

Project: AquaLast

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Status: finished

Co-use of Offshore Structures for Marine Aquaculture

Rising demands and as a consequence rising prices for fossil fuel have resulted in European governments to invest in renewable energies. Whilst suitable locations for hydropower stations on land were nearly fully exploited 20 years ago wind energy turbines on land have seen a massive increase in the last years. However due to a number of factors wind energy plants on land have nearly reached their maximal economic growth potential already. Further growth is restricted by the availability of suitable sites, and transport limitations of generators with land transport.

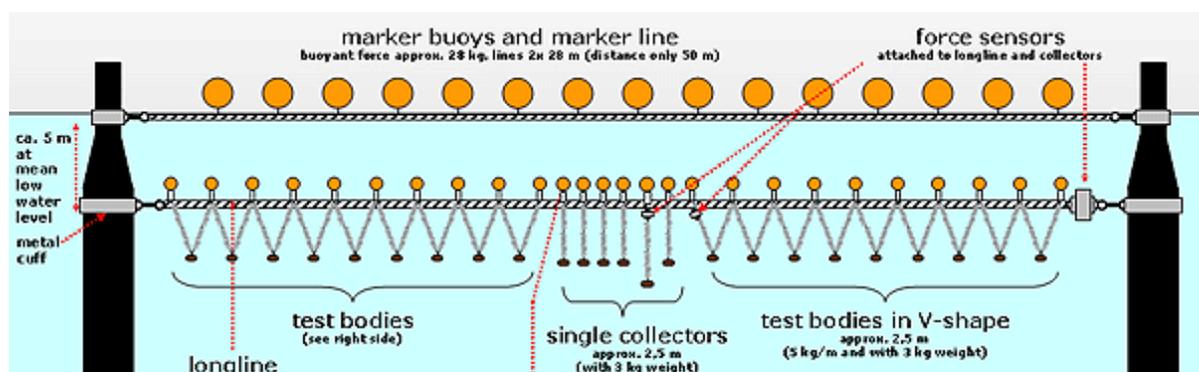
There is now a growing interest to move this industry offshore where steady and often stronger winds make energy production more profitable. At the same time larger generators can be installed as the transport limitations are circumvented.

At first the move to offshore energy production by wind energy appears to be an ingenious move. There are however significant problems: Firstly the space available in the German Bight for such enterprises is significantly limited, and secondly the use of the remaining space will cause user conflicts with other parties, such as military, shipping, and most significantly fishing.

To counter those socio-economic user conflicts it is planned to combine the underwater foundations of offshore wind energy plants with marine aquaculture. This move is particularly interesting as the demand for high quality seafood (e.g. blue mussels and seaweed) is constantly rising and as such enterprises would combine the interest of the user groups of areas dedicated to wind farms offshore.

In our project AquaLast – funded by the [Ministry for Construction, Environment and Transport in Bremen](#) (Germany) within the support program "Applied Environmental Research", Grant Number FV 174 – we plan to measure the loads on the grounding structures of offshore wind turbines that have to be considered for such a use. To measure such loads we have set up a test facility in the open ocean 14 nm off the island of Sylt. This facility consists of a roughly 60 meters long submerged longline with load sensors where mussel collectors are replaced by test bodies. The installation is submerged to account for the rough weather in the German Bight and the test bodies resemble a mussel collector which is fully grown. This allows for a full year of measuring. The data are logged and supported by oceanographic measurements taken at the same site.

With the data we are gathering the aim to refine models of the hydrodynamic behaviour of test bodies/mussel collectors. In combination with data such as wave height and currents we will then develop – together with our partners – to what degree structural modifications to foundations have to be performed to make them suitable for co-use with marine offshore aquaculture. Project Partners: [Technologiekontor Bremerhaven GmbH](#), [WeserWind GmbH](#), [Fraunhofer-Center für Windenergie und Meerestechnik CWMT](#), [University of Applied Science Bremerhaven](#)



References:

Buck, B. H., Berg-Pollack, A., Assheuer, J., Zielinski, O., Kassen, D. (2006). Technical Realization of Extensive Aquaculture Constructions in Offshore Wind Farms: Consideration of the Mechanical Loads, Proceedings of the 25th International Conference on Offshore Mechanics and Arctic Engineering, OMAE 2006 : presented at the 25th International Conference on Offshore Mechanics and Arctic Engineering, 4-9 June 2006, Hamburg, Germany / sponsored by Ocean, Offshore, and Arctic Engineerig, ASME ... New York, NY : American Society of Mechanical Engineers, pp 1-7.