

DEVELOPMENT OF A NOVEL WAVE-ENERGY CONVERTER

LEAD ORGANISATION

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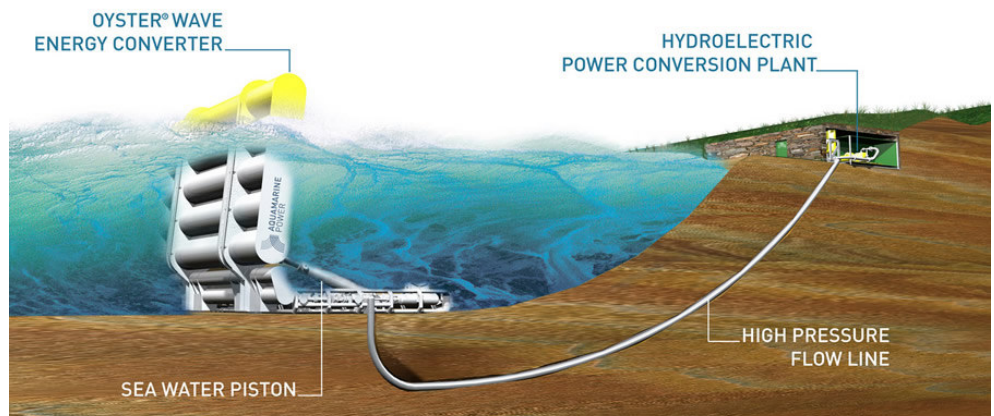
Queen's University Belfast

COST AND DURATION

The Carbon Trust contribution towards this project is £250,000. The project started in November 2008 and is due for completion in August 2010.

PROJECT REFERENCE NUMBER

088-140



Schematic of the Oyster® wave-energy converter system

OBJECTIVES

The aim of this project is to deliver detailed engineering designs for a commercially viable wave energy farm using Aquamarine Power Limited's wave-energy converter, Oyster®.

SUMMARY

Oyster® is a hydro-electric wave power converter, designed to capture the energy found in amplified surge forces in near-shore waves.

The principle behind Oyster® is simple. The system consists of a steel oscillating wave surge converter, or pump, fitted with double-acting water pistons, deployed near the shore in depths of between 10m and 12m. Each passing wave activates the pump, which delivers high pressure water via a sub-sea pipeline to the shore. Onshore, the high-pressure water is converted to electrical power using conventional hydro-electric generators.

A full-scale prototype has been successfully designed and manufactured. It is capable of generating between 300kW and 600kW, depending on location and configuration. In this project,

an array of these devices will be designed to feed a single onshore hydro-electric generator with an installed capacity of 21MW or higher.

The project seeks to:

- Reduce the cost of electricity generated by Oyster® devices for the first commercial arrays
- Achieve device survivability of at least 20 years
- Maximise reliability
- Achieve designs for cost-effective maintainability
- Maximise annual energy output per device (dependant on resource/location)
- Decrease the manufacturing carbon footprint by reducing the amount of steel used by at least 50%
- Achieve the lowest deployment density possible
- Minimise installation costs.

It is estimated that by 2020, between 1GW and 2GW could be installed, resulting in an annual CO₂ emissions reduction of at least 1.4 million tonnes.

