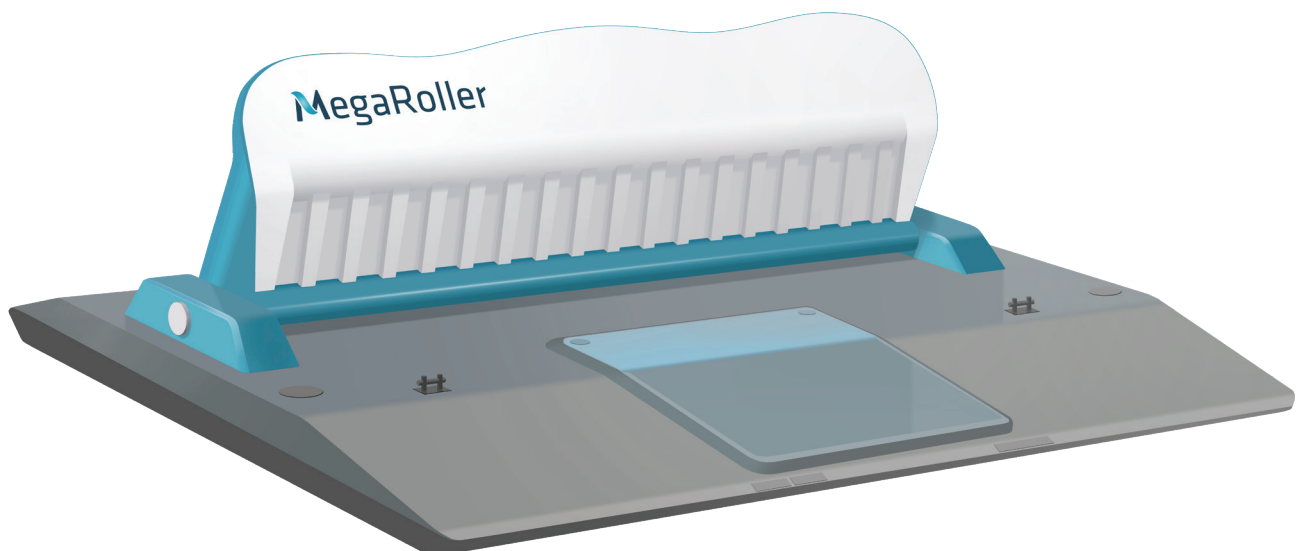


MegaRoller

Developing the PTO of the first MW-level Oscillating Wave Surge Converter

The MegaRoller project will develop and demonstrate a Power Take-Off (PTO) for wave energy converters. The PTO is developed in conjunction with oscillating wave surge converters (OWSCs), a class of wave power technology that uses bottom-hinged plates oscillating in pitch following the surge movement of the water particles in the nearshore zone (10m-25m water depth).



The project shall develop and demonstrate a Power Take-Off for wave energy converters with the following characteristics;

- Increased performance
- Increased reliability
- Decreased costs
- Improved power quality

In the long term, a 40,000 MW roll-out of MegaRoller power plants can generate 400,000 jobs by 2050 and 110M tons / year CO₂ savings in Europe only.

Objectives

The development and demonstration of the PTO for a 1MW OWSC device is based on multiple hardware innovations (modular design, twin drive trains, intelligent cylinders, standardized central power unit and novel accumulator arrangement) and software innovations (wave-by-wave prediction, wave-by-wave damping control, advanced efficiency control, energy storage control, supervisor controller). The project will therefore generate extensive know-how in the area of PTO design and PTO control systems, with the aim to decrease the LCOE of next generation OWSC devices.

Industrial impact

The project will generate extensive know-how in the area of PTO design and PTO control systems, with the aim to decrease the LCOE of next generation OWSC devices below €150/MWh. The developments will combine hardware improvements designed to increase reliability, power density and power quality with algorithm improvements designed to improve power capture and power conversion efficiency, including in multi-PTO (array) scenarios. The methodologies used in the project (such as wave-by-wave damping control and prediction, standardized power units) will be applicable to many other Wave Energy Converter (WEC) types and generate new standards (algorithms) for PTO control.

Societal impact

The project is expected to save 4.4M tons CO₂/year on 2030 (based on an initial deployment of 20 arrays) and 517M tons CO₂/year (based on a global roll-out of 2,000 arrays by 2050), driven by an LCOE reduction to 100-150 €/MWh.



An example of a wave energy technology deployment site in Peniche, Portugal. Photo: Mikael Martikainen

Megaroller partners:

- AW-Energy (WaveRoller)
- ABB Finland
- Cruz Atcheson Consulting Engineers
- WavEC Offshore Renewables
- HYDROLL The piston accumulator company
- HYDMAN Hydraulic Manifold Systems
- SINTEF Energy Research
- VTT Technical Research Centre of Finland Ltd
- University of Bergen
- Leibniz Institute for Neurobiology Magdeburg

Project duration: 2018 - 2021

Coordinating entity: Hydroll Oy

Project web site: www.megaroller.eu

Contact: Jussi Åkerberg

+ 358 50 4411199 • jussi.akerberg@aw-energy.com

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement ENER/H2020EN/763959/
MegaRoller