECHULL project where a new high-performance concrete formulation was developed for Ocean Harvesting's innovative honeycomb buoy design.

The solutions developed by the WECHULL+ project regarding concrete material and modelling will be applicable in all types of floating substructures for ORE installations, and can be used also for other application areas such as aquaculture. Compared to steel and composite hulls, WECHULL+ is expected to result in alternative solutions enabling a reduction of LCOE by 25 - 29% and CO<sub>2</sub> emissions by 70% and 85% respectively compared to today's solutions using steel and composite hull. WECHULL+ will deliver ocean renewable energy technologies using less material due to high-performance concrete, improving the circularity and reducing the carbon intensity throughout the life cycle by using



low carbon formulation with recycled aggregate, increasing the product lifetime and reducing maintenance.

The project will rely on expertise from leading European research organisations (RISE Research Institutes of Sweden, Gdansk University and TUDelft university), offshore test center (PLOCAN) and industrial experts across Europe (Pekabex, Ocean Harvesting Technologies, Carnegie Clean Energy and SolarDuck).

*“Blue economy will play a crucial role in the necessary energy and industry transition towards a circular and sustainable society. This will imply the need of using a tremendous amount of material for marine applications. Providing material solutions for these specific applications which are sustainable, circular and robust is thus of uttermost importance and requires a broad international collaboration. WECHULL+ is one of the pieces allowing us to build the puzzle towards a sustainable blue economy.”*

Olivier Rod, Vice President Material & Production at RISE

*“The deep expertise and experience of Pekabex specialists will help provide valuable solutions in the WECHULL+ Project. The main problem to be solved will be to minimize the weight of the floating concrete buoy while increasing the stresses arising in the buoy structure in extreme storm conditions at sea. We are looking forward to the first models of the prefabricated floating buoy and next steps of this multilateral cooperation.”*

Andrzej Marczak, director of the prefabrication plant in Gdansk.

*“A CETO wave energy converter buoy made of concrete rather than steel has the potential to be cheaper, easier to manufacture in remote locations, require zero maintenance and last longer than the life of the project. We are excited about the opportunity to contribute to the WECHULL+ Project which will work toward these outcomes with a novel, sustainable concrete.”*

Jonathan Fiévez, Chief Executive Officer, Carnegie Clean Energy Ltd



*“Offshore floater solar requires cost-effective durable and low maintenance solutions. The research on the concrete which will be developed in the WECHULL+ project will provide that opportunity for the floating substructures of the SolarDuck.”*

Don Hoogendoorn, CTO at SolarDuck

*“Reducing the use of resources and the environmental impact are critical for the energy transition. We are very pleased to see the honeycomb design of high-performance concrete developed for the InfinityWEC buoy in the WECHull project, being tested in sea trials also for other ORE technologies.”*

Mikael Sidenmark, CEO at Ocean Harvesting Technology

For further information, please contact:  
Pierre Ingmarsson Senior Project Manager  
RISE Research Institutes of Sweden  
[pierre.ingmarsson@ri.se](mailto:pierre.ingmarsson@ri.se)  
+46(0)70 620 52 90

#### Editor's notes:

**RISE Research Institutes of Sweden** is the coordinator and applied research partner of the project. With a staff of over 2.800 and over 70 years of experience working with concrete materials, reliability methodologies and lab testing for different industries. RISE brings their expertise into the WECHULL+ project with the aim to strengthen their industrial capacity in sustainable materials and lightweight structural design.

**Delft University of Technology (Netherlands)** is a world-renowned University with significant expertise in civil engineering and offshore renewables. TUD has a long-term expertise with regards to numerical wave modelling, climate statistics, wave structure interactions, machine learning for metocean data, and techno-economic studies for the benefits of marine renewable energies at local and EU scale. In the WECHULL+ project the Machine Learning (ML) process will be trained with ultra-high-fidelity data and will use a cradle-to-life approach to quantify LCA and societal impacts associated with the design cases. TUD



will contribute to the technical specification of the user cases, integrating the novel designs into the detailed sustainability assessment, including the engineering considerations.

**Carnegie Clean Energy (Ireland)** is the owner and developer of the CETO® technology. CETO is a unique, fully submerged, point absorber type wave energy technology. A submerged buoy sits a few metres below the surface of the ocean and moves with the ocean's waves. This orbital motion drives a power take-off (PTO) system that converts this motion into electricity. CETO uses the latest advances in artificial intelligence and electric machines to optimally control the device to maximize the energy output. Carnegie Clean Energy have a long history in ocean energy with a track record of world leading developments. The CETO prime mover is one of the user cases in the WECHULL+ project.

**Ocean Harvesting Technologies AB (Sweden)** is a wave power company developing the InfinityWEC wave energy converter. OHT was started in 2007 and brings in extensive experience and competence in evaluating and developing wave power technologies, which will be used to provide the project with relevant data and assess the results. Developing the new low carbon high-performance concrete for InfinityWEC's honeycomb buoy was one of the user cases in the original WECHULL project. In the WECHULL+ project, OHT will provide engineering for the integration of the honeycomb design in two other developer's products.

**Gdansk University of Technology (Poland)** is a leading technical and research university in Poland. The Faculty of Civil and Environmental Engineering at GUT gathers research teams developing technologically advanced solutions in the field of characterization and modelling of innovative materials for civil engineering. In the WECHULL+ project, Gdansk University will focus on developing predictive numerical tools to simulate the behavior of newly designed circular materials.

**SolarDuck (Netherlands)** is building the world's leading offshore floating solar company while offering societies access to affordable renewable electricity, through the delivery of turnkey and profitable offshore floating solar solutions. In the WECHULL+ project,



SolarDuck will evaluate floating substructures with high-performance concrete for their platform.

**Plataforma Oceánica de Canarias (Spain)** is a public research entity, recognized as a ICTS (unique scientific & technical infrastructure) by the Spanish Science ministry. PLOCAN manages a unique infrastructure, including a hash lab and an ocean test site, and provides auxiliary services, devoted to the development of ocean R&D with focus on the sustainable and responsible use of the marine resources.

**Pekabex (Poland)** is an international construction company: a leading manufacturer of prefabricated structures, general contractor and developer with extensive experience in design, production, assembly and comprehensive construction and investment services. Established in 1972, it currently employs over two thousand specialists in offices, factories and construction sites in Poland, Germany and Scandinavia.

