

A wide wave/current flume for research on offshore renewable energy devices: with a first application on multiple heaving point wave absorbers - Grant Awarded £47494

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Summary

Renewable energy may make a significant contribution to the UK energy supply and provide worldwide business opportunities. We are concerned here with marine energy in the form of waves and tidal stream which may in principle supply more than the UK energy needs. The question is economic viability.

Devices need to be designed, characterised, assessed and tested. An important step in this process is investigation through model testing in the laboratory. Devices may be realistically reproduced at about 1/100th scale and the scaling laws to relate to field conditions are well known. However devices, whether wave or tidal stream, are generally deployed in arrays and the interaction of devices is a vital consideration in both cases. Also the influence of currents on wave devices and waves, particularly swell waves, on tidal stream devices is often overlooked. The aim of this project is to provide a wave/current facility which is sufficiently wide to enable arrays to be investigated without significant interference from the flume side walls.

This will be achieved by adding a piston-type wave maker to an existing environmental flume. Waves may be regular, random or in groups and currents may run concurrently. Edinburgh Designs are acknowledged to be leading suppliers of such wave makers and associated operational software. The laboratory is ideal for this 5m wide by 20m long flume with craneage, good instrumentation and visualisation from above and below, as well as excellent technical support. This will become a world class facility in the North West within the Joule Centre.

There are many projects for such a flume and the first will be an investigation of arrays of vertically oscillating floats known as the much publicised **Manchester Bobber**, which has been developed through Carbon Trust funding and for which field trials are being planned. However their performance in an array is a vital consideration. Little is known about this for any type of wave energy device. Further projects on other wave devices and tidal stream devices are under discussion.