TETRON WAVE ENERGY DEVICE

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COST AND DURATION
The Carbon Trust contribution towards this project is £128,300. The project started in March 2005 and is due for completion in December 2006.

PROJECT REFERENCE NUMBER
2005-3-2835

OBJECTIVES

The objectives of this project are to prove that dual-mode, wave-power absorption is superior to conventional, vertical-mode, point-absorber buoy systems and offers higher productivity.

SUMMARY

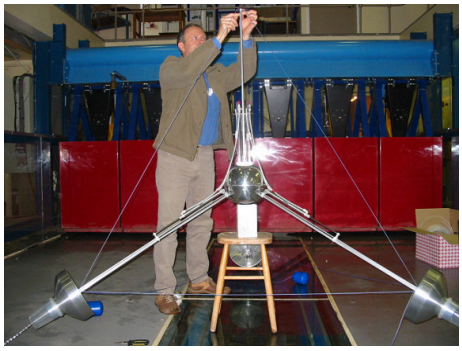
The energy available in a travelling wave may be resolved into two components:

- That due to vertical (heave) motion, which has about one third of the available energy.
- That due to horizontal (surge) motion, which has about two thirds of the available energy.

Most floating point-absorber, wave-energy converters extract energy using the vertical motion. Consequently, only up to one third of the available energy is utilised.

The TETRON device, a novel, floating, dual-mode, wave-energy device can extract energy from the vertical and horizontal components. This means it has the potential to be up to three times as efficient as current systems.

This development offers a potential route to improved device productivity that may be of use to all the current point-absorber, wave-energy teams. It could add significant commercial advantage to UK teams that adopt the concept.



TETRON model prior to testing in a wave tank

This project will use numerical modelling of the equations of motion and wave-tank model testing, at 1:38 scale of the TETRON device, to clearly establish the productivity advantages of dual-mode power extraction. On completion of the technical evaluation phase, it is intended to optimise power take-off, mooring and control system components in a numerical study. Then a second set of wave-tank model tests at 1:38 scale will be carried out on the optimum design and a CAD package of design drawings will be prepared ready for a full-size prototype to be built.

The TETRON device uses: an immersed sphere at the centroid of a tetrahedron cable-stayed structure with double-acting, tube-pump, power take-off in telescopic struts; a Pelton turbine; and an electrical generator. This power take-off technology is well established and used by other teams.

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