

## Emerging wave energy technologies from Finland

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Due to the climate change and local industry demands for reliable and environmentally friendly solutions is growing. In Finland, there are good engineering skills and resource available for development of wave energy business. Currently, there are two main industry actors with two totally different technologies.

AW-Energy Ltd.'s (<http://aw-energy.com/>) flagship product, WaveRoller®, is a submerged wave energy converter based on a hinged panel that is attached to the sea bed in the near shore area. It generates electricity from the movement of the waves (surge phenomenon) and is connected to the electric grid on shore. Wello Ltd. (<http://wello.eu/>) uses the rotational movement of a Penguin device is derived directly from wave motion, and it's captured by the hull shape. The Penguin has no hydraulics or joints, and all moving components never come into contact with sea water. Both devices can be manufactured by any shipyard and transported to the site. They are planned to be easily connected to moorings and electricity grid. Electrical connections, grid connection points and grid capacities with national regulations are setting threats for commercially profitable site.

Industry is still quite young and testing of different technologies in challenging environments is still fragile. Weather conditions and seasonal changes are different than used in Finland. In ice and snow, Finns manage but for example tide levels can be challenging. Weather conditions and seasonal changes can differ much from Bay of Bothnia. Stormy waves, salty sea water, sand storms and unforgiven sun shine can test the devices over their limits. Bathymetric data, including sea bottom type (e.g. sand, rock and clay) and seabed geology can be challenging at promising wave energy areas due to lack of reliable information. Environmental aspects have to be taken into account protected ecological/wildlife, archaeological or other special interest areas.

Opportunities are as several coastally situated industries has shown interest to invest to reliable local energy source. In addition, the demand of the industry to reduce the cost of energy and especially at the coastal areas are increasing in marine renewable energy resources.



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