

# Projects WESA & Wave Energy in Swedish Seawaters

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## Abstract

Project WESA (Wave Energy for a Sustainable Archipelago) is an international scientific research project headed by Uppsala University aimed at developing and investigating the performance of a wave energy converter (WEC) system designed for surviving operations in an archipelago environment with ice interference during winter conditions. The project is the first step in a research strategy aimed at investigating to potential of utilizing wave energy in the Baltic Sea.

Project WESA was funded to 75 % by the European Regional Development Fund and included in the Central Baltic INTERREG IVA programme 2007-2013. Project WESA introduced full-scale sea trials of a WEC system in the Baltic Sea. Experiments were conducted outside Hammarudda on the island of Åland. Experimental setup and selected results from the experiments will be presented. It was concluded that the WEC and buoy system could handle ice-interaction of the kind encountered at the temporary test site during two winter seasons. The system survived drifting ice fields up to a maximum ice thickness of 15 cm according to satellite radar (SAR) of the area. The results indicate good survivability characteristics for a WEC system in icy conditions, which may open up large parts of the Baltic Sea for wave energy utilization.

The next step in the research strategy for the Baltic Sea is to identify the most suitable pilot sites by applying a holistic and systematic approach to the entire region. A recently started national Swedish project, funded by the Swedish Energy Agency, has recently been initiated for this purpose. The project focuses on Swedish seawaters, including the Swedish Exclusive Economic Zone (EEZ). The objective is to use state-of-the arts modelling to map conditions of relevance and to predict power production through simulations of farms size clusters of generic point absorber type wave energy converters. Mapping will include geological, meteorological and oceanographic variables in high resolution representing a wave energy farm size installation with arrays of point absorbers. Mapping will also include ecosystem components, maritime activities and regulated areas. This time we are able to present some of our methodology and initial results from the project for a selected focus area outside the Swedish east coast in the Baltic Sea.