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Green Energy from Tidal Streams

Abstract

With the demise of fossil fuels, the World is facing an unprecedented energy crisis. Demand for energy massively increased over the 20th Century due to population growth, industrial development, and technological advances. This seminar will briefly review the energy situation, then compare and contrast different forms of green energy, before concentrating on marine renewable energy – in other words, energy from the sea. There are several main types of marine renewable energy device; namely: tidal turbine, tidal barrier, wave energy converter, and offshore wind turbine. Of particular importance is the environmental impact of such devices; for example, the damping effect on tides by the presence of a farm of tidal turbines. The lecture shall consider three ways of including tidal devices in a coastal basin model, and thus estimating the influence of such devices on the flow field and sediment transport. Case studies will be presented of tidal resource assessments of sites in the Pentland Firth, Scotland, and off the Anglesey Skerries, Wales.

Reference

Draper S., Adcock T.A.A., Borthwick A.G.L. and Houlby G.T. (2014) A note on the power potential of tidal currents in channels. *International Journal of Marine Energy*, **6**: 1-17.

Short Biography

Alistair Borthwick has more than 35 years' engineering experience. He is Professor of Applied Hydrodynamics at The University of Edinburgh, an Emeritus Fellow at St Edmund Hall, Oxford, and holds Adjunct Professorships at Peking University and NUI Galway. He was previously Professor of Engineering Science at the University of Oxford, where he worked for 21 years from 1990-2011. He was Head of Civil & Environmental Engineering at University College Cork from 2011-13, where he was the Founding Director of the SFI Centre for Marine Renewable Energy Ireland. Prof. Borthwick's research interests include environmental fluid mechanics, flood risk management, coastal processes, offshore engineering, and marine renewable energy. He has co-authored more than 130 journal papers and supervised 37 doctoral students to completion. He was the founding Chairman of the Editorial Board of the *ICE Journal of Engineering and Computational Mechanics*. Prof. Borthwick was awarded a DSc by the University of Oxford in 2007. He is a Fellow of the Institution of Civil Engineers and a Fellow of the Royal Academy of Engineering.