

Ocean Harvesting commissions test-rig for InfinityWEC power take-off with instant force control capabilities

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Ocean Harvesting Technologies (OHT) has commissioned a Hardware in the Loop (HIL) test rig at scale 1:10 to validate the InfinityWEC power take-off (PTO) with instant force control capabilities.

The test rig simulates the buoy motion with force feedback from the PTO system, and will be used to validate the complete functionality of the PTO and control system as in a complete WEC for real sea conditions. The functionality includes (i) instant force control capability in combination with efficiency and constraint-aware predictive control, amplifying energy capture, and (ii) a soft two-stage end stop, holding the buoy submerged through the crest of large waves to ensure both survival and continued, reliable power production even in the harshest conditions. The test rig will later be used as a platform to develop and evaluate AI-based control strategies and design principles, to further refine InfinityWEC's capability to capture maximum power from each wave. The project is co-financed by the Swedish Energy Agency and will be completed by February 2022.

The developed control system will be used in the sea trial of a complete InfinityWEC system at scale 1:3, to take place on the Swedish west coast. The sea trial project is planned to start in 2022 and key suppliers are Sigma Energy & Marine, Acumo/NSK, and Beckhoff, among others. RISE Research Institutes of Sweden is partnering in the project and will be responsible for validation of the integrity of the hull that includes sustainable high performance concrete and biofouling as outcomes in the research project WEChull, financed by the Swedish Energy Agency.

The sea trial in scale 1:3 will demonstrate that InfinityWEC is on track towards LCoE 100 EUR / MWh at 100 MW installed capacity and < 35 EUR / MWh at 5 GW installed capacity. System performance will be tested in real sea conditions and results will be used to validate and calibrate the simulation tools to predict energy yield, ownership cost, affordability, availability and process efficiency. The commercial-scale single device demonstration is planned to start in 2024, to be followed by array installations on commercial terms. The road map to commercialization follows the staged development process recommended in the Ocean Energy Systems (OES) framework, a technology collaboration program by the International Energy Agency (IEA).

OHT is, furthermore, performing a feasibility study on how a wave farm installation could provide electricity to one of Lundin Energy Norway's oil & gas platforms. The study includes sizing and specification of the wave farm, energy storage, handling procedures and a life cycle cost assessment. OHT also participates in three joint industry collaborative projects led by RISE: WEChull (hull materials), Seasnake (dynamic power cables) and NextWave2 (sensor technology and algorithms for wave prediction).

OHT's technology is protected by five patent families filed since 2017, covering all vital aspects of the power take-off and control system, the buoy design and general arrangements.

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About Wave Power

Wave power offers a vast unexploited renewable energy resource, expected to become an important part of the future energy mix. Compared to wind and solar it is more continuous, improving the balance between electricity supply and demand and reducing the need for energy storage.

Wave power does not compete for the same resource as wind and solar. Co-location with wind power offers:

- Increased energy production per used sea area
- More stable power supply with less intermittency
- Shared infrastructure and operations

About Ocean Harvesting Technologies AB

Ocean Harvesting Technologies (OHT) is developing InfinityWEC, a novel breakthrough wave energy converter (WEC) with an advanced power take-off (PTO) and control system, which tunes to the waves to efficiently extract energy in all wave conditions. InfinityWEC has a passive end-stop function that ensures reliable production and survival in the harshest conditions. The excellent performance and reliability, combined with a modular design, where all critical parts are easily transported, installed and maintained, make InfinityWEC a very competitive solution for the future global energy market.

OHT is a privately held company with offices in Karlskrona and Gothenburg, Sweden.

About InfinityWEC

After years of research within the wave energy sector, OHT started in 2017 developing the InfinityWEC concept, a point absorbing type WEC.

Compared to wind- and solar power, InfinityWEC offers:

- Low cost of energy production, <35 EUR/MWh at large scale deployment
- Smoother power output, which contributes to improved balancing of the grid
- 5-10 times more energy output per sea area
- Lower visual impact, with buoys in the water line

What makes InfinityWEC so competitive is the advanced power take-off system, which gives maximum energy production from every individual wave. Furthermore, a unique survival function holds the buoy submerged through the crest of large waves, and power can be produced also in the most severe wave conditions. In contrast, other wave power technologies typically shut down power production in larger waves, the same way wind turbines do in high wind speed.

The buoy floating on the water surface is constructed with a honeycomb structure consisting of concrete wall s and cells filled with expanded polystyrene (EPS), providing a very strong, light- weight, unsinkable, corrosion resistant, production friendly and low-cost buoy.

The entire InfinityWEC system is built with commercial of-the-shelf (COTS) systems, engineered for mass production, effective logistics and sustainability.

Read more: www.oceanharvesting.com