

Talk title: ICT: The breakthrough technology for economic wave energy ?

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Abstract

With diminishing fossil fuel reserves and concern over the impact of anthropogenic climate change, there is an increasing imperative to find new sources of clean, sustainable energy. While hydro, wind, solar and biofuels have made significant impacts as energy sources, wave energy has been largely untapped, despite the considerable potential resource available. Though there are some mitigating factors, such as difficulties in foreshore licensing, a lack of coastline for many countries and often significant distances between major wave resources and population centres, the main issues in developing wave energy as an economically viable recourse are primarily technical.

Significant challenges include the reciprocating nature of the energy flux, the corrosive environment in which wave energy devices must operate, and the need for survival strategies to cater for extreme weather conditions. While earliest developments of wave energy technology date to the 1890's, a wave farm has yet to deliver electricity on a commercial basis. This talk explores the main reasons for this and suggests a paradigm shift in the way wave energy systems are designed and brought to commercial reality. In particular, the role of information and communications technology (ICT) in making the breakthrough to the commercial viability of wave energy is examined. The talk will focus on the application of mathematical modelling, control design, inter-device communication and techno-economic design optimisation to wave energy system design. Presented results will demonstrate the significant gains that such ICT technologies can make on the road to commercial wave energy economic viability.